



EPA Enforcement: National Petroleum Refinery Initiative

Petroleum Refinery Initiative

Four Program Areas — Sources of Refinery Emissions (“Marquee” Issues)

- **New Source Review/Prevention of Significant Deterioration (NSR/PSD)**
 - Fluidized Catalytic Cracking Units (FCCUs)
 - Heaters and Boilers

- **New Source Performance Standards (NSPS)**
 - Flares
 - Sulfur Recovery Units
 - Fuel Gas Combustion Devices (including heaters & boilers)

- **Leak Detection and Repair (LDAR)**

- **Benzene**

Refinery National Strategy

■ National Priority Goals:

- EPA met its primary goal to cover of 80% of the nation's domestic refining capacity under the Petroleum Refinery Initiative, by entering into settlements with refiners addressing all four "marquee" issues by the end of FY 05.
- Having met the primary goal as a national enforcement priority, the strategy to address the petroleum refining sector has returned to EPA's "core" enforcement program.

■ Level Playing Field:

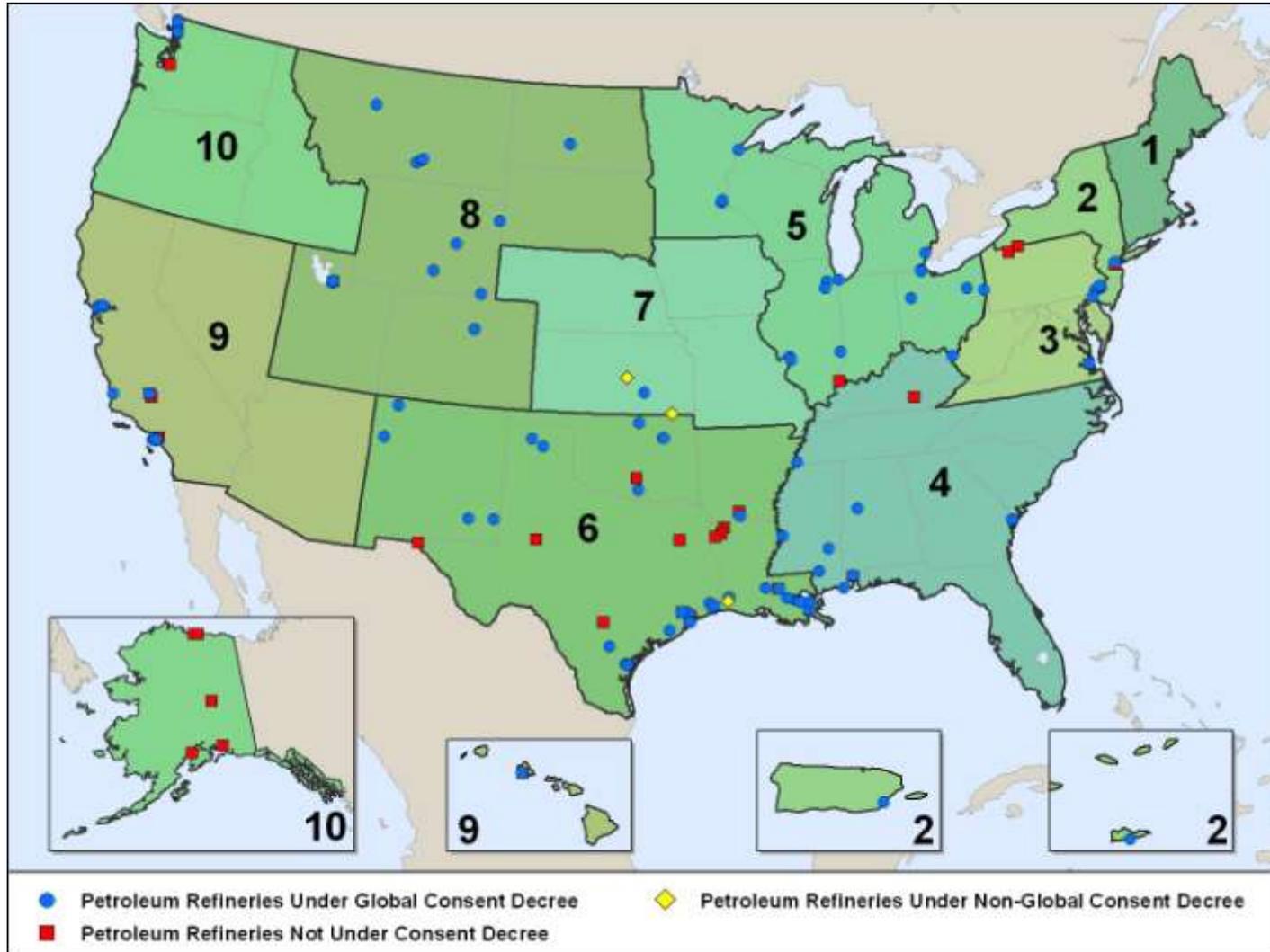
- As of January 2011, companies representing more than 90% of total domestic refining capacity are under settlement, and negotiations are underway with other refiners not currently under settlement.
- EPA is continuing its work in this sector to address these issues with refiners not under consent decree.

Refinery National Strategy

- **As of January 2011:**
 - **Approximately 90% of the nation's refinery capacity is under lodged or entered "global" settlements ("global" settlements address marquee issues at refineries company-wide)**
 - Negotiations are continuing with other refiners not yet under consent decree, and investigations are underway on others.
 - **Settlements to date represent:**
 - 28 refiners
 - 105 refineries
 - Over \$6 billion in capital costs for new control technologies
 - Over \$80 million in civil penalties
 - \$75 million in environmental projects (such as the installation of additional controls and equipment to further reduce refinery emissions, emergency response equipment for local communities, and wildlife habitat restoration)
 - Located in 32 states and territories
 - **Emissions reductions from FCCUs, sulfur recovery units, heaters and boilers, flares:**
 - More than 92,000 tpy NOx
 - More than 255,000 tpy SO2

(estimated annual reductions when all current settlements are fully implemented)

U.S. Petroleum Refineries

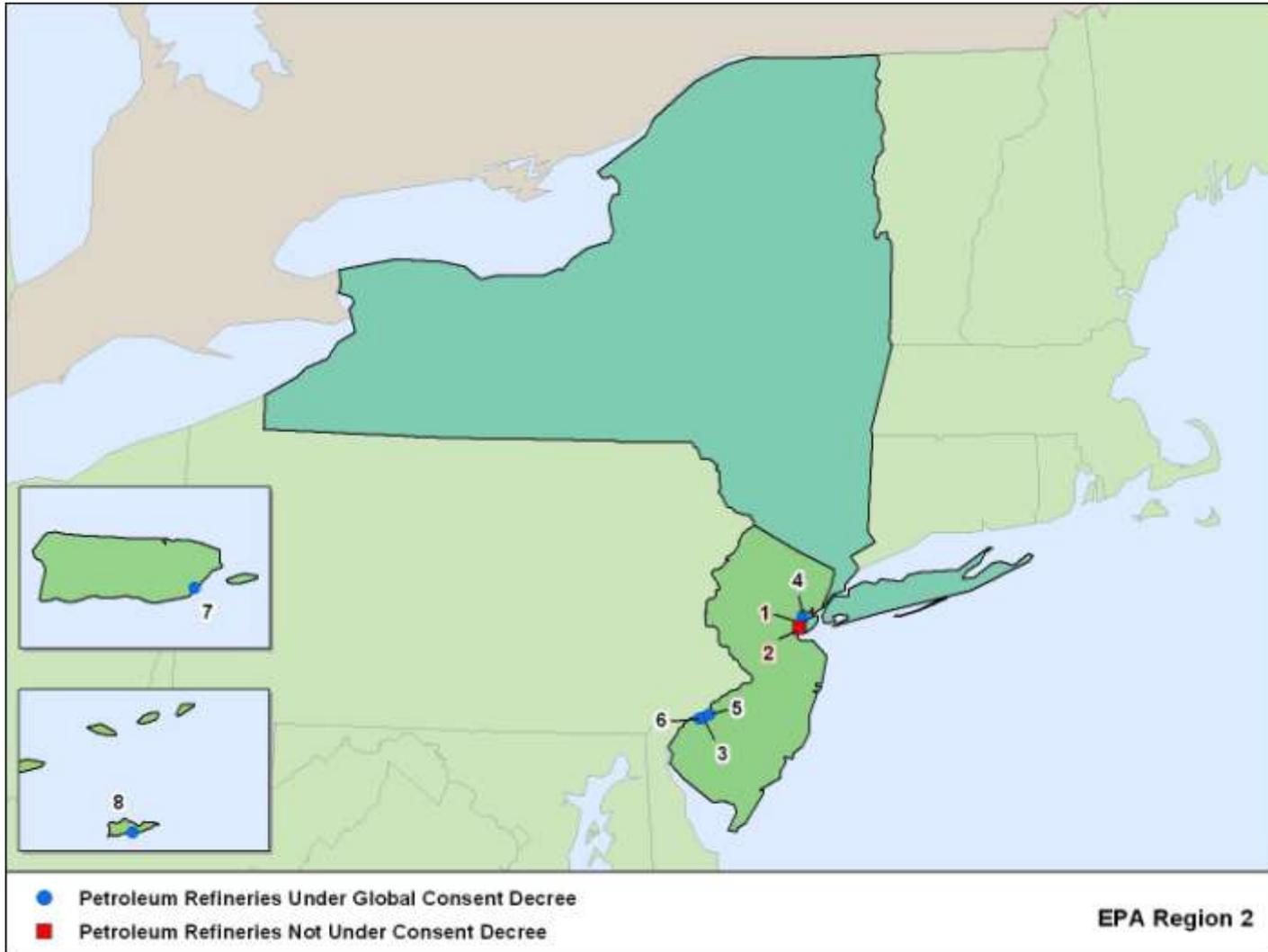


U.S. Petroleum Refineries

National Crude Petroleum Refining Capacity			
EPA Region	Crude Refining Capacity under CD	Total Crude Refining Capacity	Percent of Capacity under CD
Region 1	No petroleum refineries are located in Region 1		
Region 2	1,206,000	1,348,500	89
Region 3	958,300	1,035,000	93
Region 4	916,225	941,725	97
Region 5	2,264,700	2,321,450	98
Region 6	7,505,919	8,289,019	91
Region 7	292,200	292,200	100
Region 8	594,700	632,200	94
Region 9	1,897,300	2,092,300	91
Region 10	465,000	996,275	47
U.S. Total	16,100,344	17,948,669	90

Capacity data from Oil & Gas Journal's 2005 Worldwide Refining Survey, December 19, 2005, except as noted on following Region slides.

Region 2 Petroleum Refineries



Region 2 Petroleum Refineries

Refineries under CD

New Jersey

3. Citgo Asphalt Refining Co. – Paulsboro – 84,000
4. ConocoPhillips – Bayway – 238,000
5. Sunoco Inc. – Eagle Point – 150,000
6. Valero Energy Corp. – Paulsboro – 166,000

Puerto Rico

7. Shell Chemical Yabucoa Inc. – Yabucoa – 73,000

U.S. Virgin Islands

8. Hovensa LLC – St. Croix – 495,000

Refineries not under CD

New Jersey

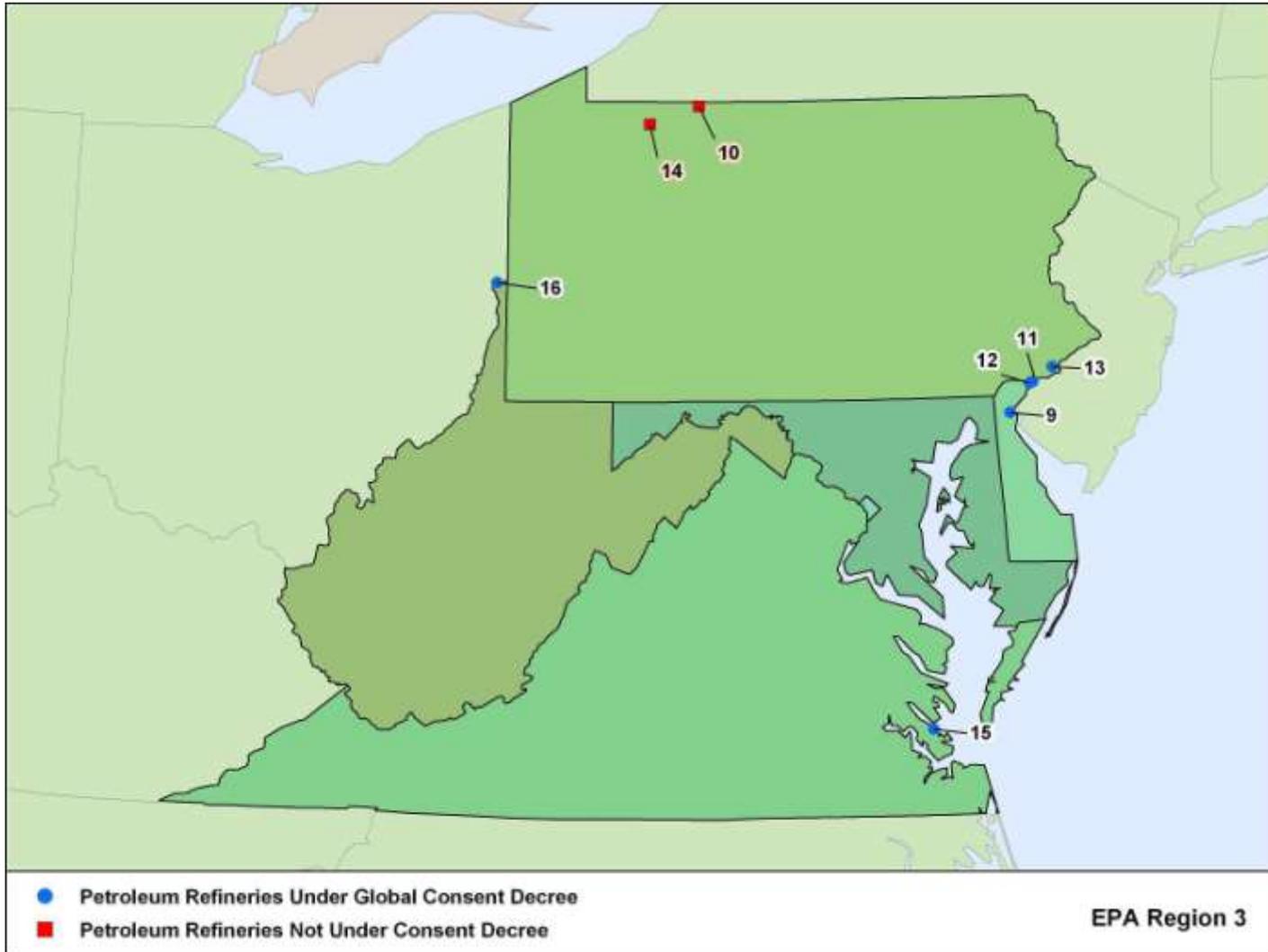
1. Amerada Hess – Port Reading – 62,500 (FCCU capacity)
2. Chevron Corp. – Perth Amboy – 80,000

By state: Number on map, Company, Refinery, Crude oil capacity (barrels/day)

Data from Oil & Gas Journal's 2005 Worldwide Refining Survey, December 19, 2005, except:

1. NPRA Refining Capacity Report 2005
2. January 2006 EIA Petroleum Profile for New Jersey
3. Citgo press release dated 11/28/2004

Region 3 Petroleum Refineries



Region 3 Petroleum Refineries

Refineries under CD

Delaware

9. Valero Energy Corp.– Delaware City –
190,000

Pennsylvania

11. ConocoPhillips – Trainer – 185,000
12. Sunoco Inc.– Marcus Hook – 175,000
13. Sunoco Inc. – Philadelphia – 330,000

Virginia

15. Giant Refining Company – Yorktown –
58,900

West Virginia

16. Ergon-West Virginia, Inc. – Newell –
19,400

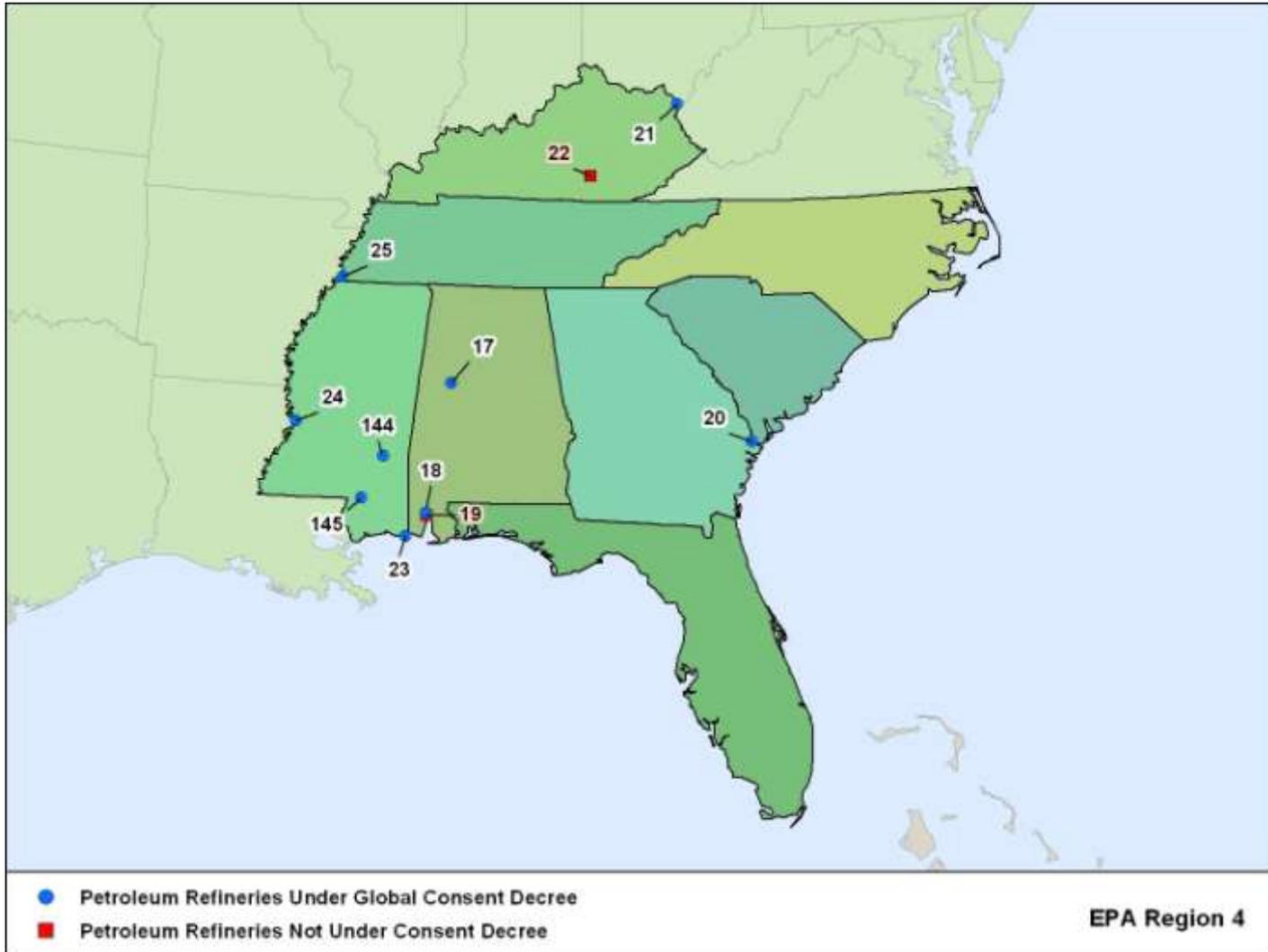
Refineries not under CD

Pennsylvania

10. American Refining Group – Bradford –
10,000
14. United Refining Co. – Warren – 66,700

By state: Number on map, Company, Refinery, Crude oil capacity (barrels/day)
Data from Oil & Gas Journal's 2005 Worldwide Refining Survey, December 19, 2005

Region 4 Petroleum Refineries



Region 4 Petroleum Refineries

Refineries under CD

Alabama

- 17. Hunt Refining Company – Tuscaloosa – 43,225
- 18. Shell Chemical Company – Saraland – 85,000

Georgia

- 20. Citgo Asphalt Refining Co. – Savannah – 28,000

Kentucky

- 21. Marathon Petroleum Company LLC – Catlettsburg – 222,000

Mississippi

- 23. Chevron Corp. – Pascagoula – 325,000
- 24. Ergon Refining Inc. – Vicksburg – 23,000
- 144, 145. Hunt Southland Refining Company – Sandersville and Lumberton – 43,225

Tennessee

- 25. Valero Energy Corp. – Memphis – 190,000

Refineries not under CD

Alabama

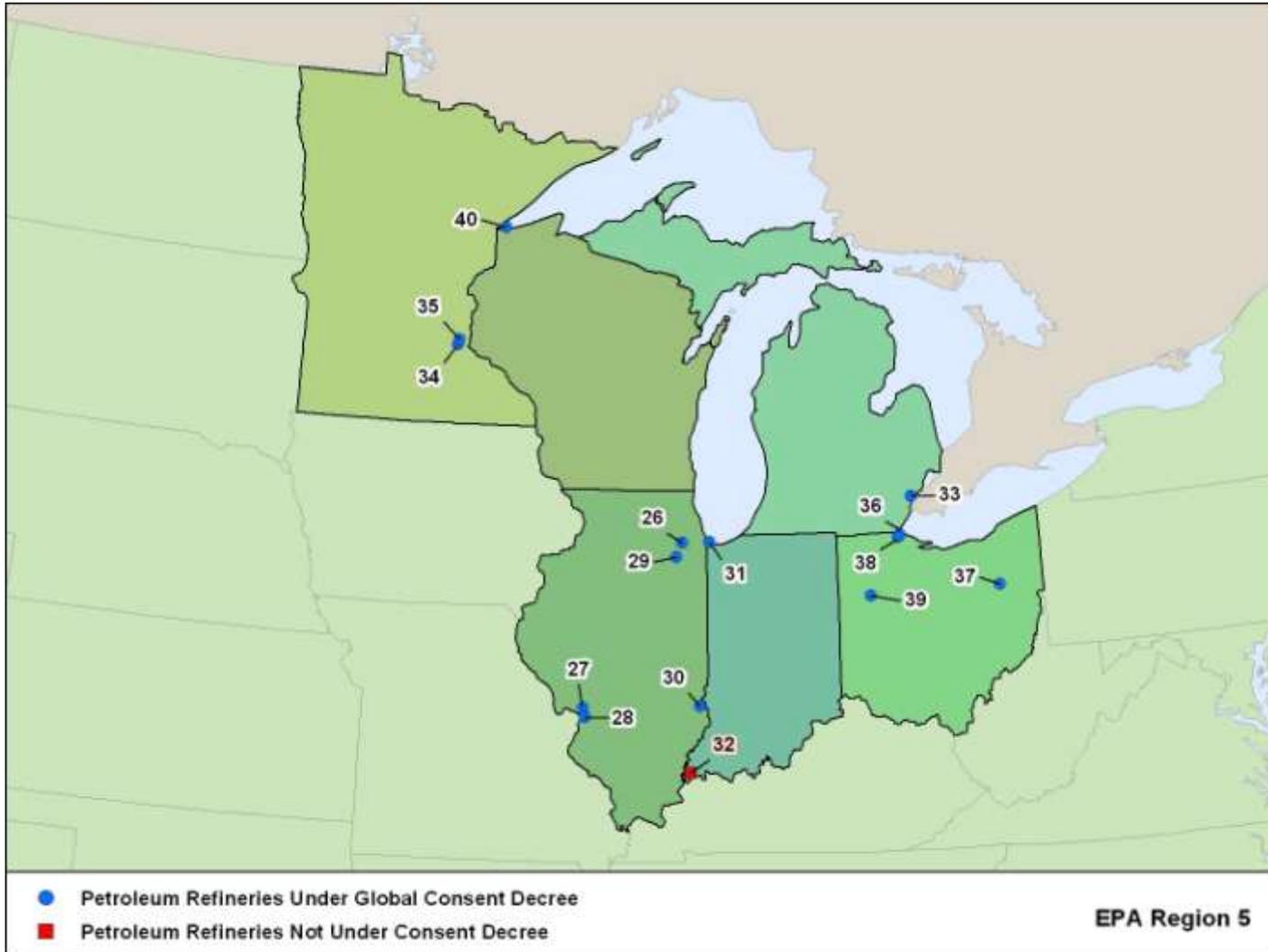
- 19. Trigeant Petroleum – Mobile Bay – 20,000

Kentucky

- 22. Somerset Refinery Inc. – Somerset – 5,500

By state: Number on map, Company, Refinery, Crude oil capacity (barrels/day)
Data from Oil & Gas Journal's 2005 Worldwide Refining Survey, December 19, 2005, except:
20. Citgo press release dated 11/28/2004
144 & 145. Hunt press release dated 9/28/2007

Region 5 Petroleum Refineries



Region 5 Petroleum Refineries

Refineries under CD

Illinois

- 26. Citgo Petroleum Corp. – Lemont – 158,650
- 27, 28. ConocoPhillips – Wood River and Distilling West – 306,000
- 29. ExxonMobil Refining and Supply Co. – Joliet – 238,000
- 30. Marathon Petroleum Company LLC – Robinson – 192,000

Indiana

- 31. BP PLC – Whiting – 399,000

Michigan

- 33. Marathon Petroleum Company LLC – Detroit – 100,000

Minnesota

- 34. Flint Hills Resources – Pine Bend – 279,300
- 35. Marathon Petroleum Company LLC – St. Paul Park – 70,000

Ohio

- 36. BP PLC – Toledo – 147,250
- 37. Marathon Petroleum Company LLC – Canton – 73,000
- 38. Sunoco Inc. – Toledo – 140,000
- 39. Valero Energy Corp. – Lima – 161,500

Wisconsin

- 40. Murphy Oil USA Inc. – Superior – 33,250

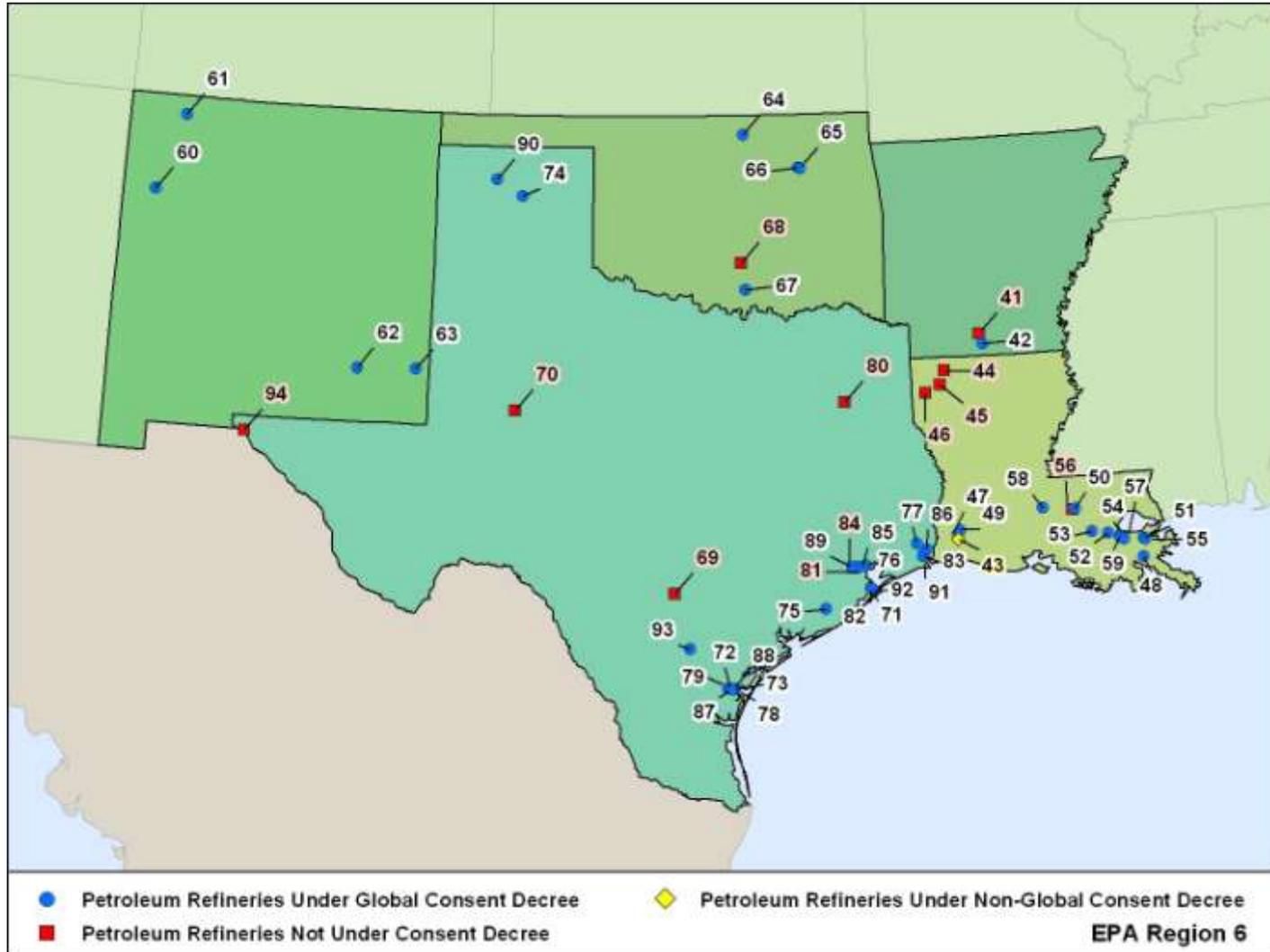
Refineries not under CD

Indiana

- 32. Countrymark Cooperative Inc. – Mount Vernon – 23,500

By state: Number on map, Company, Refinery,
Crude oil capacity (barrels/day)
Data from Oil & Gas Journal's 2005 Worldwide
Refining Survey, December 19, 2005

Region 6 Petroleum Refineries



Region 6 Petroleum Refineries

Refineries under global CD

Arkansas

42. Lion Oil Company – El Dorado – 70,000

Louisiana

47. Citgo Petroleum Corp. – Lake Charles – 440,000

48. ConocoPhillips – Alliance – 247,000

49. ConocoPhillips – Lake Charles – 239,000

50. ExxonMobil Refining and Supply Co. – Baton Rouge – 501,000

51. ExxonMobil Refining and Supply Co. – Chalmette – 188,000

52. Marathon Petroleum Company LLC – Garyville – 245,000

53. Motiva Enterprises LLC – Convent – 235,000

54. Motiva Enterprises LLC – Norco – 220,000

55. Murphy Oil USA Inc. – Meraux – 125,000

57. Shell Chemical Company – St. Rose – 55,000

58. Valero Energy Corp. – Krotz Springs – 83,100

59. Valero Energy Corp. – St. Charles – 186,000

New Mexico

60. Giant Refining Company – Ciniza – 26,000

61. Giant Refining Company – Bloomfield – 18,600

62, 63. Navajo Refining Company – Artesia and Lovington – 60,000

Oklahoma

64. ConocoPhillips – Ponca City – 187,000

65. Sinclair Oil Corp. – Tulsa – 50,000

66. Sunoco Inc. – Tulsa – 85,000

67. Valero Energy Corp. – Ardmore – 87,877

By state: Number on map, Company, Refinery, Crude oil capacity (barrels/day)

Data from Oil & Gas Journal's 2005 Worldwide Refining Survey, December 19, 2005

Region 6 Petroleum Refineries

Refineries under global CD (cont.)

Texas

- 71. BP PLC – Texas City – 446,500
- 72, 73. Citgo Petroleum Corp. – Corpus Christi East and West Plants – 156,750
- 74. ConocoPhillips – Borger – 146,000
- 75. ConocoPhillips – Sweeny – 247,000
- 76. ExxonMobil Refining and Supply Co. – Baytown – 563,000
- 77. ExxonMobil Refining and Supply Co. – Beaumont – 348,500
- 78, 79. Flint Hills Resources – Corpus Christi East and West Plants – 279,300
- 82. Marathon Petroleum Company LLC – Texas City – 72,000
- 83. Motiva Enterprises LLC – Port Arthur – 285,000
- 85. Shell Deer Park Refining Co. – 333,700
- 86. Total SA – Port Arthur – 231,252
- 87, 88. Valero Energy Corp. – Corpus Christi East and West Plants – 205,000
- 89. Valero Energy Corp. – Houston – 90,000
- 90. Valero Energy Corp. – McKee – 166,660
- 91. Valero Energy Corp. – Port Arthur – 250,000
- 92. Valero Energy Corp. – Texas City – 225,000
- 93. Valero Energy Corp. – Three Rivers – 96,000

Refineries under non-global CD

Louisiana

- 43. Calcasieu Refining Co. – Lake Charles – 15,680

Note:

Calcasieu Refining Co. is under a consent decree with the United States and the State of Louisiana that covers some, but not all, of the marquee issues of the National Petroleum Refinery Initiative.

By state: Number on map, Company, Refinery, Crude oil capacity (barrels/day)
Data from Oil & Gas Journal's 2005 Worldwide Refining Survey, December 19, 2005

Region 6 Petroleum Refineries

Refineries not under CD

Arkansas

41. Cross Oil and Refining Company –
Smackover – 7,000

Louisiana

44. Calumet Lubricants Co. – Cotton Valley –
9,500

45. Calumet Lubricants Co. – Princeton – 9,500

46. Calumet Lubricants Co. – Shreveport –
35,000

56. Placid Refining Co. LLC – Port Allen –
55,000

Oklahoma

68. Wynnewood Refining Co. – Wynnewood –
52,500

Texas

69. AGE Refining And Manufacturing – San
Antonio – 12,000

70. Alon USA – Big Spring – 70,000

80. LaGloria Oil and Gas Co. – Tyler – 60,000

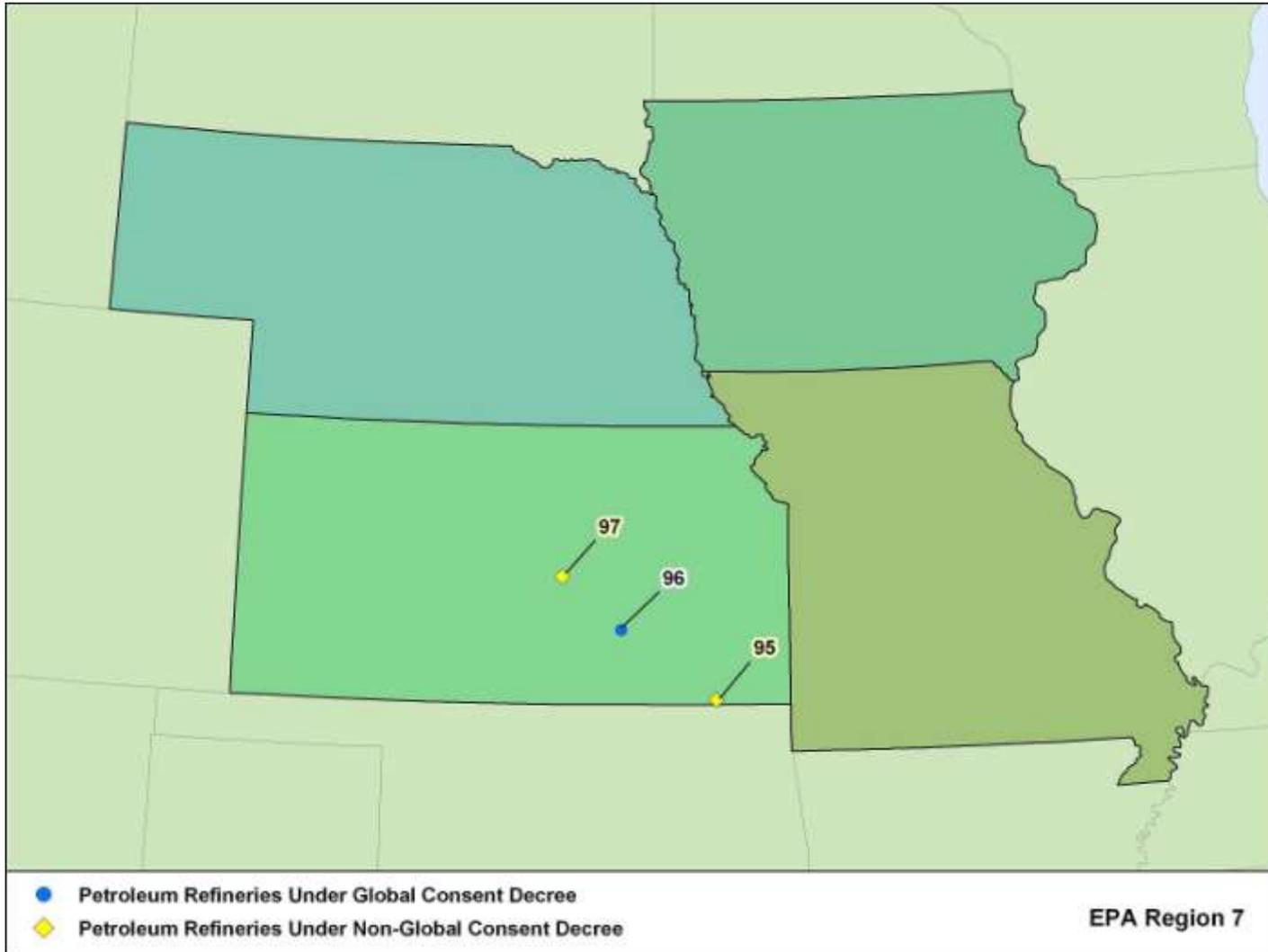
81. Lyondell-Citgo Refining LP – Houston –
282,600

84. Pasadena Refining System – 100,000

94. Western Refining Inc. – El Paso – 90,000

By state: Number on map, Company, Refinery,
Crude oil capacity (barrels/day)
Data from Oil & Gas Journal's 2005 Worldwide
Refining Survey, December 19, 2005

Region 7 Petroleum Refineries



Region 7 Petroleum Refineries

Refineries under global CD

Kansas

96. Frontier – El Dorado – 110,000

Refineries not under CD

None

Refineries under non-global CD

Kansas

95. Coffeyville Resources Refining & Marketing – Coffeyville – 100,000

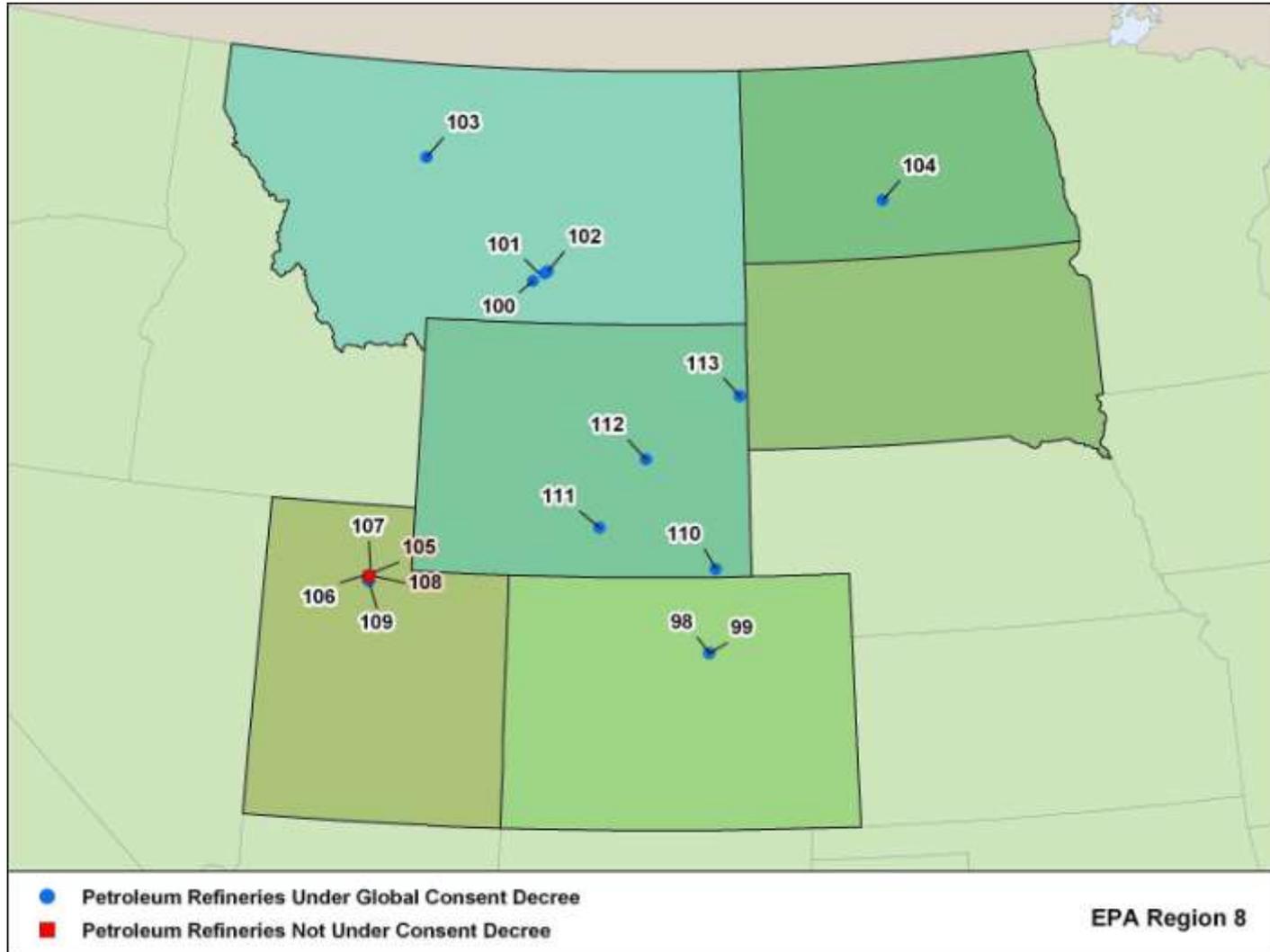
97. National Cooperative Refining Association – McPherson – 82,200

Note:

Coffeyville Resources Refining & Marketing and National Cooperative Refining Association are both under consent decrees with the United States and the State of Kansas that cover some, but not all, of the marquee issues of the National Petroleum Refinery Initiative.

By state: Number on map, Company, Refinery, Crude oil capacity (barrels/day)
Data from Oil & Gas Journal's 2005 Worldwide Refining Survey, December 19, 2005

Region 8 Petroleum Refineries



Region 8 Petroleum Refineries

Refineries under CD

Colorado

- 98. Suncor Energy Products – Denver West Plant – 92,000
- 99. Suncor Energy Products – Denver East Plant – 28,000

Montana

- 100. Cenex Harvest States – Laurel – 57,500
- 101. ConocoPhillips – Billings – 58,000
- 102. ExxonMobil Refining and Supply Co. – Billings – 60,000
- 103. Montana Refining Company – Great Falls – 8,200

North Dakota

- 104. Tesoro West Coast Co. – Mandan – 58,000

Utah

- 106. Chevron Corp. – Salt Lake City – 45,000
- 107. Holly Corporation – Woods Cross – 25,000
- 109. Tesoro West Coast Co. – Salt Lake City – 60,000

Wyoming

- 110. Frontier Refining Inc. – Cheyenne – 46,000
- 111. Sinclair Oil Corp. – Sinclair – 22,000
- 112. Sinclair/Little America – Casper – 22,500
- 113. Wyoming Refining Co. – Newcastle – 12,500

Refineries not under CD

Utah

- 105. Big West Oil LLC – Salt Lake City – 25,000
- 108. Silver Eagle Refining Inc. – Woods Cross – 12,500

By state: Number on map, Company, Refinery, Crude oil capacity (barrels/day)
Data from Oil & Gas Journal's 2005 Worldwide Refining Survey, December 19, 2005

Region 9 Petroleum Refineries



Region 9 Petroleum Refineries

Refineries under CD

California

- 114. Big West Oil LLC – Bakersfield – 65,000
- 115. BP PLC – Carson – 247,000
- 116. Chevron Corp. – El Segundo – 260,000
- 117. Chevron Corp. – Richmond – 225,000
- 118, 119. ConocoPhillips – LAR-Carson and Wilmington – 138,700
- 120, 121. ConocoPhillips – Rodeo and Santa Maria – 120,000
- 122. ExxonMobil Refining and Supply Co. – Torrance – 149,500
- 126. Shell Oil Products US – Los Angeles – 100,000
- 127. Shell Oil Products US – Martinez – 157,600
- 128. Tesoro Corp. – Golden Eagle – 161,000
- 129. Valero Energy Corp. – Benicia – 139,500
- 130. Valero Energy Corp. – Wilmington – 80,000

Hawaii

- 131. Chevron Corp. – Hawaii – 54,000

Refineries not under CD

California

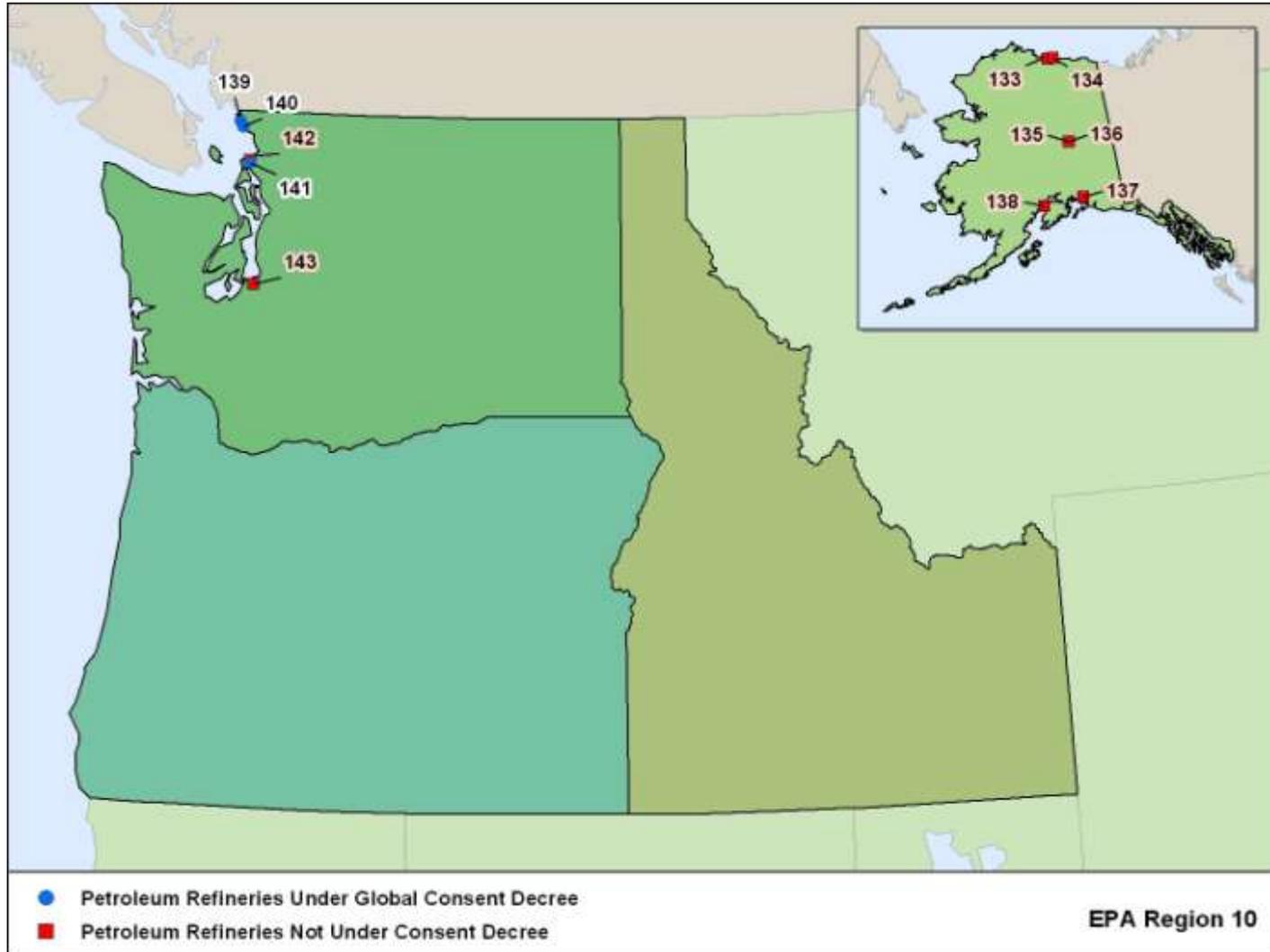
- 123. Kern Oil and Refining Co. – Bakersfield – 25,000
- 124. Paramount Petroleum Corp. – Long Beach – 52,000
- 125. San Joaquin Refining Co., Inc. – Bakersfield – 24,300

Hawaii

- 132. Tesoro Hawaii Corp. – Hawaii – 93,700

By state: Number on map, Company, Refinery, Crude oil capacity (barrels/day)
Data from Oil & Gas Journal's 2005 Worldwide Refining Survey, December 19, 2005

Region 10 Petroleum Refineries



Region 10 Petroleum Refineries

Refineries under CD

Washington

- 139. BP PLC – Cherry Point – 220,400
- 140. ConocoPhillips – Ferndale – 96,000
- 141. Shell Oil Products US – Puget Sound – 148,600

Refineries not under CD

Alaska

- 133. BP PLC – Kuparuk – 14,500
- 134. BP PLC – Prudhoe Bay – 15,000
- 135. Flint Hills Resources – North Pole – 215,175
- 136. Petro Star Inc. – North Pole – 17,500
- 137. Petro Star Inc. – Valdez – 48,000
- 138. Tesoro Alaska Company – Kenai – 72,000

Washington

- 142. Tesoro West Coast Co. – Anacortes – 113,300
- 143. US Oil and Refining Co. – Tacoma – 35,800

By state: Number on map, Company, Refinery,
Crude oil capacity (barrels/day)
Data from Oil & Gas Journal's 2005 Worldwide
Refining Survey, December 19, 2005



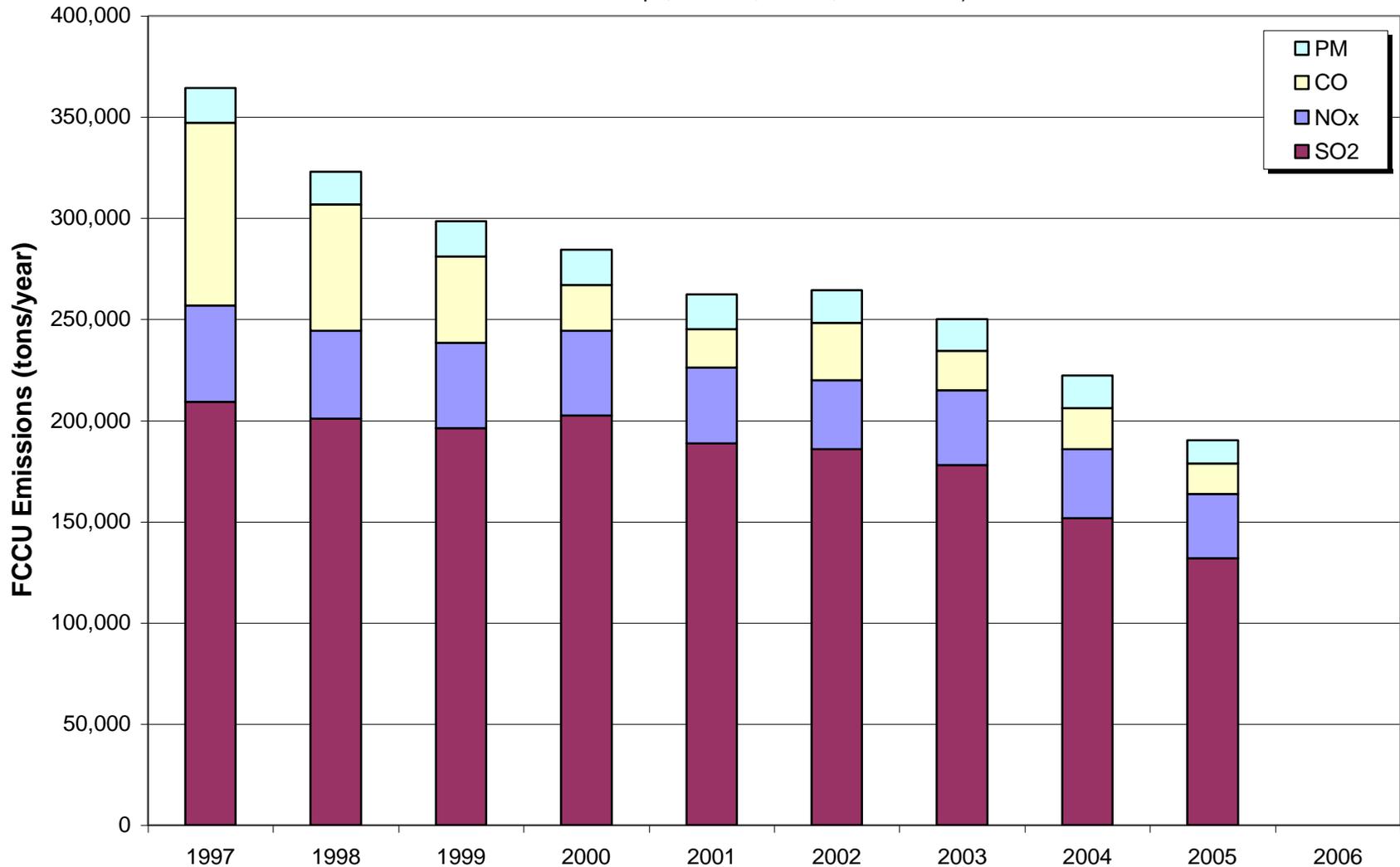
Petroleum Refinery Initiative

Actual Emissions Reductions from Settling Refiners under Consent Decrees

(Entered as of June 1, 2006)

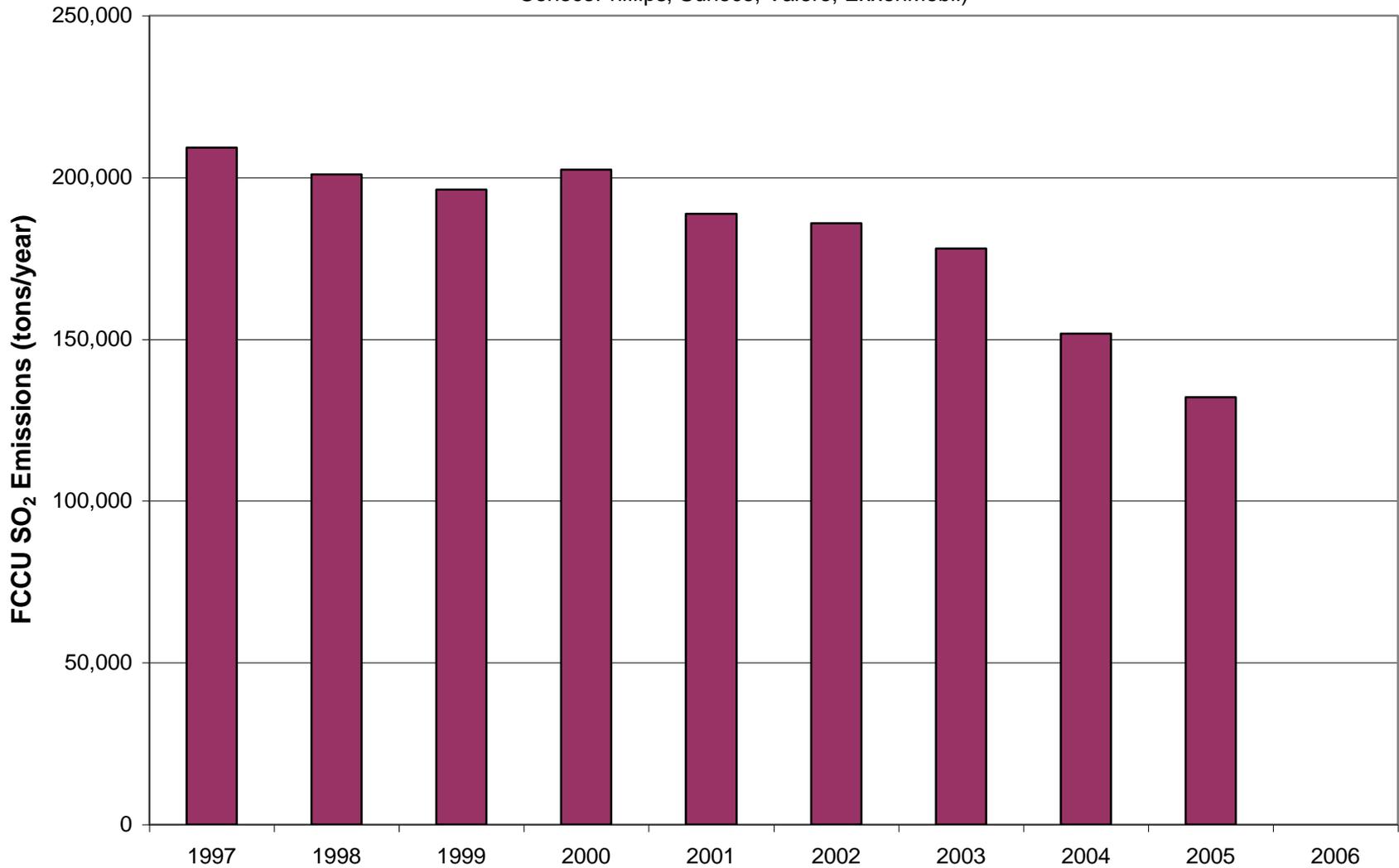
Actual FCCU Emissions from Refineries Under Consent Decrees

(Koch, BP, Motiva-Equilon-Deer Park, Marathon, Conoco, Navajo-Montana, Lion, CHS, Coastal, Chevron, CITGO, ConocoPhillips, Sunoco, Valero, ExxonMobil)



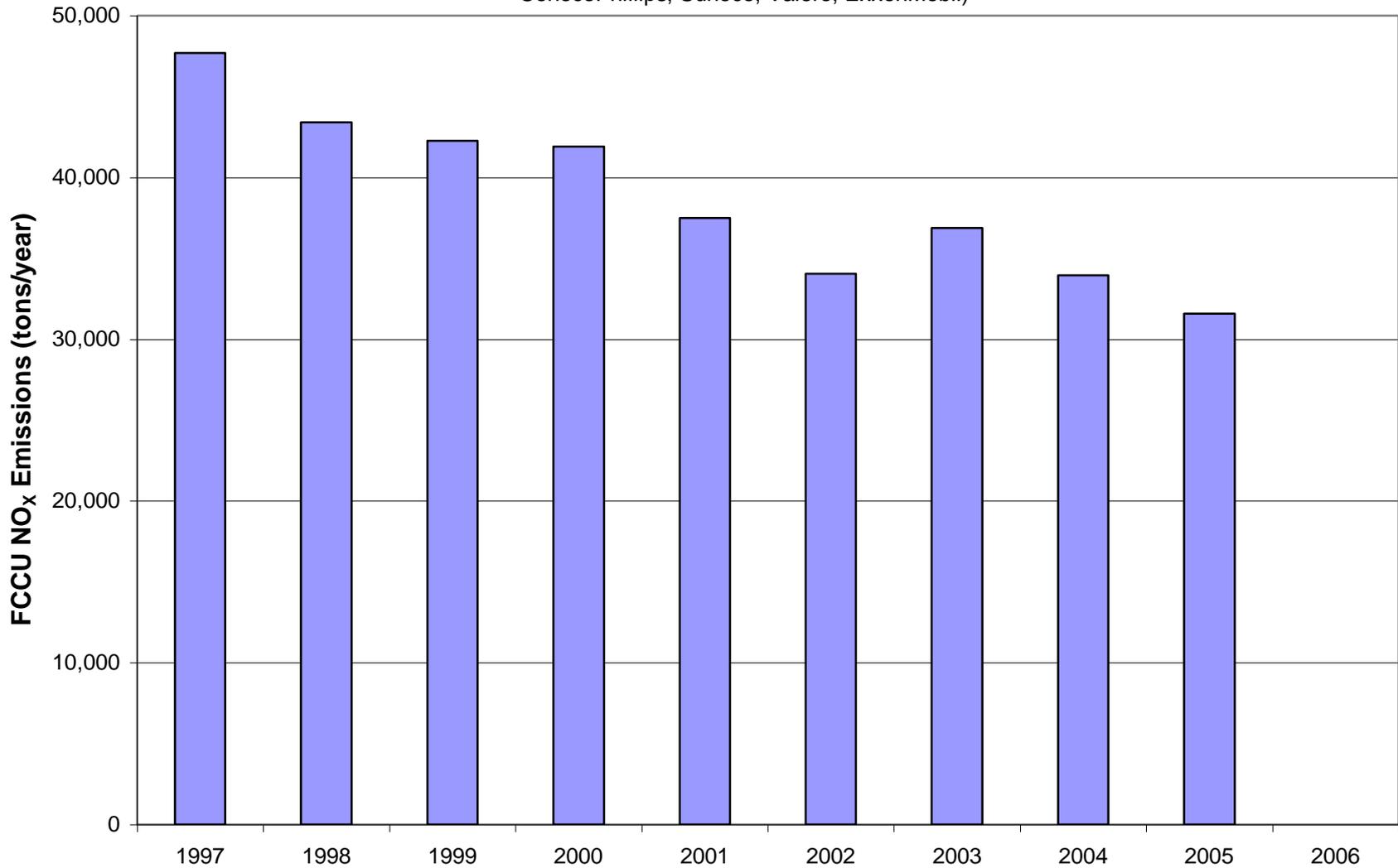
Actual FCCU SO₂ Emissions from Refineries Under Consent Decrees

(Koch, BP, Motiva-Equilon-Deer Park, Marathon, Conoco, Navajo-Montana, Lion, CHS, Coastal, Chevron, CITGO, ConocoPhillips, Sunoco, Valero, ExxonMobil)



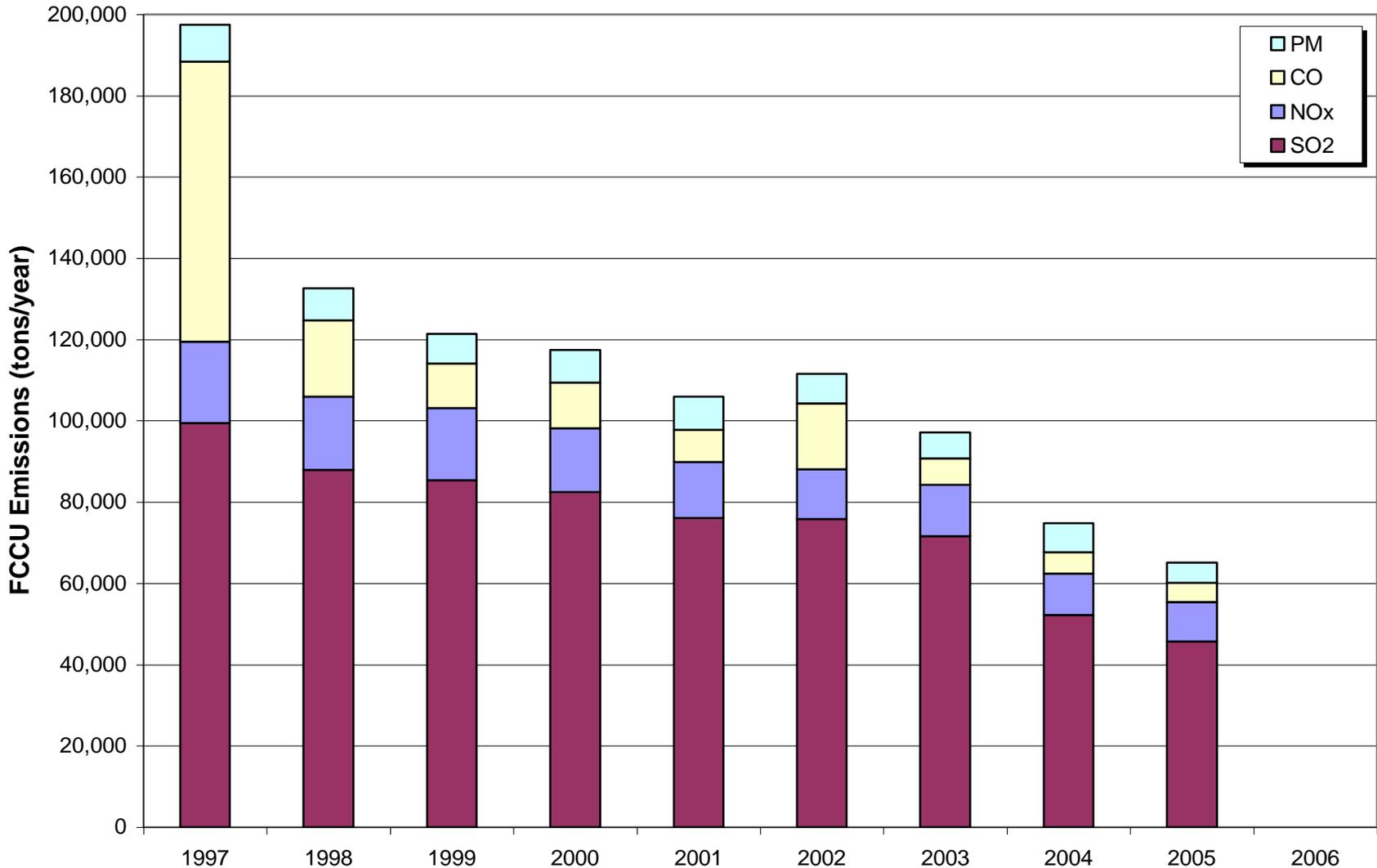
Actual FCCU NO_x Emissions from Refineries Under Consent Decrees

(Koch, BP, Motiva-Equilon-Deer Park, Marathon, Conoco, Navajo-Montana, Lion, CHS, Coastal, Chevron, CITGO, ConocoPhillips, Sunoco, Valero, ExxonMobil)



Actual FCCU Emissions from Refineries Under Early Consent Decrees

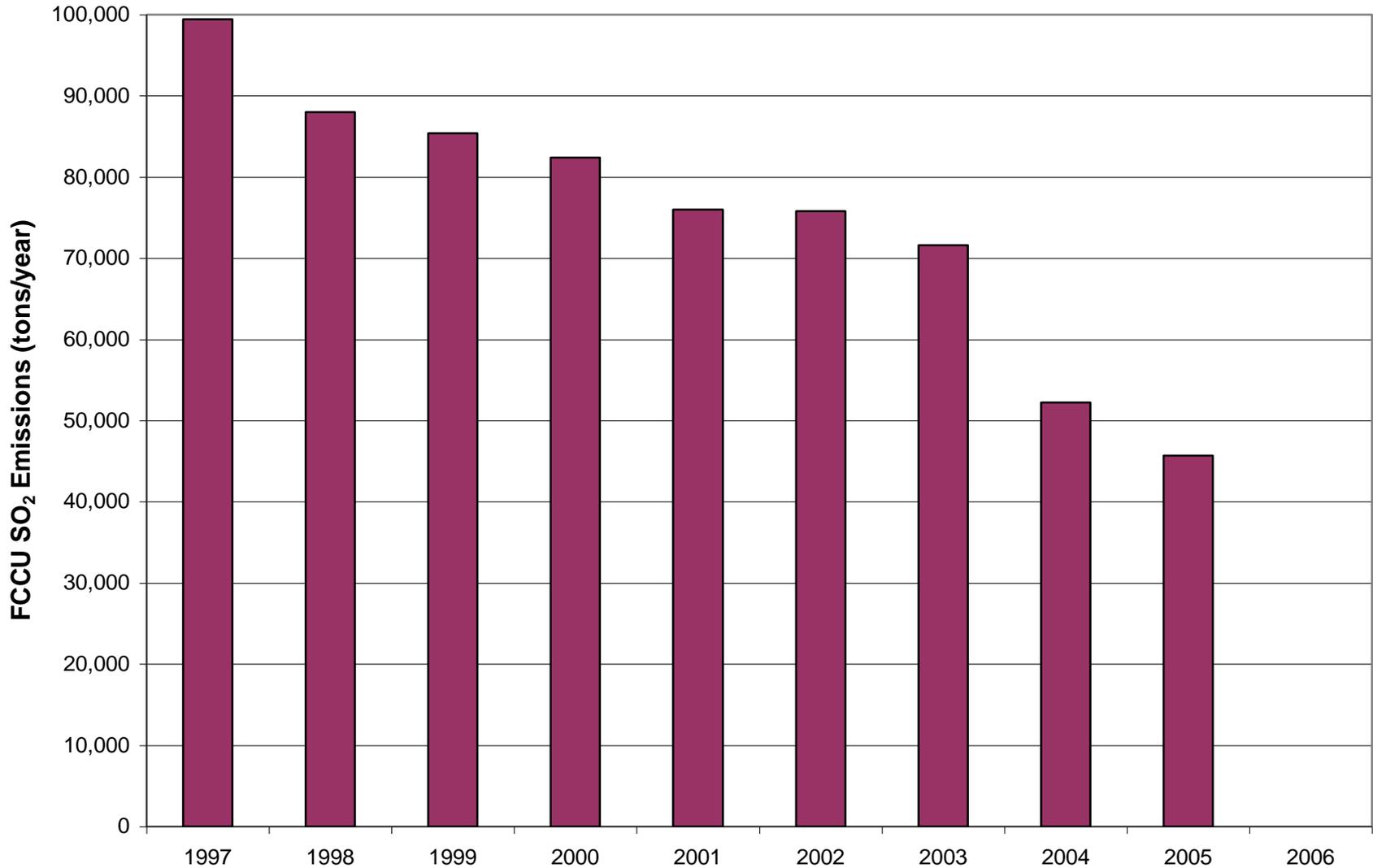
(Koch, BP, Motiva-Equilon-Deer Park, Marathon, Conoco, Navajo-Montana, Lion, CHS, Coastal)



Note: The early consenters are further along in the CD implementation process and better represent projected emissions reductions than the more recent consenters who are in the early stages of CD implementation.

Actual FCCU SO₂ Emissions from Refineries Under Early Consent Decrees

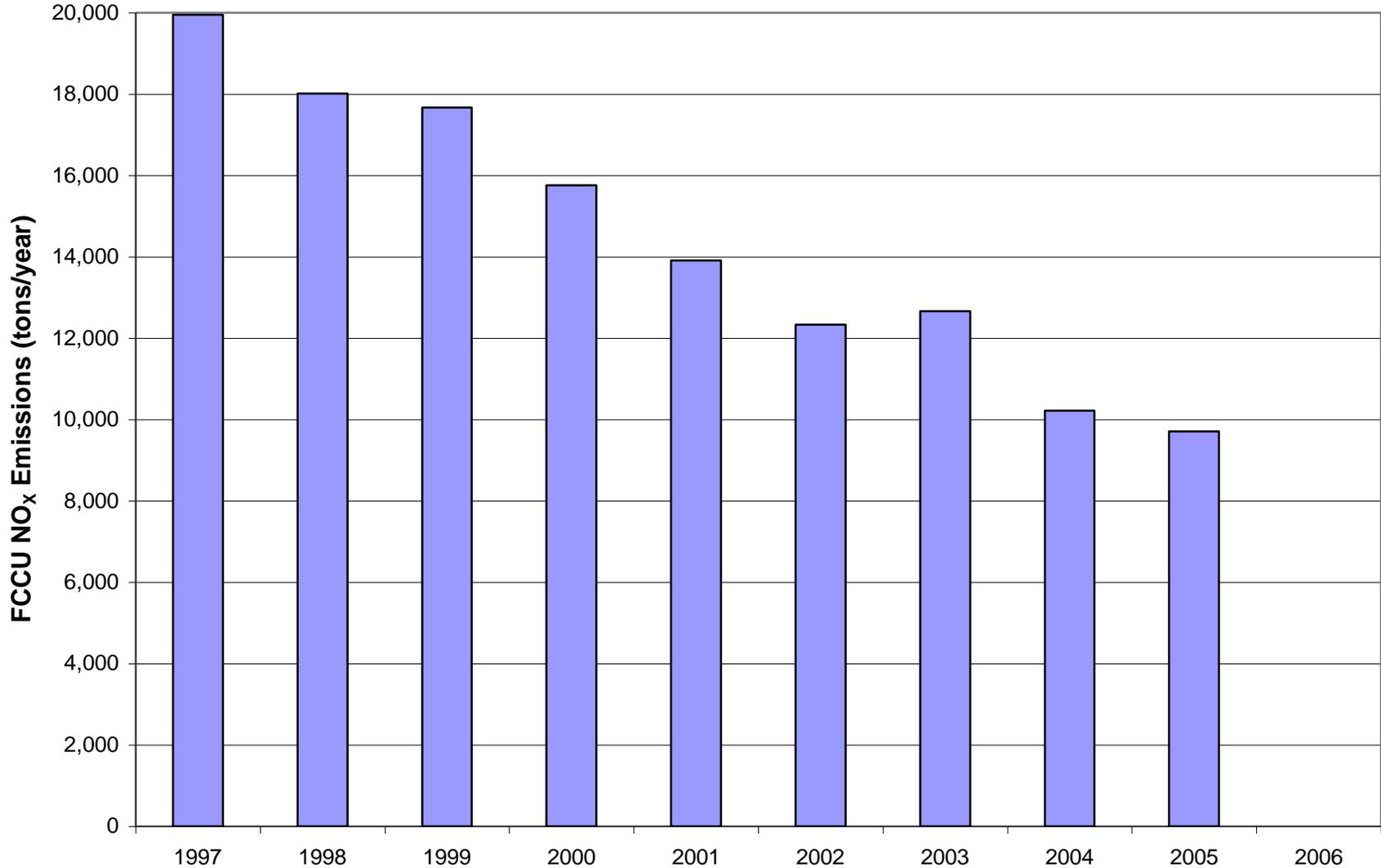
(Koch, BP, Motiva-Equilon-Deer Park, Marathon, Conoco, Navajo-Montana, Lion, CHS, Coastal)



Note: The early consenters are further along in the CD implementation process and better represent projected emissions reductions than the more recent consenters who are in the early stages of CD implementation.

Actual FCCU NO_x Emissions from Refineries Under Early Consent Decrees

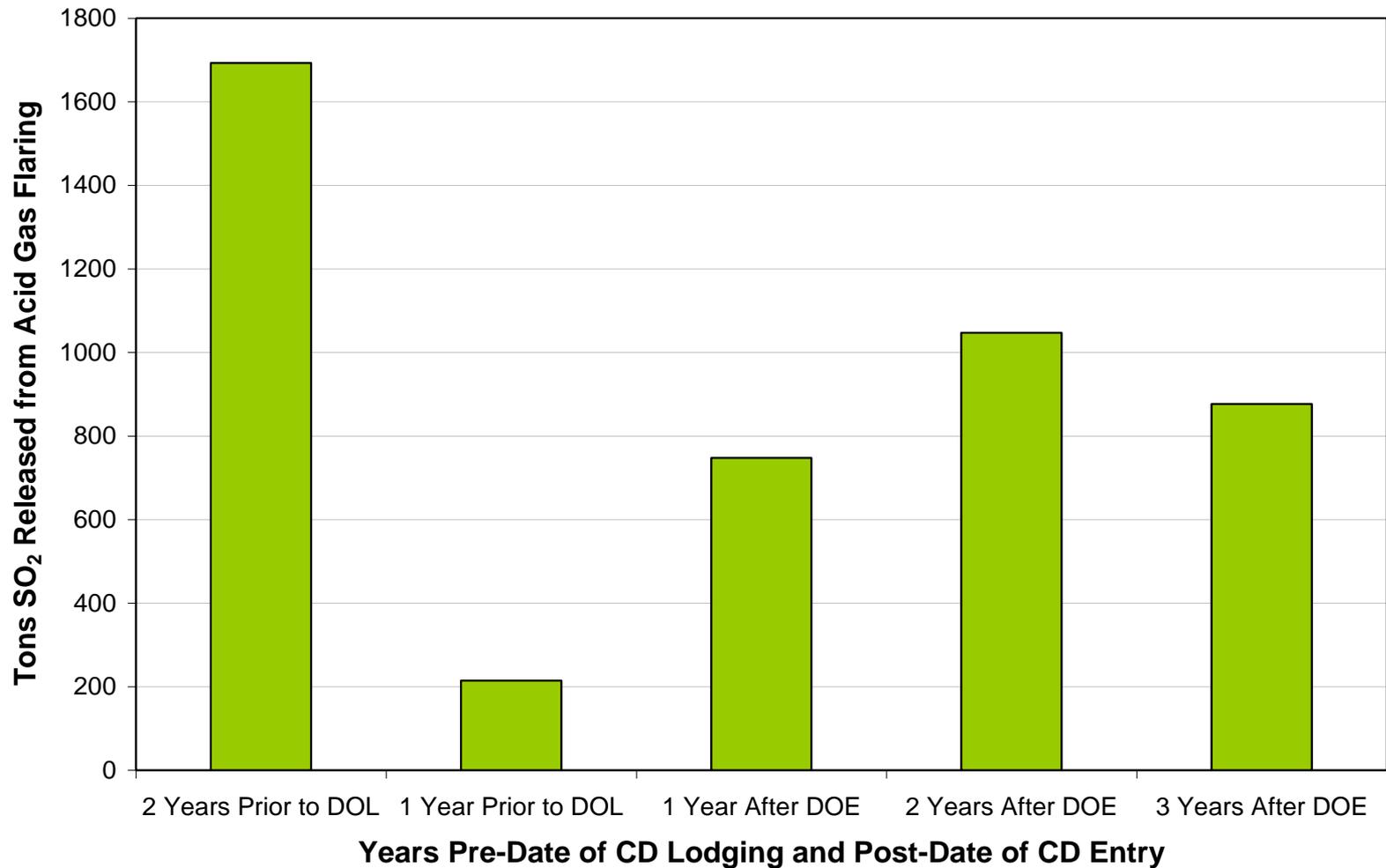
(Koch, BP, Motiva-Equilon-Deer Park, Marathon, Conoco, Navajo-Montana, Lion, CHS, Coastal)



Note: The early consenters are further along in the CD implementation process and better represent projected emissions reductions than the more recent consenters who are in the early stages of CD implementation.

Reductions in SO₂ from Flaring

(Koch, BP, Motiva-Equilon-Deer Park, Marathon, Conoco, and CHS Consent Decrees)



Note: The CDs presented provided flaring reports prior to the CD lodging and have completed three full years after CD entry.



Petroleum Refinery Initiative

**Schedule for Installation of Controls:
All Refiners**

Fluidized Catalytic Cracking Unit (FCCU) Emissions Reduction Compliance Dates

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Flint Hills DOL Dec 2000															
FCCU SO ₂		2 ■	■												
FCCU NO _x	△	▲	△		▲/△	▲	△	▲/△		▲/△					
BP DOL Jan 2001															
FCCU SO ₂	■		□ □	■ ■	3 ■ ¹	4 ■									
FCCU NO _x			△		3 ▲ ²	▲	2 ▲	▲				△			▲
M-E-DP DOL Mar 2001															
FCCU SO ₂	2 ■		■		■	■	2 ■	■							
FCCU NO _x				▲	2 ▲	▲	▲	▲	▲	2 ▲					
MAP DOL May 2001															
FCCU SO ₂	2 ■			■ ■		2 ■	■	■							
FCCU NO _x		△		△		4 ▲/△	▲	▲/△	5 ▲	△					▲
Conoco DOL Dec 2001															
FCCU SO ₂					■ ■	■	■ ■	■ ■		■					
FCCU NO _x						▲	▲	▲		▲					▲

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NO_x COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Footnotes:
¹BP Carson, Texas City FCCU 1, Texas City FCCU 2: Compliance date for SO₂ final limits is date of entry of Fourth Amendment to the Consent Decree, October 7, 2005.
²BP Carson, Texas City FCCU 1, Whiting FCCU 600: Compliance date for NO_x final limits is date of entry of Fourth Amendment to the Consent Decree, October 7, 2005.
³Ponca City 5: NO_x reducing additive demonstration report provides interim NO_x limits until the hardware limits are effective.

FCCU Emissions Reduction Compliance Dates

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Montana	DOL Dec 2001																
	FCCU SO ₂		[Yellow bar]					■									
	FCCU NO _x		[Yellow bar]					▲									
Navajo	DOL Dec 2001																
	FCCU SO ₂		[Yellow bar]		■												
	FCCU NO _x		[Yellow bar]					▲									
Lion Oil	DOL Mar 2003																
	FCCU SO ₂			[Yellow bar]		■											
	FCCU NO _x		[Yellow bar]								▲						
Chevron	DOL Oct 2003																
	FCCU SO ₂			[Yellow bar]								■					
	FCCU NO _x			▲					▲	▲		▲	▲				
Sunoco (Coastal)	DOL Oct 2003																
	FCCU SO ₂			■													
	FCCU NO _x		[Yellow bar]								▲/▲						
CHS	DOL Oct 2003																
	FCCU SO ₂			[Yellow bar]					■								
	FCCU NO _x		[Yellow bar]					▲									

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NO_x COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Footnotes:
¹Chevron Salt Lake City: If WGS is installed, compliance date is 3/2012; if WGS is not installed, compliance date is 9/2010.
²CHS Laurel: If WGS is installed, compliance date is 12/2009; if WGS is not installed, compliance date is 12/2007.

FCCU Emissions Reduction Compliance Dates

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
CITGO DOL Oct 2004	FCCU SO ₂				[Timeline for SO2: 2005-2013]										
	FCCU NO _x				[Timeline for NOx: 2007-2013]										
Conoco-Phillips DOL Jan 2005	FCCU SO ₂				[Timeline for SO2: 2005-2012]										
	FCCU NO _x				[Timeline for NOx: 2005-2015]										
Sunoco DOL Jun 2005	FCCU SO ₂				[Timeline for SO2: 2005-2013]										
	FCCU NO _x				[Timeline for NOx: 2008-2013]										
Valero DOL Jun 2005	FCCU SO ₂				[Timeline for SO2: 2005-2013]										
	FCCU NO _x				[Timeline for NOx: 2006-2007]										
ExxonMobil & Chalmette DOL Oct 2005	FCCU SO ₂				[Timeline for SO2: 2005-2011]										
	FCCU NO _x				[Timeline for NOx: 2005-2011]										
Total	FCCU SO ₂				[Summary Timeline for SO2: 2007-2008]										
	FCCU NO _x				[Summary Timeline for NOx: 2007-2009]										

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Sashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Sashes (/) indicate combinations (e.g. either additives or hard limits).

Footnotes:
¹ConocoPhillips Alliance: If SNERT is installed, compliance date is 3/2015; if SNERT is not installed, compliance date is 12/2009.
²Chalmette: If additives are found to be effective, compliance date is 6/30/2007, if additives are not effective, compliance date is 12/31/2008.
³Total Port Arthur: Compliance dates for SO₂ final limits are based on Date of Entry; timeline assumes Consent Decree will be entered by the second quarter 2008.

FCCU Emissions Reduction Compliance Dates

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Valero (Premcor) DOL Aug 2007	FCCU SO ₂							□				■			
	FCCU NO _x ¹							2□							
											△				▲
Sinclair DOL Jan 2008	FCCU SO ₂														
	FCCU NO _x														
Holly DOL Apr 2008	FCCU SO ₂														
	FCCU NO _x														
Frontier DOL Feb 2009	FCCU SO ₂ ^{3,4}														
	FCCU NO _x ^{5,6}														
Wyoming DOL Feb 2009	FCCU SO ₂														
	FCCU NO _x														
Murphy DOL Sep 2010	FCCU SO ₂														
	FCCU NO _x														

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NO_x CQPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hardware installation).

Footnotes:
¹Valero (Premcor): System wide NO_x interim limit is effective 12/2010 to include Lima, Memphis, and Port Arthur. The final system wide NO_x limit is effective 12/2010.
²Sinclair: Casper and/or Sinclair, may accept 20/40 ppm to be achieved by 12/31/2012.
³Frontier: Cheyenne and El Dorado: Compliance dates for NO_x and SO₂ interim limits and start of additives/low NO_x COP are based on Date of Entry; timeline assumes Consent Decree will be entered by the third quarter 2009.
⁴Frontier: Cheyenne: May elect to comply with final 25/50 ppm limit by 12/31/2010 -- or add SO₂-reducing additive by DOE + 180 days, and comply with final 25/50 ppm limit by 9/30/2015 (chart illustrates latter option).
⁵Frontier: Cheyenne: May elect to comply with final 40/80 ppm limit by 12/31/2010 -- or interim 60/120 ppm limit by DOE + 180 days, and final 40/80 ppm limit by 12/31/2015 (chart illustrates latter option).
⁶If the Company elects to switch from 'full burn operation' to 'partial burn operation' by making physical changes ... By no later than 180 days after the Company switches ... the Company shall comply with ... [20/40 ppm] Final NO_x Emission Limits on the FCCU.
⁷If hardware cannot meet final limit, additional hardware will be installed and the final limit of 20/40 ppm must be met by 12/31/2010.

FCCU Emissions Reduction Compliance Dates

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HOVENSA DOL Jan 2011															
FCCU SO ₂											■				
FCCU NO _x											▲				

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline. Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline. Slashes (/) indicate combinations (e.g. either additives or



Petroleum Refinery Initiative

**Information and Emissions Data by
Individual Refiner/Refinery**

Flint Hills (formerly Koch)

December 2000

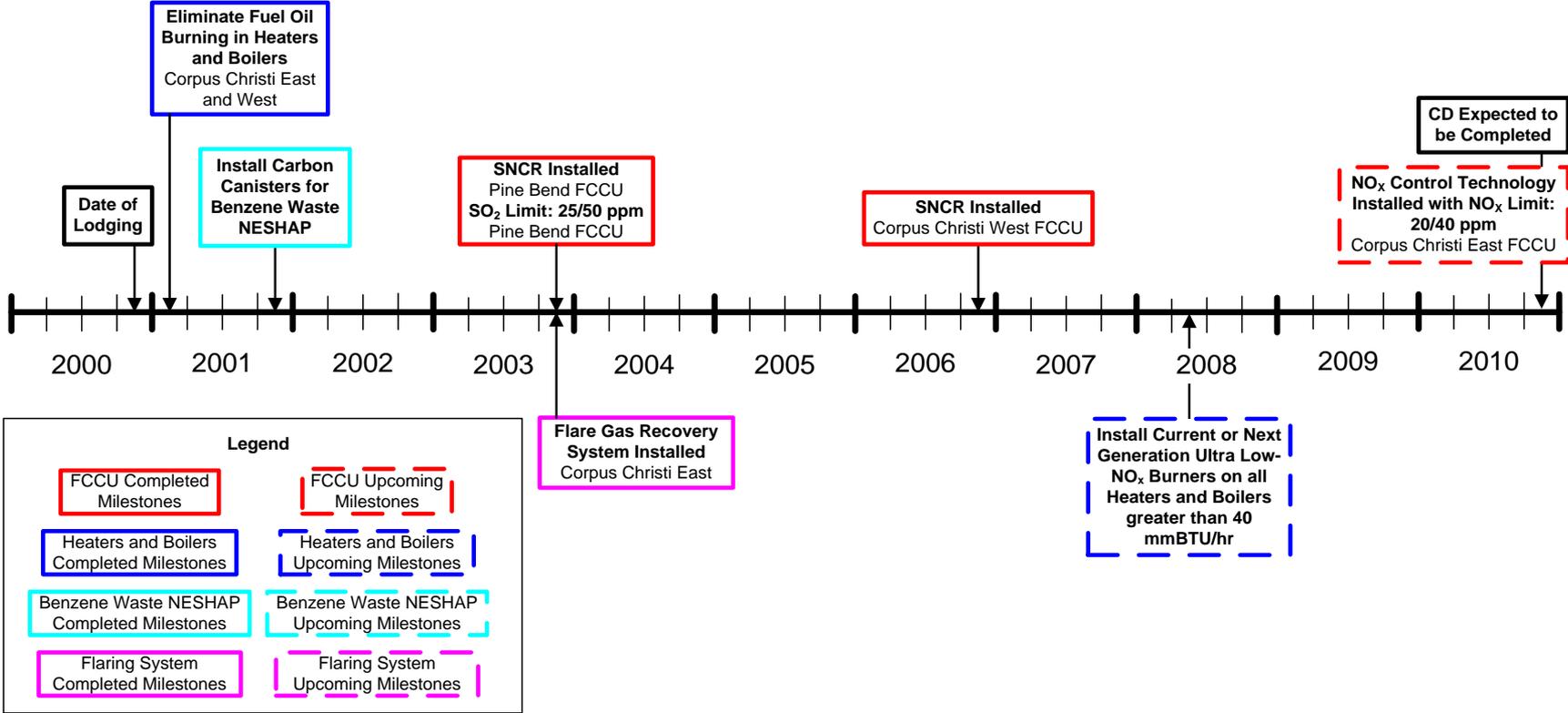
- 3 refineries in Minnesota and Texas
- \$80 million in injunctive relief
- Annual Reductions
 - 5,200 tons of NO_x and SO₂
- Penalty: \$1 million
- SEPs: \$3.5 million
- Co-Plaintiff: Minnesota
- The refining business of Koch Petroleum Group was restructured into Flint Hills Resources in 2002

Koch FCCU Emissions Reduction Compliance Dates

DOL Dec 2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Flint Hills Corpus Christi East FCCU SO ₂	■		■												
	■		■												
Flint Hills Corpus Christi West FCCU SO ₂	■		■												
	■		■												
Flint Hills Pine Bend FCCU SO ₂	■		■												
	■		■												
FCCU NO _x	■		■												
	■		■												
FCCU NO _x	■		■												
	■		■												

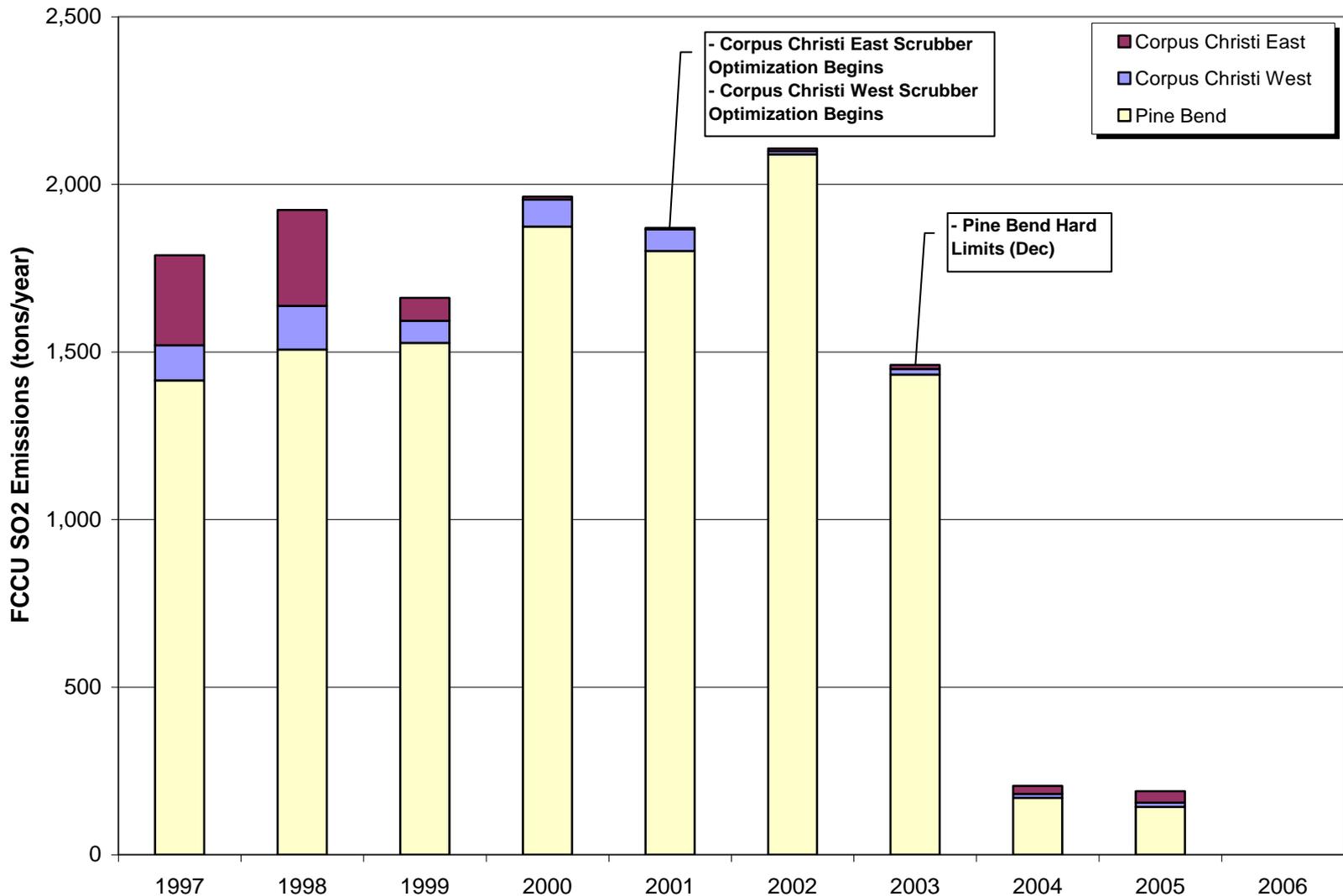
Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Koch Emissions Controls Milestones



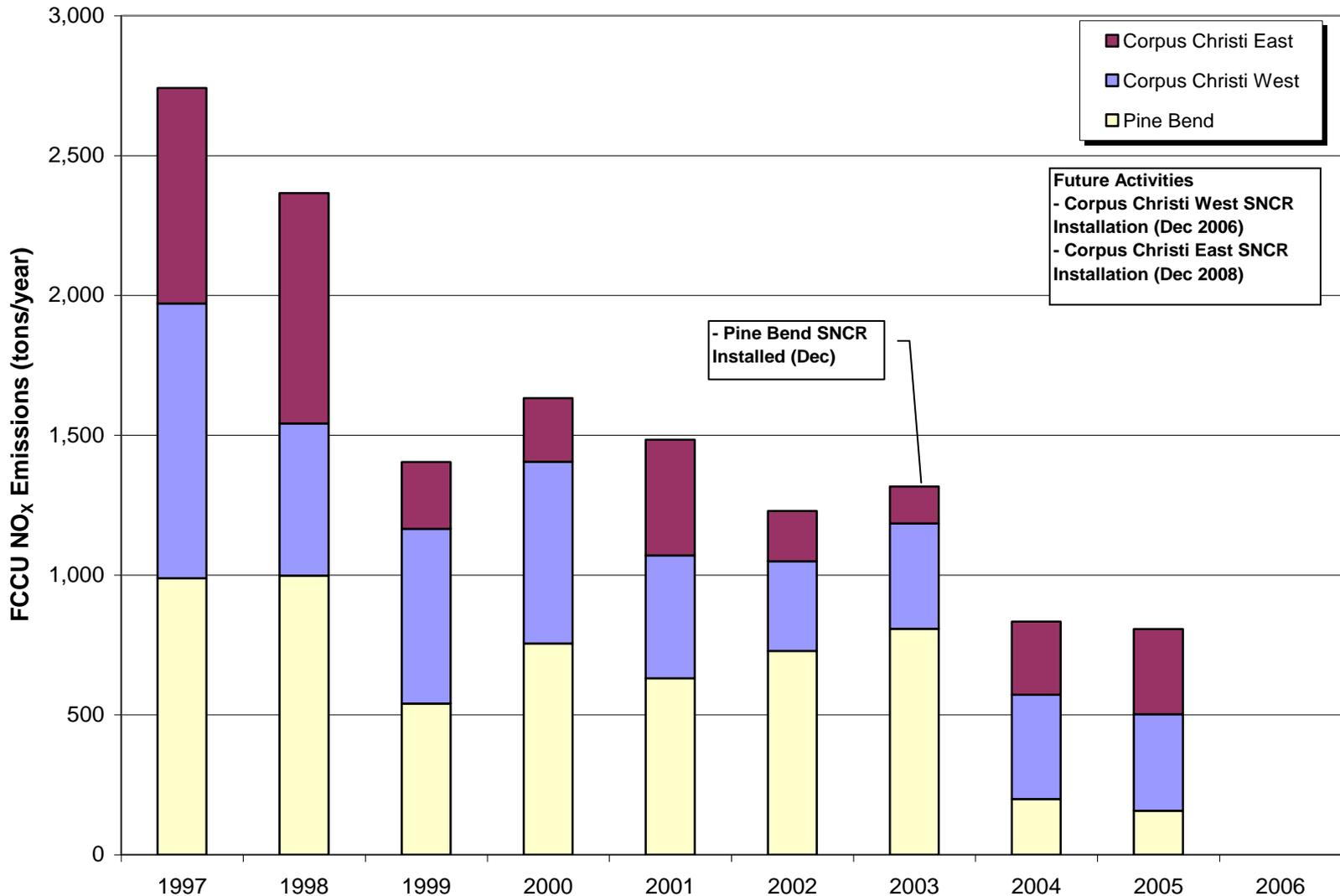
Koch Actual FCCU SO2 Emissions

Date of Lodging: 12/22/2000



Koch Actual FCCU NO_x Emissions

Date of Lodging: 12/22/2000



BP

January 2001

- 8 refineries in California, Indiana, North Dakota, Ohio, Texas, Utah, Virginia and Washington
- \$600 million in injunctive relief
- Annual Reductions
 - 22,000 tons of NO_x
 - 27,300 tons of SO₂
- Penalty: \$10 million
- Co-Plaintiffs: Indiana, Northwest Air Pollution Authority and Ohio
- Tesoro Petroleum Corporation acquired the Mandan, North Dakota and Salt Lake City, Utah refineries in 2001
- Giant Yorktown, Inc. acquired the Yorktown, Virginia refinery in 2002

BP FCCU Emissions Reduction Compliance Dates

DOL Jan 2001	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Carson	FCCU SO ₂					■ ¹										
	FCCU NO _x					▲ ²										
Texas City 1	FCCU SO ₂					■ ¹										
	FCCU NO _x					▲ ²										
Texas City 2	FCCU SO ₂					■ ¹										
	FCCU NO _x						▲									
Texas City 3	FCCU SO ₂						■									
	FCCU NO _x							▲								
Toledo	FCCU SO ₂						■									
	FCCU NO _x				▲		▲									
Whiting 500	FCCU SO ₂						■									
	FCCU NO _x						▲									
Whiting 600	FCCU SO ₂						■									
	FCCU NO _x						▲ ²									
Tesoro Mandan	FCCU SO ₂			□	■											
	FCCU NO _x										▲		▲			
Tesoro Salt Lake City	FCCU SO ₂	■														
Giant Yorktown	FCCU SO ₂			□	■											

Notes:

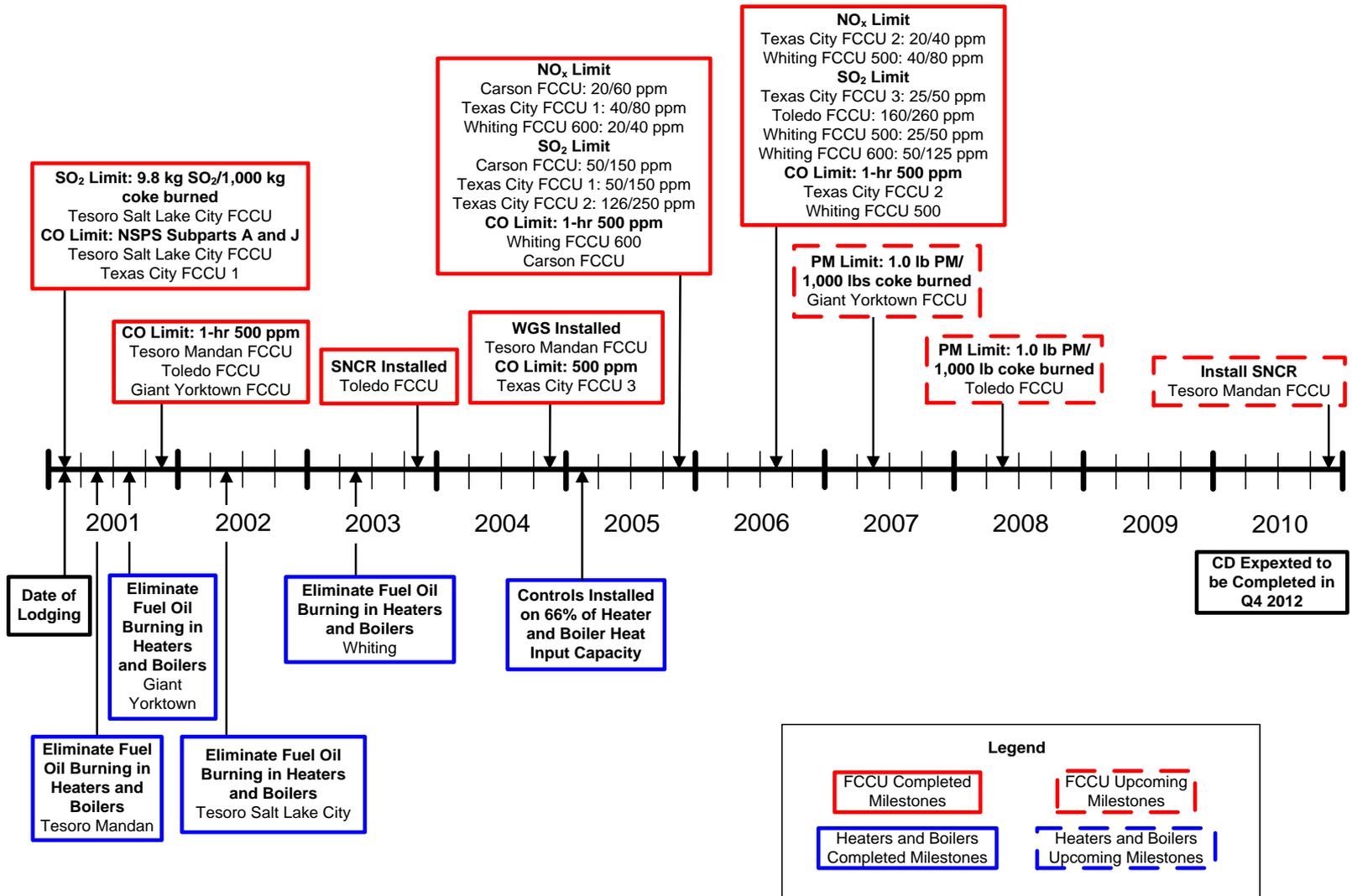
SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: ▲ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NO_x COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Footnotes:

¹BP Carson, Texas City FCCU 1, Texas City FCCU 2: Compliance date for SO₂ final limits is date of entry of Fourth Amendment to the Consent Decree, June 20, 2005.

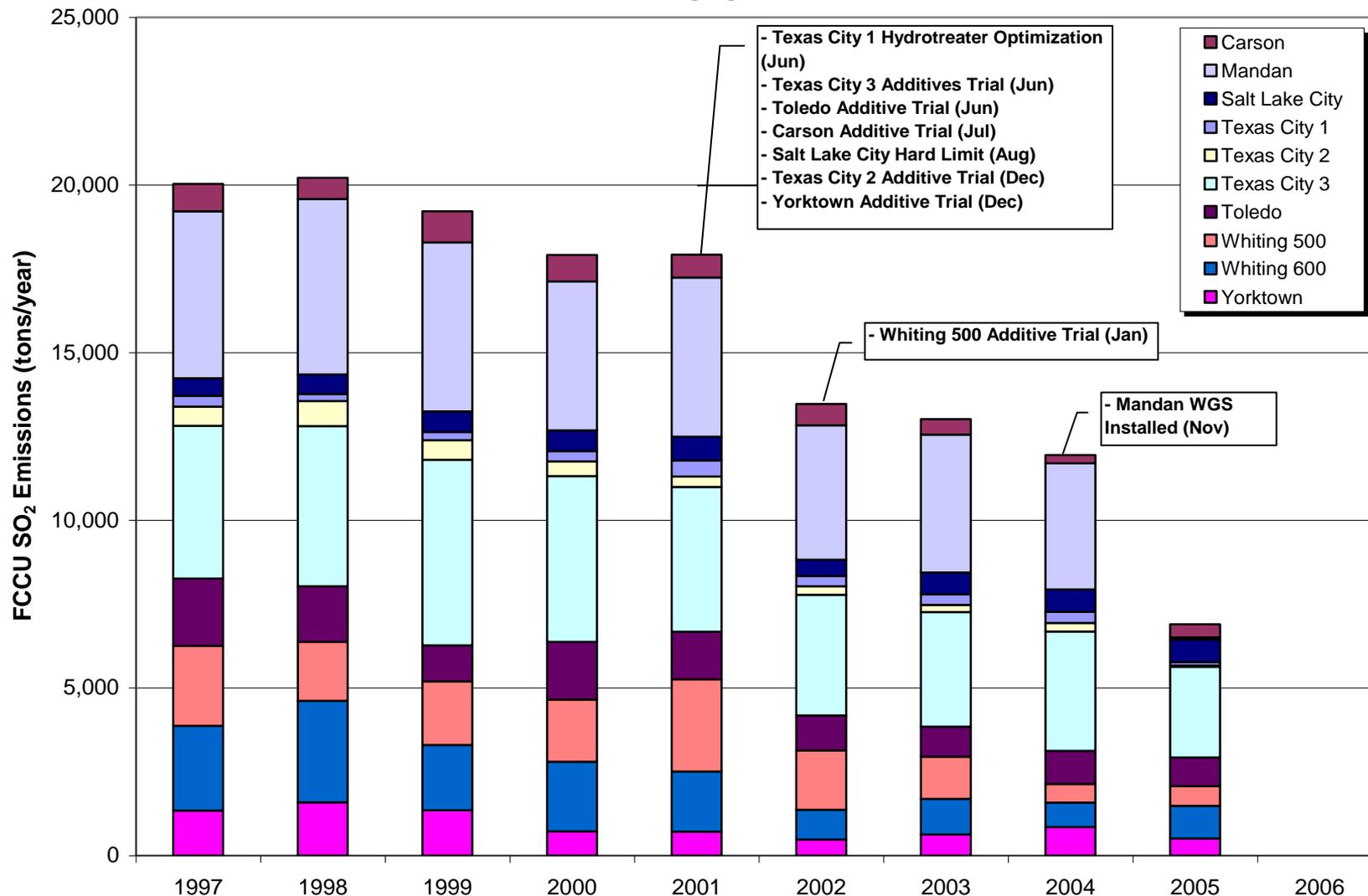
²BP Carson, Texas City FCCU 1, Whiting FCCU 600: Compliance date for NO_x final limits is date of entry of Fourth Amendment to the Consent Decree, June 20, 2005.

BP Emissions Controls Milestones



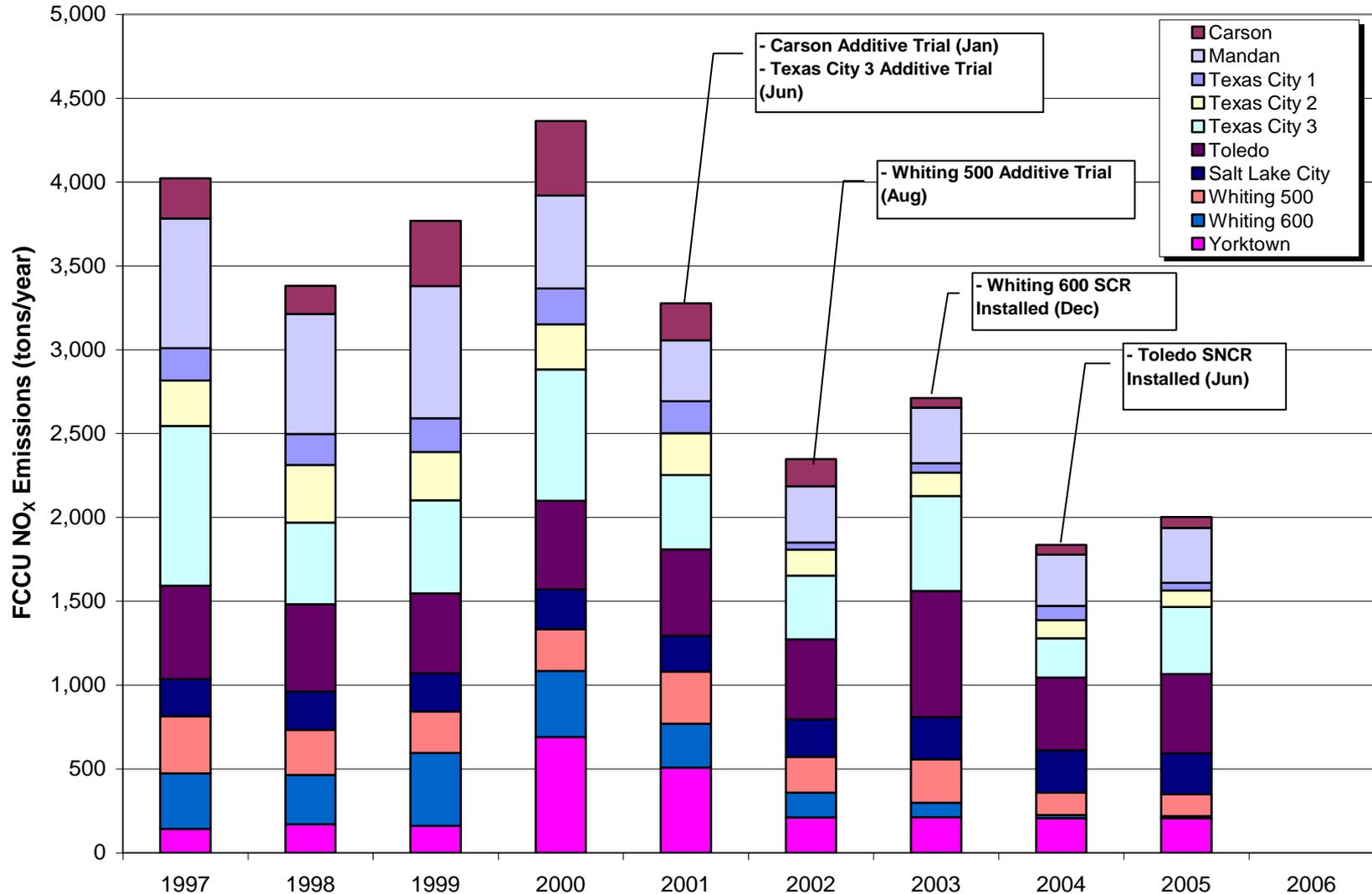
BP Actual FCCU SO₂ Emissions

Date of Lodging: 1/18/2001



BP Actual FCCU NO_x Emissions

Date of Lodging: 1/18/2001



Motiva-Equilon-Deer Park

March 2001

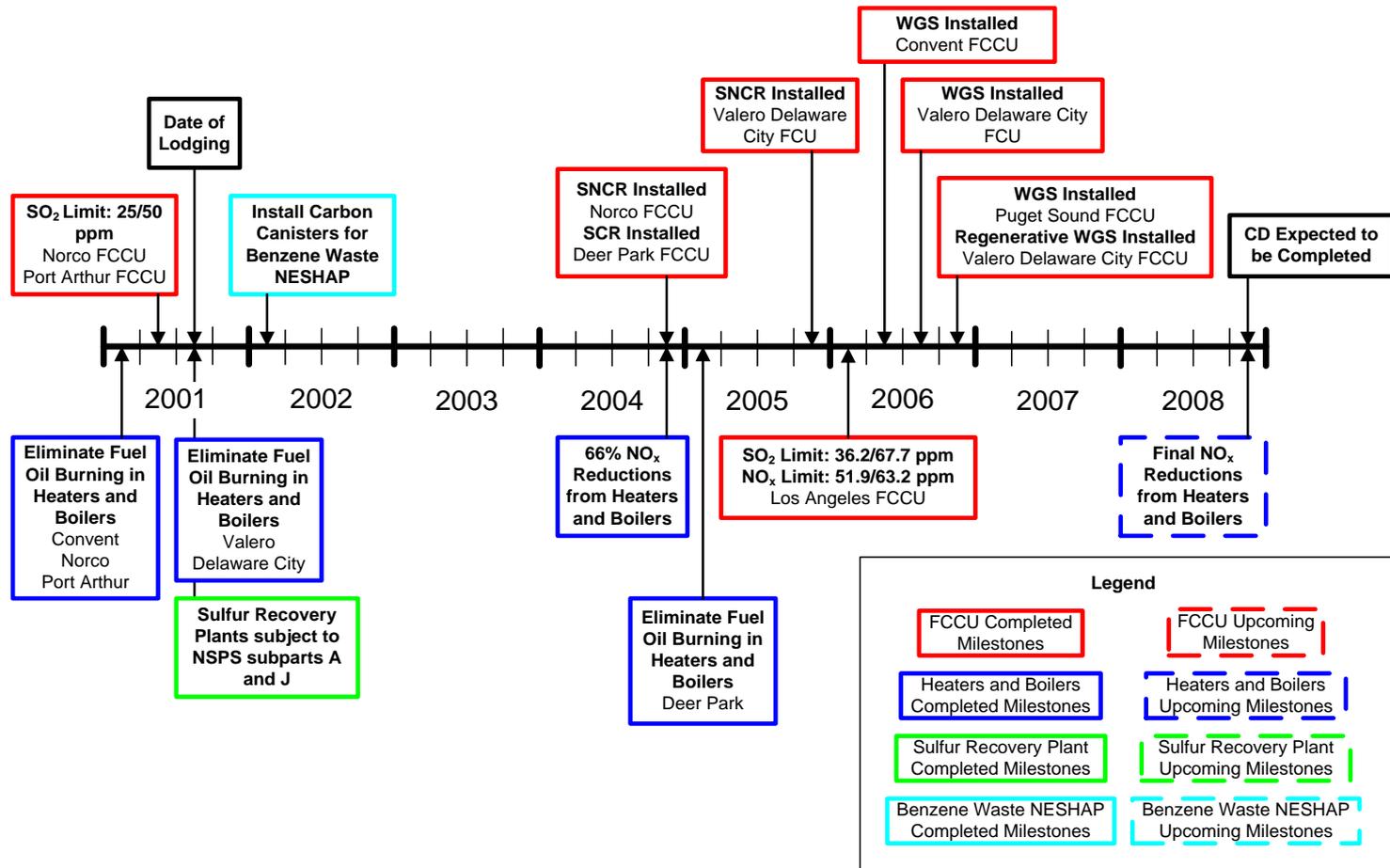
- 9 refineries in California, Delaware, Louisiana, Texas and Washington
- \$400 million in injunctive relief
- Annual Reductions
 - 8,000 tons of NO_x
 - 49,550 tons of SO₂
- Penalty: \$9.5 million
- SEPs: \$5.5 million
- Co-Plaintiffs: Delaware, Louisiana, Northwest Air Pollution Authority and Sierra Club
- Premcor Refining Group, Inc. acquired the Delaware City refinery in 2004
- Valero acquired Premcor and the Delaware City refinery in 2005
- Big West of California, LLC acquired the Bakersfield refinery in 2005
- Alon USA acquired the Bakersfield Refinery in 2010
- PBF Energy acquired the Delaware City refinery in 2010

M-E-DP FCCU Emissions Reduction Compliance Dates

DOL Mar 2001	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Motiva Convent															
FCCU SO ₂	[Yellow bar]					[□] [■]									
FCCU NO _x	[△]	[Yellow bar]					[▲]								
Motiva Norco															
FCCU SO ₂	[■]														
FCCU NO _x	[Yellow bar]			[△]		[▲]									
Motiva Port Arthur															
FCCU SO ₂	[■]														
FCCU NO _x	[△]	[Yellow bar]					[▲]								
Shell Deer Park															
FCCU SO ₂	[Yellow bar]		[□] [■]												
FCCU NO _x	[Yellow bar]			[△] [▲]											
Shell Los Angeles															
FCCU SO ₂	[Yellow bar]						[■]								
FCCU NO _x	[Yellow bar]						[▲]								
Shell Martinez															
FCCU SO ₂	[□]	[Yellow bar]				[■]									
FCCU NO _x	[△]	[Yellow bar]					[▲]								
Shell Puget Sound															
FCCU SO ₂	[Yellow bar]						[□] [■]								
FCCU NO _x	[Yellow bar]						[△]								
Valero Delaware City FCCU															
FCCU SO ₂	[Yellow bar]						[□] [■]								
FCCU NO _x	[Yellow bar]						[△]								
Valero Delaware City Coker															
FCCU SO ₂	[Yellow bar]						[□] [■]								
FCCU NO _x	[Yellow bar]						[△]								

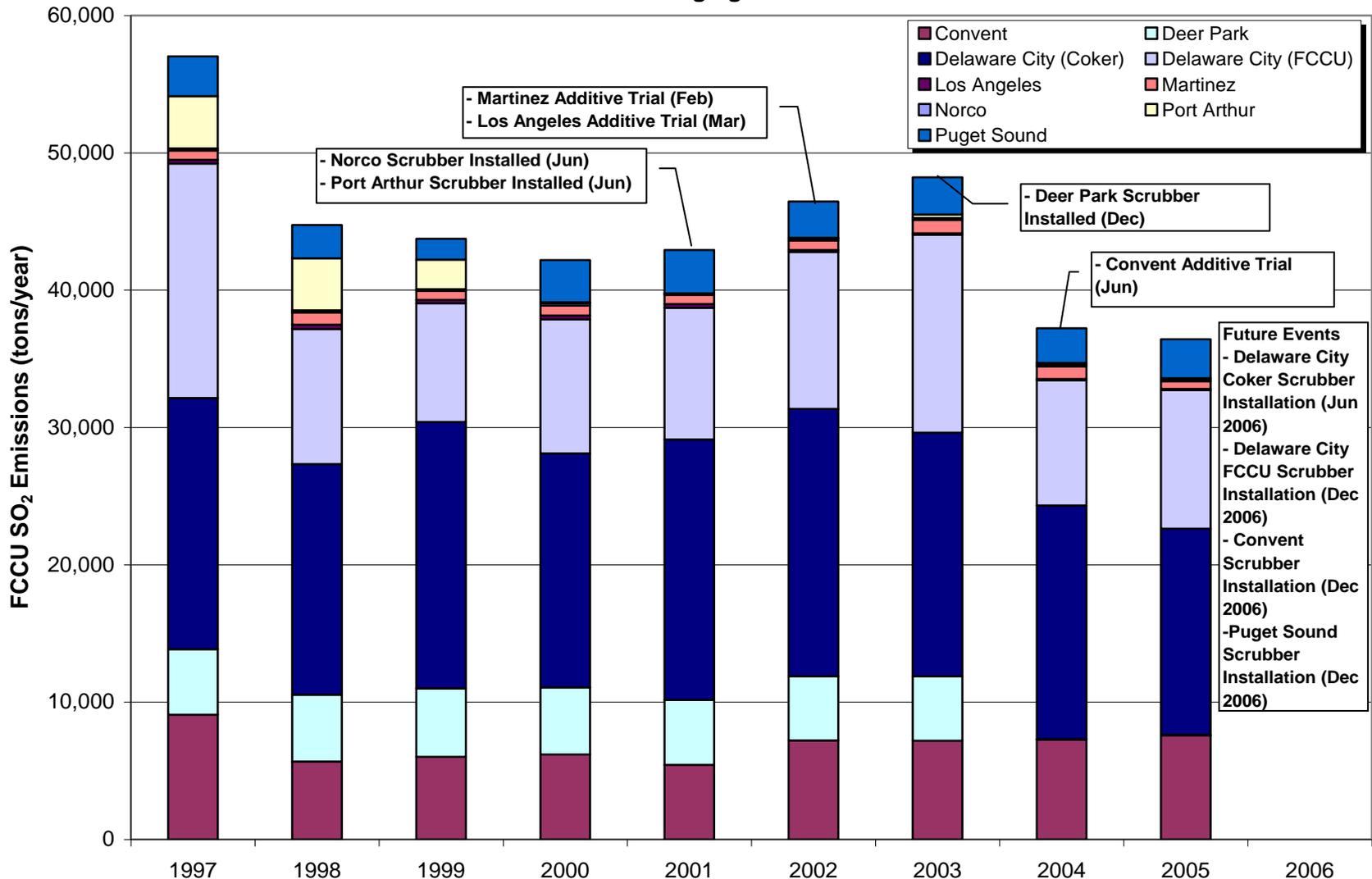
Notes:
SO₂: [□] = interim hard limit, [■] = final hard limits, [□] = hardware installation, [■] = hardware limits effective, [□] = start of additives, [■] = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
NO_x: [△] = interim hard limit, [▲] = hard limits, [△] = hardware installation, [▲] = hardware limits effective, [△] = start of additives and/or low NOx COPs, [▲] = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

M-E-DP Emissions Controls Milestones



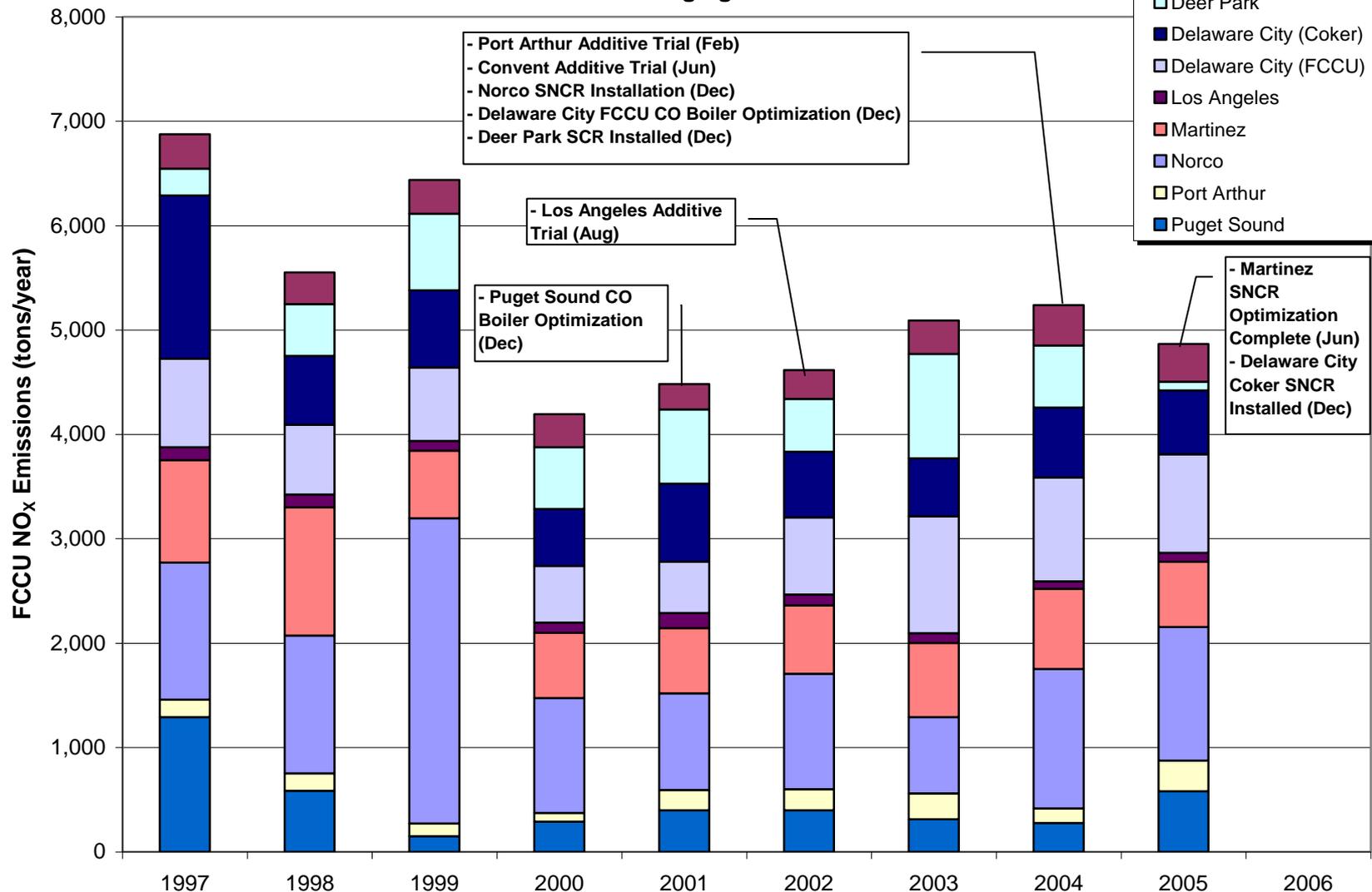
Motiva-Equilon-Deer Park Actual FCCU SO₂ Emissions

Date of Lodging: 3/21/2001



Motiva-Equilon-Deer Park Actual FCCU NO_x Emissions

Date of Lodging: 3/21/2001



Marathon Ashland Petroleum

May 2001

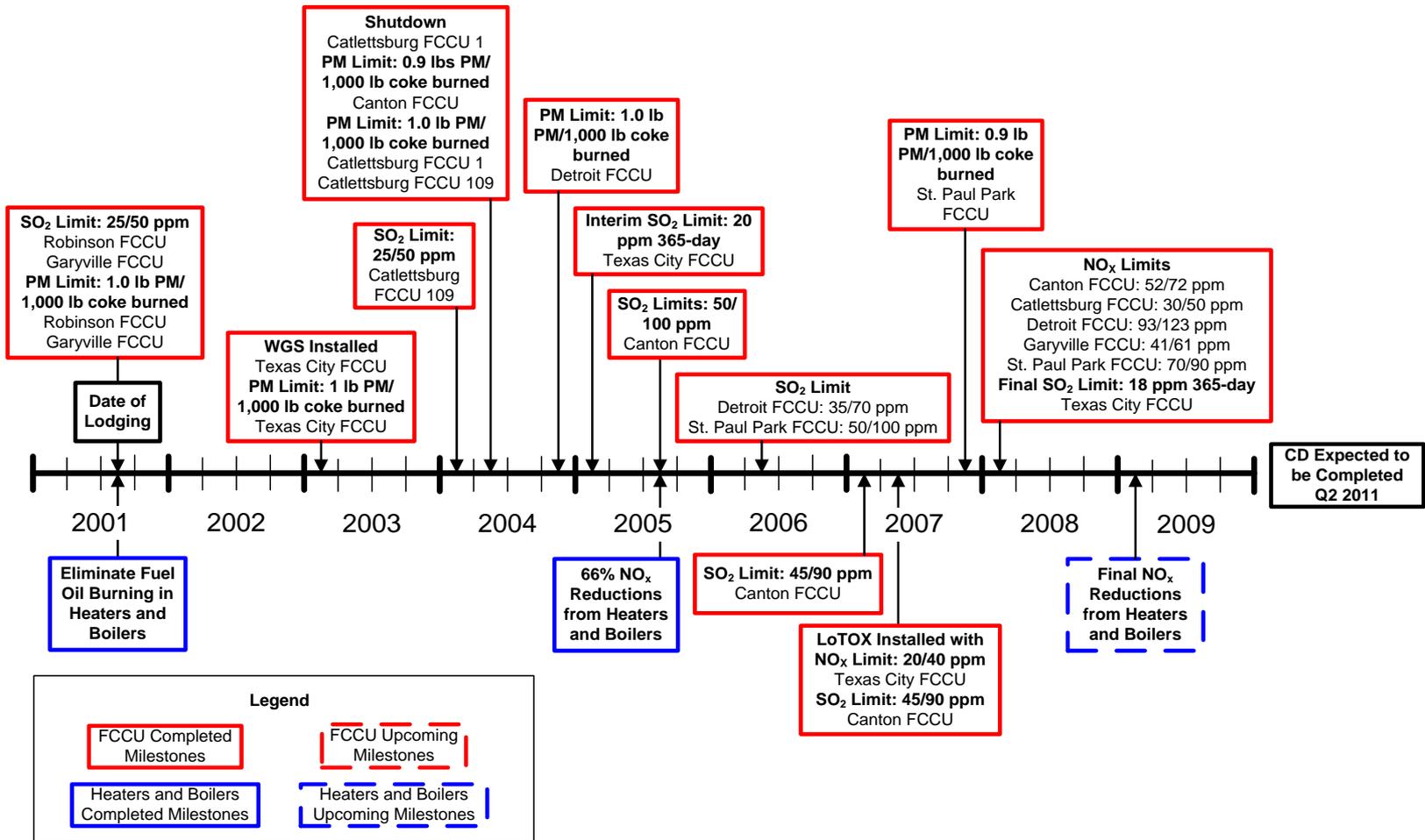
- 7 refineries in Illinois, Kentucky, Louisiana, Michigan, Minnesota, Ohio and Texas
- \$265 million in injunctive relief
- Annual Reductions
 - 8,000 tons of NO_x
 - 12,800 tons of SO₂
- Penalty: \$3.8 million
- SEPs: \$6.5 million
- Co-Plaintiffs: County of Wayne, Michigan, Louisiana and Minnesota
- Marathon Oil Corp. acquired Ashland Inc.'s interests in Marathon Ashland Petroleum and changed the name to Marathon Petroleum Company in 2005
- Northern Tier Energy acquired the St. Paul Park refinery in 2010

MAP FCCU Emissions Reduction Compliance Dates

DOL May 2001		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Canton	FCCU SO ₂	[Yellow bar]						■									
	FCCU NO _x	△		[Yellow bar]						▲							
Cattlettsburg FCCU	FCCU SO ₂	[Yellow bar]				■											
	FCCU NO _x	[Yellow bar]								▲							
Cattlettsburg RCCU	FCCU SO ₂	[Yellow bar]				■											
	FCCU NO _x	[Yellow bar]			△	[Yellow bar]			▲								
Detroit	FCCU SO ₂	[Yellow bar]						■									
	FCCU NO _x	△		[Yellow bar]						▲							
Garyville	FCCU SO ₂	■															
	FCCU NO _x	△		[Yellow bar]						▲							
Robinson	FCCU SO ₂	■															
	FCCU NO _x	[Yellow bar]						△	[Yellow bar]			▲					
St. Paul Park	FCCU SO ₂	[Yellow bar]						■									
	FCCU NO _x	[Yellow bar]			△	[Yellow bar]			▲								
Texas City	FCCU SO ₂	[Yellow bar]			□	[Yellow bar]			■								
	FCCU NO _x	[Yellow bar]						▲▲									

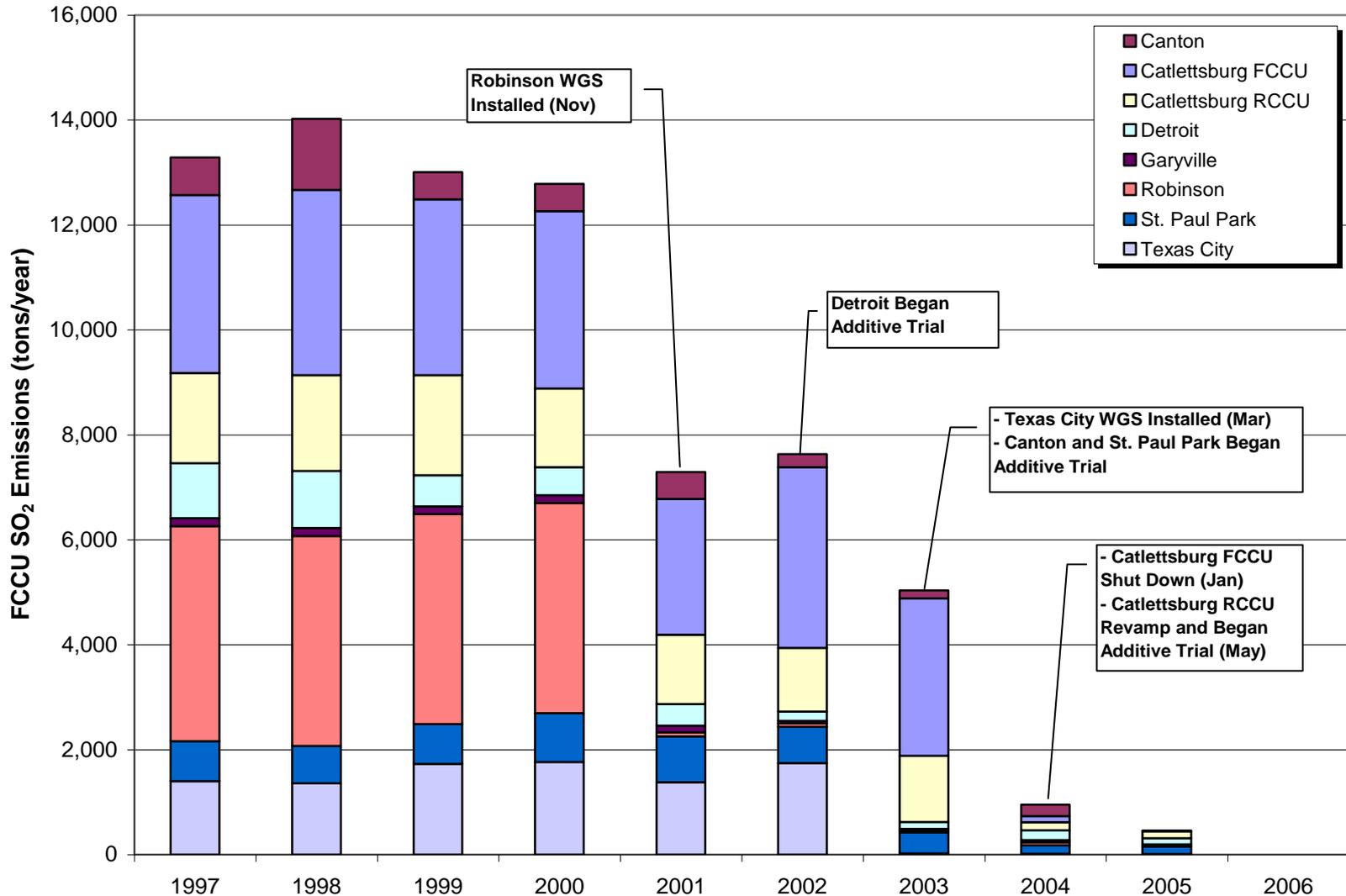
Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NO_x COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

MAP Emissions Controls Milestones



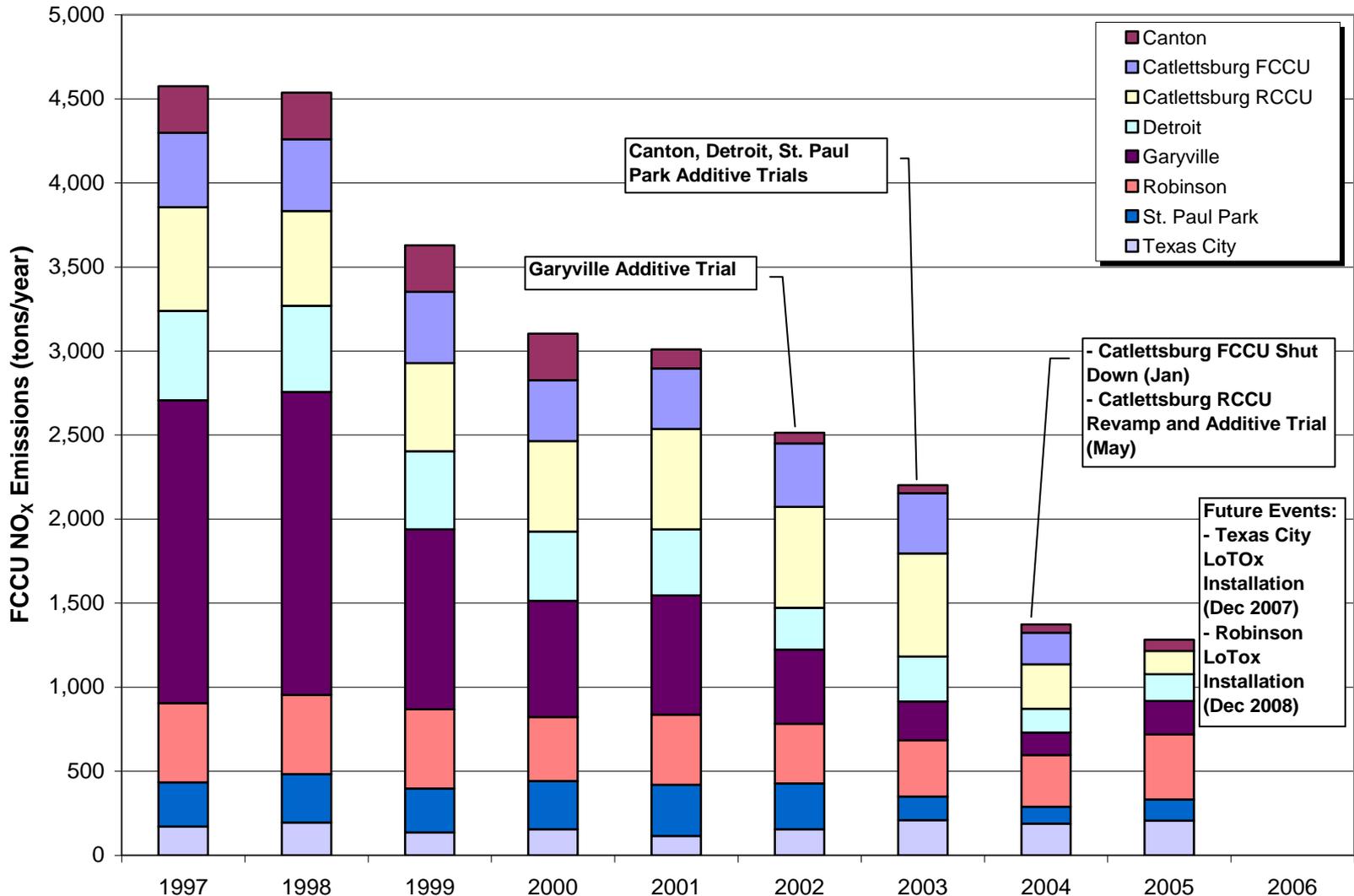
MAP Actual FCCU SO₂ Emissions

Date of Lodging: 5/11/2001



MAP Actual FCCU NO_x Emissions

Date of Lodging: 5/11/2001



Conoco

(pre-merger with Phillips Petroleum)

December 2001

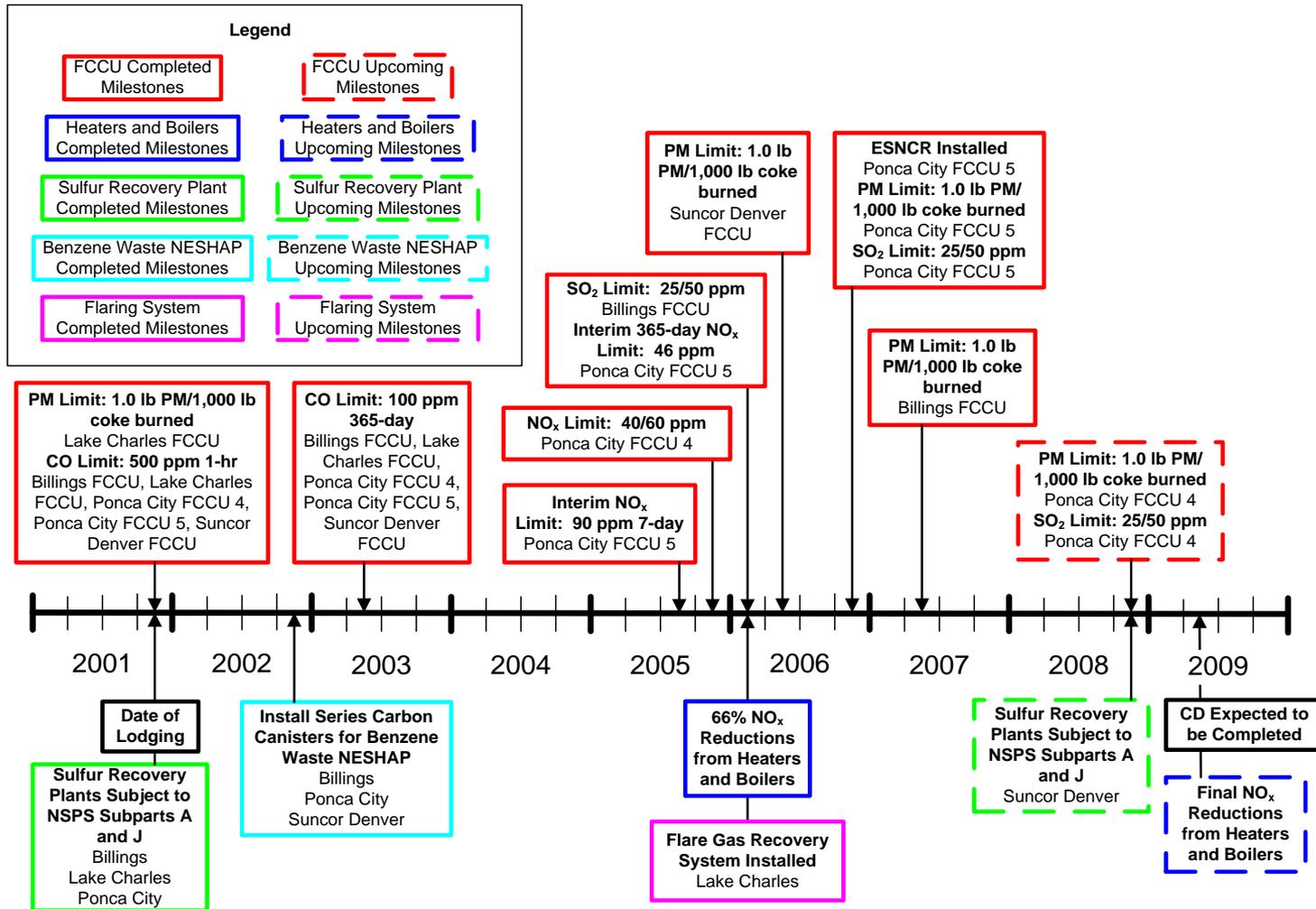
- 4 refineries in Colorado, Louisiana, Montana and Oklahoma
- \$110 million in injunctive relief
- Annual Reductions
 - 3,210 tons of NO_x
 - 4,000 tons of SO₂
- Penalty: \$1.5 million
- SEPs: \$5.1 million
- Co-Plaintiffs: Colorado, Louisiana, Montana and Oklahoma
- Suncor Energy (U.S.A.) Inc. acquired the Denver, Colorado refinery in 2003 (later integrated with adjacent refinery acquired from Valero in 2005)

Conoco FCCU Emissions Reduction Compliance Dates

	DOL Dec 2001	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Billings	FCCU SO ₂		■				■										
	FCCU NO _x		△					▲									
Lake Charles	FCCU SO ₂		□	■			■										
	FCCU NO _x		△				▲										
Ponca City 4	FCCU SO ₂		□	■			■		■								
	FCCU NO _x		△					▲									
Ponca City 5	FCCU SO ₂		□	■			■		■								
	FCCU NO _x		△					▲									
Suncor Denver	FCCU SO ₂		□	■			■		■ ²								
	FCCU NO _x		△					▲ ³									

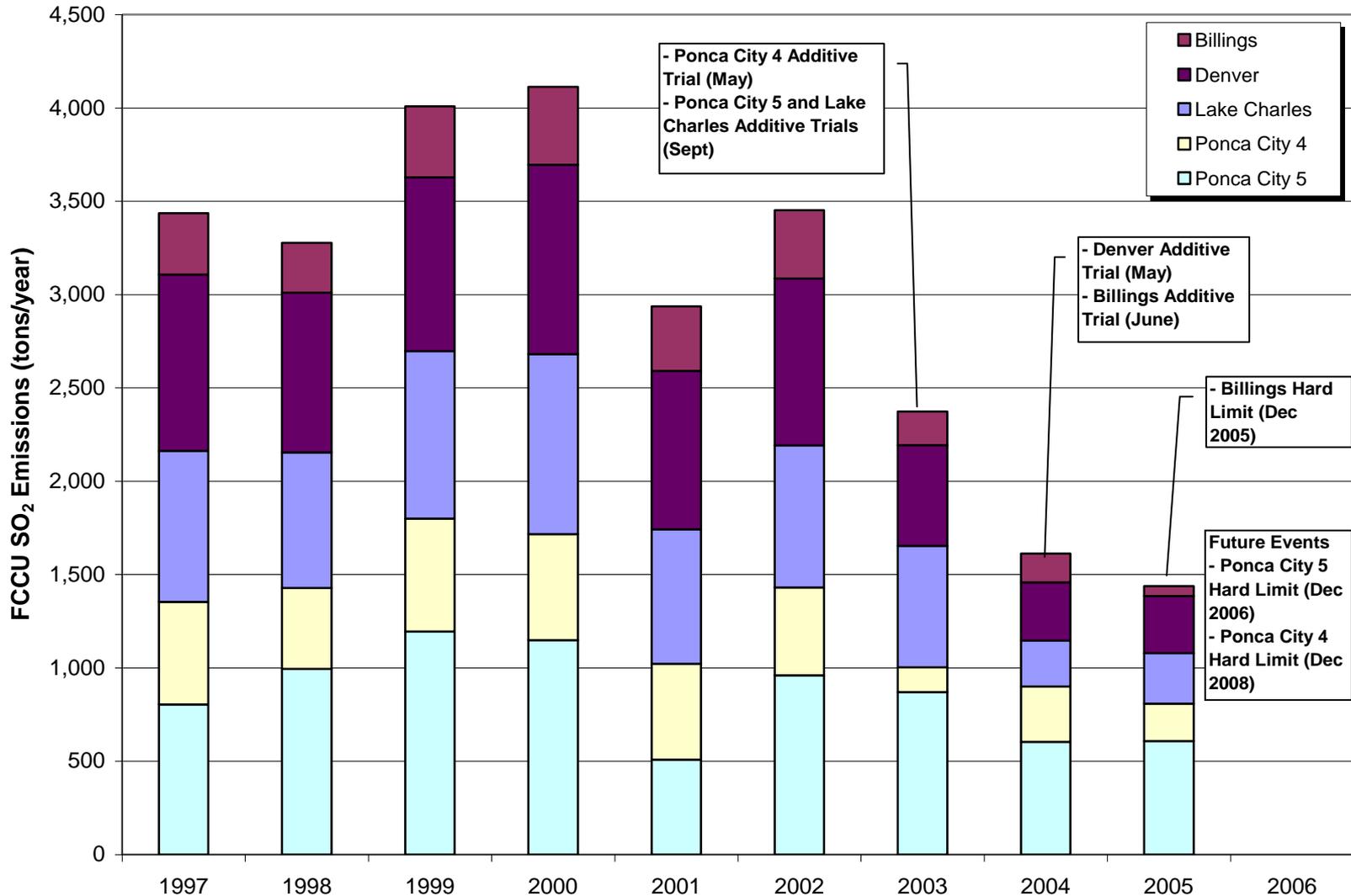
Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NO_x COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Conoco Emissions Controls Milestones



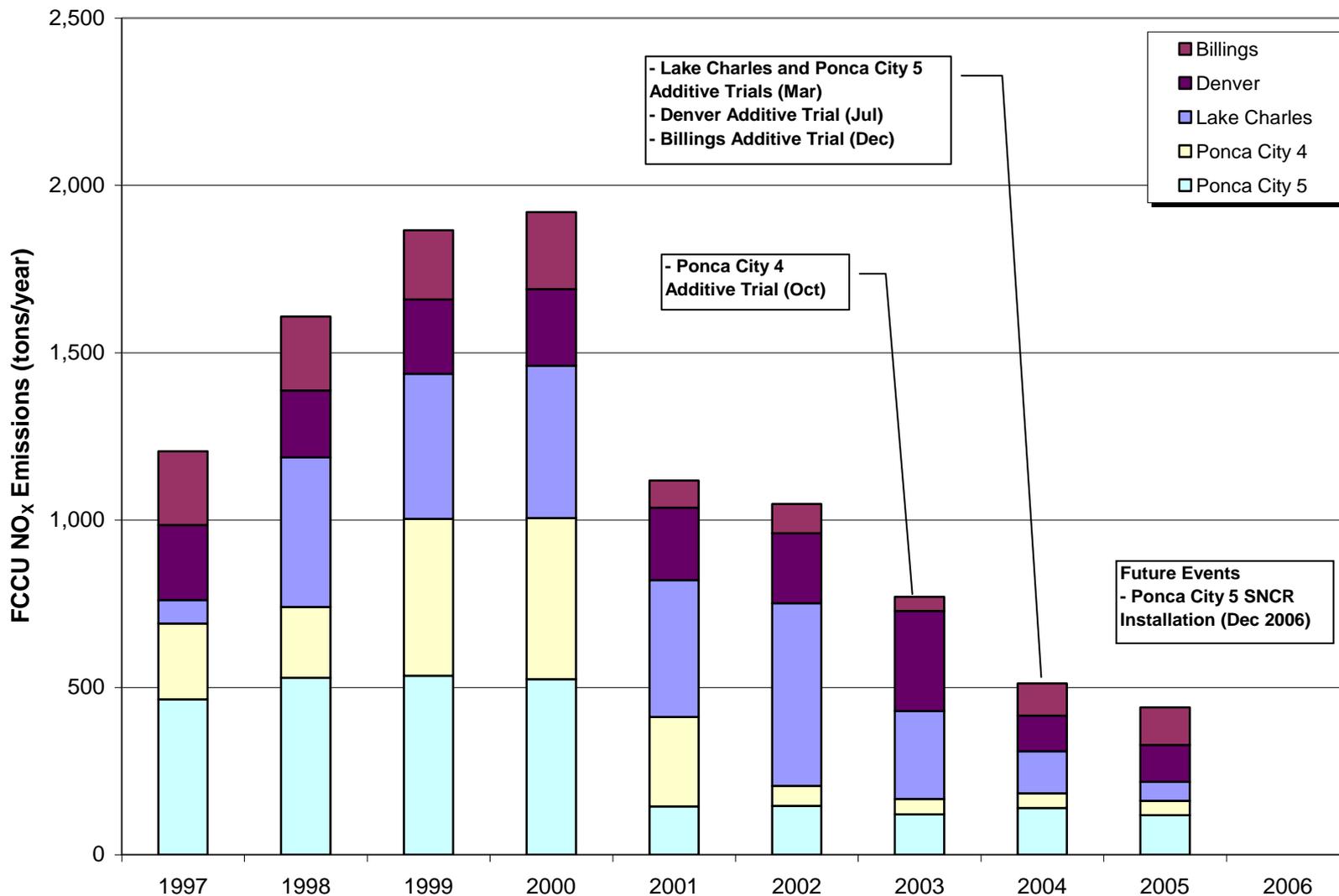
Conoco and Suncor Actual FCCU SO₂ Emissions

Date of Lodging: 12/20/2001



Conoco and Suncor Actual FCCU NO_x Emissions

Date of Lodging: 12/20/2001



Navajo-Montana

December 2001

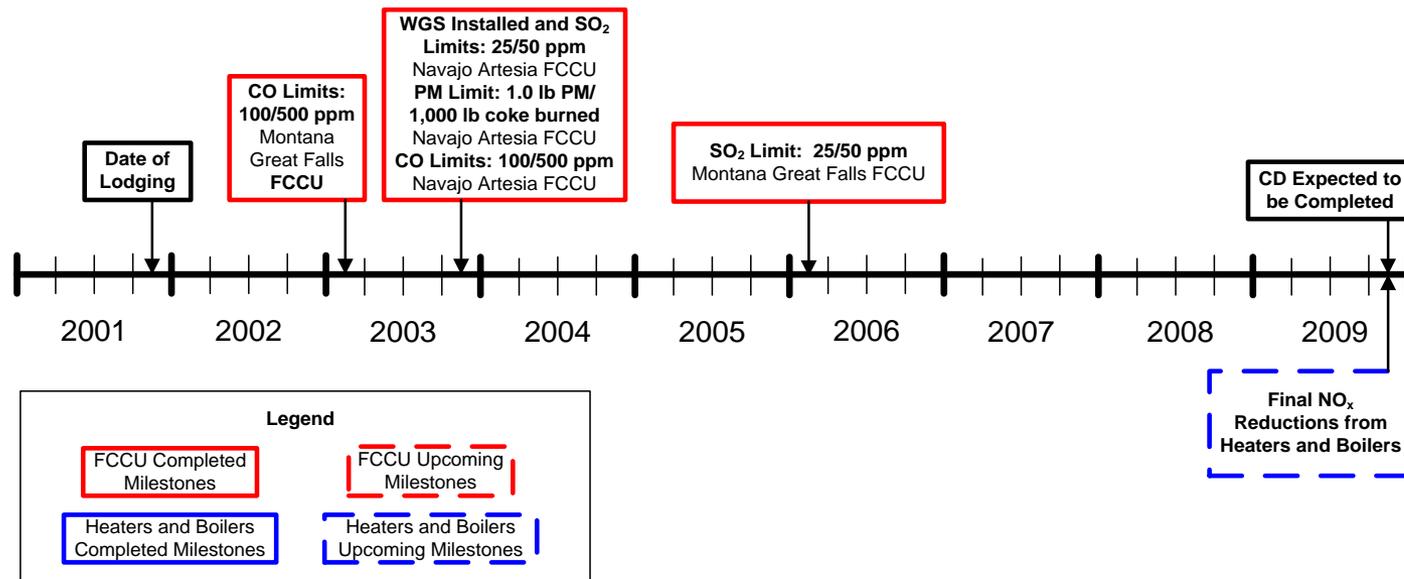
- 3 refineries in Montana and New Mexico
- \$15 million in injunctive relief
- Annual Reductions
 - 2,500 tons of NO_x
 - 2,350 tons of SO₂
- Penalty: \$750,000
- SEPs: \$200,000
- Co-Plaintiffs: Montana and New Mexico
- Connacher acquired the Montana refinery in 2006

Navajo-Montana FCCU Emissions Reduction Compliance Dates

DOL Dec 2001	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Navajo Artesia															
FCCU SO ₂															
FCCU NO _x															
Montana Great Falls															
FCCU SO ₂															
FCCU NO _x															

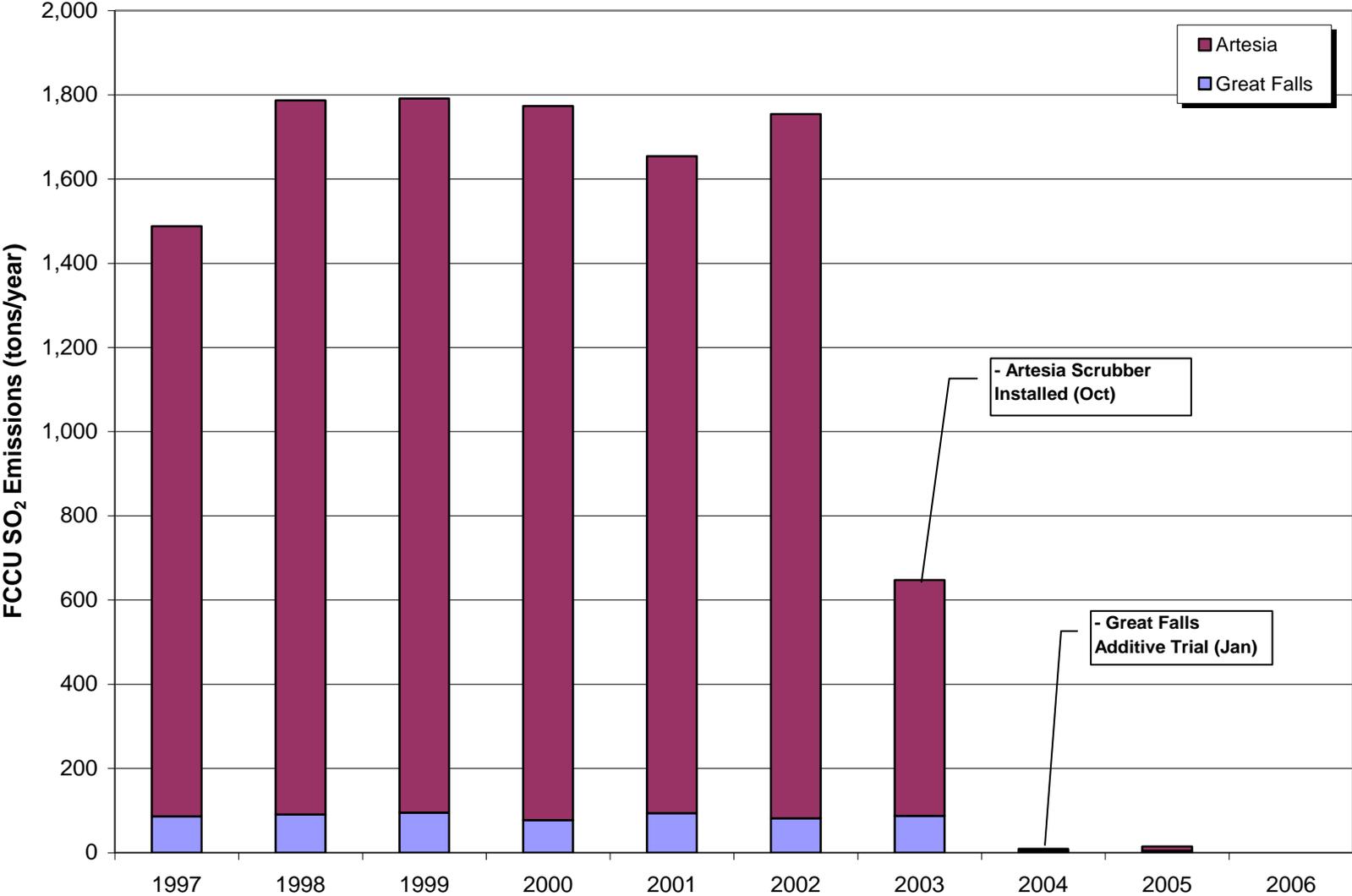
Notes:
SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Navajo-Montana Emissions Controls Milestones



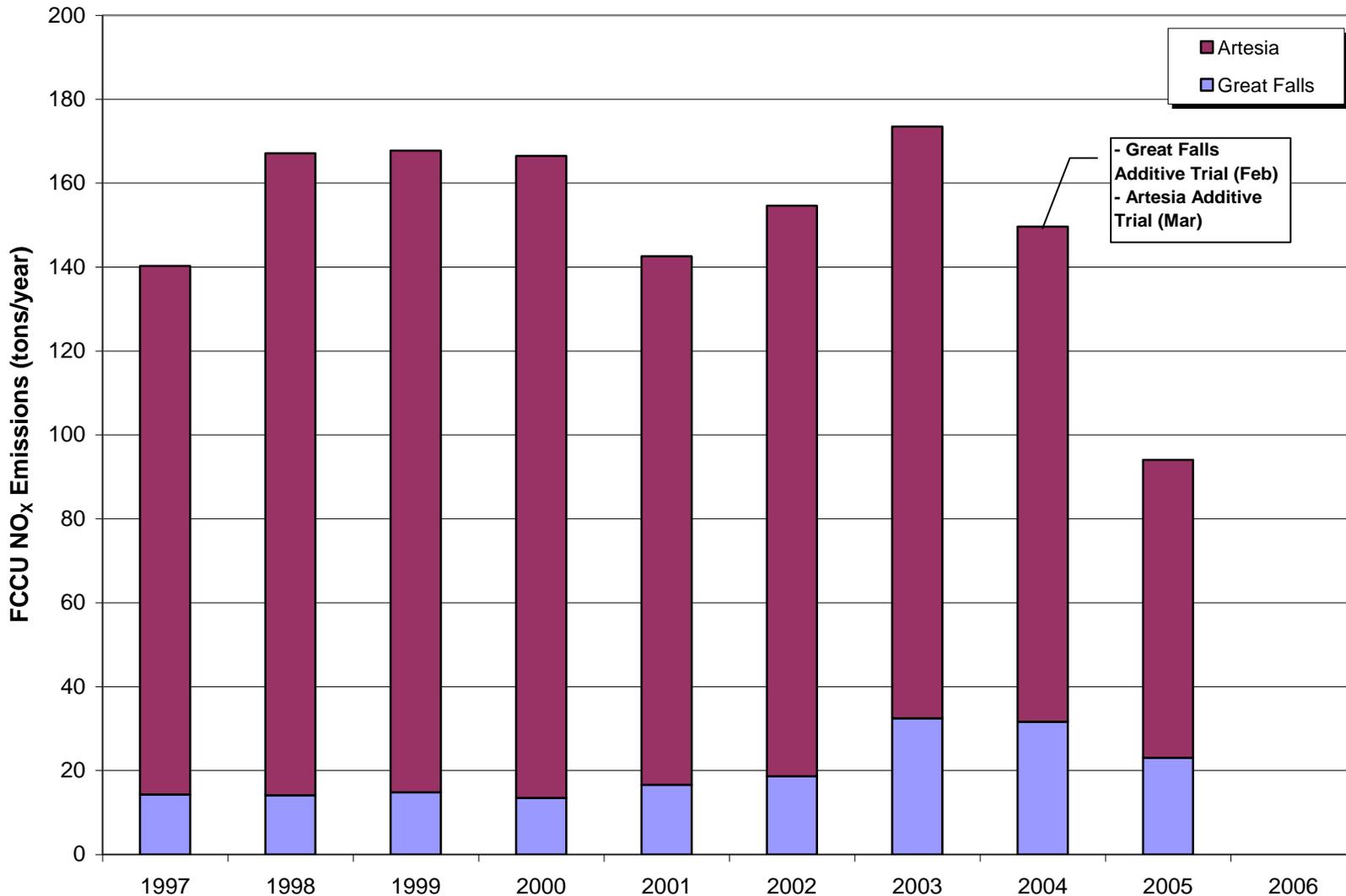
Navajo-Montana Actual FCCU SO₂ Emissions

Date of Lodging: 12/20/2001



Navajo-Montana Actual FCCU NO_x Emissions

Date of Lodging: 12/20/2001



Lion Oil

May 2003

- 1 refinery in Arkansas
- \$21.5 million in injunctive relief
- Annual Reductions
 - 530 tons of NO_x
 - 650 tons of SO₂
- Penalty: \$348,000
- SEPs: \$450,000
- Co-Plaintiffs: Arkansas

Lion Oil FCCU Emissions Reduction Compliance Dates

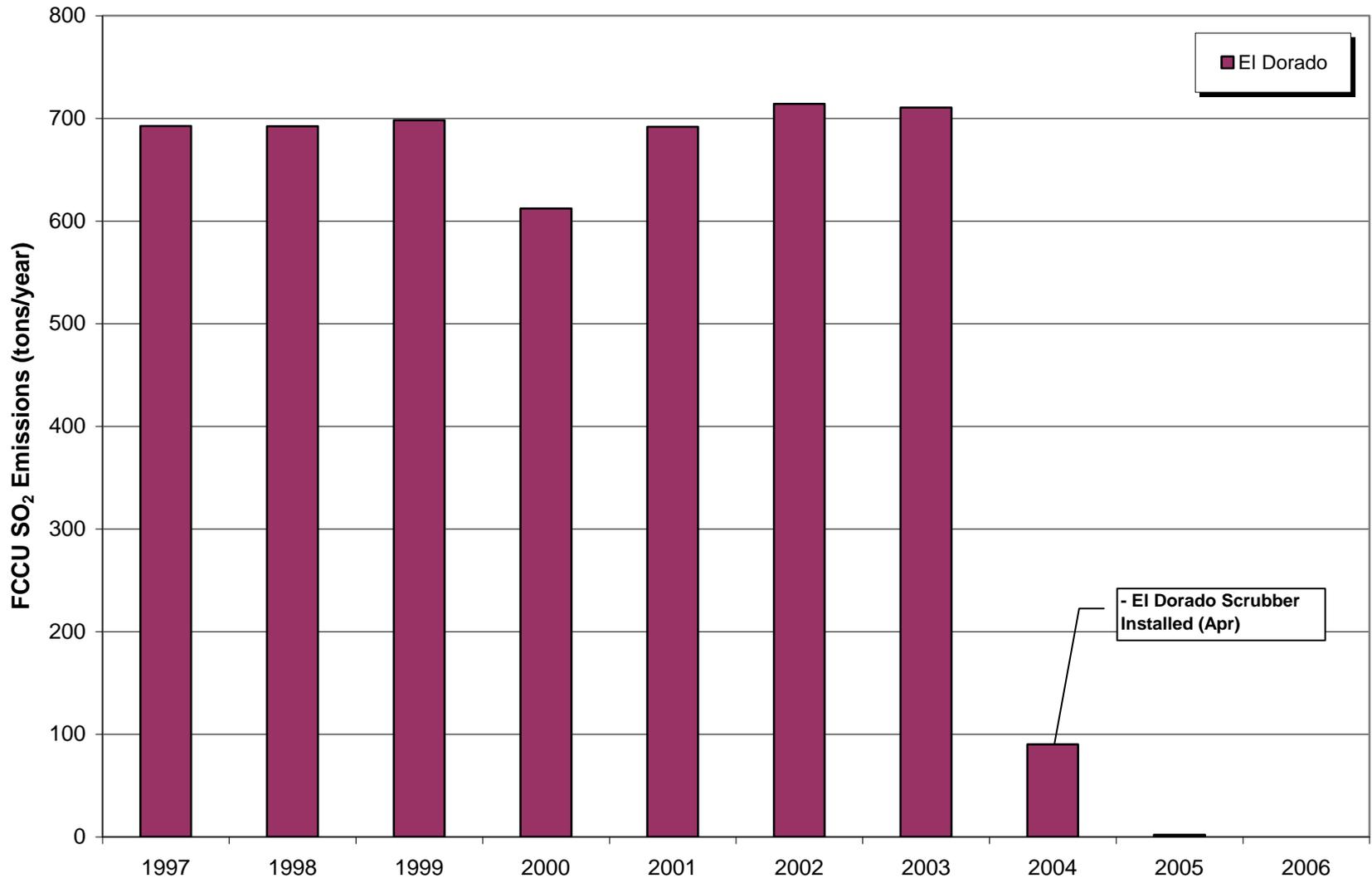
	DOL Oct 2003	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
El Dorado	FCCU SO ₂				□■											
	FCCU NO _x							△		▲						
<small>Notes: SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits). NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).</small>																

Lion Oil Emissions Controls Milestones



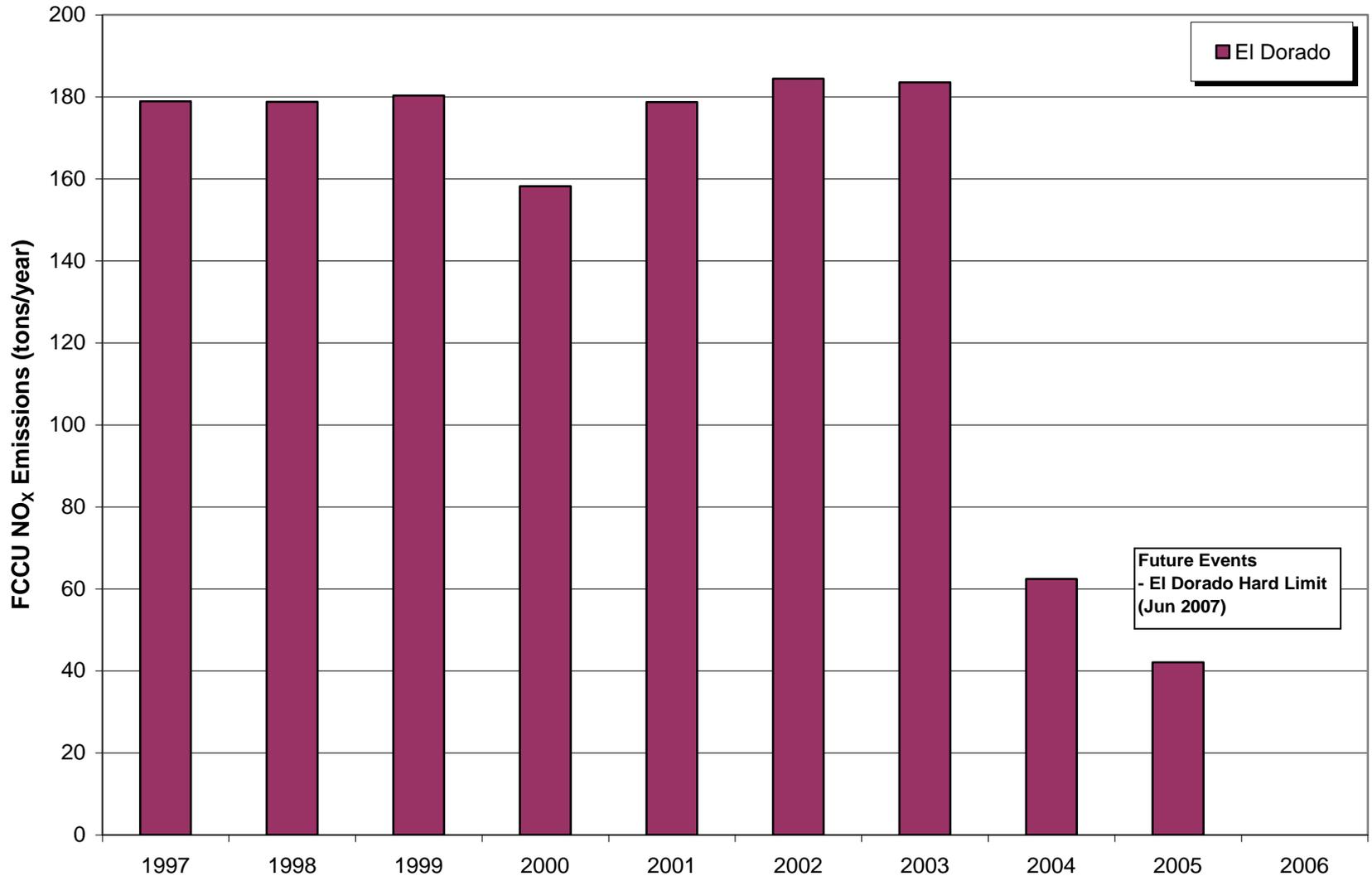
Lion Actual FCCU SO₂ Emissions

Date of Lodging: 3/11/2003



Lion Actual FCCU NO_x Emissions

Date of Lodging: 3/11/2003



CHS-Coastal-Ergon

October 2003

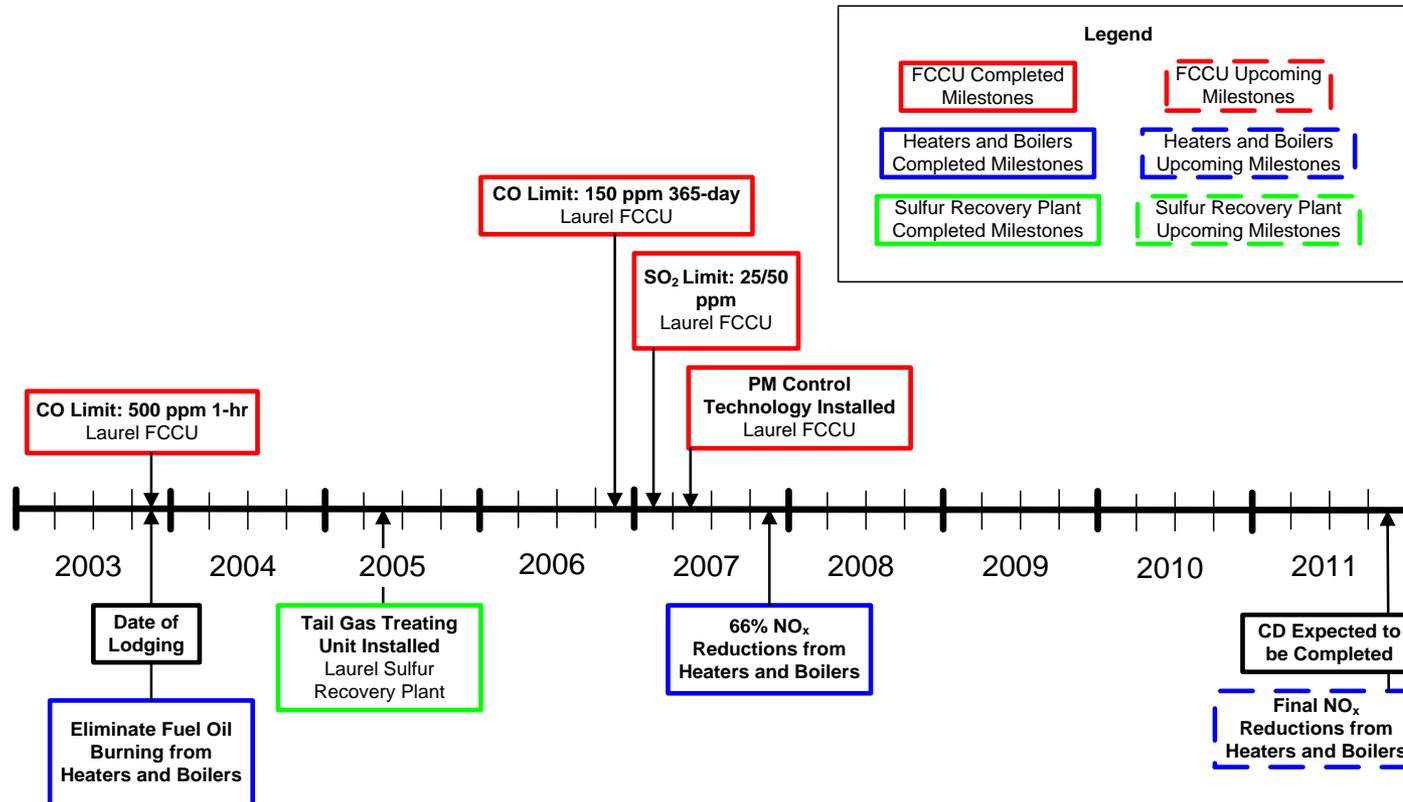
- 4 refineries in Mississippi, Montana, New Jersey and West Virginia
- Annual Reductions
 - 1,100 tons of NO_x
 - 2,800 tons of SO₂
- Penalty: \$2.9 million
- SEPs: \$1.6 million
- Co-Plaintiffs: Montana (CHS), New Jersey (Coastal), Mississippi Commission on Environmental Quality and West Virginia Department of Environmental Protection (Ergon)
- Sunoco, Inc. acquired the Eagle Point (Westville, New Jersey) refinery in 2004

CHS FCCU Emissions Reduction Compliance Dates

	DOL Oct 2003	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Laurel																
FCCU SO ₂																
FCCU NO _x																

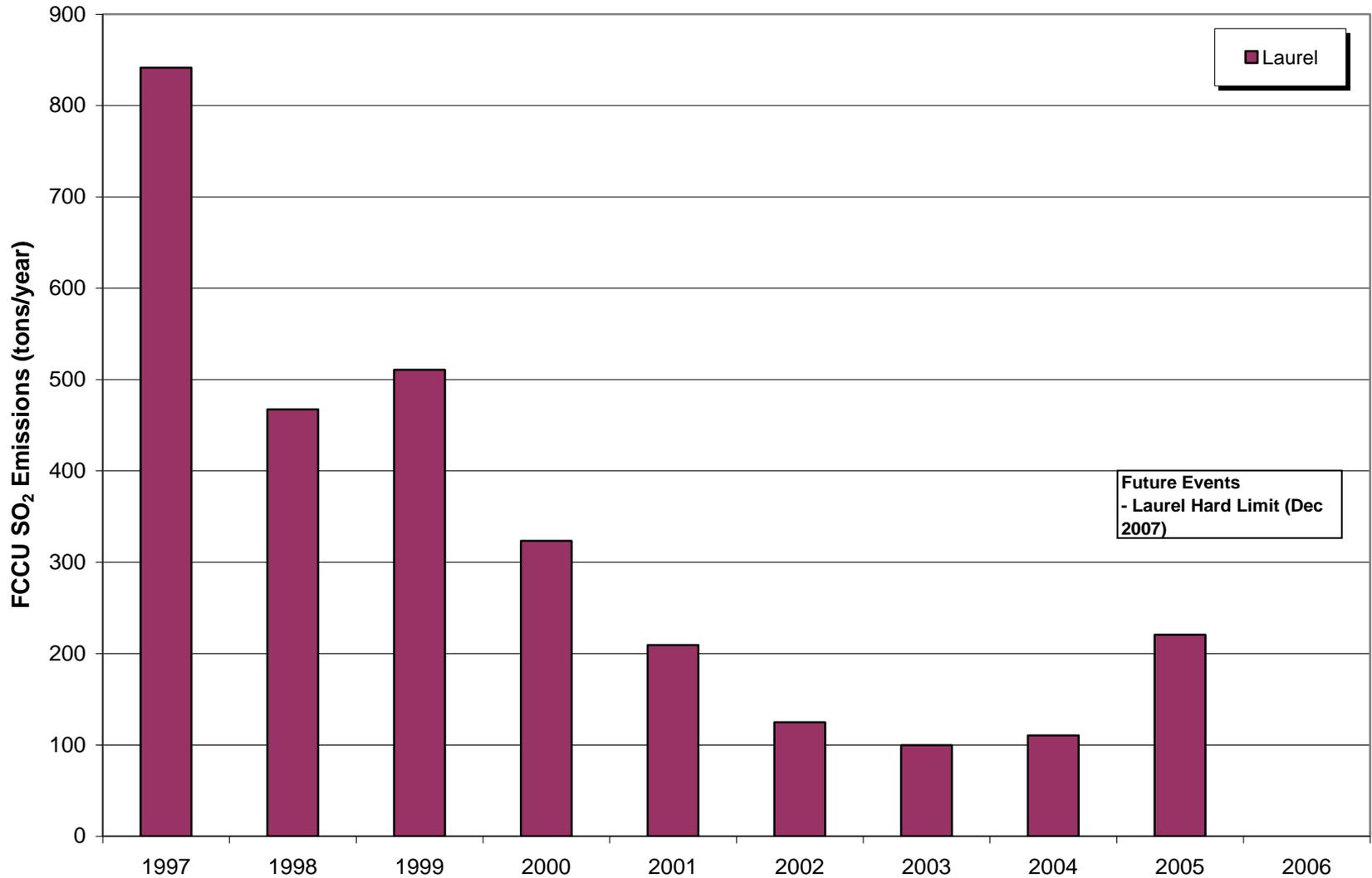
Notes:
SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
NO_x: △ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

CHS Emissions Controls Milestones



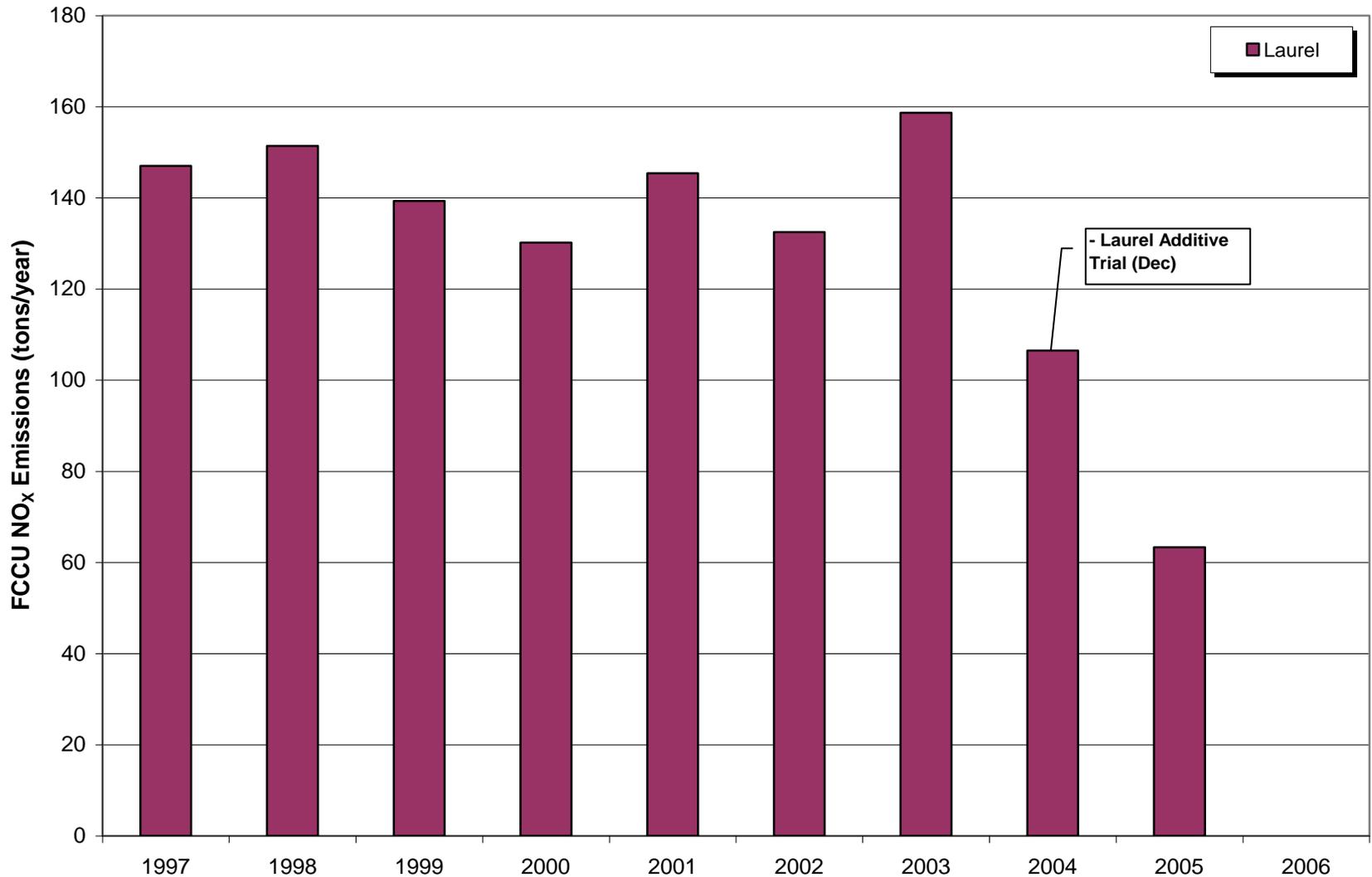
CHS Actual FCCU SO₂ Emissions

Date of Lodging: 9/30/2003



CHS Actual FCCU NO_x Emissions

Date of Lodging: 9/30/2003

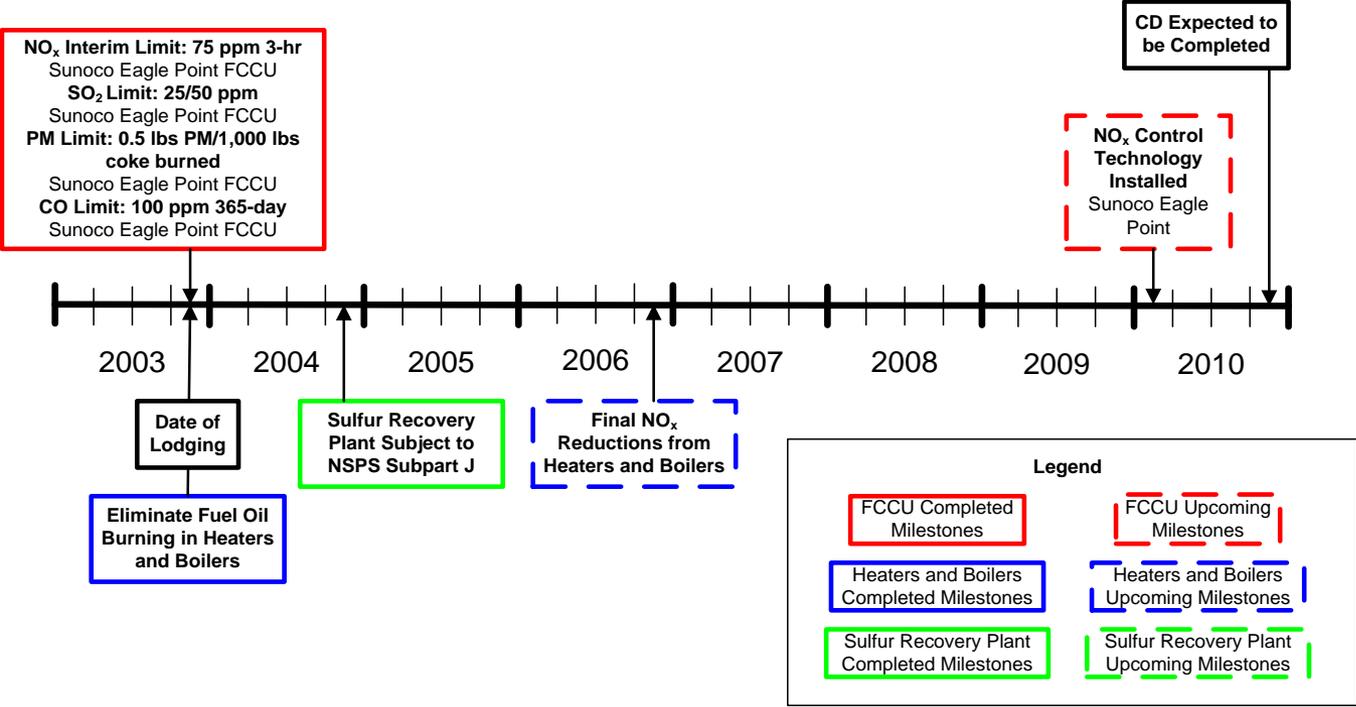


CEPOC FCCU Emissions Reduction Compliance Dates

DOL Oct 2003	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sunoco Eagle Point FCCU SO ₂			■												
FCCU NO _x			▲							▲▲					

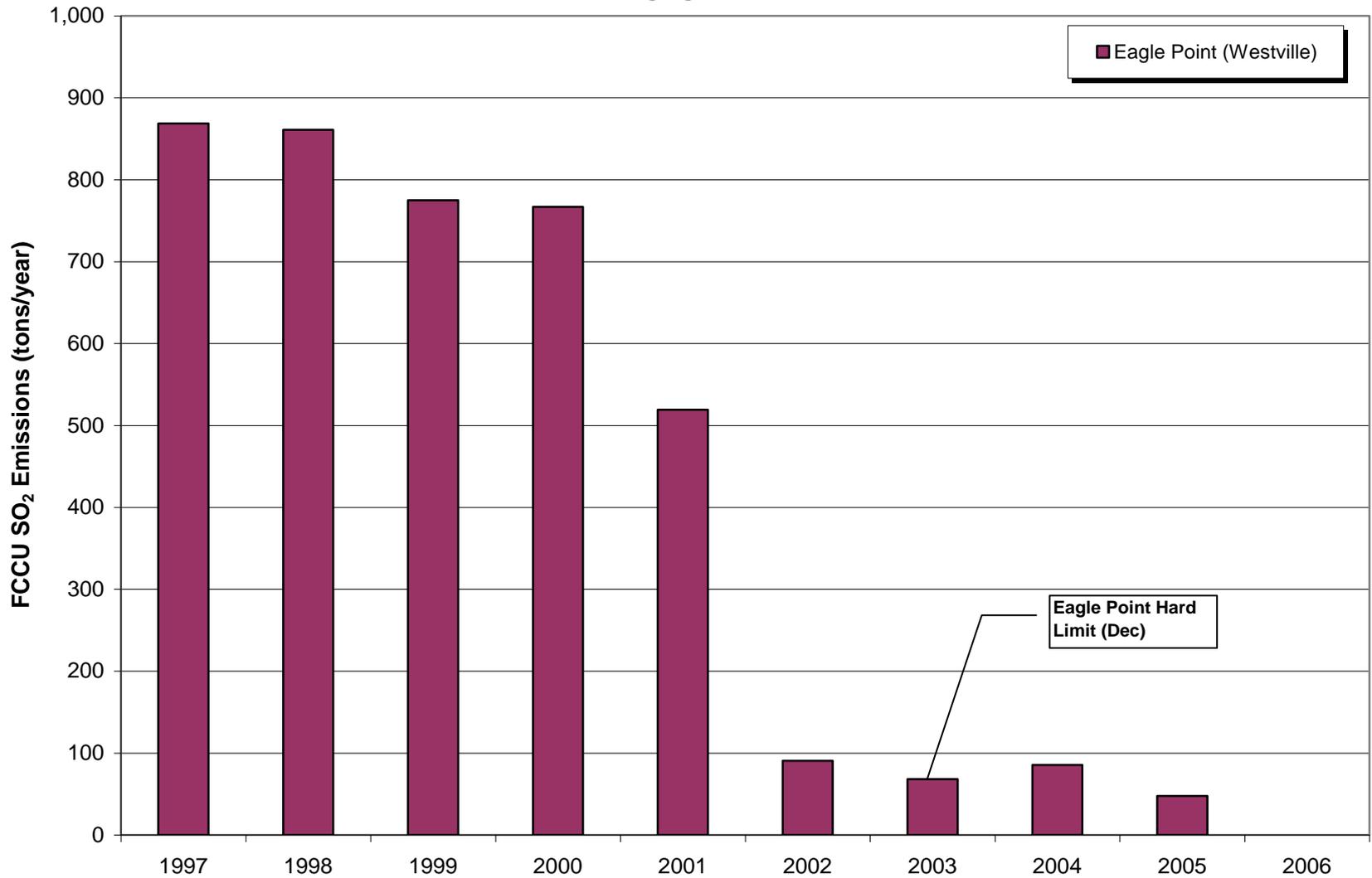
Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: ▲ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

CEPOC Emissions Controls Milestones



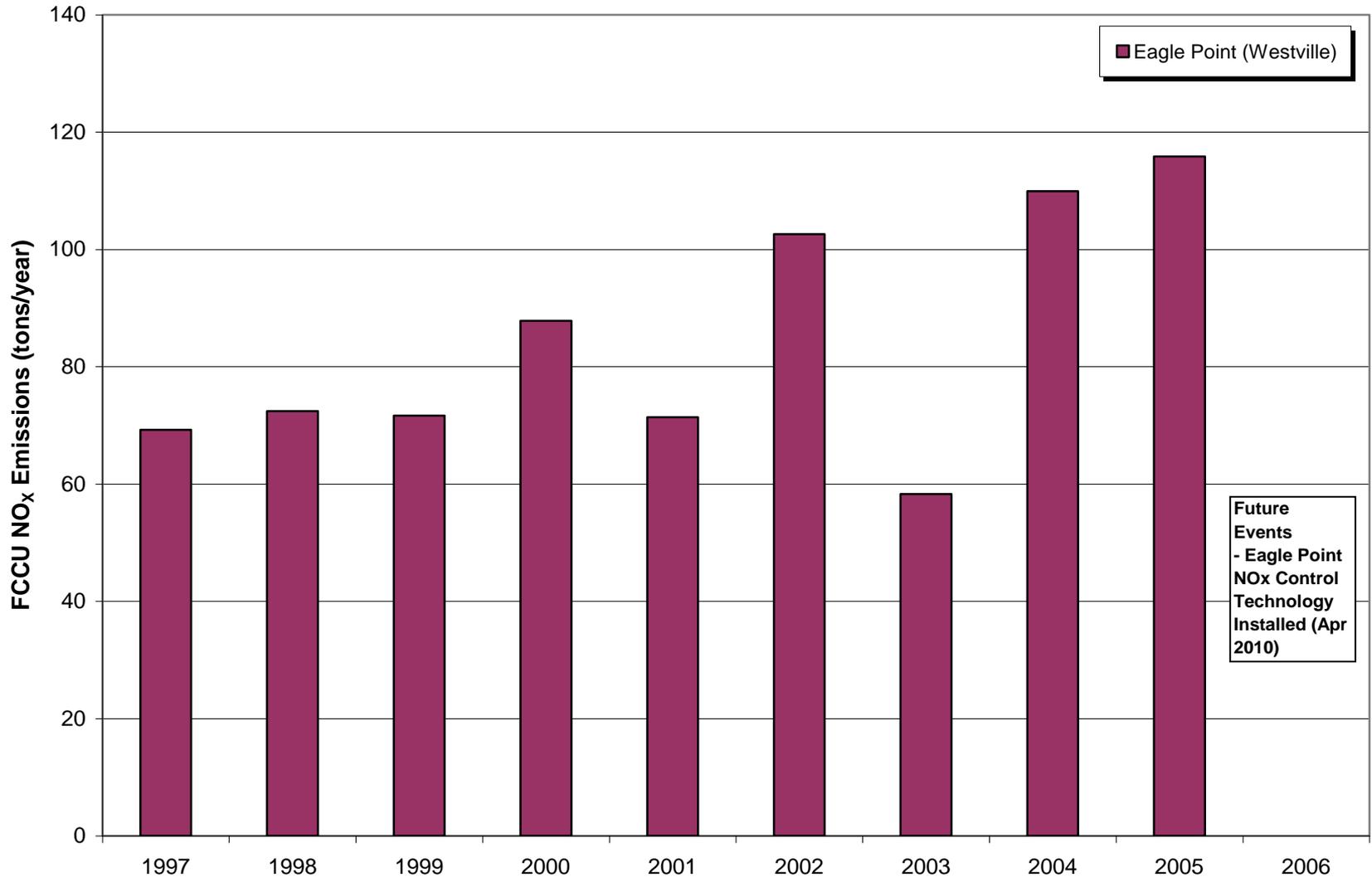
Coastal Actual FCCU SO₂ Emissions

Date of Lodging: 9/30/2003



Coastal Actual FCCU NO_x Emissions

Date of Lodging: 9/30/2003



Chevron

October 2003

- 5 refineries in California, Hawaii, Mississippi and Utah
- \$275 million in injunctive relief
- Annual Reductions
 - 3,300 tons of NO_x
 - 6,300 tons of SO₂
- Penalty: \$3.5 million
- SEPs: \$4 million
- Co-Plaintiffs: Bay Area Air Quality Management District, Hawaii, Mississippi Commission on Environmental Quality, and Utah

Chevron FCCU Emissions Reduction Compliance Dates

	DOL Oct 2003	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
El Segundo	FCCU SO ₂				□	■										
	FCCU NO _x								▲							
Hawaii	FCCU SO ₂						□	□					■			
	FCCU NO _x								▲				▲			
Pascagoula	FCCU SO ₂					□		■								
	FCCU NO _x					▲				▲						
Richmond	FCCU SO ₂							■								
	FCCU NO _x					▲										
Salt Lake City	FCCU SO ₂								■ ¹							
	FCCU NO _x								▲				▲			

Notes:

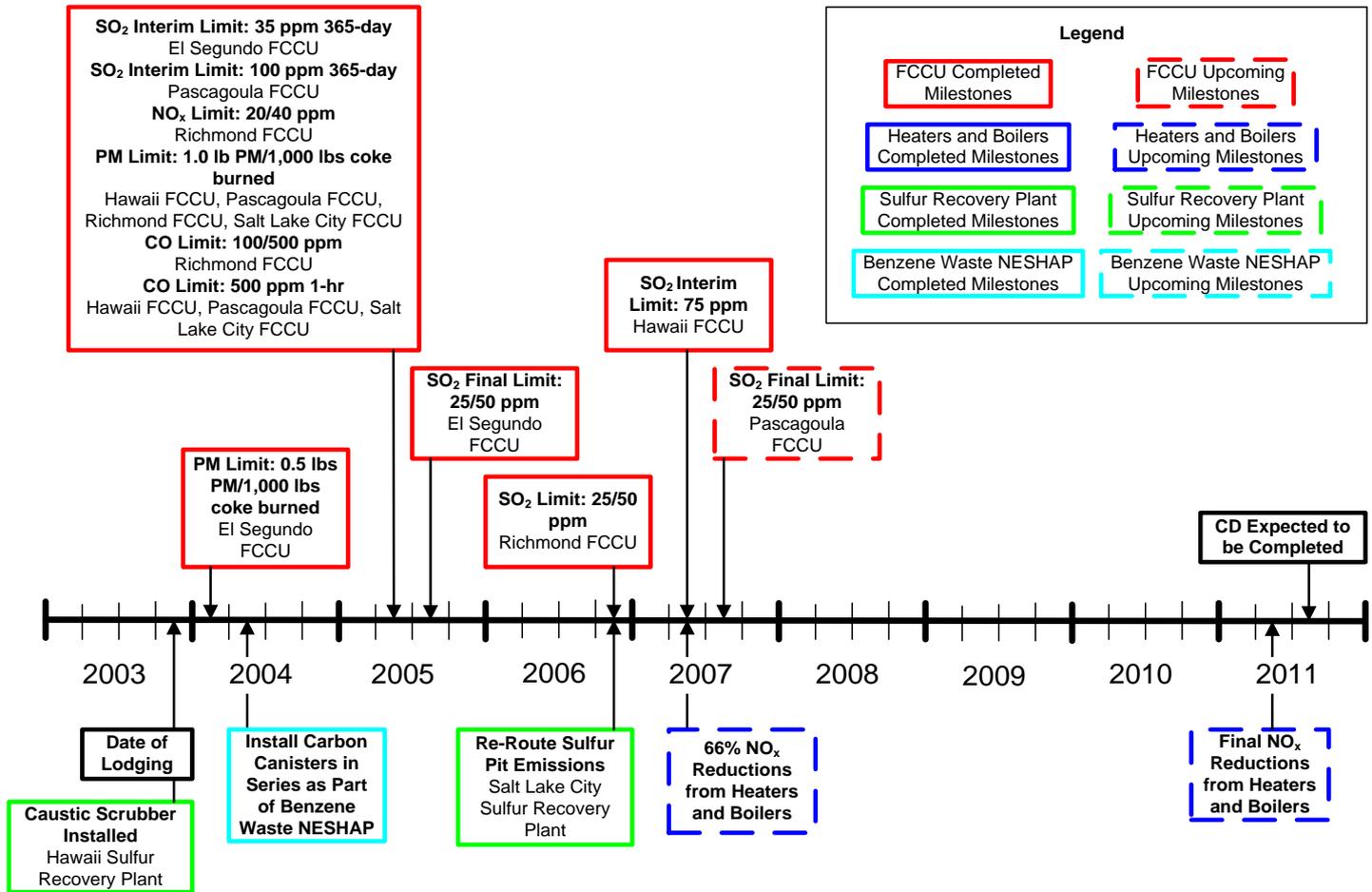
SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

NO_x: ▲ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NO_x COPS, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Footnotes:

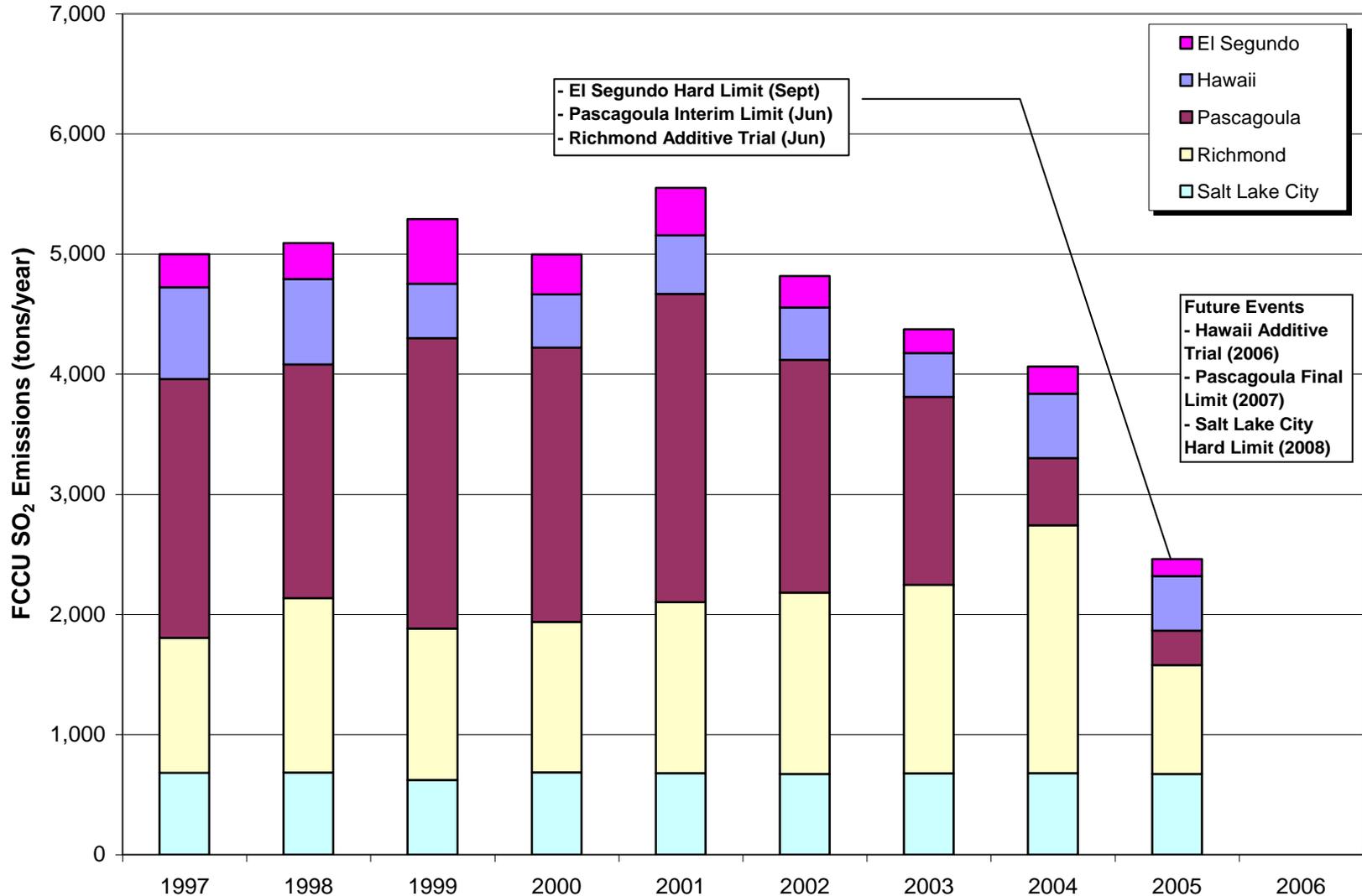
¹Salt Lake City: If feed hydrotreating and SO₂ additives are unable to meet the 12/2008 hard limit, WGS must be used to meet the hard limit by 12/2010.

Chevron Emissions Controls Milestones



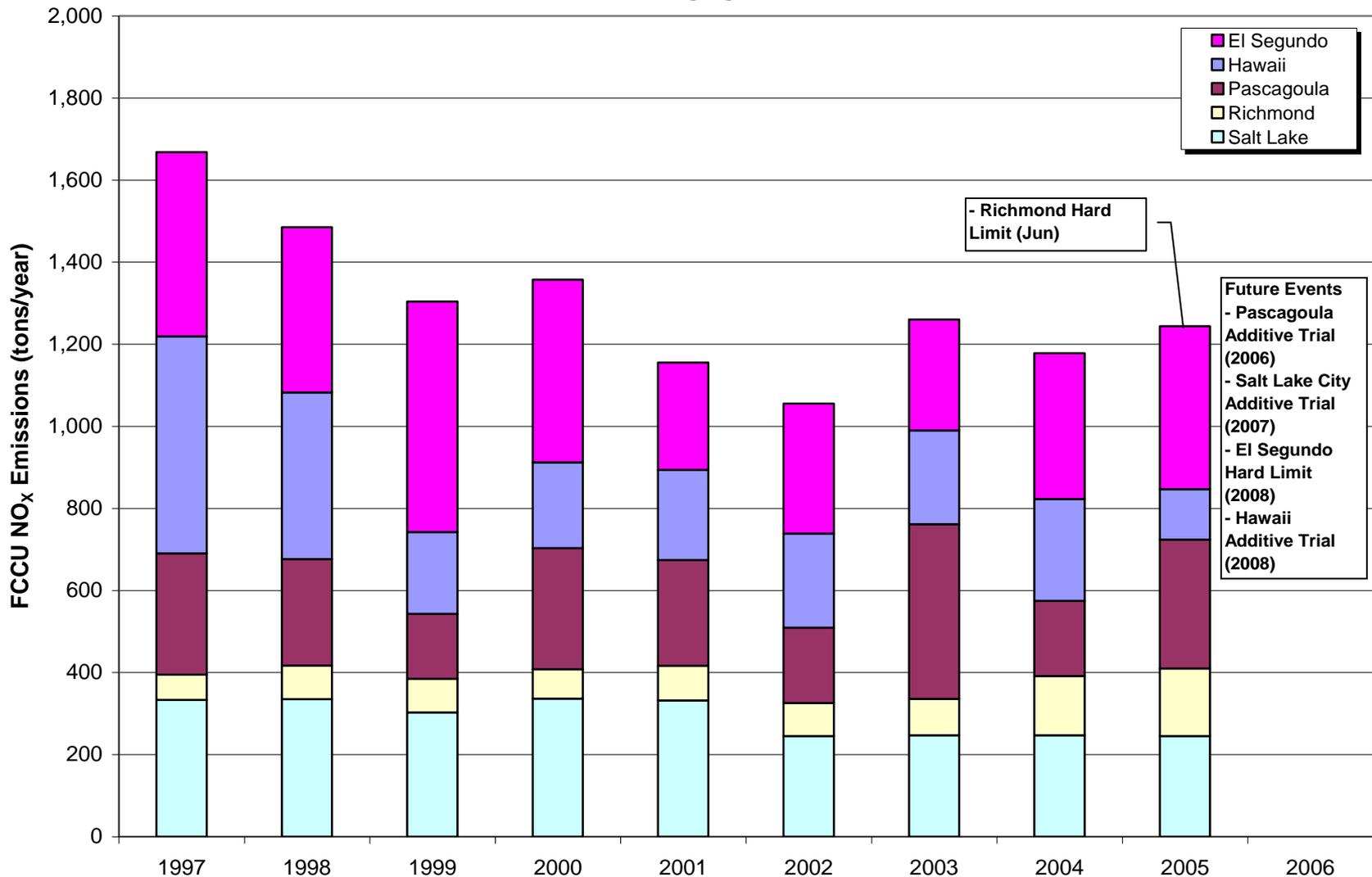
Chevron Actual FCCU SO₂ Emissions

Date of Lodging: 10/16/2003



Chevron Actual FCCU NO_x Emissions

Date of Lodging: 10/16/2003



CITGO

October 2004

- 5 refineries in Georgia, Illinois, Louisiana, New Jersey and Texas
- \$320 million in injunctive relief
- Annual Reductions
 - 7,100 tons of NO_x
 - 23,250 tons of SO₂
- Penalty: \$3.6 million
- SEPs: \$5 million
- Co-Plaintiffs: Georgia, Illinois, Louisiana and New Jersey

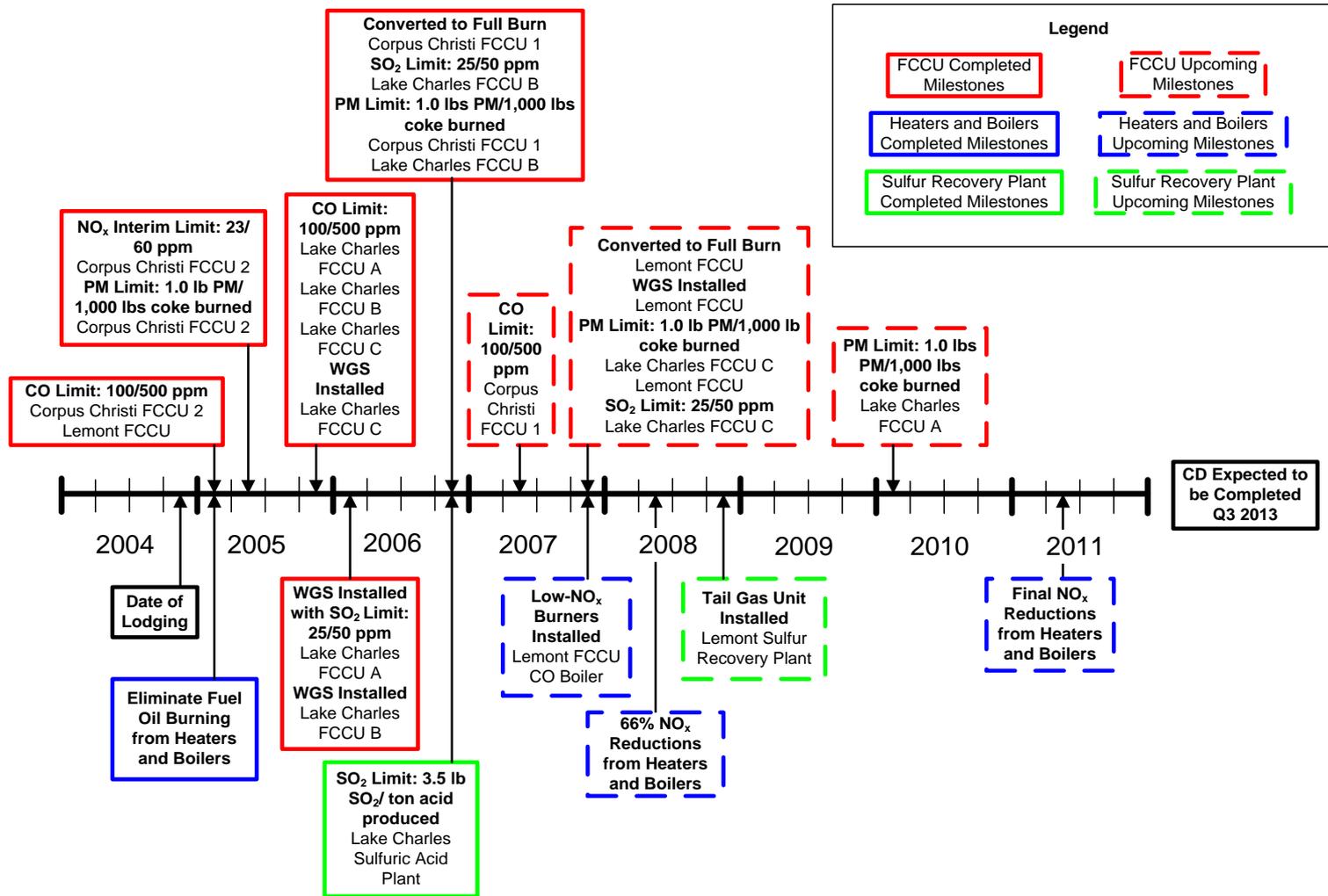
CITGO FCCU Emissions Reduction Compliance Dates

	DOL Oct 2004	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Corpus Christi East 1																
FCCU SO ₂										□						
FCCU NO _x									△							
Corpus Christi East 2																
FCCU SO ₂								□								
FCCU NO _x						△		△								
Lake Charles A																
FCCU SO ₂							□	■								
FCCU NO _x								△						▲		
Lake Charles B																
FCCU SO ₂							□	■								
FCCU NO _x								△						▲		
Lake Charles C																
FCCU SO ₂							□	■								
FCCU NO _x								△						▲		
Lemont																
FCCU SO ₂								□	■							
FCCU NO _x										△				▲		

Notes:
SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

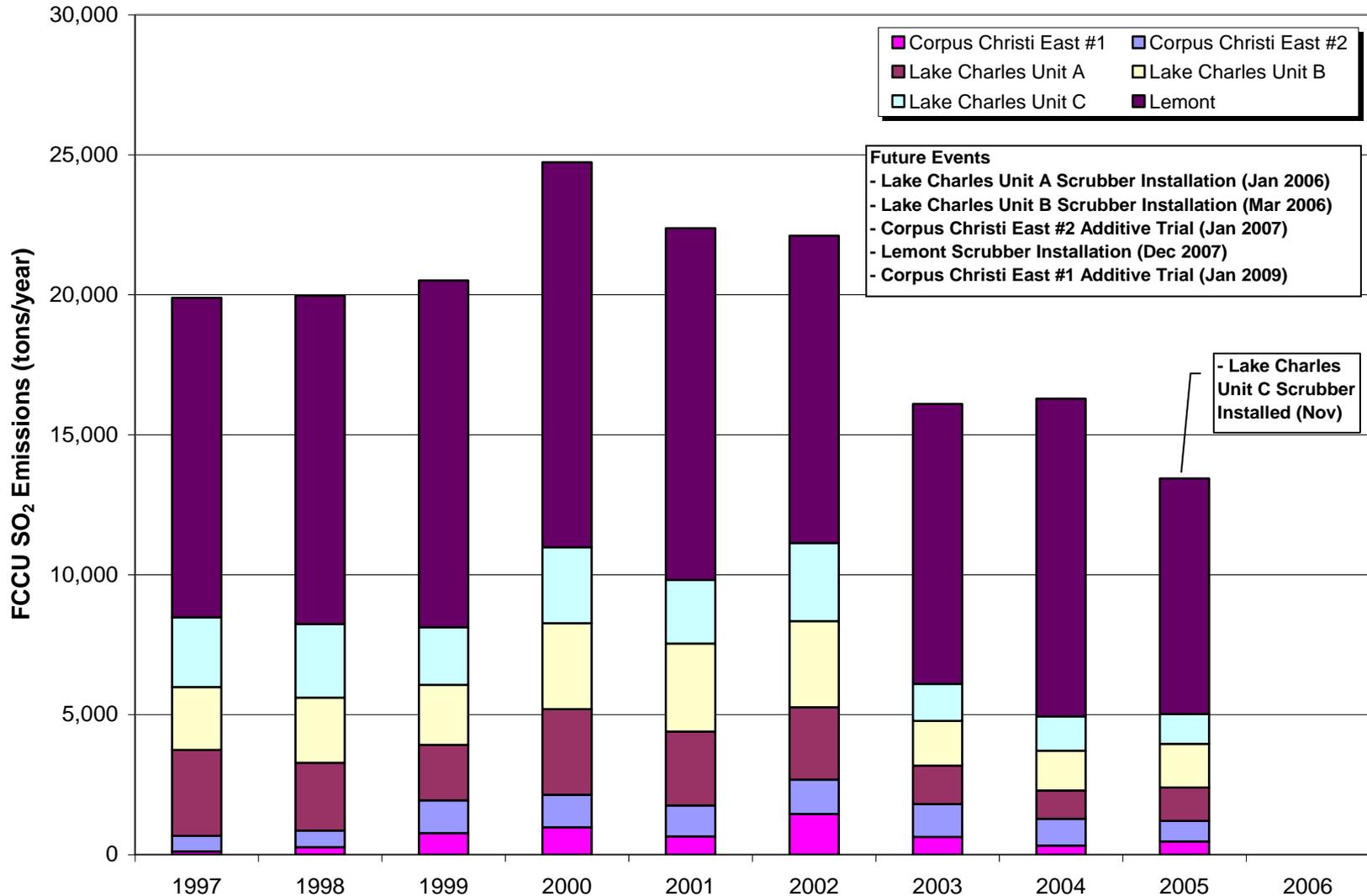
Footnotes:
Lemont: If FCCU is not converted to full-burn, hard limits are effective 12/31/2007.

CITGO Emissions Controls Milestones



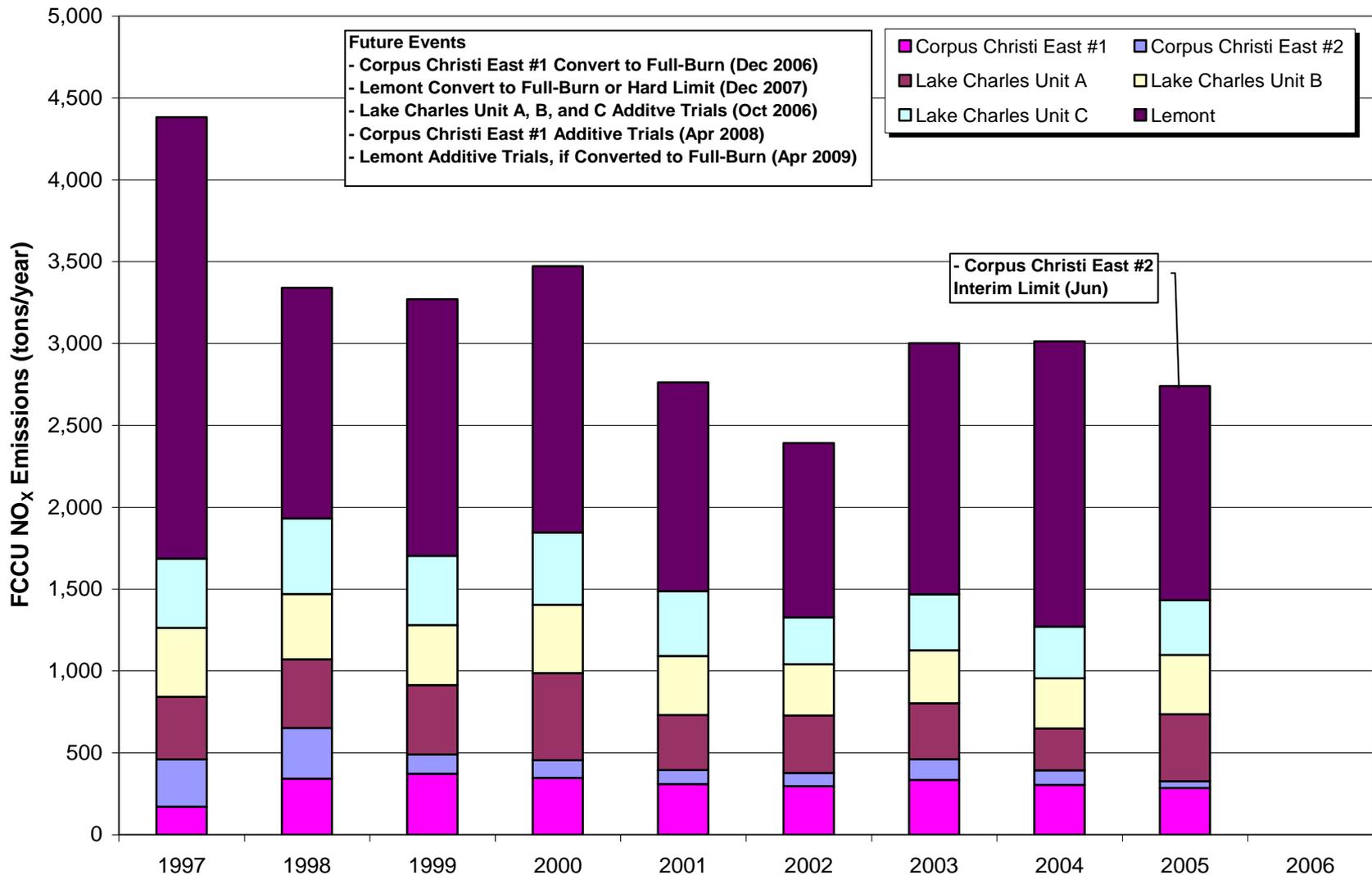
CITGO Actual FCCU SO₂ Emissions

Date of Lodging: 10/6/2004



CITGO Actual FCCU NO_x Emissions

Date of Lodging: 10/6/2004



ConocoPhillips

January 2005

- 11 refineries in California, Illinois, Louisiana, New Jersey, Pennsylvania, Texas and Washington
- \$525 million in injunctive relief
- Annual Reductions
 - 10,000 tons of NO_x
 - 37,100 tons of SO₂
- Penalty: \$4.5 million
- SEPs: \$10 million
- Co-Plaintiffs: Commonwealth of Pennsylvania, Illinois, Louisiana, New Jersey, and Northwest Clean Air Agency

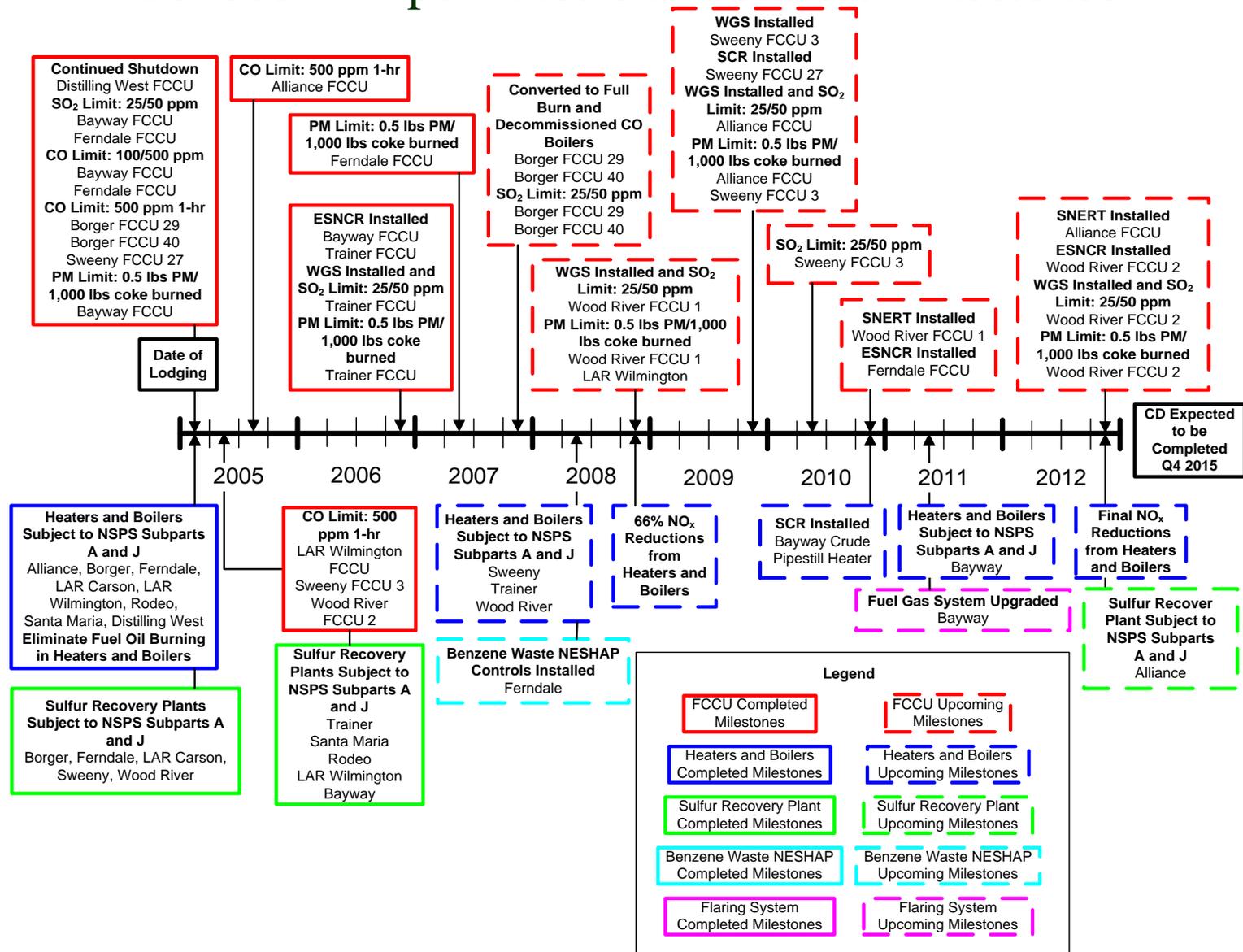
ConocoPhillips FCCU Emissions Reduction Compliance Dates

DOL Jan 2005		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Alliance	FCCU SO ₂									□■						
	FCCU NO _x												△			▲ ¹
Bayway	FCCU SO ₂					■										
	FCCU NO _x						△			▲						
Borger 29	FCCU SO ₂							■ ²								
	FCCU NO _x								△				▲ ³			
Borger 40	FCCU SO ₂							■ ²								
	FCCU NO _x								△				▲ ³			
Ferndale	FCCU SO ₂					■										
	FCCU NO _x											△			▲	
Los Angeles-Wilmington	FCCU SO ₂								□			■				
	FCCU NO _x						△					▲				
Sweeny 3	FCCU SO ₂									□■	■					
	FCCU NO _x							△					▲			
Sweeny 27	FCCU SO ₂						□					■				
	FCCU NO _x									▲▲						
Trainer	FCCU SO ₂							□■								
	FCCU NO _x						△			▲						
Wood River 1	FCCU SO ₂								□■							
	FCCU NO _x											△			▲	
Wood River 2	FCCU SO ₂												□■			
	FCCU NO _x												△			▲

Notes: SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits). NO_x: △ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NO_x COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

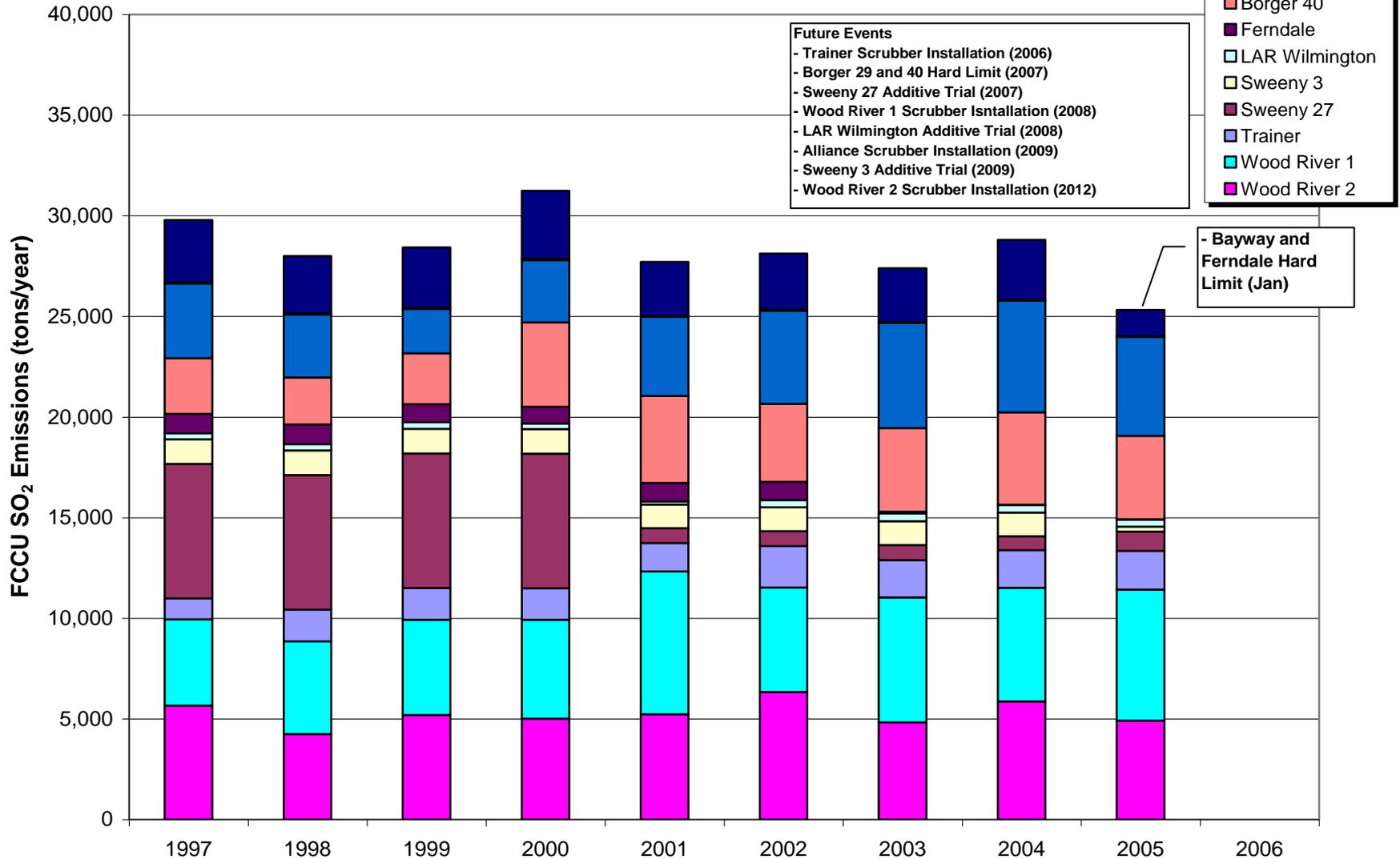
Footnotes:
¹Alliance: If SNERT is installed, compliance date is 3/2015; if SNERT is not installed, compliance date is 12/2009.
²Borger 29, Borger 40: ConocoPhillips notified EPA pursuant to paragraph 58 that the CO boilers will be decommissioned, the FCCUs converted to full burn, and the FCCU feed high pressure hydrotreated. ConocoPhillips will take SO₂ hard limits.
³Borger 29, Borger 40: ConocoPhillips notified EPA pursuant to paragraph 39 that the CO boilers will be decommissioned, the FCCUs converted to full burn, and the FCCU feed high pressure hydrotreated. ConocoPhillips will implement a NO_x additive program.

ConocoPhillips Emissions Controls Milestones



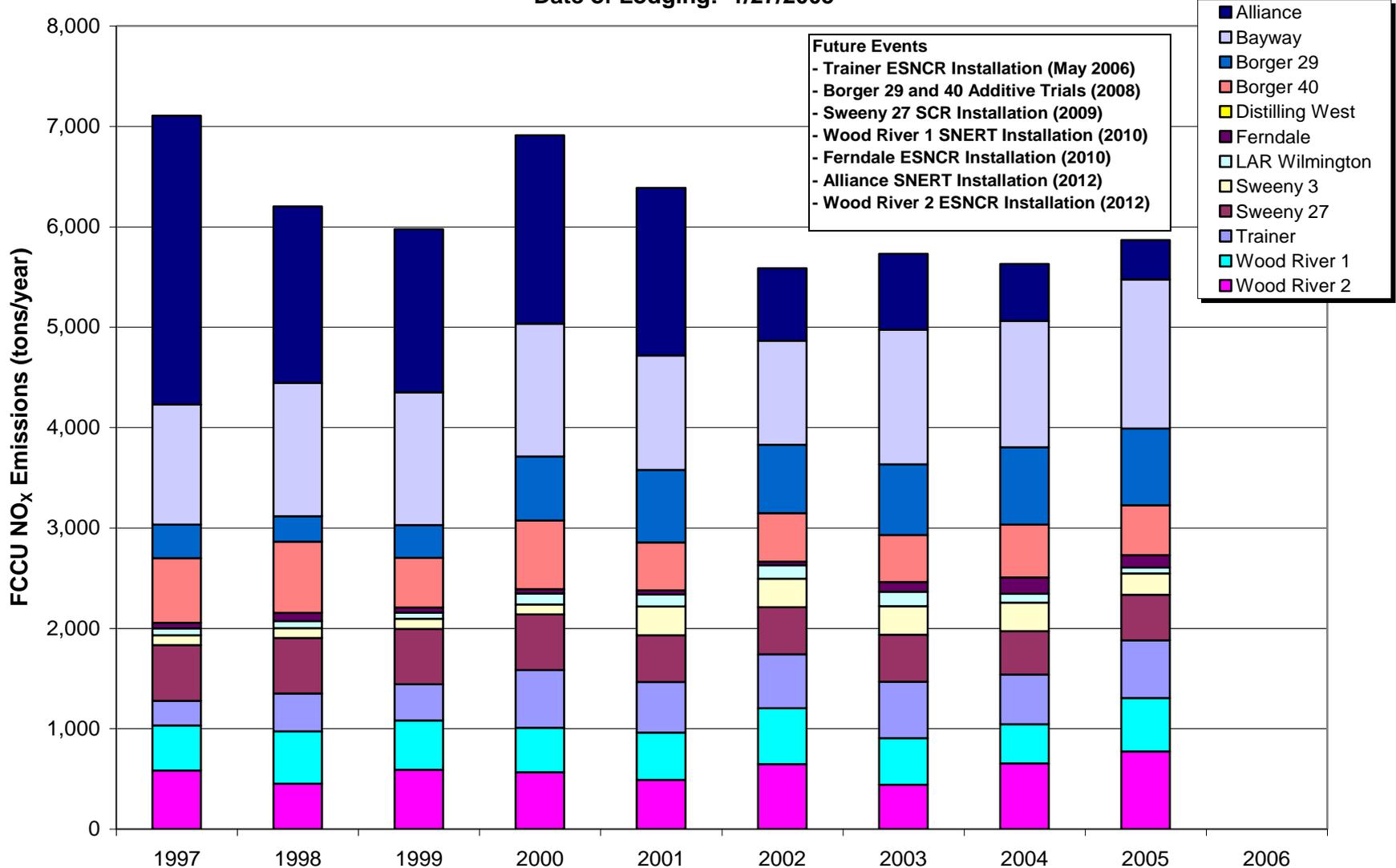
ConocoPhillips Actual FCCU SO₂ Emissions

Date of Lodging: 1/27/2005



ConocoPhillips Actual FCCU NO_x Emissions

Date of Lodging: 1/27/2005



Sunoco

June 2005

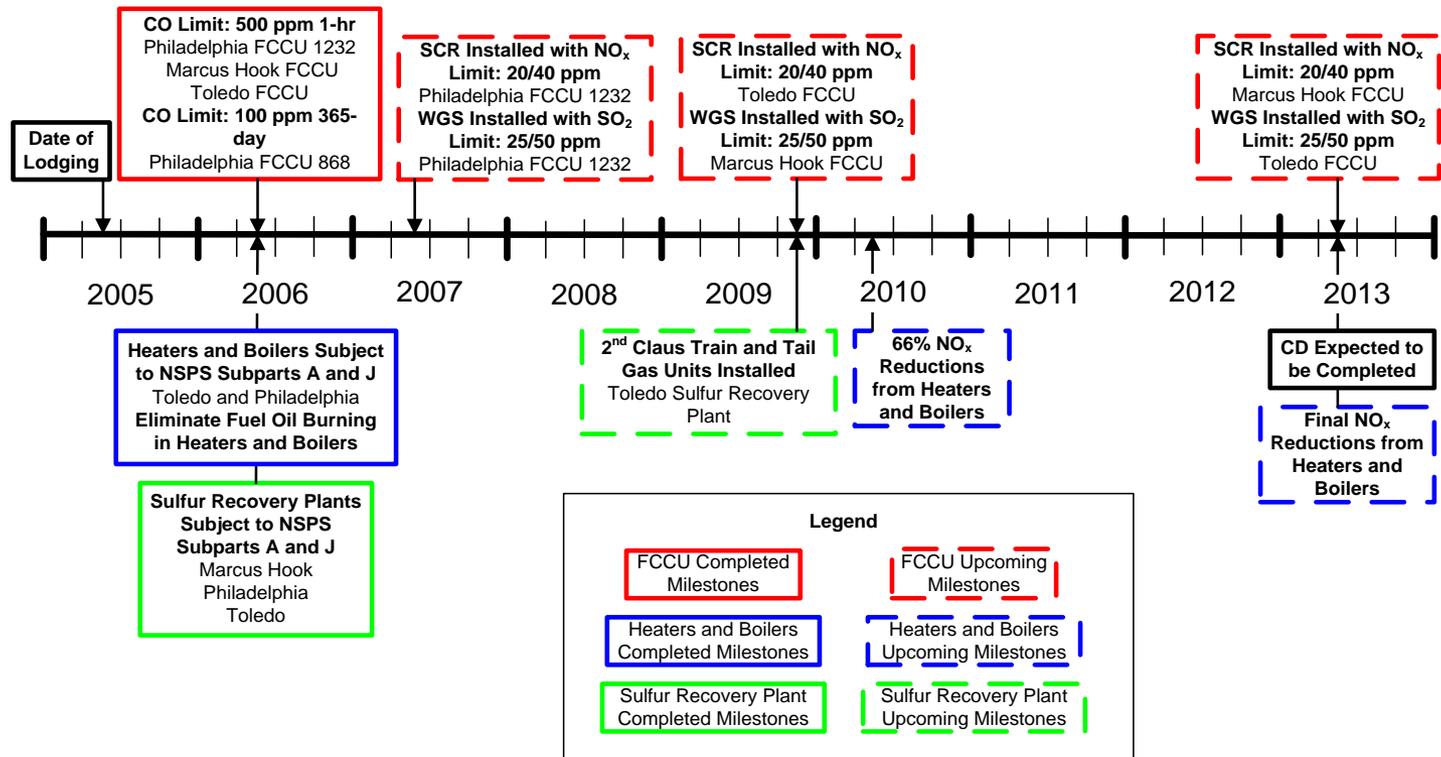
- 4 refineries in Ohio, Oklahoma and Pennsylvania
- \$350 million in injunctive relief
- Annual Reductions
 - 49,500 tons of NO_x
 - 19,500 tons of SO₂
- Penalty: \$3 million
- SEPs: \$3.9 million
- Co-Plaintiffs: City of Philadelphia, Ohio, Oklahoma, and Pennsylvania
- Holly acquired the Tulsa refinery in 200

Sunoco FCCU Emissions Reduction Compliance Dates

DOL Jun 2005	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Marcus Hook															
FCCU SO ₂													□■		
FCCU NO _x													▲		
Philadelphia 1232															
FCCU SO ₂								□■							
FCCU NO _x								▲							
Philadelphia 868															
FCCU SO ₂															
FCCU NO _x															
Toledo															
FCCU SO ₂															
FCCU NO _x															

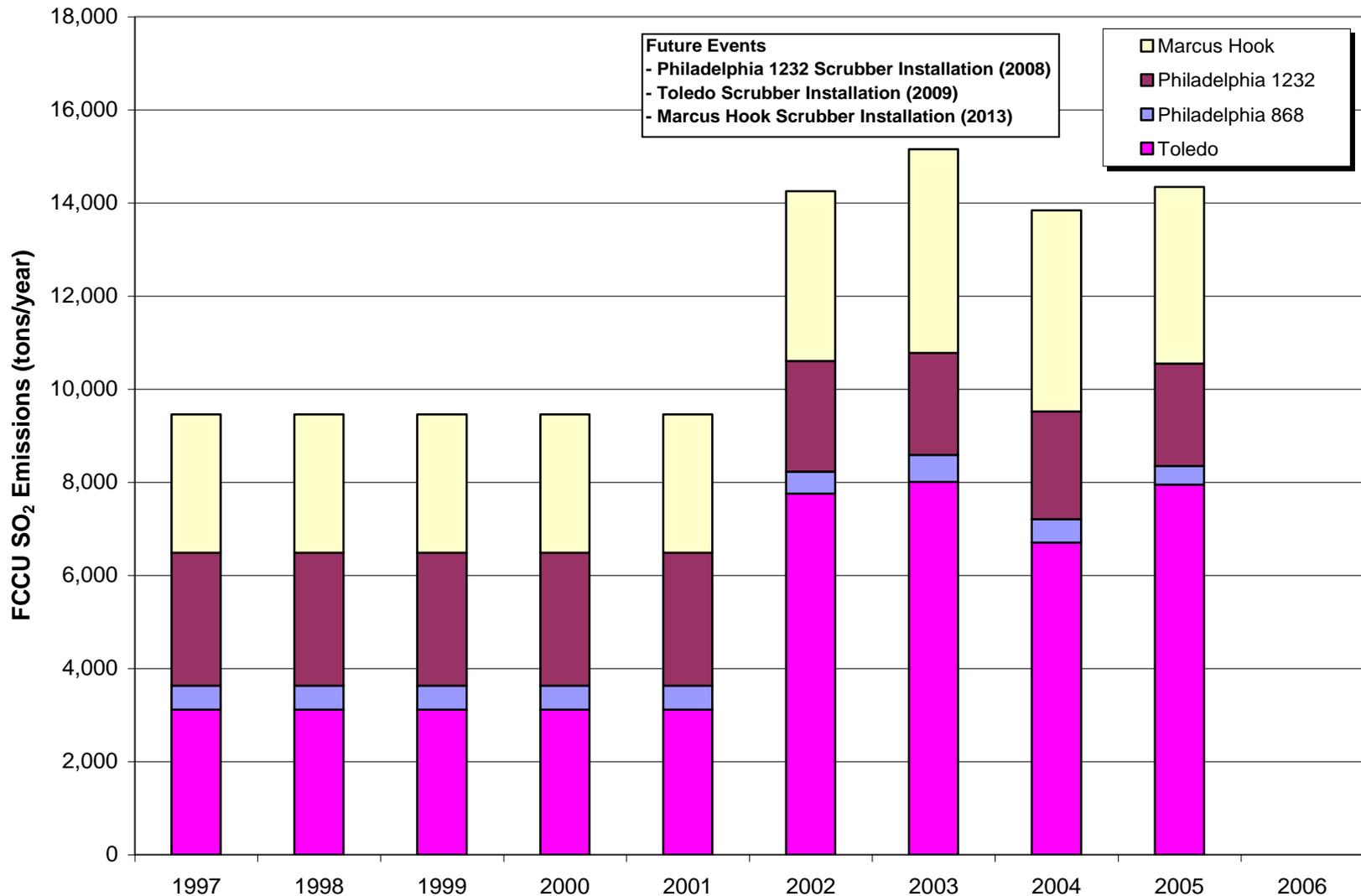
Notes:
SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
NO_x: ▲ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Sunoco Emissions Controls Milestones



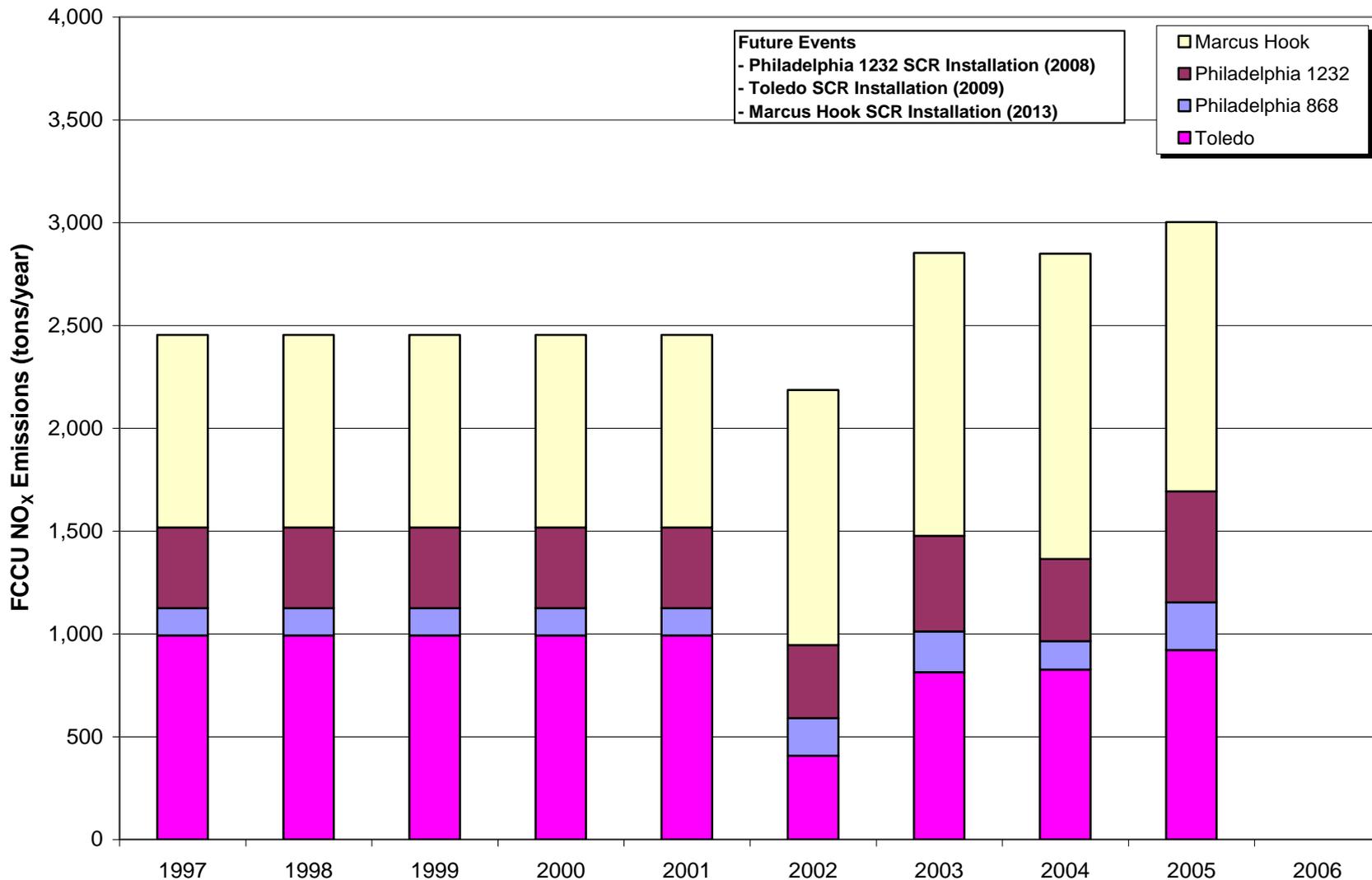
Sunoco Actual FCCU SO₂ Emissions

Date of Lodging: 6/16/2005



Sunoco Actual FCCU NO_x Emissions

Date of Lodging: 6/16/2005



Valero

June 2005

- 14 refineries in California, Colorado, Louisiana, New Jersey, Oklahoma and Texas
- \$700 million in injunctive relief
- Annual Reductions
 - 4,000 tons of NO_x
 - 16,000 tons of SO₂
- Penalty: \$5.5 million
- SEPs: \$5.5 million
- Co-Plaintiffs: Colorado, Louisiana, New Jersey, Oklahoma and Texas
- Suncor Energy (U.S.A.) Inc. acquired the Denver, Colorado refinery in 2005 (integrated with adjacent refinery previously acquired from ConocoPhillips in 2003)
- Alon USA acquired the Krotz Springs refinery in 2008
- PBF Energy acquired the Paulsboro refinery in 2010

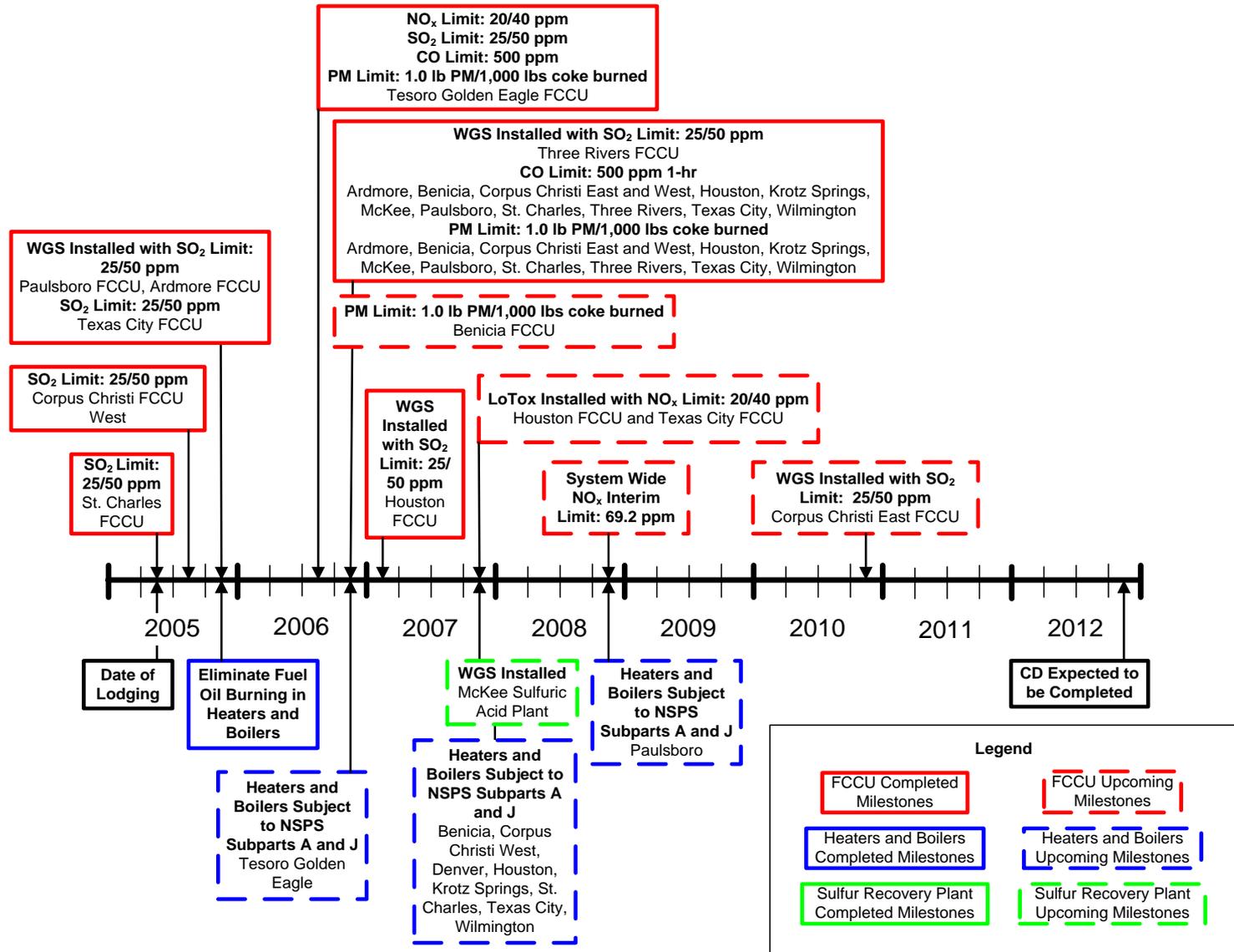
Valero FCCU Emissions Reduction Compliance Dates

	DOL Jun 2005	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Ardmore FCCU SO ₂						■ □										
Benicia FCCU FCCU SO ₂						■ □			□		■					
Benicia Coker FCCU SO ₂						■ □						□	■			
Corpus Christi East FCCU SO ₂						■ □		□			■ □					
Corpus Christi West FCCU SO ₂						■ □										
Denver FCCU SO ₂						■ □		□				■				
Houston FCCU SO ₂						■ □		□								
Houston FCCU NO _x						■ □		▲ ▲								
Krotz Springs FCCU SO ₂						■ □			□				■			
McKee FCCU FCCU SO ₂						■ □		□				■				
McKee Sulfuric Acid Plant FCCU SO ₂						■ □		□								
Paulsboro FCCU SO ₂						■ □										
Paulsboro FCCU NO _x						■ □		▲								
St. Charles FCCU SO ₂						■ □										
St. Charles FCCU NO _x						■ □		▲								
Texas City FCCU SO ₂						■ □										
Texas City FCCU NO _x						■ □		▲ ▲								
Three Rivers FCCU SO ₂						■ □		□								
Wilmington FCCU SO ₂						■ □		□				■				
Wilmington FCCU NO _x						■ □		▲								
Tesoro Golden Eagle FCCU SO ₂						■ □		■								
Tesoro Golden Eagle FCCU NO _x						■ □		▲								

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: ▲ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NO_x COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

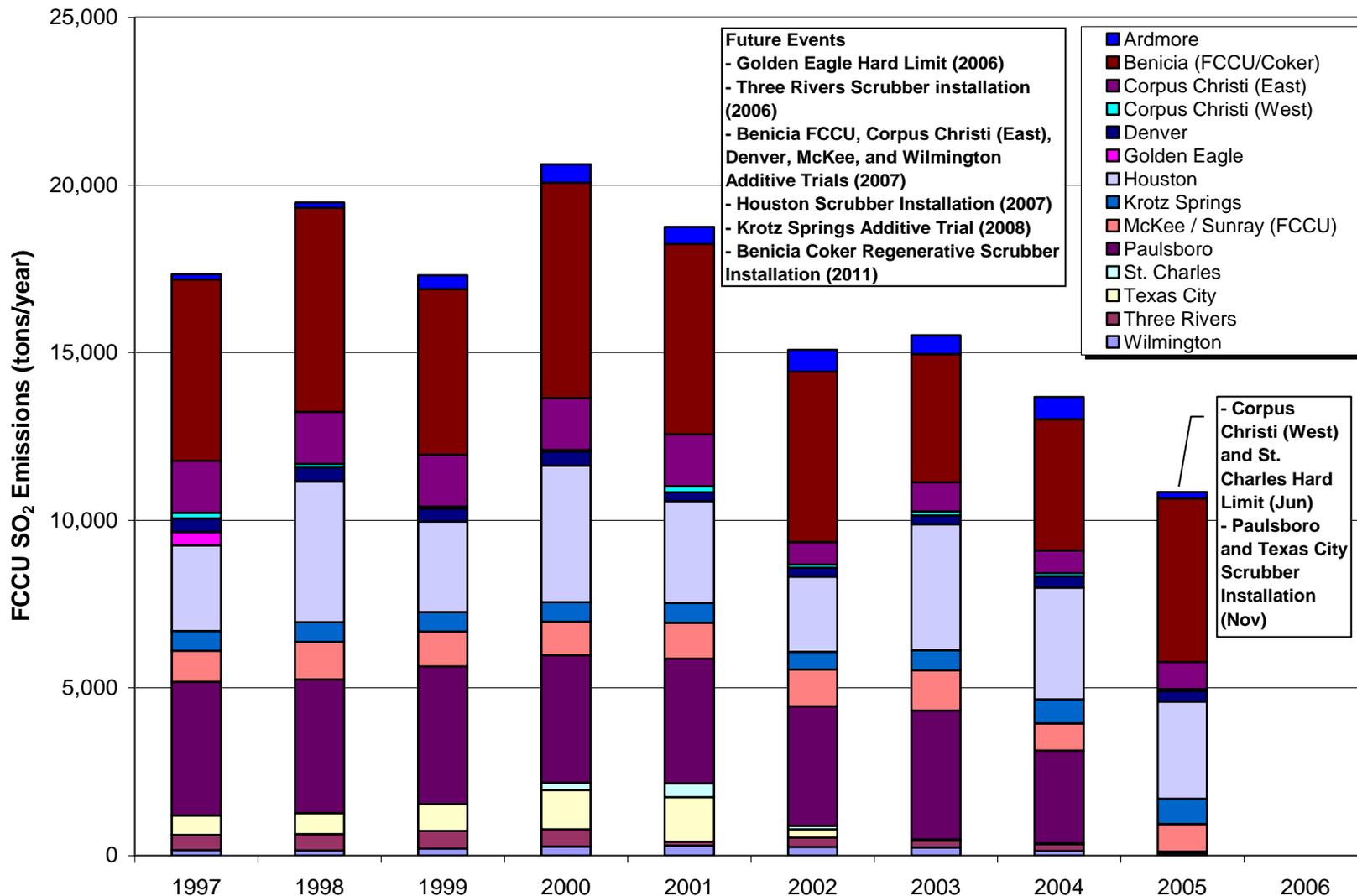
Footnotes:
 By 12/2010 one of the ultra-low NO_x regenerators at either Paulsboro, St. Charles, or Wilmington must meet hard limits for NO_x.
 System wide coke burn-weighted average NO_x interim limit must be effective 3/2009 to include Ardmore, Corpus Christi East, Corpus Christi West, Denver, Houston, Krotz Springs, McKee, Paulsboro, St. Charles, Texas City, Three Rivers, Wilmington, and Tesoro Golden Eagle. The final system wide coke-burn weighted average NO_x limit is effective 3/2012.

Valero Emissions Controls Milestones



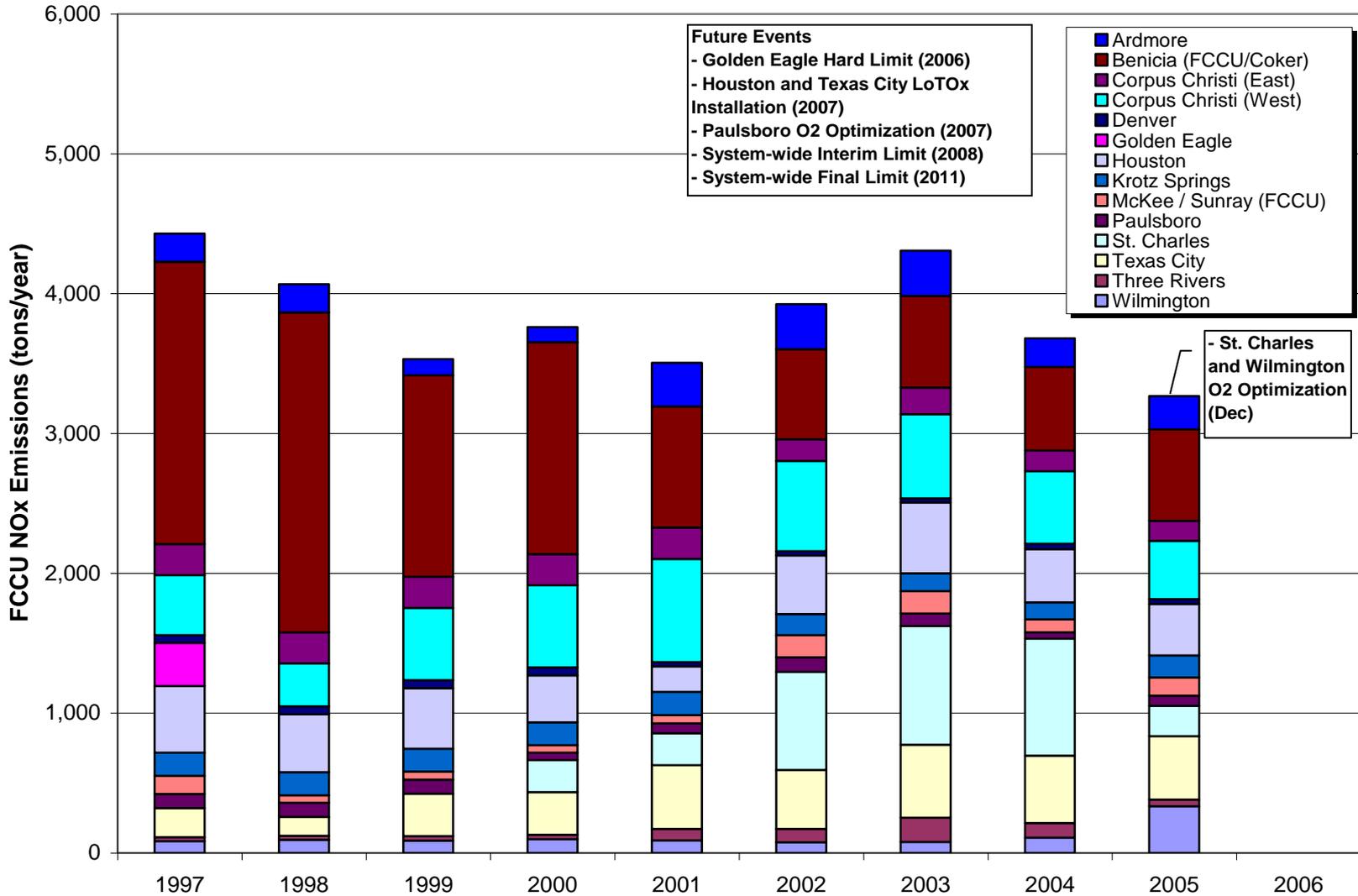
Valero Actual FCCU SO₂ Emissions

Date of Lodging: 6/16/2005



Valero Actual FCCU NO_x Emissions

Date of Lodging: 6/16/2005



ExxonMobil

October 2005

- 7 refineries in California, Illinois, Louisiana, Montana and Texas
- \$570 million in injunctive relief
- Annual Reductions
 - 11,000 tons of NO_x
 - 42,000 tons of SO₂
- Penalty: \$8.7 million
- SEPs: \$9.7 million
- Co-Plaintiffs: Illinois, Louisiana and Montana

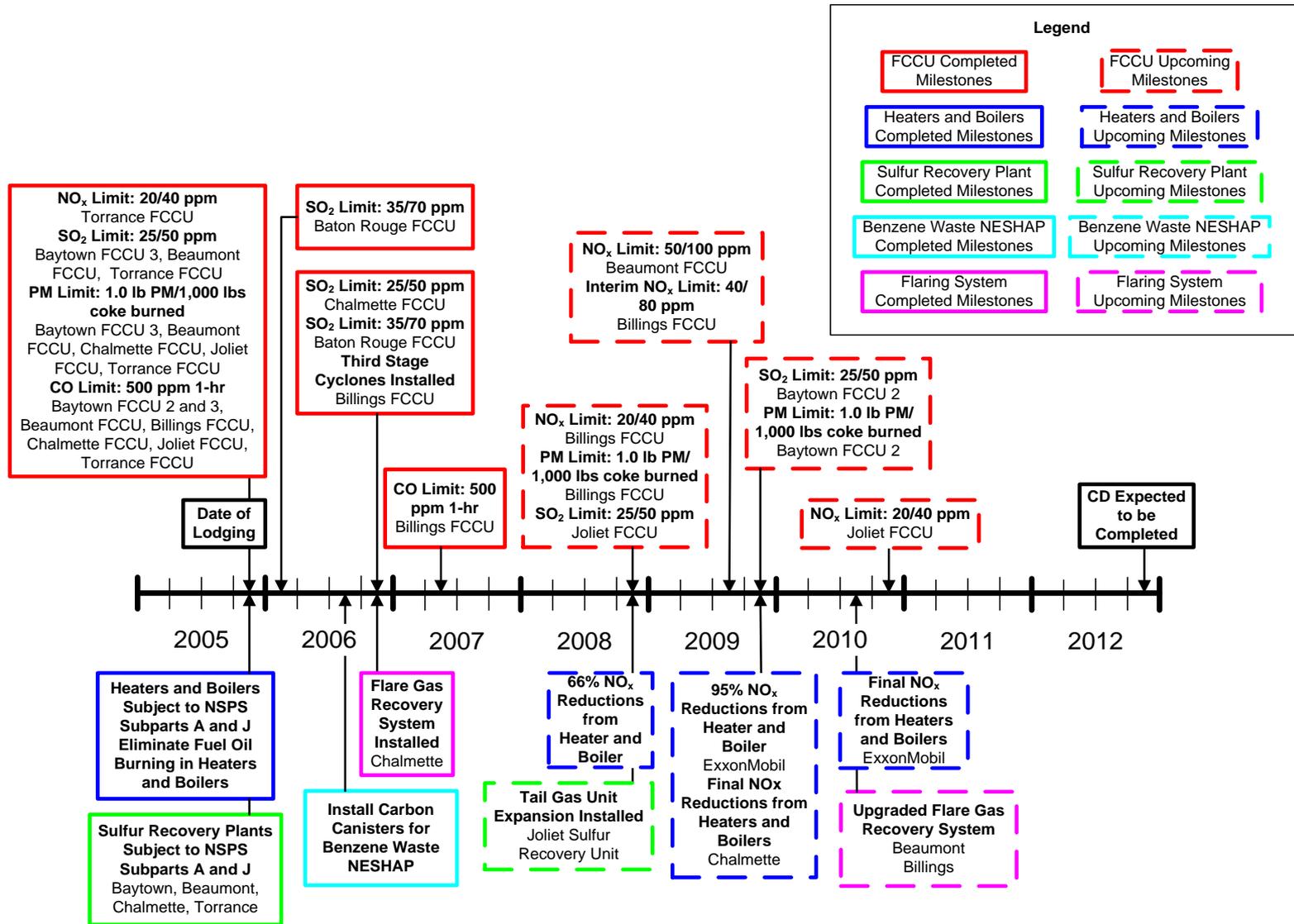
ExxonMobil FCCU Emissions Reduction Compliance Dates

	DOL Oct 2005	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Baton Rouge																
FCCU SO ₂							■	■								
FCCU NO _x							▲	▲								
Baytown 2																
FCCU SO ₂																
FCCU NO _x							▲	▲								
Baytown 3																
FCCU SO ₂							■	■								
FCCU NO _x							▲	▲								
Beaumont																
FCCU SO ₂							■	■								
FCCU NO _x																
Billings																
FCCU SO ₂							□	□								
FCCU NO _x																
Joliet																
FCCU SO ₂																
FCCU NO _x																
Torrance																
FCCU SO ₂							■	■								
FCCU NO _x							▲	▲								
Chalmette																
FCCU SO ₂							■	■								
FCCU NO _x																

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: ▲ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

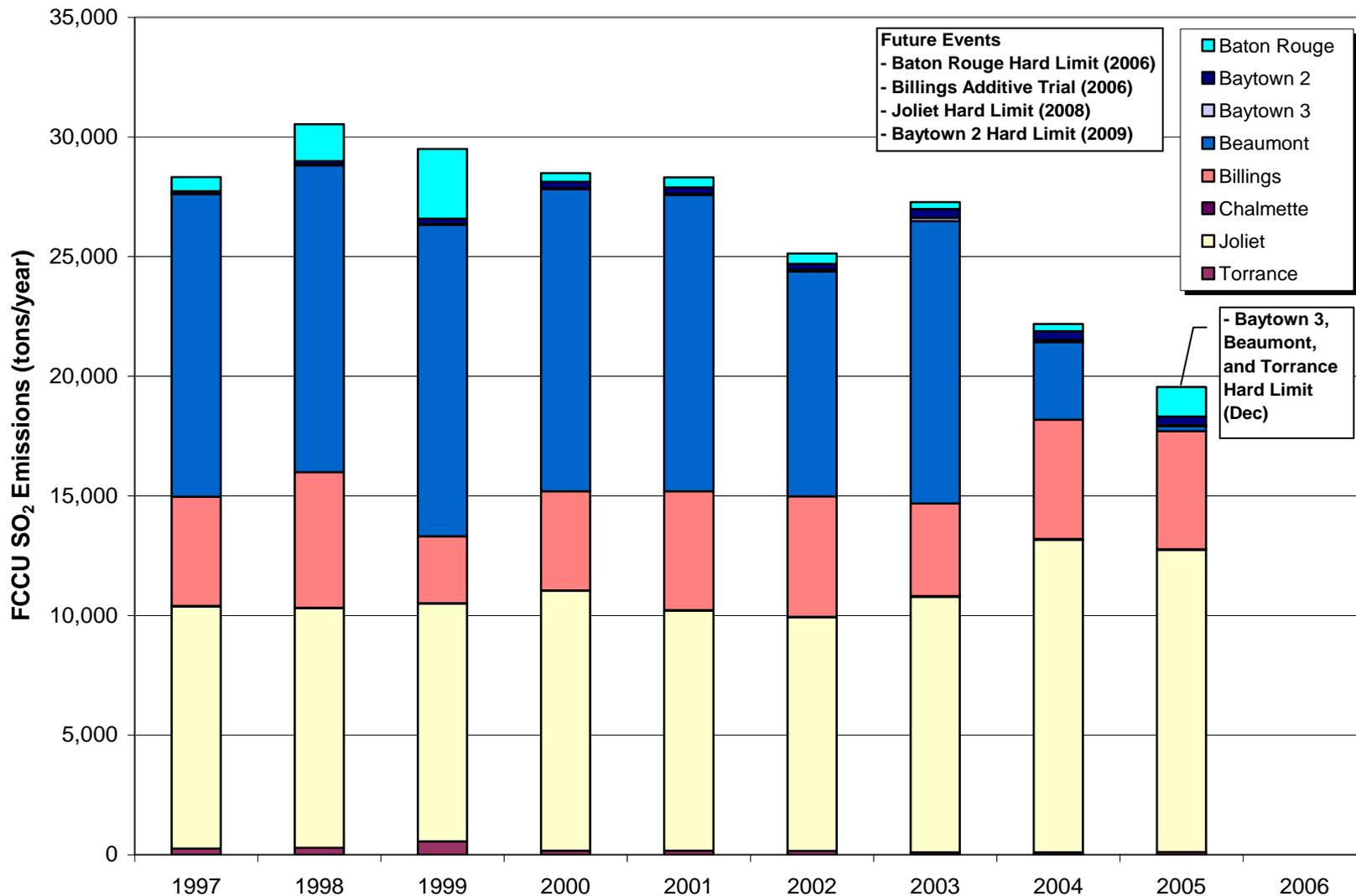
Footnotes:
 *Chalmette: If additives are found to be effective, compliance date is 6/30/2007, if additives are not effective, compliance date is 12/31/2008.

ExxonMobil & Chalmette Emissions Controls Milestones



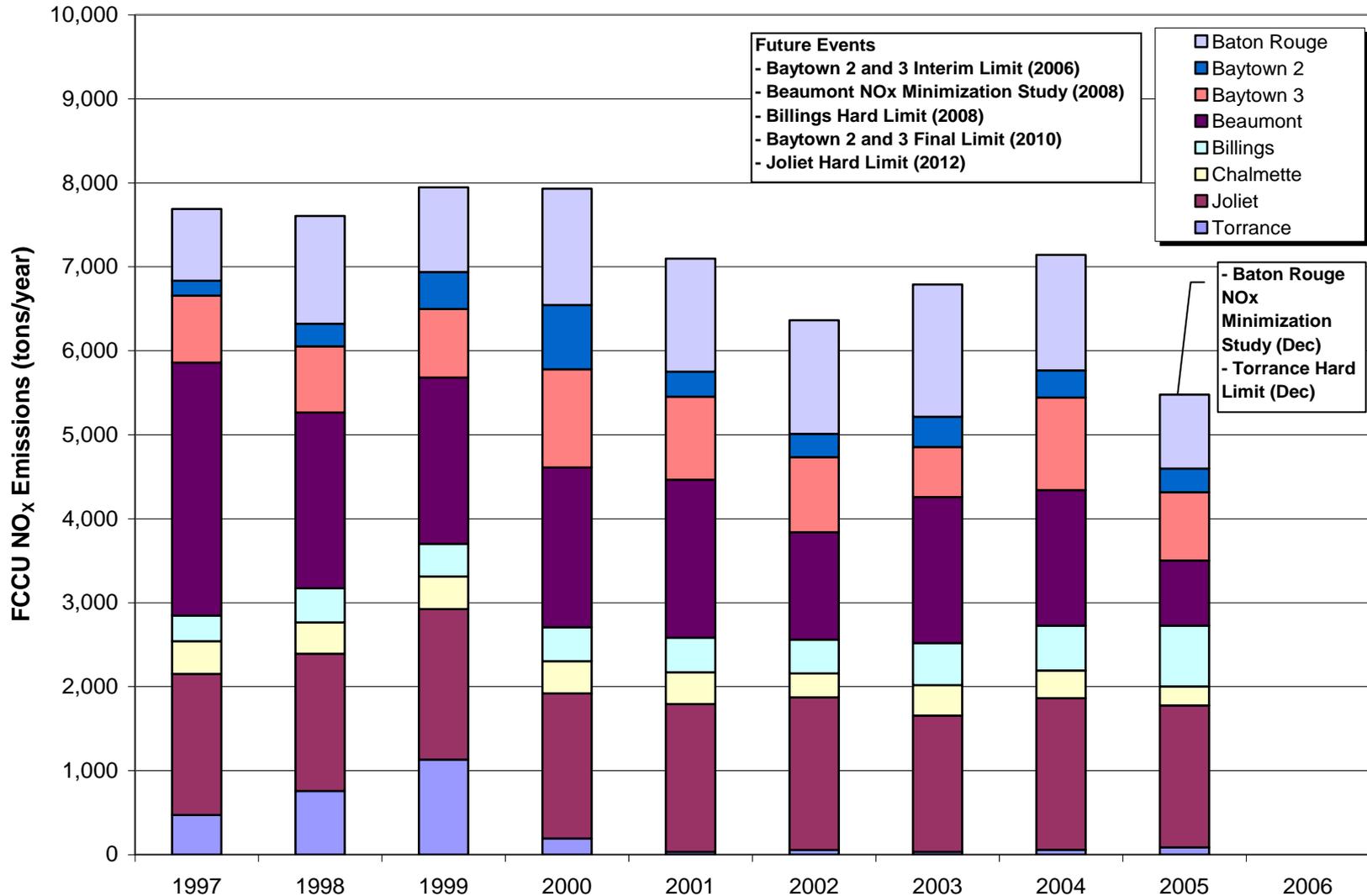
ExxonMobil Actual FCCU SO₂ Emissions

Date of Lodging: 10/11/2005



ExxonMobil Actual FCCU NO_x Emissions

Date of Lodging: 10/11/2005



Total Petrochemicals

May 2007

- 1 refinery in Port Arthur, Texas
- \$37 million in injunctive relief
- Annual Reductions
 - 180 tons of NO_x
 - 800 tons of SO₂
- Penalty: \$2.9 million
- SEP: Innovative infrared camera technology to detect leaks of volatile organic emissions from valves, piping and other equipment

Total Petrochemicals FCCU Emissions Reduction Compliance Dates

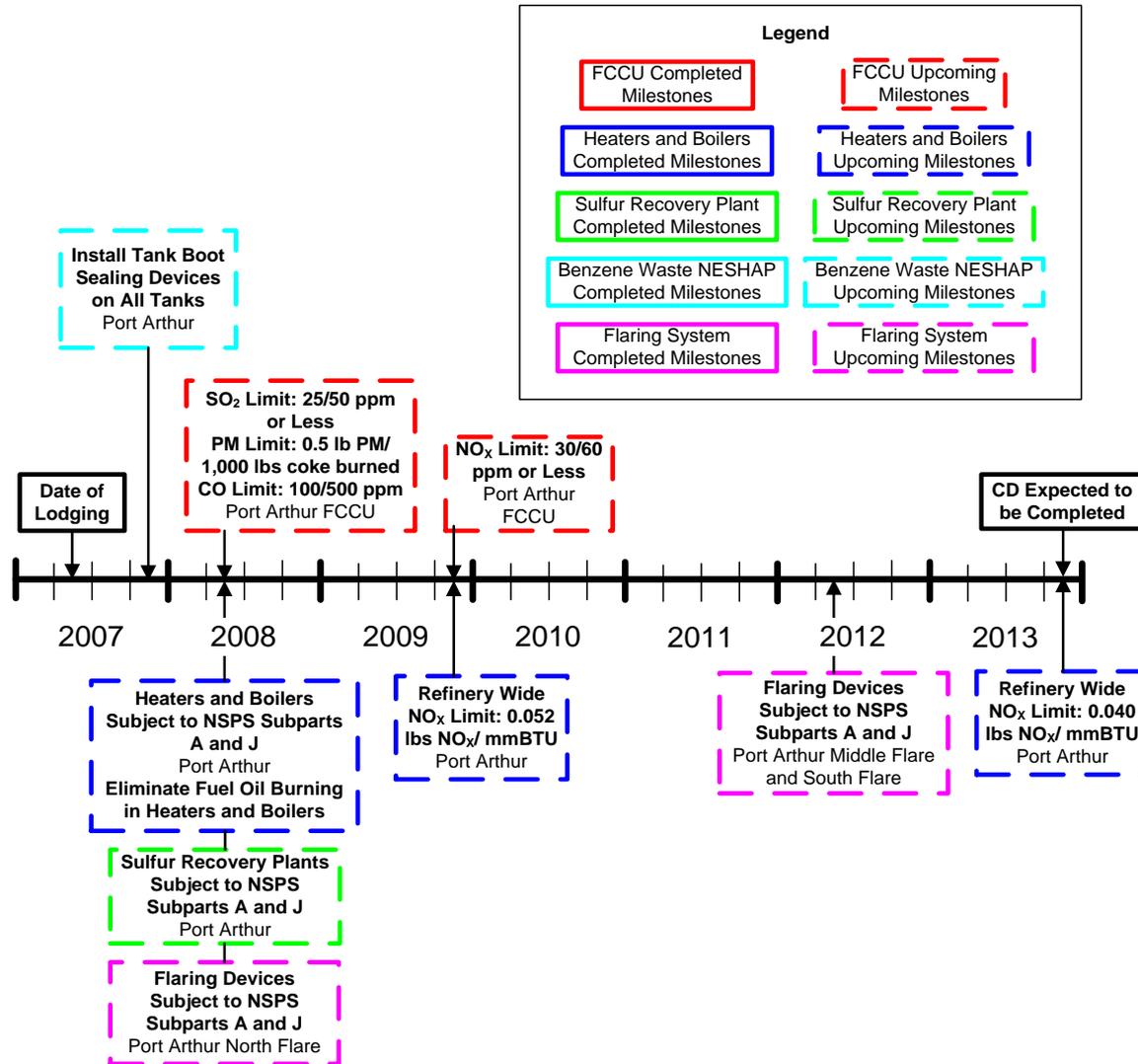
DOL May 2007	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Port Arthur															
FCCU SO ₂							■								
FCCU NO _x							■			▲					

Notes:

SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

NO_x: ▲ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Total Petrochemicals Emissions Controls Milestones

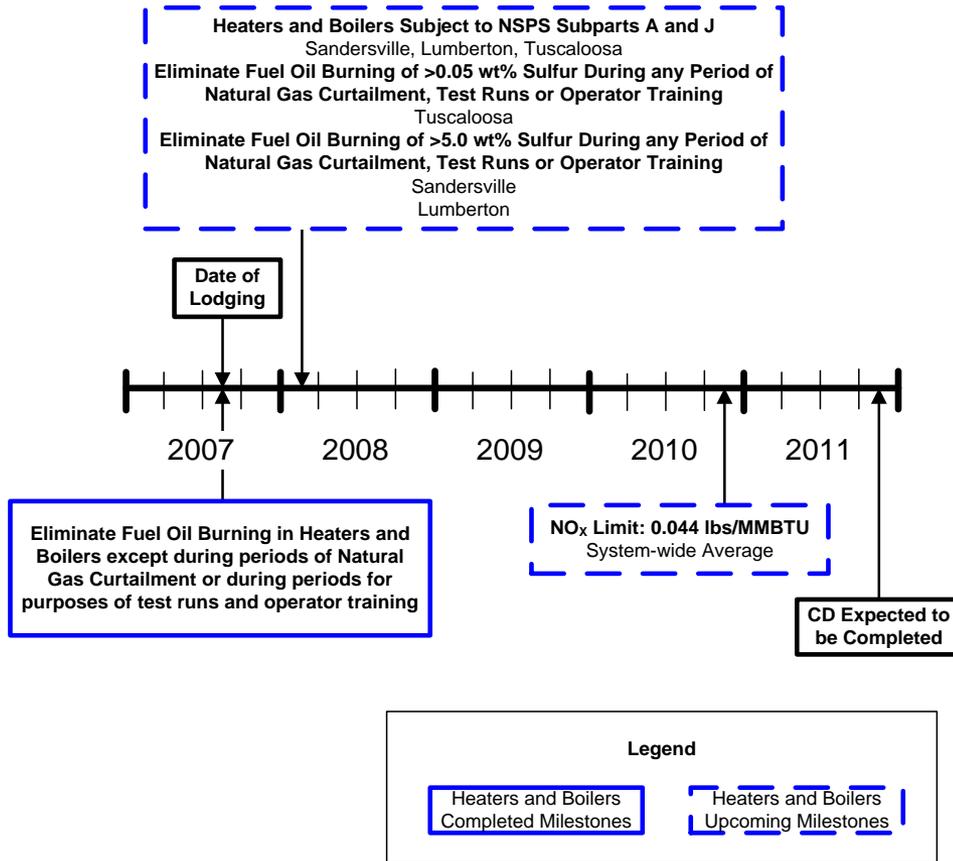


Hunt Refining

January 2007

- 3 refineries in Alabama and Mississippi
- \$48.5 million in injunctive relief
- Annual Reductions
 - 150 tons of NO_x
 - 1,100 tons of SO₂
- Penalty: \$400,000
- SEPs: \$475,000
- Co-Plaintiffs: Alabama and Mississippi

Hunt Refining Emissions Controls Milestones



Valero Energy Corp. (formerly Premcor, Inc.)

August 2007

- 3 refineries in Tennessee, Ohio and Texas
- \$232 million in injunctive relief
- Annual Reductions
 - 1,870 tons of NO_x
 - 1,810 tons of SO₂
- Penalty: \$4.25 million
- SEPs: \$4.25 million
- Co-Plaintiffs: State of Ohio and Memphis-Shelby County, TN
- Refineries were previously owned by Premcor and purchased by Valero in late 2005
- Husky acquired the Lima refinery in 2007

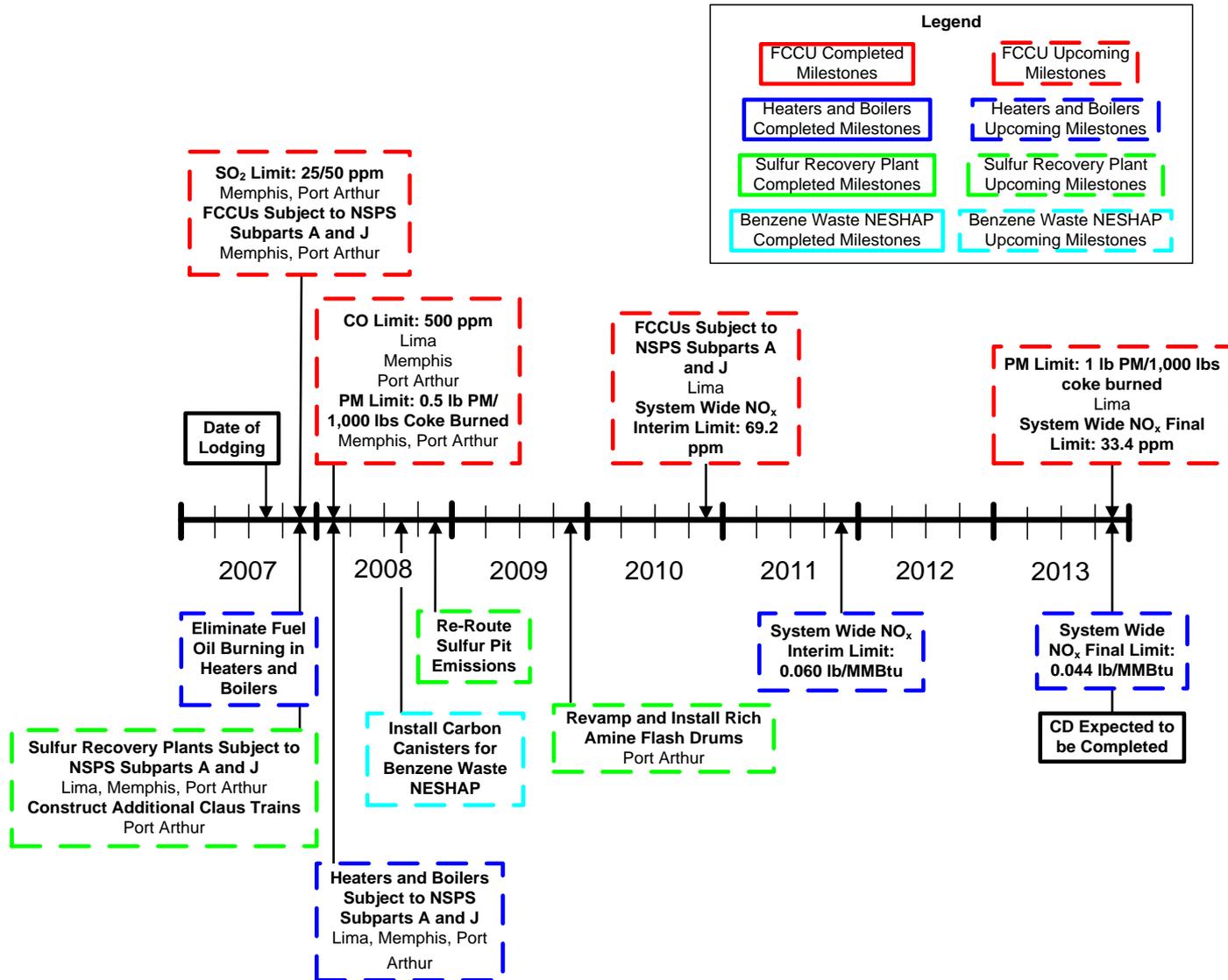
Valero (Premcor) FCCU Emissions Reduction Compliance Dates

DOL Aug 2007		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015			
Lima	FCCU SO ₂							□	■										
	FCCU NO _x								■										
Memphis	FCCU SO ₂							□											
	FCCU NO _x								■										
Port Arthur	FCCU SO ₂							□											
System-wide ¹	FCCU NO _x								■										

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Footnotes:
¹System wide NOx interim limit is effective 12/2010 to include Lima, Memphis, and Port Arthur. The final system wide NOx limit is effective 12/2010.

Valero (Premcor) Emissions Controls Milestones



Sinclair Oil Corporation

January 2008

- 3 refineries in Wyoming and Oklahoma
- \$72 million in injunctive relief
- Annual Reductions
 - 1,100 tons of NO_x
 - 4,600 tons of SO₂
- Penalty: \$2.45 million
- SEPs: \$150,000
- Co-Plaintiffs: Oklahoma and Wyoming
- Holly acquired the Tulsa refinery in 2009

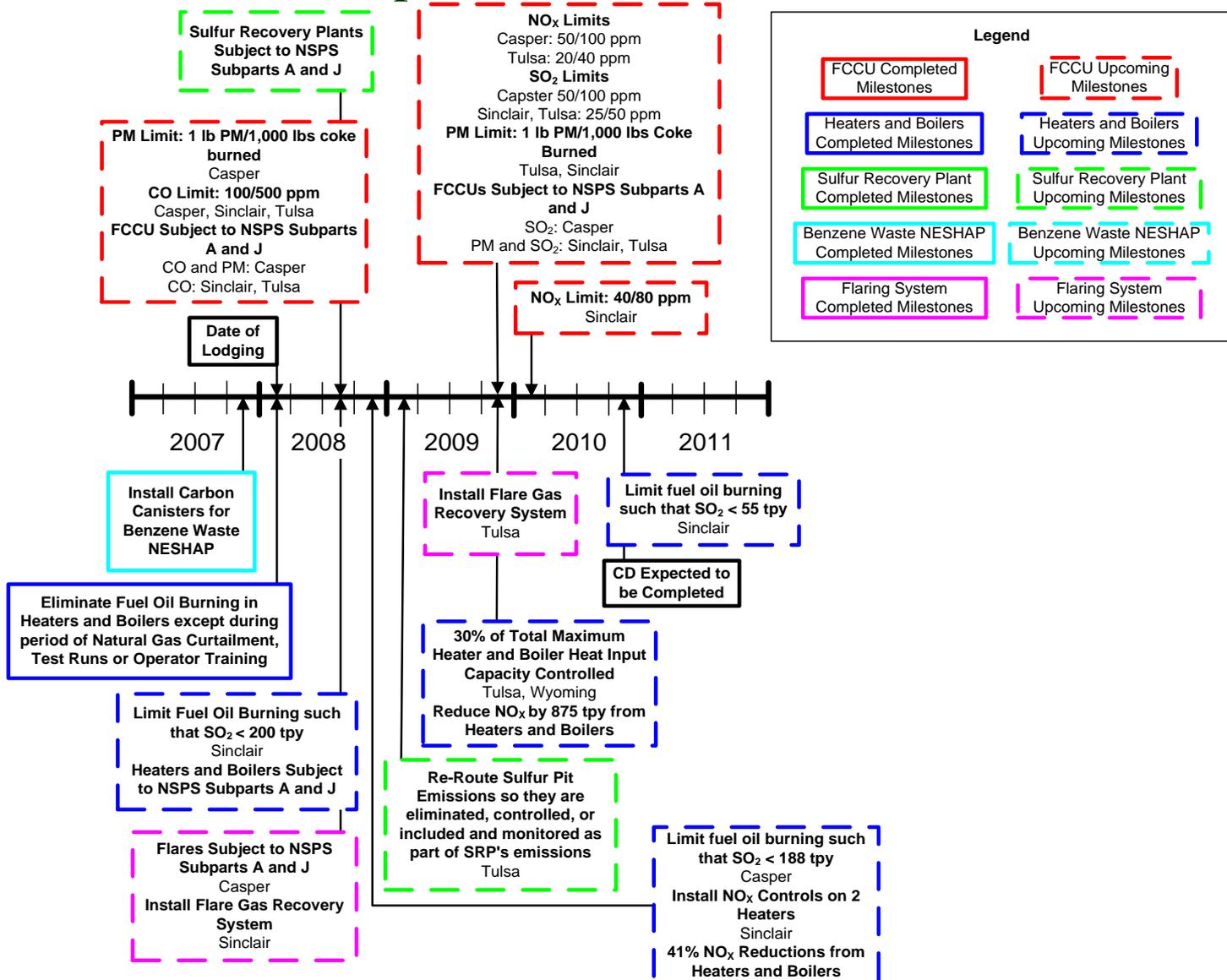
Sinclair Oil Corporation FCCU Emissions Reduction Compliance Dates

DOL Jan 2008		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Casper	FCCU SO ₂															
	FCCU NO _x															
Tulsa	FCCU SO ₂															
	FCCU NO _x															
Sinclair	FCCU SO ₂															
	FCCU NO _x															

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or

Footnotes:
 *Casper and/or Sinclair: may accept 20/40 ppm to be achieved by 12/31/2012

Sinclair Oil Corporation Emissions Controls Milestones



Holly Refining and Marketing Company

April 2008

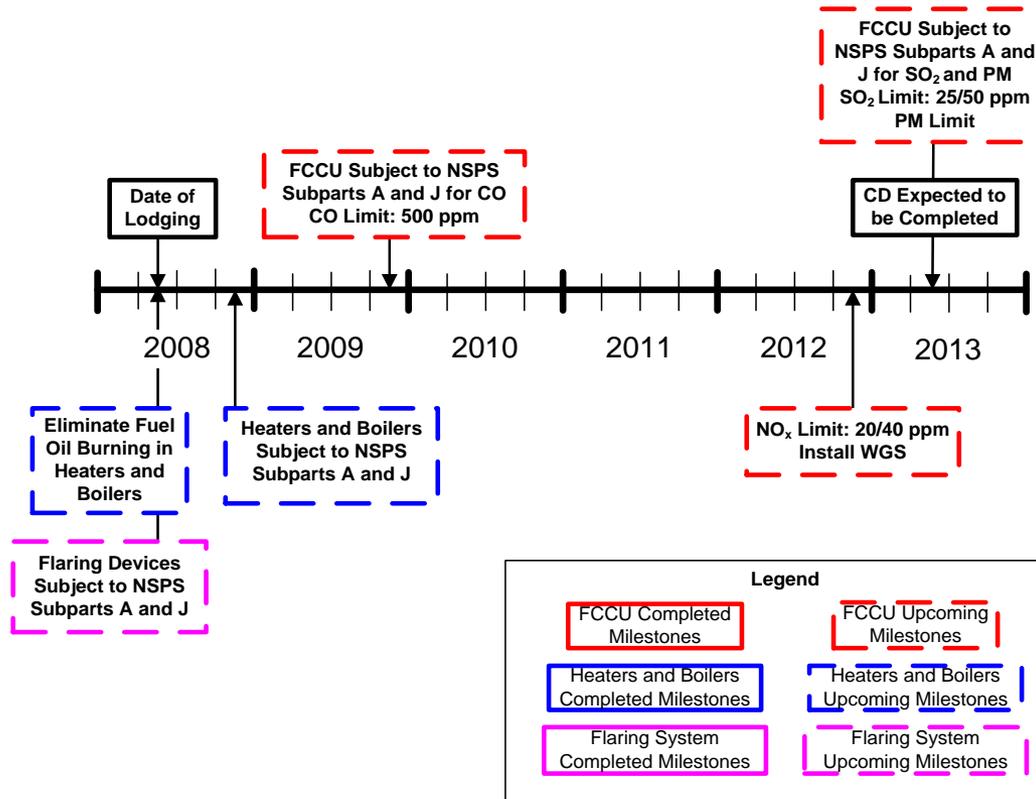
- 1 refinery in Utah
- \$17.25 million in injunctive relief
- Annual Reductions
 - 106 tons of NO_x
 - 315 tons of SO₂
- Penalty: \$120,000
- SEPs: \$130,000
- Co-Plaintiffs: Utah

Holly Refining FCCU Emissions Reduction Compliance Dates

DOL Apr 2008	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
FCCU SO ₂											□	□	■		
FCCU NO _x										△		△		▲	

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or

Holly Refining Emissions Controls Milestones



Frontier Refining Company

February 2009

- 2 refineries in Kansas and Wyoming
- \$127 million in injunctive relief
- Annual Reductions
 - 2,098 tons of NO_x
 - 2,987 tons of SO₂
- Penalty: \$1.23 million
- SEPs: \$585,000
- Co-Plaintiffs: Kansas and Wyoming

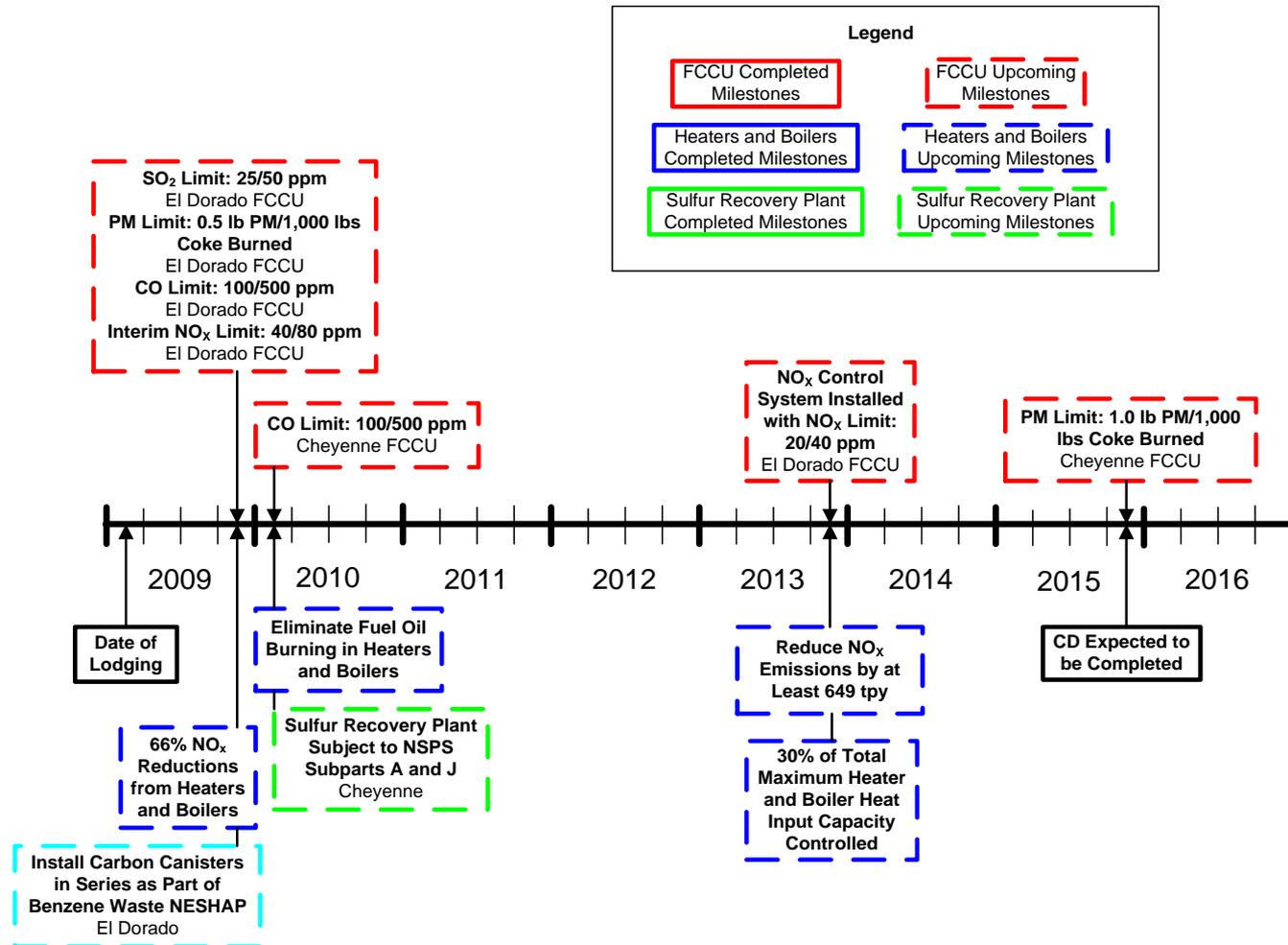
Frontier Refining FCCU Emissions Reduction Compliance Dates

DOL Feb 2009		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cheyenne	FCCU SO ₂ ^{1,2}										□					■
	FCCU NO _x ^{1,3}										△					▲
El Dorado	FCCU SO ₂									■						
	FCCU NO _x ¹									△	△			△▲		

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: △ = interim hard limit, ▲ = final hard limits, ▲ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Footnotes:
¹ Cheyenne and El Dorado: Compliance dates for NOx and SO₂ interim limits and start of additives/low NOx COP are based on Date of Entry; timeline assumes Consent Decree will be entered by the first quarter 2010.
² Cheyenne: May elect to comply with final 25/50 ppm limit by 12/31/2010 -- or add SO₂-reducing additive by DOE + 180 days, and comply with final 25/50 ppm limit by 9/30/2015 (chart illustrates latter option)
³ Cheyenne: May elect to comply with final 40/80 ppm limit by 12/31/2010 -- or interim 60/120 ppm limit by DOE + 180 days, and final 40/80 ppm limit by 12/31/2015 (chart illustrates latter option)

Frontier Refining Emissions Controls Milestones



Wyoming Refining Company

February 2009

- 1 refinery in Wyoming
- \$14 million in injunctive relief
- Annual Reductions
 - 20 tons of NO_x
 - 788 tons of SO₂
- Penalty: \$150,000
- Co-Plaintiffs: Wyoming

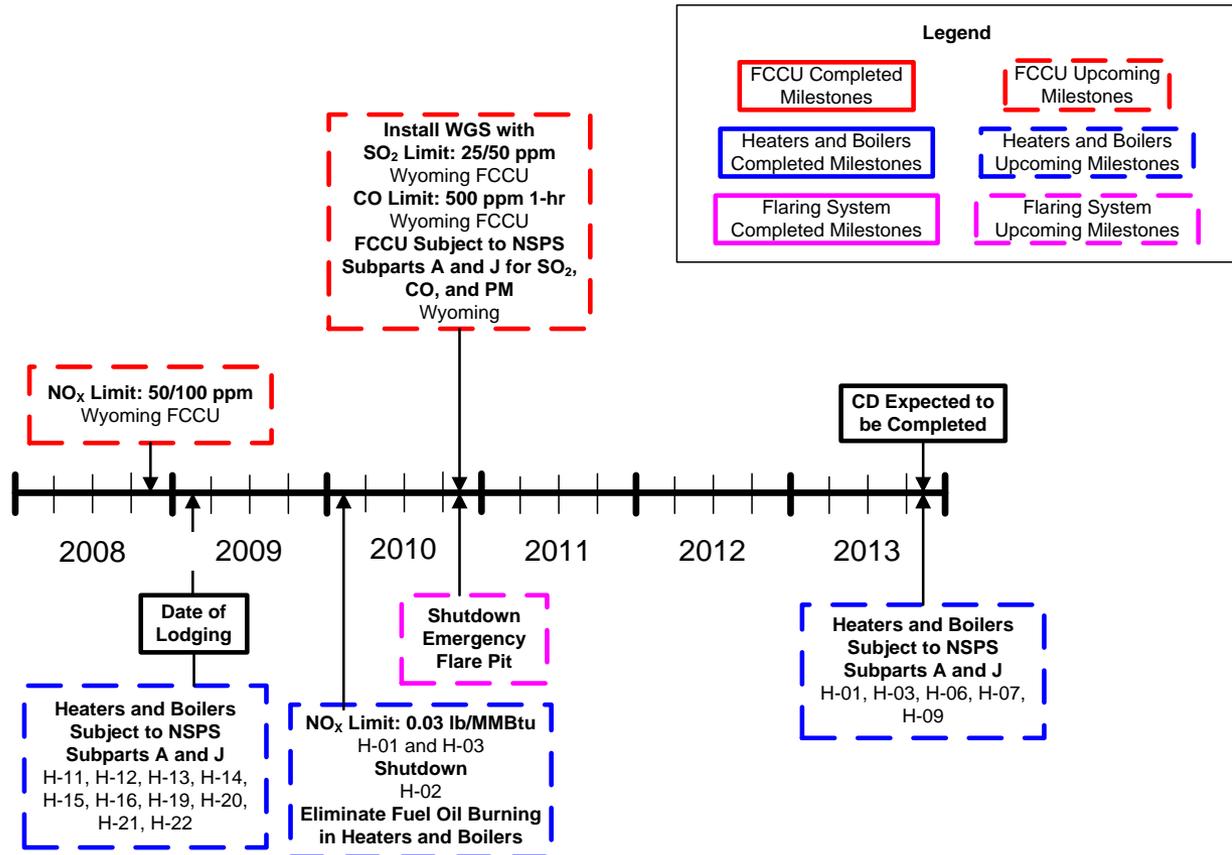
Wyoming Refining FCCU Emissions Reduction Compliance Dates

DOL Feb 2009	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
FCCU SO ₂									□ ■						
FCCU NO _x								▲ ¹							

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: ▲ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).

Footnotes:
¹ "If the Company elects to switch from 'full burn operation' to 'partial burn operation' by making physical changes ... By no later than 180 days after the Company switches ... the Company shall comply with ... [20/40 ppm] Final NOx Emission Limits on the FCCU."

Wyoming Refining Emissions Controls Milestones

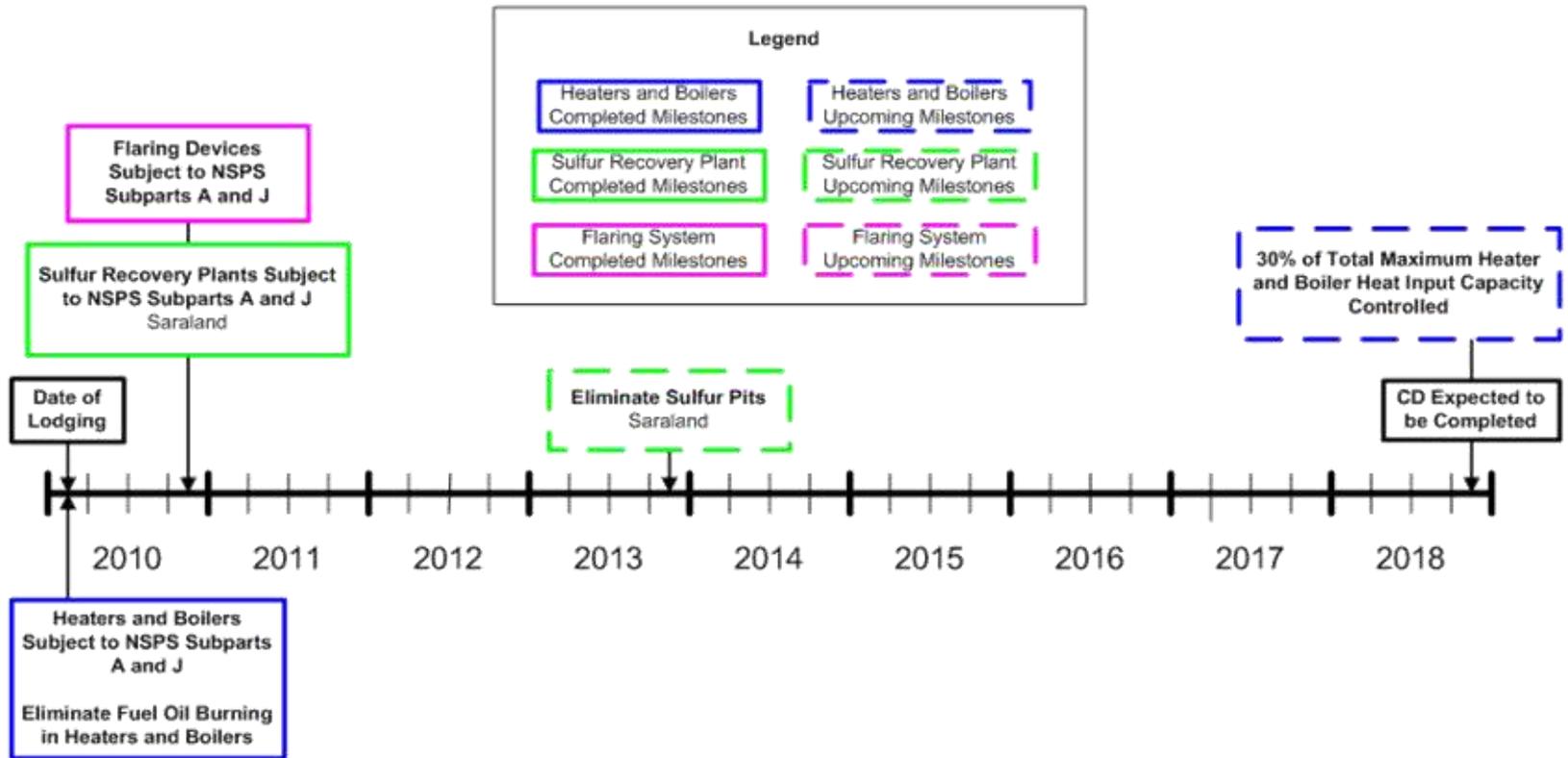


Shell Chemical LP / Shell Chemical Yabucoa, Inc.

March 2010

- Shell Chemical: 2 refineries in Alabama and Louisiana
- Shell Yabucoa: 1 refinery in Puerto Rico
 - Facility shut down operations in June 2009.
 - CD requires all permits for refining operations be relinquished.
- Annual Reductions
 - 813 tons of NO_x
 - 645 tons of SO₂
- Penalty: \$3.5 million
- SEPs: \$193,000
- Co-Plaintiffs: Alabama and Louisiana

Shell Chemical Emissions Controls Milestones



Murphy Oil USA

September 2010

- 2 refineries in Louisiana and Wisconsin
- \$142 million in injunctive relief
- Annual Reductions
 - 452 tons of NO_x
 - 944 tons of SO₂
- Penalty: \$1.25 million
- SEPs: \$1.5 million
- Co-Plaintiffs: Louisiana and Wisconsin

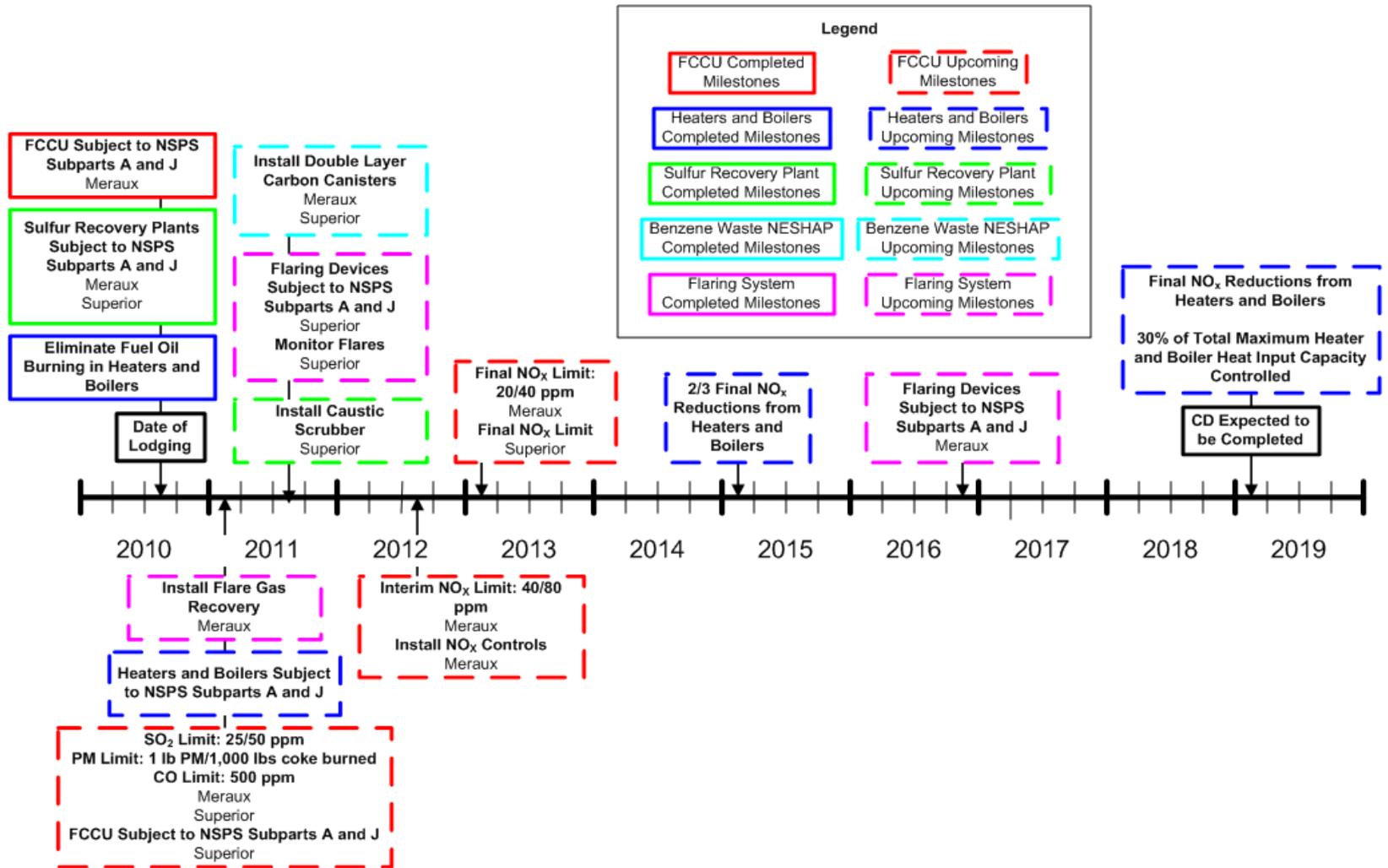
Murphy Oil USA FCCU Emissions Reduction Compliance Dates

DOL SEP 2010		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Meraux	FCCU SO ₂											■				
	FCCU NO _x											■	△△	▲		
Superior	FCCU SO ₂											■				
	FCCU NO _x											■	▲	▲		

Notes:
SO₂: □ = interim hard limit, ■ = final hard limits, □ = hardware installation, ■ = hardware limits effective, □ = start of additives, ■ = additives demonstration report deadline. Slashes (/) indicate combinations (e.g. either additives or hard limits).
NO_x: △ = interim hard limit, ▲ = hard limits, △ = hardware installation, ▲ = hardware limits effective, △ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits)

Footnotes:
¹ If hardware cannot meet final limit, additional hardware will be installed and the final limit of 20/40 ppm must be met by 12/31/2016.

Murphy Oil USA Emissions Controls Milestones



HOVENSA LLC

January 2011

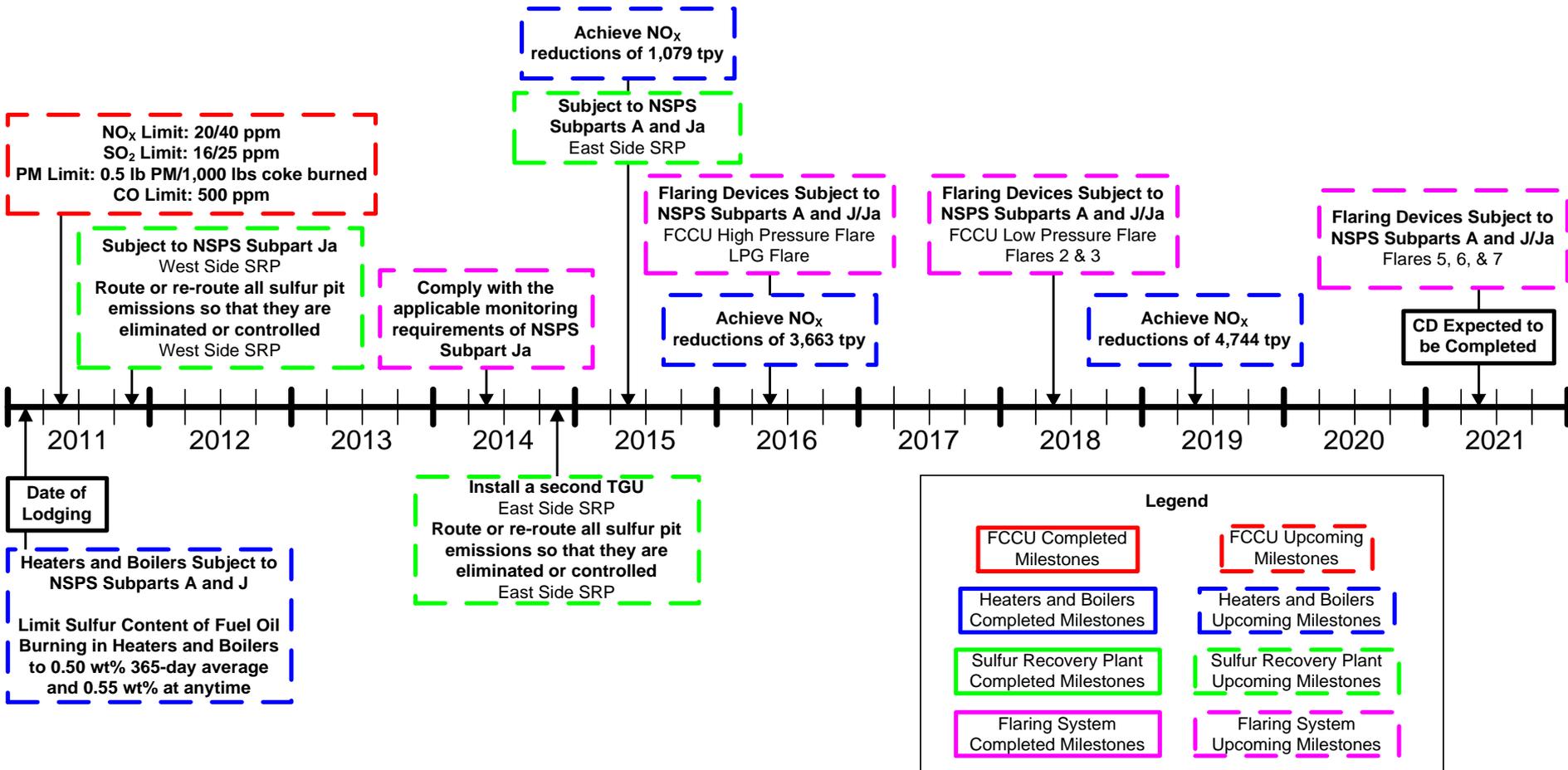
- 1 refinery in U.S. Virgin Islands
- \$700 million in injunctive relief
- Annual Reductions
 - 5,031 tons of NO_x
 - 3,460 tons of SO₂
- Penalty: \$5.375 million
- SEPs: \$4.875 million
- Co-Plaintiffs: U.S. Virgin Islands

HOVENSA LLC FCCU Emissions Reduction Compliance Dates

DOL JAN 2011	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
St. Croix															
FCCU SO ₂											■				
FCCU NO _x											▲				

Notes:
 SO₂: □ = interim hard limit, ■ = final hard limits, ◻ = hardware installation, ◼ = hardware limits effective, ◻ = start of additives, ■ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits).
 NO_x: ▲ = interim hard limit, ▲ = hard limits, ▲ = hardware installation, ▲ = hardware limits effective, ▲ = start of additives and/or low NOx COPs, ▲ = additives demonstration report deadline, Slashes (/) indicate combinations (e.g. either additives or hard limits)

HOVENSA LLC Emissions Controls Milestones





Petroleum Refinery Initiative

Emissions Monitoring Requirements

Types of Emissions Monitoring Methods

- Continuous Emissions Monitoring System (CEMS)
 - Installed, certified, maintained and operated in accordance with 40 CFR 60.11, 60.13, and Part 60 Appendix A
 - Relative Accuracy Audit (RAA) or Relative Accuracy Test Audit (RATA) conducted once every three years
 - Cylinder Gas Audit (CGA) conducted the quarters when RAA or RATA are not
- Continuous Opacity Monitoring System (COMS)
 - Operate continuous opacity monitoring system (COMS) in accordance with 40 CFR 60.11, 60.13, and Part 60 Appendix A
- Parametric or Predictive Emissions Monitoring System (PEMS)
 - Mathematical model calculating pounds pollutant per mmBTU using heater and boiler operating parameters
 - Consistent with CEMS data frequency requirements of 40 CFR Part 60
- Stack Tests
 - Conducted in accordance with 40 CFR Part 60 Appendix A or EPA-approved alternative method

Fluid Catalytic Cracking Unit (FCCU) Emissions Monitoring

- SO₂, NO_x, CO, and O₂: CEMS
 - CEMS installed prior to conducting performance tests
 - Calibration drifts of CEMS checked daily
 - CEMS sample, analyze, and record data for each successive 15-minute period
 - 1-hour averages computed using the 15-minute CEMS data
- PM: Stack Tests
 - Stack testing according to 40 CFR Part 60 Appendix A Methods 5B or 5F; typically annually, but frequency can vary by consent decree
 - Some consent decrees also require COMS for opacity

Heater and Boiler Emissions Monitoring

- Capacity greater than 150 mmBTU/hr
 - NO_x, CO, and O₂: CEMS
- Capacity between 100 and 150 mmBTU/hr
 - NO_x, CO, and O₂ : CEMS or PEMS
- Capacity less than 100 mmBTU/hr
 - NO_x, CO, and O₂: stack tests or portable continuous analyzer

Sulfur Recovery Plant (SRP)

Emissions Monitoring

- SO₂: CEMS or EPA-approved alternative
 - Monitor and report all excess emissions as required by 40 CFR 60.7(c), 60.13, and 60.105(a)(5), (6), or (7)
 - Develop and implement a Preventative Maintenance and Operation Plan to reduce SO₂ emissions using good air pollution control practices

Hydrocarbon Flare Emissions Monitoring

- One of the following requirements apply:
 - Install and operate CEMS or PEMS
 - Control flaring by operating flare gas recovery system to control continuous or routine flaring
 - Eliminate the routes of generated fuel gases and only flare:
 - Process upset gases;
 - Fuel gas released as a result of relief valve leakage; or
 - Gas released due to a malfunction
 - Eliminate the routes of generated fuel gases and monitor the flare with CEMS or a flow meter

Benzene Emissions Monitoring

- 40 CFR Part 61 Subpart FF Benzene Waste NESHAP (BWON)
 - Sampling for benzene concentration according to 40 CFR 61.355(c)(3)
 - If Total Annual Benzene (TAB) emissions less than 10 Mg/yr, then exempt from BWON
 - If TAB emissions greater than 10 Mg/yr, then develop and implement a plan identifying a strategy to ensure compliance with BWON

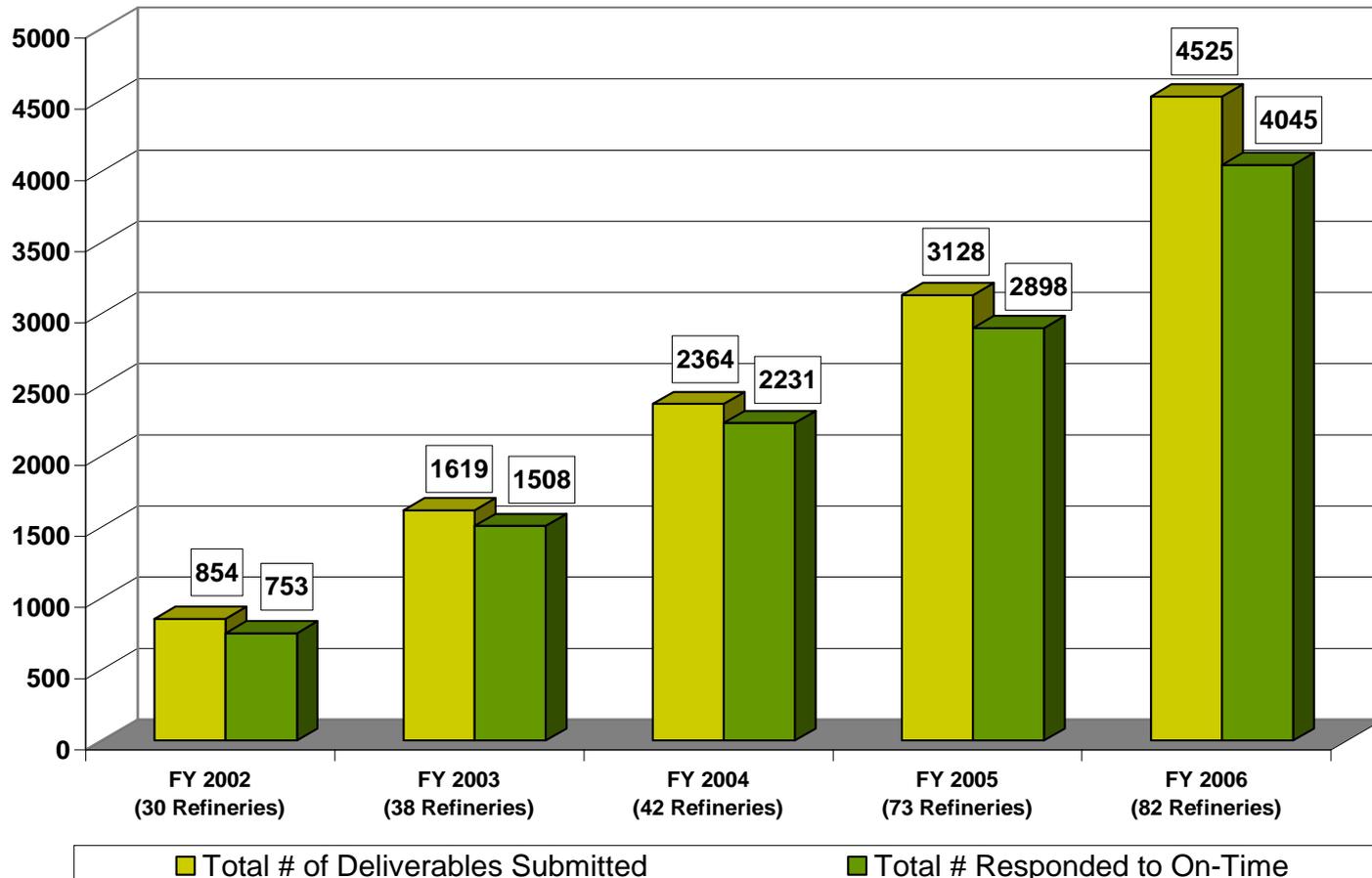
Leak Detection and Repair (LDAR) Emissions Monitoring

- Develop and implement a program to achieve and maintain compliance with state and federal LDAR regulations (e.g., 40 CFR Part 60 Subparts VV and GGG)
- Program must include:
 - Refinery wide leak rate goal
 - Identification of all equipment with the potential to leak
 - Procedures to identify, repair, and track leaky equipment
 - LDAR audits

Implementation of Decrees

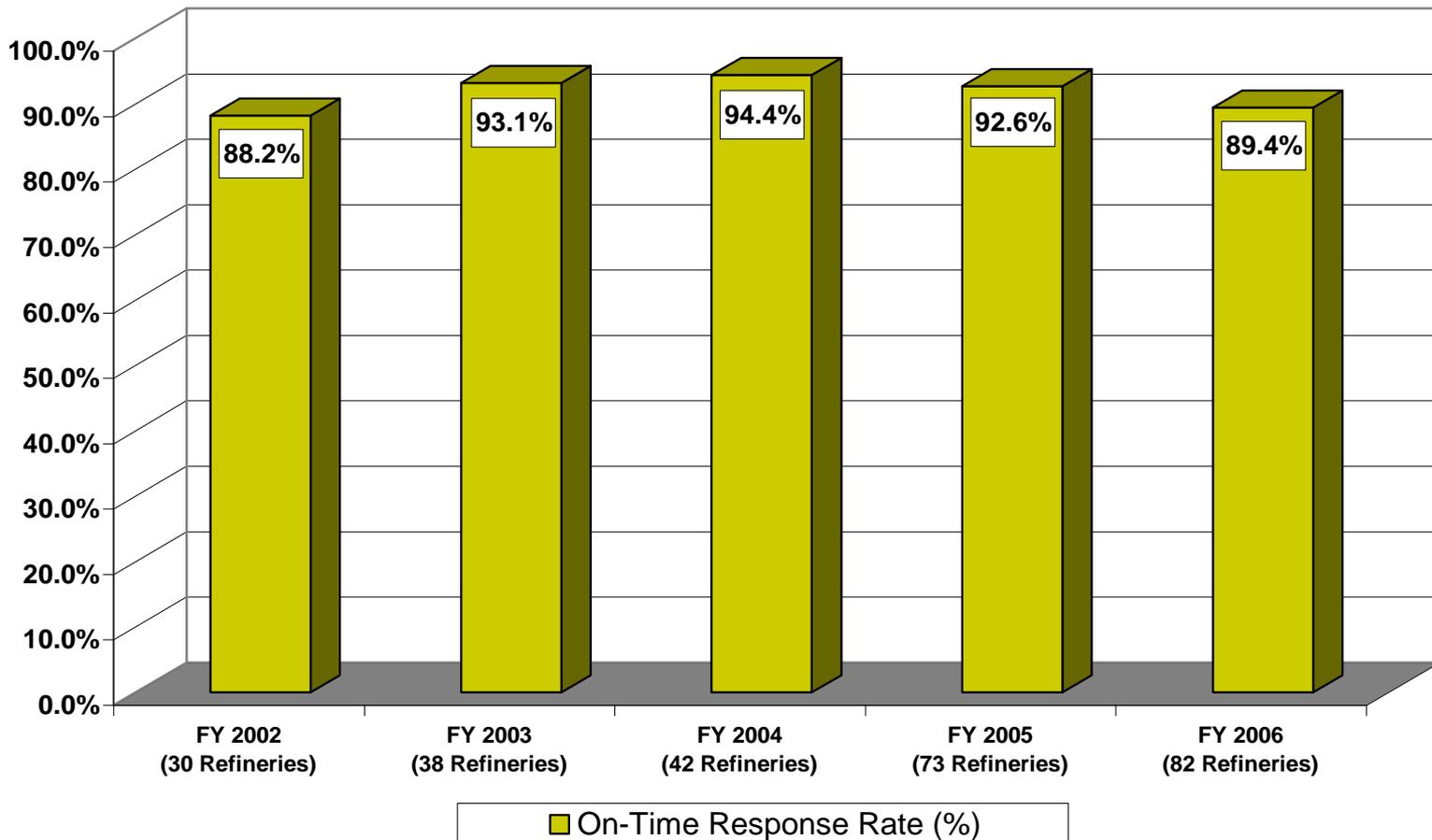
Volume of “Deliverables” Submitted under Decrees

“Deliverables” Include Reports of Flaring Incidents and Corrective Action, Biennial Reporting, etc.



Implementation of Decrees

Improvements in EPA Responsiveness



Next Steps

- **Continue work toward bringing the remainder of the refining industry under settlements for all “marquee” Clean Air Act issues, or by referral to DOJ or filed enforcement action.**
- **Negotiations currently ongoing with refiners representing a sizable percentage of the remaining 10% of industry**
- **Maintain focus on implementation of Consent Decrees to achieve expected emissions reductions.**

Link and Contact Information

- **EPA National Petroleum Refinery Initiative (NPRI) Website:**
<http://www.epa.gov/compliance/resources/cases/civil/caa/oil/>
- **EPA Headquarters Contact: Patrick Foley, Senior Environmental Engineer, (202) 564-7978**