

**APPENDIX B**

**REASONABLY AVAILABLE CONTROL TECHNOLOGY ANALYSIS**

## **REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) ANALYSIS**

### **Introduction**

The Houston-Galveston-Brazoria (HGB) eight-county area is currently classified as a moderate nonattainment area for the new United States Environmental Protection Agency (EPA) eight-hour ozone National Ambient Air Quality Standards (NAAQS). Under the eight-hour ozone standard, the HGB area is required to meet the mandates of the Federal Clean Air Act (FCAA) under §§172(c)(1), 182(b)(2) and 182(f).

According to EPA's Final Rule to Implement the Eight-Hour Ozone NAAQS (40 Code of Federal Regulations §51.912, November 29, 2005), states containing areas classified as moderate nonattainment or higher must submit as a revision to the state implementation plan a demonstration that their current rules fulfill the eight-hour RACT requirements for all Control Technique Guidelines (CTG) categories and all non-CTG major sources of nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC). Such demonstrations can be made with either a new RACT determination or a certification that previously required RACT controls represent RACT for the eight-hour ozone standard. Areas may rely on previous analyses prepared for the one-hour ozone plans and EPA guidance documents.

RACT is defined as the lowest emissions limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility (44 Federal Register (FR) 53762; September 17, 1979). RACT requirements for moderate nonattainment areas are included in the FCAA to assure that significant source categories at major sources of ozone precursor emissions are controlled to a reasonable extent, but not necessarily to Best Available Control Technology (BACT) levels expected of new sources or to maximum achievable control technology (MACT) levels required for major sources of hazardous air pollutants.

This RACT analysis demonstrates that the RACT requirements for the HGB eight-hour ozone nonattainment area have been fulfilled by:

1. identifying all categories of CTG and non-CTG major sources of VOC and NO<sub>x</sub> emissions within the HGB area;
2. listing the state regulation that implements or exceeds RACT requirements for that CTG or non-CTG category;
3. detailing the basis for concluding that these regulations fulfill RACT through comparison with established RACT requirements described in the CTG and Alternative Control Technique (ACT) guidance documents and rules developed by other state and local agencies; and
4. submitting negative declarations when there are no CTG or non-CTG major sources of VOC and NO<sub>x</sub> emissions within the HGB area.

### **VOC RACT Demonstration**

In the approval notice for the revised HGB one-hour attainment demonstration (71 FR 52676) EPA noted that the HGB VOC rules were previously determined to meet the FCAA RACT requirements and that the attainment demonstration revisions do not interfere with the implementation of RACT. Under the current rules, the HGB area is subject to some of the most stringent VOC control requirements in the country. The RACT specifications for the eight-hour ozone attainment demonstration will not change from the existing one-hour requirements and therefore the focus of this RACT analysis is to determine if the existing requirements still fulfill RACT for the relevant unit types. The Texas Commission on Environmental Quality (TCEQ) has reviewed EPA CTG and ACT documents to verify that the current rules still satisfy the RACT requirements for all applicable major source types.

### **NO<sub>x</sub> RACT Demonstration**

The emission specifications for attainment demonstration established in 30 Texas Administrative Code (TAC) Chapter 117 Subchapter B, Division 3 (relating to Combustion Control at Major

Industrial, Commercial, and Institutional Sources in Nonattainment Areas; Houston-Galveston-Brazoria Eight-Hour Ozone Nonattainment Area) regulate all major sources of NO<sub>x</sub> emissions in the area and consistently contain lower NO<sub>x</sub> emission limits than those established by CTG and ACT documents, EPA guidelines and policies, and those technologies and methodologies currently considered RACT by the EPA and other affected states.

The HGB nonattainment area has existing emission specifications for RACT and for the area's one-hour attainment demonstration adopted by the TCEQ in December 2002 and by the EPA in 2006. The NO<sub>x</sub> emission specifications for RACT were set at emission levels associated with the widely accepted RACT methodologies in 2002. The NO<sub>x</sub> emission specifications for attainment demonstration are not bound by the cost constraints of RACT and were specified at emission levels associated with BACT for the unit types or at emission levels necessary for ozone attainment.

The proposed HGB eight-hour emission specifications for RACT and for the attainment demonstration will not change from the existing one-hour specifications. Therefore, the focus of this RACT analysis will be to determine if the technologies associated with the existing emission specifications still fulfill RACT for the relevant unit types. If a new technology has been considered as RACT by the EPA or another nonattainment area since 2002, it is analyzed here to determine if it is reasonable for the unit types and conditions in the HGB eight-hour ozone nonattainment area. To ensure the proposed HGB eight-hour emission specifications fulfill the RACT requirements for all applicable major source types, the proposed specifications have been compared to the controls contained in the CTG and ACT guidance documents and current control technologies and methodologies implemented as RACT in other moderate nonattainment areas.

### **Conclusion**

The level of control that satisfied the VOC RACT requirements for the one-hour ozone standard also fulfills the RACT requirements for the eight-hour ozone standard. Table B-1: *HGB VOC RACT Analysis* provides the state rules addressing the RACT requirements for sources in the CTG and ACT documents. A negative declaration is provided in the table for source types described within the EPA guidance documents that do not exist in the HGB eight-hour area and the standard industrial classification (SIC) code for these sources is listed. For many source categories, existing rules are more stringent than levels that are generally recognized as RACT.

The HGB eight-hour NO<sub>x</sub> emission specifications for attainment demonstration in 30 TAC §117.310 are equal to or lower than the emission levels associated with the controls contained in the CTG and ACT guidance documents and current control technologies and methodologies implemented as RACT in other moderate nonattainment areas. Although adopted in 2002, these emission specifications remain significantly stricter than current RACT requirements.

The HGB eight-hour NO<sub>x</sub> emission specifications for RACT in 30 TAC §117.305 are consistent with RACT as determined in 2002. The emission limits for RACT were compared with current emission limits associated with RACT for unit types that are only regulated by the emission specifications. In all cases, the emission limits adopted in 2002 were found to be consistent with current RACT.

Table B-2: *HGB NO<sub>x</sub> RACT Analysis* provides the state specifications addressing the RACT requirements for sources in the CTG and ACT documents or for generally recognized major sources of NO<sub>x</sub> considered in the RACT analysis of other moderate nonattainment regions. A negative declaration is provided for source types described in the EPA guidance documents or sources considered in the RACT analysis of other regions that do not exist in the HGB eight-hour area. For CTG and ACT categories that are not regulated under the proposed eight-hour HGB rules, there are either no sources in the area subject to these CTG and ACT categories, or sources exist but are not major and are not required to demonstrate RACT compliance.

**Table B-1: HGB VOC RACT Analysis**

<b>CTG/ACT Source Category</b>	<b>CTG/ACT Reference Document</b>	<b>30 TAC Specification Fulfilling RACT Requirements</b>
Aerospace	Guideline Series: Control of Volatile Organic Compound Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations, EPA-453/R-97-004, EPA-68/D1-00115, EPA-453/D-96-016, December 1997 (see 59 FR 29216, June 6, 1994)	§115.420 – 429
Agricultural Pesticides	Control of Volatile Organic Compound Emissions from the Application of Agricultural Pesticides, EPA-450/R-92-011, March 1993	ACT document does not give presumptive RACT controls
Architectural and Industrial Maintenance Coatings	Reduction of Volatile Organic Compound Emissions from Application of Traffic Markings, EPA-450/3-88-007, August 1988 (Note – the Architectural and Industrial Maintenance coatings national rule issued in 1998 includes limits for traffic coatings and superseded the ACT)	National rule
Automobile Coating	The Reduction of Volatile Organic Compound Emissions from Automobile Refinishing, EPA-450/3-88-009, October 1988, NTIS No PB-89-148-282	§115.420 – 429
Automobile Refinishing	Alternative Control Techniques Document: Automobile Body Refinishing, EPA-453/R-94-031, April 1994 (Note: a national rule for auto-body refinishing was issued in 1998 after the ACT)	§115.420 – 429
Batch Processes	Alternative Control Techniques Document: Control of Volatile Organic Compound Emissions from Batch Processes, EPA-453/R-93-017 or EPA 453/R-93-020, February 1994	§115.160 – 169
Bulk Gasoline Plants	Control of Volatile Organic Emissions from Bulk Gasoline Plants, EPA-450/2-77-035, December 1977	§115.211 – 219
Cleaning Solvents	Alternative Control Techniques Document: Industrial Cleaning Solvents, EPA-453/R-94-015, February 1994	§115.412 – 419 and §115.420 – 429
Commercial Bakeries	Alternative Control Techniques Document: Bakery Ovens, EPA-453/R-92-017, December 1992	§115.120 – 129
Cutback Asphalt	Control of Volatile Organic Compounds from Use of Cutback Asphalt, EPA-450/2-77-037, December 1977	§115.510 – 519
Ethylene Oxide Sterilization/ Fumigation Operations	Alternative Control Technology Document: Ethylene Oxide Sterilization/Fumigation Operations, EPA-450/3-89-007, March 1989	Covered by MACT per §113.200
Fugitive Emissions	Fugitive Emission Sources of Organic Compounds – Additional Information on Emissions, Emission Reductions, and Costs, EPA-450/3-82-010, April 1982	§115.352 – 359
Gasoline Service Stations	Design Criteria for Stage I Vapor Control Systems - Gasoline Service Stations, November 1975	§115.221 – 229

<b>CTG/ACT Source Category</b>	<b>CTG/ACT Reference Document</b>	<b>30 TAC Specification Fulfilling RACT Requirements</b>
Graphic Arts	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VIII: Graphic Arts - Rotogravure and Flexography, EPA-450/2-78-033, December 1978	§115.430 – 439
Graphic Arts	Control of Volatile Organic Compound Emissions from Offset Lithographic Printing, September 1993	§115.440 – 449
Graphic Arts	Alternative Control Technology Document: Offset Lithographic Printing, EPA-453/R-94-054, June 1994	§115.440 – 449
Industrial Wastewater	Control Techniques for Industrial Wastewater, EPA-453/D-93-056, September 1992 (ACT: April 1994, consists of cover memo with option tables and CTG)	§115.140 – 149
Ink and Paint Manufacturing	Alternative Control Technology Document: Control of Volatile Organic Compounds from Ink and Paint Manufacturing, EPA-453/3-92-013	§115.120 – 129
Leather Tanning and Finishing Operations	Alternative Control Technology Document: Leather Tanning and Finishing Operations, EPA-453/R-93-025	No existing major sources in HGB eight-hour ozone area (SIC 3111)
Metal Furniture	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume III: Surface Coating of Metal Furniture, EPA-450/2-77-032, December 1977	§115.420 – 429
Natural Gas/Gasoline Processing	Control of Volatile Organic Compound Equipment Leaks from Natural Gas/Gasoline Processing Plants, EPA-450/2-83-007, December 1983	§115.352 – 359
Petroleum Dry Cleaners	Control of Volatile Organic Compound Emissions from Large Petroleum Dry Cleaners, EPA-450/3-82-009, September 1982	Contingency Measures: §115.552 – 553 §115.555 – 557 §115.559
Petroleum Liquid Storage	Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed Roof Tanks, EPA-450/2-77-036, December 1977	§115.112 – 119
Petroleum Liquid Storage	Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks, EPA-450/2-78-047, December 1978	§115.112 – 119
Petroleum Liquid Storage	Alternative Control Techniques Document: Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks, EPA-453/R-94-001, January 1994	§115.112 – 119
Plywood Veneer Dryers	Control Techniques for Organic Emissions from Plywood Veneer Dryers, EPA-450/3-83-012, May 1983	Covered by general vent gas rules in §115.120 – 129
Process Vents	Alternative Control Technology Document: Organic Waste Process Vents, EPA-450/3-91-007, December 1990	Covered by general vent gas rules in §115.120 – 129
Refineries	Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds, EPA-450/2-77-025, October 1977	§115.311 – 319 and §115.131 – 139

<b>CTG/ACT Source Category</b>	<b>CTG/ACT Reference Document</b>	<b>30 TAC Specification Fulfilling RACT Requirements</b>
Refineries	Control of Volatile Organic Compound Leaks from Petroleum Refinery Equipment, EPA-450/2-78-036, June 1978	§115.352 – 359
Rubber Tires	Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires, EPA-450/2-78-030, December 1978	No existing major sources in HGB eight-hour ozone area (SIC 3011)
Shipbuilding and Ship Repair	Control Technique Guidelines for Shipbuilding and Ship Repair Operations, EPA-453/R-94-032, April 1994	§115.420 – 429
Shipbuilding and Ship Repair	Control Technique Guidelines for Shipbuilding and Ship Repair Surface Coating Operations, 61 FR 44050, August 27, 1996	§115.420 – 429
Solvent Cleaning	Control of Volatile Organic Emissions from Solvent Metal Cleaning, EPA-450/2-77-022, November 1977	§115.412 – 419 and §115.420 – 429
Solvent Cleaning	Alternative Control Technology Document: Halogenated Solvent Cleaners, EPA-450/3-89-030, August 1989	§115.412 – 419
Stationary Sources	Control Techniques for Volatile Organic Compound Emissions from Stationary Sources, EPA-453/R-92-018, December 1992	Basic reference – does not contain control requirements for specific sources
Surface Coating	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume I: Control Methods for Surface Coating Operations, EPA-450/2-76-028, November 1976	§115.420 – 429
Surface Coating	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks, EPA-450/2-77-008, May 1977	§115.420 – 429
Surface Coating	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume IV: Surface Coating for Insulation of Magnet Wire, EPA-450/2-77-033, December 1977	Covered by rules for miscellaneous metal parts and products in §115.420 – 429
Surface Coating	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume V: Surface Coating of Large Appliances, EPA-450/2-77-034, December 1977	§115.420 – 429
Surface Coating	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VI: Surface Coating of Miscellaneous Metal Parts and Products, EPA-450/2-78-015, June 1978	§115.420 – 429
Surface Coating	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VII: Factory Surface Coating of Flat Wood Paneling, EPA-450/2-78-032, June 1978	§115.420 – 429
Surface Coating	Alternative Control Techniques Document: Surface Coating of Automotive/Transportation and Business Machine Plastic Parts, EPA-453/R-94-017, February 1994	§115.420 – 429

<b>CTG/ACT Source Category</b>	<b>CTG/ACT Reference Document</b>	<b>30 TAC Specification Fulfilling RACT Requirements</b>
Synthetic Organic Chemical Manufacturing Industry	Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products, 450/2-78-029, December 1978	§115.531 – 539
Synthetic Organic Chemical Manufacturing Industry	Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins, EPA-450/3-83-008, November 1983	§115.120 – 129
Synthetic Organic Chemical Manufacturing Industry	Control of Volatile Organic Compound Fugitive Emissions from Synthetic Organic Chemical Polymer and Resin Manufacturing Equipment, EPA-450/3-83-006, March 1984	§115.352 – 359
Synthetic Organic Chemical Manufacturing Industry	Control of Volatile Organic Compound Emissions from Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industry, EPA-450/3-84-015, December 1984	§115.120 – 129
Synthetic Organic Chemical Manufacturing Industry	Polystyrene Foam Manufacturing, EPA-450/3-90-020, 1990	§115.120 – 129
Synthetic Organic Chemical Manufacturing Industry	Control of Volatile Organic Compound Emissions from Reactor Processes and Distillation Operations in Synthetic Organic Chemical Manufacturing Industry, EPA-450/4-91-031, August 1993	§115.120 – 129
Tank Trucks	Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals, EPA-450/2-77-026, December 1977	§115.211 – 219 or §115.221 – 229
Tank Trucks	Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems, EPA-450/2-78-051, December 1978	§115.211 – 219 and §115.234 – 239
Vegetable Oil Manufacturing	Control of Volatile Organic Emissions from Manufacture of Vegetable Oils, EPA-450/2-78-035, June 1978	No existing major sources in HGB eight-hour ozone area (SIC 2046 and 2076)
Wood Furniture Manufacturing	Guideline Series: Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations, EPA-453/D-95/002	§115.420 – 429
Wood Furniture Manufacturing	Guidelines Series: Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations, EPA-453/R-96-007, April 1996 (see also 61 FR 25223, and, 61 FR 50823, September 27, 1996)	§115.420 – 429

**Table B-2: HGB NO<sub>x</sub> RACT Analysis**

<b>CTG/ACT Source Category</b>	<b>CTG/ACT Reference Document</b>	<b>30 TAC Specification Fulfilling RACT Requirements</b>
Brick and Ceramic Manufacturing	Non-CTG Major NO <sub>x</sub> Source	No existing major sources in HGB eight-hour ozone area
Cement Manufacturing	NO <sub>x</sub> Emissions from Cement Manufacturing, EPA-453/R-94-004, March 1994 (Updated September 2000)	§117.3110
Coke, Wood, Rice, and Other Biomass-Fired Boilers	Non-CTG Major NO <sub>x</sub> Source	§117.305(a), (b), and (g)
Fiberglass Manufacturing	Non-CTG Major NO <sub>x</sub> Source	No existing major sources in HGB eight-hour ozone area
Fuel Switching	Fuel Switching to Meet NO <sub>x</sub> RACT for NO <sub>x</sub> , EPA Memorandum, July 30, 1993	Chapter 117 Subchapter B, Division 3 and Subchapter C, Division 3 contain NO <sub>x</sub> emission limits for all fuel sources used in HGB
Glass Manufacturing	NO <sub>x</sub> Emissions from Glass Manufacturing, EPA-453/R-94-037, June 1994	No existing major sources in HGB eight-hour ozone area
Hot Mix Asphalt Plants	Non-CTG Major NO <sub>x</sub> Source	No existing major sources in HGB eight-hour ozone area
Incinerators	Non-CTG Major NO <sub>x</sub> Source	§117.310
Industrial, Commercial, and Institutional Boilers	NO <sub>x</sub> Emissions from Industrial, Commercial & Institutional Boilers, EPA-453/R-94-022, March 1994	§117.305(a), (b), and (g)
Iron and Steel	NO <sub>x</sub> Emissions from Iron and Steel, EPA-453/R-94-065, September 1994	§117.310
Lead Smelting	Non-CTG Major NO <sub>x</sub> Source	No existing major sources in HGB eight-hour ozone area
Lightweight Aggregate Kilns	Non-CTG Major NO <sub>x</sub> Source	§117.310
Lime Manufacturing	Non-CTG Major NO <sub>x</sub> Source	§117.310
Magnesium Chloride Fluidized Bed Dryers	Non-CTG Major NO <sub>x</sub> Source	§117.310
Natural Gas-Fired Dryers, Heaters, and Ovens at Major Sources	Non-CTG Major NO <sub>x</sub> Source	No existing major sources in HGB eight-hour ozone area
Nitric and Adipic Acid Manufacturing	NO <sub>x</sub> Emissions from Nitric and Adipic Acid Manufacturing Plants, EPA-453/3-91-026, December 1991	Chapter 117 Subchapter F, Divisions 1 and 2
Oilfield Drilling Operations	Non-CTG Major NO <sub>x</sub> Source	§117.310
Other Minerals Processing Kilns	Non-CTG Major NO <sub>x</sub> Source	No existing major sources in HGB eight-hour ozone area
Petroleum Refining Operations	Non-CTG Major NO <sub>x</sub> Source	§117.310

<b>CTG/ACT Source Category</b>	<b>CTG/ACT Reference Document</b>	<b>30 TAC Specification Fulfilling RACT Requirements</b>
Process Heaters	NO <sub>x</sub> Emissions from Process Heaters, EPA-453/R-93-034, revised September 1993	§117.305(a), (b), (e), and (g)
Pulping Liquor Recovery Furnaces	Non-CTG Major NO <sub>x</sub> Source	§117.310
Pyrolysis Reactors	Non-CTG Major NO <sub>x</sub> Source	§117.310
Stationary Internal Combustion Engines	NO <sub>x</sub> Emissions from Stationary Internal Combustion Engines, EPA-453/R-93-032, July 1993 (Updated September 2000)	§117.305(a), (d), and (g)
Stationary Turbines	NO <sub>x</sub> Emissions from Stationary Combustion Turbines, EPA-453/R-93-007, January 1993	§117.305(a), (c), and (g)
Utility Auxiliary Steam Boilers	Non-CTG Major NO <sub>x</sub> Source	§117.1205(a) - (e), (k), and (l)
Utility Boilers	NO <sub>x</sub> Emissions from Utility Boilers, EPA-453/R-94-023, March 1994	§117.1205(a) - (e), (k), and (l)
Utility Stationary Gas Turbines	Non-CTG Major NO <sub>x</sub> Source	§117.1205(f), (g), (i), (k), and (l)