5. REGIONAL HAZE BART REQUIREMENT

5.1 Overview of Federal BART Requirement

In addition to development of the broader 2018 Progress Strategy, the Best Available Retrofit Technology (BART) requirement of the Regional Haze Rule involves a specific review of existing, older stationary sources that pre-dated the 1977 Clean Air Act Amendments and therefore, were not subject to New Source Performance Standards (NSPS.) The purpose is to identify older emission sources that contribute to haze at Class 1 Areas and can be retrofit to reduce emissions.

The BART requirement applies to all emission units that fit all three of these criteria:

1. came into existence between August 7, 1962 and August 7, 1977, referred to as "BART-era" in this Plan;
2. are at facilities in the 26 NSPS categories listed below in Table 5-1; and
3. have a total potential to emit (PTE) of at least 250 tons per year (TPY) of NOx, SOx, PM10, VOC, or ammonia, from all BART-era emission units at the same facility.

Emission units which meet all three of these criteria are termed BART-eligible. If the emissions of all the BART-era units at a single facility exceed any one of the pollutant thresholds, then all the BART-era units are considered potentially "BART-eligible", no matter what their emissions level of the other pollutants. If an emission unit (source) has not been retrofit or sufficiently controlled, and has a visibility impact, then it becomes "subject-to-BART". A detailed analysis called the "BART determination" decides which retrofit or control option for the source is necessary to improve visibility.

Table 5-1 BART Categories (New Source Performance Standards categories)

1. Fossil-fuel fired steam electric plants with >250M BTU/hr heat input	14. Coke oven batteries
2. Coal cleaning plants (thermal dryers)	15. Sulfur recovery plants
3. Kraft pulp mills	16. Carbon black plants (furnace process)
4. Portland cement plants	17. Primary lead smelters
5. Primary zinc smelters	18. Fuel conversion plants
6. Iron and steel mill plants	19. Sintering plants
7. Primary aluminum ore reduction plants	20. Secondary metal production facilities
8. Primary copper smelters	21. Chemical process plants
9. Municipal incinerators capable of charging >250 tons of refuse daily	22. Fossil-fuel boilers with >250 MBTU per hour heat input
10. Hydrofluoric, sulfuric, and nitric acid plants	23. Petroleum storage and transfer facilities with a capacity exceeding 300,000 barrels
11. Petroleum refineries	24. Taconite ore processing facilities
12. Lime plants	25. Glass fiber processing plants
13. Phosphate rock processing plants	26. Charcoal production facilities

Basically, the Regional Haze Rule requires the Plan to provide:

1. A list of all BART-eligible sources within the state; and
2. A determination of BART for each BART-eligible source in the state that emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility in any Class I area.

Summary lists of BART-eligible units and those needing BART determinations are included later in this chapter.

5.2 Stationary Source Control in California

California has a long history of controlling emissions from stationary sources. Thirty-five local air districts have regulatory authority over stationary sources in the State. California was able to simplify the BART process somewhat because it has had a Best Available Retrofit Control Technology (BARCT) requirement since 1988. BARCT is:

> "an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source."

The requirement to meet BARCT for existing sources applies to all air districts not attaining the California standards for ozone as well as to those upwind districts whose emissions contribute to air quality in a downwind non-attainment district.

Further, all air districts not attaining the State standards must consider all feasible measures to reduce air pollution and adopt and implement measures to attain the State standards as soon as possible. Except for one of the smaller rural air districts in the State, which has no BART-eligible sources, all the other air districts do not attain at least one State standard. The California Air Quality Standards are more stringent than the federal standards. Therefore, the air districts already have adopted and implemented BARCT rules or stringent control measures for sources. Every few years, the California Association of Air Pollution Control Officers Association, in conjunction with ARB, conducts a Statewide evaluation of source category controls used by the air districts to determine all feasible measures.

5.3 The BART Process in California

Many BART-eligible sources have already been retrofit or controlled, by air district permit or prohibitory rule, to a BART equivalent or better level. To list those sources and then to select the ones which could be retrofit, ARB began with facilities potentially having BART-eligible sources. The WRAP contractor Eastern Research Group, Incorporated (ERG) prepared a short list of all facilities in California permitted under Title V of the Clean Air Act that fall into the 26 BART categories. Title V requires permits for facilities that emit the targeted pollutants

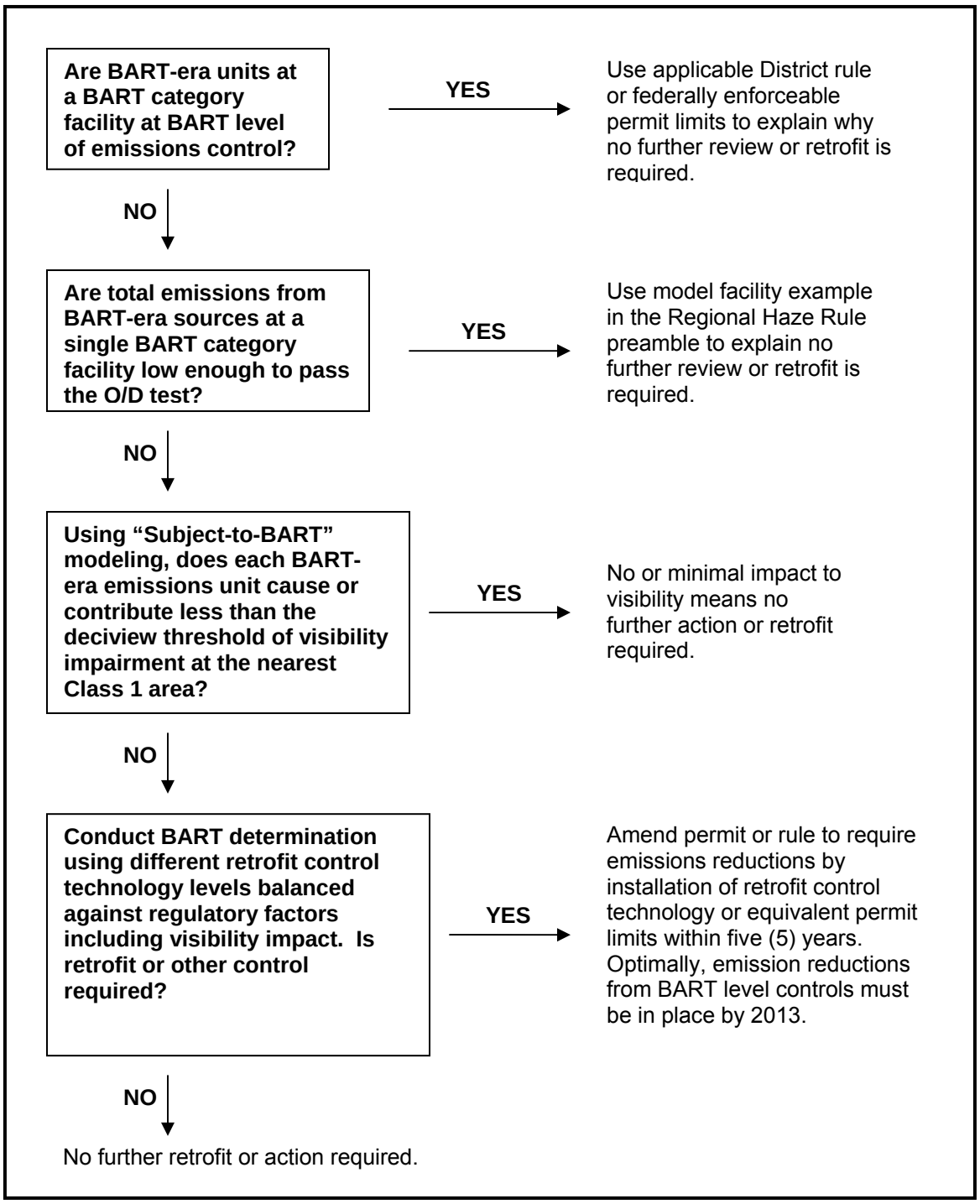
above a threshold ranging from 100 TPY to 250 TPY, depending on the attainment status in different parts of California.

While NOx, SOx, and PM emissions must be evaluated for BART-eligibility, the Regional Haze Rule gives states the discretion to excuse facilities solely exceeding the threshold for VOC or ammonia provided that those pollutants do not contribute to impaired visibility at Class 1 Areas. In California, ammonia emissions from area, mobile, and natural sources exceed those from stationary sources. Also, since secondary organic aerosols formed from anthropogenic VOC emissions are not significant contributors to haze on worst days in California, the State chose not to include sources that exceed the threshold for VOCs. When worst days in California are driven by organic aerosols, they appear to be the result of seasonally high biogenic emissions from plants or from wildfire events. Therefore, California's BART-eligible list includes only BART-era units with total emissions of NOx, SOx, or PM above the BART threshold at a single facility.

As stated in our July 2, 2004 letter to U.S. EPA commenting on the BART Regulation, California believes that air districts have generally already adopted and implemented rules requiring the best available retrofit control technology (BARCT) as part of the planning requirements to meet both federal and California air quality standards. (The letter is included in Appendix H.) These BARCT level rules meet the BART-level requirements of the Regional Haze Rule on a source category basis. Give the large number of BART-eligible sources in California, this rule-based approach provides a more efficient process, while still ensuring that the Regional Haze Rule BART control requirements are met. California believes this rule-based approach meets the intent of Regional Haze requirements and achieves the same results as a case-by-case BART determination.

ARB worked with the air districts' staffs to create the required summary lists for the Plan. Air district staff provided information regarding control level and age of units. Figure 5-1 illustrates the stepwise winnowing process for confirming which listed BART-eligible sources already meet BART levels and for finding the few remaining sources that might have been grandfathered from stringent controls and therefore, may need a BART determination.

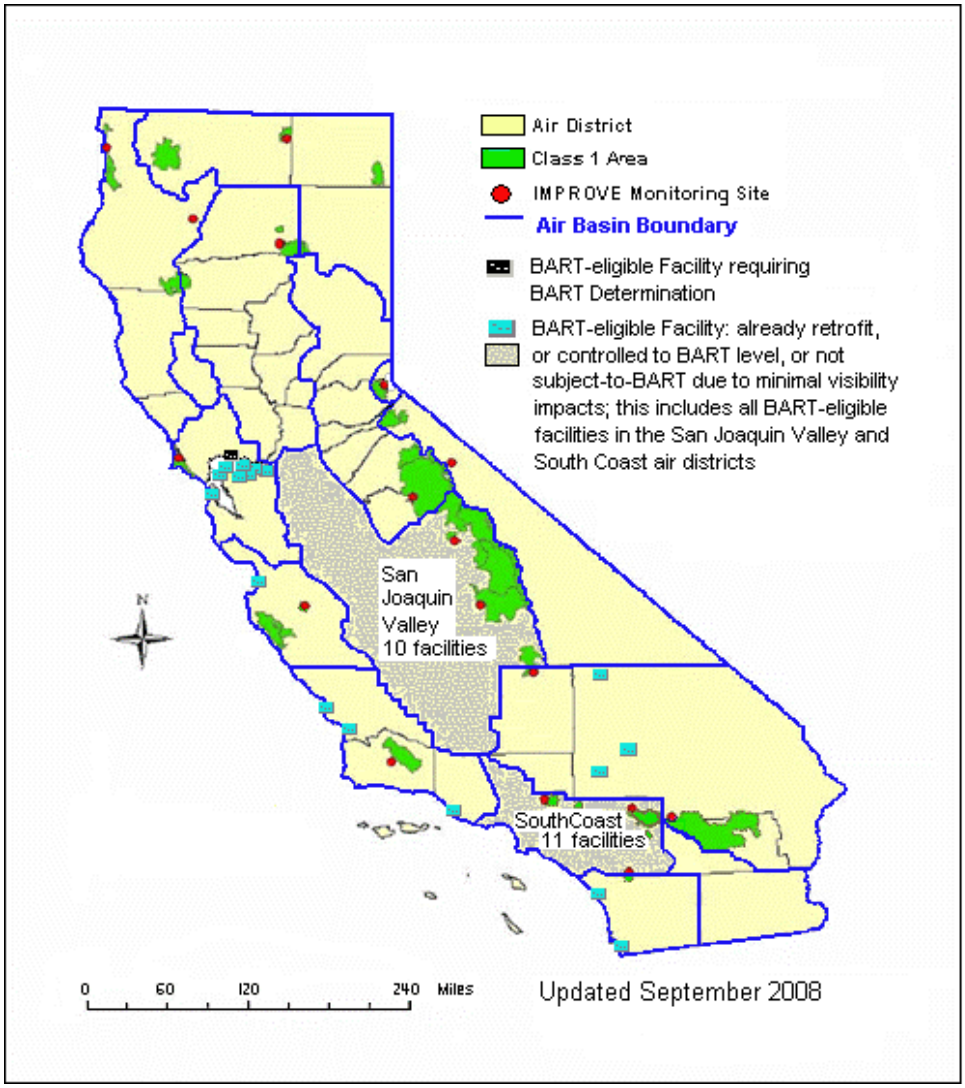
Figure 5-1 California's BART-eligible Source Review Process



5.4 Locating BART-eligible Source Facilities

The locations of facilities with BART-eligible sources are mapped in Figure 5-2, showing their proximity to Class 1 Areas. Most of the BART-eligible sources are found along the coast, in the San Joaquin Valley, in the South Coast Air Basin and in the Mojave Desert. In California, the types of sources are predominately power plants, refineries, industrial boilers, cement plants, and manufacturing plants. Although there are numerous BART-eligible sources, many are excused from a BART determination because they are already controlled to a BART equivalent level. Some BART-eligible sources active during the Plan baseline period (2000-2004) have been shut down permanently since then. Those sources already scheduled for replacement before 2013, were not put through a BART determination because the facility is required to go through New Source Review and replace the old units with Best Available Control Technology (BACT).

Figure 5-2 Location of Facilities with BART-eligible Sources



5.5 Listing BART-eligible Sources

The Regional Haze Rule requires listing of all BART-eligible sources at a facility. Table 5-2 is the list of BART-eligible sources in California. Air districts provided the information on which sources are compliant with the respective prohibitory rule establishing operational emission limits or the permit conditions that are equivalent to the most stringent technology feasible in their area for the source category. When an air district adopts a rule, California air quality and environmental laws require that the air district's staff report contains an analysis of cost-effectiveness, energy and environmental impact, best available technology including equipment lifetime, and local economic impact, among other things. The air districts' rulemaking process takes into consideration the factors also required for a BART determination. Therefore, California did not proceed to the subject-to-BART modeling or BART determination phase when the source was already equipped with the most stringent technology, or, is at the level of control deemed cost-effective by the air district for that source category.

5.6 Visibility Impact Analysis

The BART rule allows a "subject-to-BART" screening prior to a BART determination that excuses sources from further review if the impact does not cause or contribute to visibility impairment. A one deciview increment is the amount of change in clarity that a human eye can detect when viewing an object on the horizon. Therefore, in the BART rule, the U.S. EPA set the contribution increment of 0.5 deciviews above the baseline threshold as the indicator of *contributing* to visibility impact and allowed states the discretion to set a lower impact threshold. For subject-to-BART visibility impact screening, the baseline threshold in California was set at the Statewide average deciview level at Baseline Conditions.

The U.S. EPA also allows all the BART-eligible sources at a facility to be excused from further review if the ratio of their cumulative potential to emit (Q) in tons per year of NOx and SOx divided by the distance in kilometers (D) to the nearest Class 1 Area, is less than 10. This rule of thumb (Q/D <10) applies only when no other facilities with BART-eligible sources are close to the surrounding Class 1 Areas, so as to avoid cumulative impacts. U.S. EPA used modeled scenarios to demonstrate that a maximum impact of 0.5 deciview impact above the threshold of the baseline best day average for the nearest Class 1 Area was not exceeded, when Q/D <10. Several of California's facilities with BART-eligible sources are within 25 kilometers of a Class 1 Area and therefore their BART-eligible emission units could not be excused via a Q/D calculation.

It is possible that several BART-eligible emission units, cumulatively, might cause or contribute to impaired visibility because they are clustered very close to a Class 1 Area, even though they individually have less than the maximum

0.5 deciview impact above the allowed threshold. In California, if the modeled visibility impact of the sum of the pertinent facility emissions exceeded the threshold by 0.5 deciviews, then BART determinations were required for each individual BART-eligible emissions unit at the facility.

The CalPuff modeling protocol used to determine visibility impacts is described in Appendix C. California conducted this "subject-to-BART" visibility modeling only on sources not sufficiently controlled by the air district rules. The BART requirement also allows the exclusion of pollutants below a de minimus emissions level from subject-to-BART visibility modeling when evaluating an entire facility for visibility impact if:

1. a PTE <15 TPY for PM emissions, or
2. a PTE <40 TPY of SOx emissions, or
3. a PTE <40 TPY of NOx emissions.

Those emission units at a single facility that cumulatively emit only the pollutant(s) falling below these de minimus thresholds were listed but excused from further review.

5.7 BART Determination Overview

A BART determination evaluates retrofit options for an individual source, starting with the most stringent level, until the appropriate level is determined. Since local air districts permit stationary sources, the local air districts are responsible for the BART determination taking into account:

1. available retrofit control options;
2. any pollution control equipment in use at the source (which affects the availability of options and their impacts);
3. costs of compliance for control options;
4. remaining useful life of the facility;
5. energy and non-air quality environmental impacts of control options, and
6. visibility impacts analysis.

Where MACT or LAER standards exist for a source category, California views these as meeting or exceeding a BART level of control. The permitee may be able to show compliance with a lesser level of control when the six factors listed above are considered.

5.8 BART-eligible List and Results of Subject-to-BART Modeling

Table 5-2 lists the BART-eligible sources in California identified and evaluated by ARB and the air districts. The list also summarizes which BART-eligible units needed subject-to-BART visibility modeling and why the others did not. Only one modeled facility had a visibility impact greater than 0.5 deciviews over the threshold.

Table 5-2 List of BART-eligible Sources (Emission Units)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
Bay Area Air Quality Management District	Chevron Refinery (Richmond) – #4 Rheniformers, F-3550 & F-3560 – #4 Rheniformers, F-3570 & F-3580 – #5 Rheniformers, F550 & F560 – #5 Rheniformers, F570 & F580 – #1 JHT Furnace #247 – #1 JHT Furnace #210A&B – Furnaces for #5 Naptha Hydrotreaters F410 & F447 – Furnace) VGO Desulfurizer F-1610 – #4 Crude Unit F 1100a – #4 Crude Unit F1100b – #4 Crude Unit F1160 – LSFO Cooling Tower – 3 CAT Cooling Tower E460 – F-100 Asphalt Solution Heater SDA Isomax – F-110 Asphalt Solution Heater SDA Isomax – F-120 Asphalt Solution Heater SDA Isomax – F-320 Naphtha Vaporizer, H2 Plant Isomax – F-330 Naphtha Vaporizer, H2 Plant – F-410 & F-420 TKC Feed Furnaces/TKC Isomax Umits – F-510 & F-520 & F-530 TKN Feed Furnace/Isomax – F-610 & F-620 &F-630 Isocracker Feed Furnace and Isomax W/Ultra Low NOx Burners – F-710 TKC Fractionator and Isomax – F-730 Isocracker Splitter Feed Furnace and Isomax W/Ultra Low NOx Burners – F-731 Isocracker Reboiler and Isomax W/Ultra Low NOx Burners	BAAQMD Regulation 9, Rule 1 BAAQMD Regulation 9, Rule 10, Section 303 40 CFR 60, Subpart J 40 CFR 63, Subpart UUU Consent Decree with U.S. EPA	NO Modeled visibility impact is 0.393 dv above the threshold

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
	Chevron Refinery (Richmond) (continued) – F305 H2 Reforming Furnace, H2 Plant – F355 Reforming Furnace, H2 Plant – Isomax Cooling Tower -E-261 – Alkane Cooling Water Tower – F-2170 Stack Gas Heater #1 SRU Cat. Crack. – F-2270 Tail Gas Heater #2 SRU – F-2370 Tail Gas Heater #3 SRU – *High Level Flare, LSFO (6010) – *V-282 South Isomax Flare (6012) – *North Isomax Flare V-281 (6013)		
Bay Area Air Quality Management District	Conoco-Phillips Refinery and Carbon Plant under single permit (Rodeo) – Kiln (stack 2) – U240_B-1 Boiler – U240_B-2 Boiler – U240_B-101 Heater – U240_B-202 Heater – U240_B-401 Heater – U244_Heaters: B-501 & B-502 & B-503 & B-504 & B-505 – U244_B-506 Heater – U244_B-507 Heater – U248_B-606 Heater – U236 Cooling Tower – U240 Cooling Tower – U200 Cooling Tower – *Dedust Oil Storage Tank (no emissions) – *Rotary Cooler #2 (no emissions) – *Sulfur Pit 236 (no emissions) – *Sulfur Pit 238 (no emissions)	– BAAQMD Regulation 9, Rule 1 – BAAQMD Regulation 9, Rule 10, Section 303 – 40 CFR 60, Subpart J – Consent decree with EPA	NO Modeled visibility impact is 0.366 dv above the threshold

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
	Conoco-Phillips Refinery and Carbon Plant under single permit (Rodeo) (continued) – *C-1 Flare – *U240_Uni-Cracking Unit 240 – *U244 Reforming Unit 244 – *U248 Unisar Unit 248 – *U40 Raw Materials Receiving	~	
Bay Area Air Quality Management District	Mirant Power Plants under single permit Antioch (A0018) – Boiler #10 (Low NOx Burners & SCR) Pittsburg (A0012) – Boiler No. 7 – Emergency Diesel Generator 36 – No. 7-1 Diesel Fire Pump – No. 7-2 Diesel Fire Pump Potrero (A0026) – Boiler No. 3-1	– BAAQMD Regulation 9, Rule 11, Section 308 for NOx (0.28 lb NOx/MMbtu) – Permit requires exclusive use of low sulfur natural gas to control PM10 and SO2 at the boilers at facilities A0012 and A0018	NO Already at BART level
Bay Area Air Quality Management District	Rhodia Sulfuric Acid Plant (Martinez) – Sulfuric acid plant – Cooling tower – *Natural Gas Preheater Furnace (start-up only, below 40 TPY) – *Sulfur Storage Tank T-2 – *Sulfur Storage Tank T-12	– Consent Decree limits SOx emissions to 2.2 lbs SO2 per Ton; current actual emissions range 0.6 to 0.8 lbs SO2 per Ton with baseline period maximum of 1.74 tons per day for sulfur plant – Storage tanks have no reported emissions	NO Modeled visibility impact is 0.092 dv above the threshold

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
Bay Area Air Quality Management District	Shell Refinery (Martinez) – EMSR7 Cooling Tower # 32 (LOP) – Thermal Oxidizers S.P. # 1 (stack 3) – Thermal Oxidizers S.P. # 2 (stack 3) – EMSR1-CO Boiler # 2 (SCR & ESP) – *LMSR1 Utilities Lime Storage Bin 1 – *EMSR1 Utilities Lime Storage Bin 2 – *Misc. Sand Hopper (storage, not used routinely, no vents) – *LOG LPG Loading Flare (abatement device for LPG loading rack) – *LOP Auxiliary Flare (emergency use only) – *LUBS2 Cooling Tower # 35 (not operating since 2003)	– BAAQMD Regulation 9, Rule 10 covers NOx from CO Boiler which is abated with SCR and ESP – Many BART-era units are closed or controlled storage systems with no reported emissions – 40 CFR 60, Subpart J – Consent decree with EPA	NO Modeled visibility impact is 0.169 dv above the threshold
Bay Area Air Quality Management District	Tesoro Refinery (Martinez) – #51 Furnace-#2 Reformer Auxiliary Reheat – Alkylation Turbine – No. 3 Crude Unit Cooling Tower – Sulfur Recovery Unit – *Tank 691 Safety Flare	– BAAQMD Regulation 9, Rule 1 – BAAQMD Regulation 9, Rule 9 (55 ppmv NOx @15% 0_2 at alkylation turbine) – BAAQMD Regulation 9, Rule 10, Section 303 – 40 CFR 60, Subpart J – 40 CFR 63, Subpart UUU – Consent decree with EPA	NO Modeled visibility impact is 0.069 dv above the threshold

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
Bay Area Air Quality Management District	Valero Refinery (Benicia) – Crude pre-Heat Process Furnace F-101 (Main Stack P-1) – Reduced Crude pre-Heat Process Furnace F-102 (Main Stack P-1) – FCCU Regenerator R-702 (Main Stack P-1) – Coker (Main Stack P-1) – Stacks P30 & P31: Reformer Furnaces S21/*S22 – Stacks P19 & P20: Turbine/Waste Heat Boiler SG-701 – Stack P47: Turbine/Waste Heat Boiler SG-702 – Stacks P17 & P18: Turbine/Waste Heat Boiler SG-401 – Stacks P24 & P25: Turbine/Waste Heat Boiler SG-1031 – Stack P50: Claus Units 1 & 2 – Cooling Tower – Sulfur Storage Tank (any emissions routed to stacks P24/25) – *Acid Gas Flare – *Butane Flare ST-1701 – *South Flare ST-2101 (Flare Gas Recovery System) – *North Flare ST-2103 (Flare Gas Recovery System) – *Sulfur Storage Pit at Sulfur Plant (any emissions routed to SRU) – *TK 2325: Brine Saturator (no emissions) – *Sulfur Plant 'A' Tail Gas Incinerator F-1302A (used only for SRU upset) – *Sulfur Plant 'B' Tail Gas Incinerator F-1302B (used only for SRU upset) – *Lime Silo 2303 controlled by baghouse; permit-limited throughput 292 TPY	– Claus Units are at MACT level; subject to NSPS and NESHAPS limits – BAAQMD Regulation 9, Rule 1 – BAAQMD Regulation 9, Rule 9 – BAAQMD Regulation 9, Rule 10, Section 303 – 40 CFR 60, Subpart J – 40 CFR 63, Subpart UUU – Flares subject to consent decree	YES Modeled visibility impact is 0.758 dv above the threshold BART Determination required.

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
Mojave Desert Air Quality Management District	Coolwater Reliant (Daggett) (EGU, all units>250MMBTU/hr) – Boiler 2 (#1078) (paired w/ Boiler #1, which is not a "BART-era" boiler) – Turbine 31 (#1079) – Turbine 32 (#1080) – Turbine 41 (#1081) – Turbine 42 (#1082) (gaseous fuel, very limited use of liquid fuel as emergency back-up)	Boilers: FGR NOx: 70 ppm (0.09 lb/MMBtu) (gas) 115 ppm (0.15 lb/MMBtu) (liquid) per MDAQMD Rule 1158 (Boilers permit limited to 1319 TPY total combined emissions) Turbines: WI NOx: 42 ppm (gas), 65 ppm NOx (liquid) per MDAQMD Rule 1158	NO Modeled visibility impact is 0.489 dv above the threshold
Mojave Desert Air Quality Management District	Searles Industrial (Searles Lake) (boilers >250 MBTU/hr) – Argus Boiler 554 (#26) – Argus Boiler 555 (#25) – Backup Boiler #483 (#22) • < 40TPY each of NOx, SOx • <15 TPY PM (Coal fuel, tangentially fired design)	Boilers: Argus Boilers have FGR, LNB, OFA, voluntary urea injection, wet scrubber, ESP Boiler #22 has permit-limited hours of operation NOx: 221 lb/hr (0.22 lb/MMBtu) SOx: 44.7 lb/hr (0.04 lb/MMBtu) PM10: 45 lb/hr (0.04 lb/MMBtu) Turbine: SCR NOx: 42 ppm	NO Modeled visibility impact is 0.208 dv above the threshold
Mojave Desert Air Quality Management District	TXI Cement (Oro Grande) (Portland Cement plant) – 5 kilns (each 130MMBTU/hr) – 2 Kilns (each 120MMBTU/hr with waste boiler) – 1 pre-calciner kiln (727 MMBTU/hr)	Complete Replacement in 2007 with new kilns under New Source Review (old kilns and boilers went out of service early 2008)	NO

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
Monterey Bay Unified Air Pollution Control District	Dynergy Moss Landing, LLC (formerly Duke Energy, Moss Landing Power Plant) (EGU) – Boiler Unit 6 – Boiler Unit 7	– Both tangential-fired boilers retrofit post-1980 with SCR, regulatory limit of 10ppm NOx and 10ppm ammonia slip – Burns natural gas; fuel oil not allowed – CEM on this facility report annually to district – NOx: Rule 4-31 limit 0.30 lbs/million Btu – SOx: low sulfur fuel only – Cooling System best achievable non-air environmental impact per California Energy Commission's Order No. 00-1025-24	NO
San Diego County Air Pollution Control District	Cabrillo Encina Plant (Carlsbad) (EGU) – Units 1-5 have SCR – Unit 6 is peaking unit with water injection & permit limited to 877 hours of operation	SCR or permit-limited operation	NO
San Diego County Air Pollution Control District	Duke Energy (South Bay) (EGU) – Units 1-4 have SCR – Unit 5 is peaking unit with water injection & permit limited to 877 hours of operation	SCR or permit-limited operation	NO

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
San Joaquin Valley Air Pollution Control District	J R Simplot Company (Nitrogenous Fertilizer and Sulfuric Acid Plant (Lathrop) – Sulfuric Acid Plant	– TOTAL PTE NOx + SOx + PM10 = 660 TPY – Distance to nearest Class 1 Area > 100 kilometers and facility is not clustered with other sources, Q/D < 10	NO
San Joaquin Valley Air Pollution Control District	Big West (formerly Equilon Bakersfield Refinery) (also former IVEC and Tosco refineries in Bakersfield) – Process Heaters/ Boilers/ Steam Generators/ Internal Combustion Engines (all less than 250MMBTU/hr.) – Flares – Cooling Towers – Tanks	– NOx controlled by BARCT Rules 4305, 4306, 4701, 4702 – Flares controlled by Rule 4311 – Tanks: Rule 4623 – During Baseline: NOx>250 TPY PTE, but phased reductions bring current operations to Total PTE NOx+SOx+PM10 ~ 313 TPY – Distance to nearest Class 1 Area = 80 kilometers and facility is not clustered with other sources, Q/D < 10	NO
San Joaquin Valley Air Pollution Control District	Aera Energy LLC (Coalinga oil fields – southwest of Fresno on west side of Valley) (Permit 1121) ~7,600 barrels of heavy crude per day	– Boilers: BARCT Rules 4305 & 4306 – Tanks: Rule 4623 – Low sulfur fuel used	NO
San Joaquin Valley Air Pollution Control District	Aera Energy LLC (Midway Sunset Complex NW of Bakersfield) (Combined Permit 1136/1548) – IC engines – light oil production field ~50,000 barrels per day	– IC engines: BARCT Rules 4701 & 4702 – Tanks: Rule 4623 – Low sulfur fuel used where system not electrified	NO
San Joaquin Valley Air Pollution Control District	Aera Energy LLC (Bellridge Complex oil fields near Fellows) (also former Shell California Production Western E & P) (Combined Permit 1135/1547) heavy oil production field >140,000 barrels per day all boiler steam generators <250 MMBTU/Hr heat input	– Boilers: BARCT Rules 4305 & 4306 – Tanks: Rule 4623 – Low sulfur fuel used – Shell Facility during baseline period now part of Aera Bellridge Complex	NO

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
San Joaquin Valley Air Pollution Control District	Chevron (by 2008) formerly Nuevo Energy Co. aka Plains Exploration & Production Co. (Fresno County "Address": S. 7f T. 20s R. 16e (Permit 2885) – gas & light oil production *(Actual NOx/SOx/PM10 <250TPY during baseline years; PTE not available)*	– IC engines: BARCT Rules 4701 & 4702 – Tanks: Rule 4623 – Low sulfur fuel used – Converting to electrified engines	NO
San Joaquin Valley Air Pollution Control District	Nuevo Energy Company aka Plains Exploration & Production Company (Kern County) (Permit 1372) – heavy oil production – all boiler steam generators <250 MMBTU/Hr heat input *(Actual NOx/SOx/PM10 < 250TPY during baseline years; PTE not available)*	– Boilers: BARCT Rules 4305 & 4306 – Tanks: Rule 4623 – Low sulfur fuel used	NO
San Joaquin Valley Air Pollution Control District	Spreckels Sugar Company (Mendota) (Permit 1179) – 311 MBTU/hr Boiler	– Boiler: BARCT Rules 4305 & 4306 – Low sulfur fuel used	NO
San Joaquin Valley Air Pollution Control District	Occidental Of Elk Hills, Inc. (by 2008) aka Vintage Petroleum Inc (Kern County) (Permit 1738) – light oil production Occidental Of Elk Hills, Inc. (linked to Vintage) (Gas Plant) (Tupman, Kern County) (Permit 2234) – Crude Petroleum & Natural Gas production – 2000 horsepower IC engine	– IC engines: BARCT Rules 4701 & 4702 – Tanks: Rule 4623 – Low sulfur fuel used – Converting to electrified engines	NO

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
San Joaquin Valley Air Pollution Control District	Chevron USA Inc. (Fresno) aka Chevron-Texaco (Permit 0311) – heavy oil production – Large boiler Chevron USA Inc (Kern) aka Chevron-Texaco (Kern County) (Permit 1127) – Heavy Oil Production Texaco Exploration aka Chevron-Texaco (Fresno) (Permit 1311) – Heavy Oil Production Santa Fe Energy Resources, Inc aka Chevron-Texaco (Permit 1311) (sold to Texaco and dismantled 1998) Chevron USA Inc aka Chevron-Texaco (Kern County) (Permit 1128) – Heavy Oil Production Chevron USA Inc aka Texaco Explor & Prod Inc aka Chevron-Texaco (Kern County)(Permit 1129) – Heavy Oil Production Texaco California Inc. (TCI) aka Chevron-Texaco (Kern County)(Permit 1141) – Heavy Oil Western	Boilers: BARCT Rules 4305 & 4306 Tanks: Rule 4623 Low-sulfur fuel used *(All these facilities may have been operating under separate permits during the baseline years but they are all under one permittee by 2008)* *(Permits 1127, 1128, 1129, 0311, 1131, 1141 are all connected)*	NO

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
San Luis Obispo County Air Pollution Control District	Duke Energy (Morro Bay EGU) – Unit 3 retrofit 1994-5 (OFA, LNB, FGR) – Unit 4 retrofit 1994-5 (OFA, LNB, FGR) (application to replace entire facility pending approval by California Energy Commission)	NOX: entire facility permit limited to 2.5 TPD, bubbled with post 1977 units 6 and 7, (facility<1000TPY) SOX: natural gas fired – State low sulfur fuel limits	NO
San Luis Obispo County Air Pollution Control District	Conoco-Phillips (formerly TOSCO) (Santa Maria Refinery) – coke calciner	Conoco-Phillips surrendered permit for Santa Maria Calciner in November 2007 per agreement with CA Attorney General for GHG reductions	NO

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
South Coast Air Quality Management District	Rhodia Sulfuric Acid Plant (Carson)	SOx & NOx: RECLAIM [2] PTE for PM10 is <15TPY	NO
South Coast Air Quality Management District	California Portland Cement (Colton)	SOx & NOx: RECLAIM [2] PM10: Rule 1156 and kilns vented to baghouse equipped with pulse jet electronic control	NO
South Coast Air Quality Management District	So Cal Gas (Natural Gas Transmission) (Northridge)	SOx & NOx: RECLAIM [2] PTE for PM10 is <15TPY	NO
South Coast Air Quality Management District	BP West Coast Products (refinery)(Carson) – Coke handling Unit – FCCU – Cooling Towers	SOx & NOx: RECLAIM [2] PM: R1158 & R1105.1 as adopted in 1999 & 2003	NO
South Coast Air Quality Management District	BP Wilmington Calciner (refinery)(Wilmington) – Coke handling Unit – FCCU – Cooling Towers	SOx & NOx: RECLAIM [2] PM: R1158 & R1105.1 as adopted in 1999 & 2003	NO
South Coast Air Quality Management District	Ultramar, Inc. (refinery) (Wilmington) – Coke handling Unit – FCCU – Cooling Towers	SOx & NOx: RECLAIM [2] PM: R1158 & R1105.1 as adopted in 1999 & 2003	NO

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
South Coast Air Quality Management District	Chevron Products Company (refinery) (El Segundo) – Coke handling Unit – FCCU – Cooling Towers	SOx & NOx: RECLAIM [2] PM: R1158 & R1105.1 as adopted in 1999 & 2003	NO
South Coast Air Quality Management District	Exxon Mobil Oil Corporation (refinery) (Torrance) – Coke handling Unit – FCCU – Cooling Towers	SOx & NOx: RECLAIM [2] PM: R1158 & R1105.1 as adopted in 1999 & 2003	NO
South Coast Air Quality Management District	Conoco Phillips Company (refinery) (Carson) – Coke handling Unit – FCCU – Cooling Towers	SOx & NOx: RECLAIM [2] PM: R1158 & R1105.1 as adopted in 1999 & 2003	NO
South Coast Air Quality Management District	Conoco Phillips Company (refinery) (Wilmington) – Coke handling Unit – FCCU – Cooling Towers	SOx & NOx: RECLAIM [2] PM: R1158 & R1105.1 as adopted in 1999 & 2003	NO
South Coast Air Quality Management District	Tesoro Corporation (refinery) (Wilmington) – Coke handling Unit – FCCU – Cooling Towers	SOx & NOx: RECLAIM [2] PM: R1158 & R1105.1 as adopted in 1999 & 2003	NO

Table 5-2 List of BART-eligible Sources (Emission Units) (continued)

Air District	BART-Eligible Source [1]	BART-Level Control (for specific District rule details go to http://www.arb.ca.gov/drdb/drdbltxt.htm)	Further Action Needed
Ventura County Air Pollution Control District	Reliant EGU (Ormond Beach) – Unit 1 Steam Generator (SCR in 1990's, AI) – Unit 2 Steam Generator (SCR in 1990's, AI) (natural gas, lo-sulfur fuel) – two auxiliary steam generators (LNB, FGR in 1990's)	BARCT (California Best Available Retrofit Control Level for Ventura) Total facility emission levels given as illustrative example only: Permitted Emissions (TPY) / 2004 Actual Emissions (TPY) 86.70 ROC / 38.3 ROC 621.58 NOx / 84.5 NOx 154.34 PM / 28.9 PM 37.04 SOx / 6.9 SOx 2778.20 CO / 520.5 CO permit allows full time use of Unit Nos. 1 & 2	NO

[1] For the facilities requiring subject-to-BART modeling, listed units preceded with an asterisk were not modeled for one of the following reasons:
- the unit is utilized during start-up, shut-down, malfunction, and other unpredictable, non-routine upsets;
- the unit is used for emergency relief, when upstream control units cannot accommodate sudden, non-routine emissions;
- the unit has minimal emissions into a closed system where its emissions are captured and routed to another unit which was modeled; or
- the unit is permit-limited to an emission level that is below the de minimus levels for NOx, SOx, and PM10, and is effectively controlled to BART level such that there is no more stringent control option available for the unit.

The emissions from these units are very low, but they were "brought into" BART-eligible listing because emissions from other BART-eligible units at the facility exceeded the 250 TPY threshold.

[2] The RECLAIM Program in the South Coast Air Quality Management District is designed to generally substitute a cap-and-trade market mechanism for a command-and-control regulatory structure in the pursuit of NOx and SOx emissions reductions from major facilities within the District. The intent of the program is to reduce emissions of these pollutants at a faster rate than could be achieved by traditional methods and at lower overall cost.

The RECLAIM Program was originally adopted in 1993, and requires three stages of emission reduction by 2011. In the first stage, which extended to 2000, facilities were required to compute emissions using historical activity rates and emission factors representing best available retrofit technology (BARCT) in 1993. Facilities were further required to meet facility-wide emission targets based on these 1993 BARCT factors by 2000. In the second phase of emission reductions, affected facilities were required to reduce NOx and SOx emissions between 2000 and 2003 by a uniform percentage calculated by the District. RECLAIM rules require that this reduction be sufficient to bring the aggregate of affected facility emissions to attainment targets specified in the 1991 Air Quality Management Plan.

In 2005, the District conducted a study to determine whether reductions under these first two phases were equivalent or greater than those that would have been achieved by the application of BARCT rules to all affected facilities. This study concluded that BARCT limits were more restrictive in 2005 than in 1993, and recommended amendments to the RECLAIM program to achieve these new lower levels. The RECLAIM rules were amended in 2005 and regulated facilities now must further reduce emissions by 2011 to achieve facility-wide emission levels equivalent to those represented by 2005 BARCT limits.

As a result of the scope of the RECLAIM Program in covering all facilities emitting four or more tons per year of NOx or SOX, and the diligence with which SCAQMD staff have analyzed and compared the benefits of this program to the universal application of BARCT to all stationary sources, the RECLAIM Program can be deemed equivalent in terms of emission reduction to the application of a universal BARCT regulation or the equivalent BART limitation under U.S. EPA's visibility protection program.

Abbreviations Used in Table 5-2

AI – Ammonia Injection
BARCT – Best Available Retrofit Control Technology
dv – Deciview or deciviews
EGU – Electric Generating Unit
ESP – Electrostatic Precipitator
FCCU- Fluid Catalytic Cracking Unit
FGR – Flue Gas Recirculation
GHG – Greenhouse gas
IC – Internal Combustion (engines)
lbs – pounds
JHT – Jet Hydrotreater
LNB – Low NOx burner
MMBTU – One million British Thermal Units, (also a thousand thousand BTUs)
NOx – Oxides of Nitrogen
NSCR – Non-Selective Catalytic Reduction
OFA – Over Fire Air
PM – Particulate Matter (usually followed by 10 or 2.5 to denote the largest particle size in microns)
ppm – Parts per million
PTE – Potential to Emit
Q/D – Q is the total of PTE for NOx + SOx + PM10 divided by distance in kilometers to Class 1 Area
ROC – Reactive Organic Carbon
SCR – Selective Catalytic Reduction
SOx – Oxides of Sulfur
SRU – Sulfur Recovery Unit
TBD – To be determined
TPD – Tons per Day
TPY – Tons per Year
WI – Water Injection

5.9 BART Determination

Valero Refining Company (Valero) operates a refinery in Benicia, in Solano County, in the San Francisco Bay Area Air Quality Management District (BAAQMD). The refinery is about 50 kilometers east of Point Reyes National Seashore. It has 27 individual BART-eligible units. Eighteen of the units emit to 12 stacks. Four are flares subject to a consent decree. Five units have no emissions or very low, non-routine, upset emissions collected and routed to pollution control devices or newer process units after 1977. The 24-hour maximum emissions during 2000-2002 were modeled for the 12 stacks. The flares were not modeled due to the non-routine nature of their operations. The remaining units were not modeled for the same reason, and because their minimal emissions are collected by non-BART-eligible controls or processes. The baseline case reflects operations during the modeling period used to obtain subject-to-BART modeling results.

Since the modeled impact of the cumulative emissions from the BART-eligible units at the facility was more than 0.5 dv, but less than one deciview over the threshold, the impacts are considered to contribute to, but not cause, haze at the Point Reyes National Seashore on the coast north of San Francisco. Therefore, BAAQMD completed a BART determination for the BART-eligible sources at the facility (Appendix D).

The BAAQMD evaluated every source for the most stringent level of technical control first. If a technology was not feasible due to physical or operational constraints, energy or non-air quality related impacts, or compliance cost, it was ruled out. The existing level of control and the lifetime of the existing equipment were also considered in evaluating the options. The Claus Units and the Cooling Tower are already operating at BART level, considering the available technology, operational constraints, and the cost of replacement for minimal emission reductions. In other words, no retrofit controls are available for the Cooling Tower and the Claus Units better than what currently exists, short of a complete rebuild. Also, these two types of units exist in part to control emissions. The Cooling Tower has internal baffles to dampen the emissions of condensable aerosol particles and the Claus Units are part of a SOx capture and recovery system. Further, the sulfur storage tank is a “closed system” built before 1977, but connected since then to the Claus units as a means of eliminating any emissions.

Based on the BAAQMD analysis, ARB modeled visibility impact for two scenarios. Option 1 includes the most stringent controls feasible for five of the emission units, including potential replacement of one reformer furnace with a Best Available Control Technology (BACT) level unit under New Source Review. The existing reformer furnace currently operates at BART level, but Option 1 includes the furnace replacement to BACT standards to evaluate the visibility impact. Option 2 adds selective catalytic reduction for the four boiler-turbine sets

to Option 1, to determine whether the incremental benefit to visibility is cost-effective. The summary of modeled options for the Valero Refinery in Benicia are in Table 5-3.

Table 5-3 Summary of BART Determination Modeling

VALERO REFINERY (Benicia)	BART Determination Modeling	NOx 24-hr. max. TPD	SOx 24-hr. max. TPD	PM10 24-hr. max. TPD	deciviews over threshold on 8th highest day
Baseline Scenario	Units listed from Table 5-2 summarized as: • Four Main Stack P-1 Units: -Coker -Process Furnace F101 -Process Furnace F102 -FCCU Regenerator R702 • Reformer Furnace S-21 • Four Boiler-Turbine Sets • Two Claus Units • One Cooling Tower	3.83	17.14	0.77	0.758 dv
Option 1	• Retrofit and replace units contributing to main stack • Potential replacement of reformer furnace to BACT level under NSR	3.22	1.25	0.72	0.291 dv
Option 2	• Retrofit and replace units contributing to main stack • Potential replacement of reformer furnace to BACT level under NSR • SCR for Boiler-Turbine Sets	2.01	1.25	0.72	0.200 dv

Due to a Consent Decree, the BAAQMD is legally required to implement the BART level controls described in Table 5-4 below. These controls will be implemented within 5 years after U.S. EPA approves the Plan. In 2005, Valero Refinery Company and the U.S. EPA entered into a Consent Decree that underlies the improvements listed for the BART-eligible units emitting to a new Main Stack that will replace Stack P-1. The Consent Decree requires the improvements to be implemented by June 30, 2012, at the latest. The emission limit will be enforceable and assured by permit conditions assigned by the BAAQMD to the permits to construct and permits to operate these specific units at the Valero Refinery.

As explained above, Valero is evaluating the possibility of constructing a new reformer furnace to replace an existing BART-eligible furnace (S-21 or S-22.)

The existing BART-eligible reformer furnaces operate at a BART level of 0.033 pounds of NOx per million BTU of heat input on a refinery-wide basis, based on an operating-day average. CalPuff modeling evaluated the visibility impact of a replacement furnace in lieu of an existing unit in both Options 1 and 2. The potential (BACT-level) replacement would reduce NOx and PM, but slightly increase SOx, for a total change in magnitude of about 80 tons per year of all pollutants combined. The additional visibility improvement at Point Reyes National Seashore due to replacing either existing furnace S-21 or S-22 is estimated to be about 0.02dv, a very marginal impact on visibility for the cost per ton of pollutant reduced. Nevertheless, this analysis does not preclude the refinery from proceeding with upgrades and new construction to reduce emissions in the future.

As explained in the BART Determination Report (Appendix D), adding Selective Catalytic Reduction to the Boiler-Turbine Sets was deemed not cost-effective for the minimal improvement in visibility, about 0.025 dv per linked boiler-turbine set. Lesser controls for these units were not evaluated for visibility impact. As with the potential reformer furnace replacement discussed above, the incremental improvement in visibility is approaching a level of uncertainty in modeling. Instead, the boiler turbine sets will continue to operate under the existing BAAQMD Prohibitory Regulation 9, Rule 9 requiring a NOx concentration of no more than 55 ppmv at 15% O2.

Although the four BART-eligible flares at the Valero Refinery were not modeled, a consent decree between the U.S. EPA and the Valero Refining Company requires a flare minimization protocol. It also requires a causal analysis for excursions above 500 lbs SO2/day. The flares already have upstream gas recovery systems, which are considered BACT for flares.

A summary of the BART emission limits and retrofit controls on BART-eligible units at the Valero Refinery is found in Table 5-4.

Table 5-4 BART Determination for Selected Units at Valero Refinery

UNIT	NOx Control Type	NOx Emission Limit	SO_2 Control Type	SO_2 Emission Limit	PM Control Type	PM Emission Limit	BART Implementation Date	Means of Compliance
"Main Stack:" -Valero Coker, -FCCU, -CO Boilers (Units S3, S4, S5, S6)	SCR	50 ppm on 365-day basis (est. annual emissions: 611 TPY) (baseline ~ 756 TPY)	CANSOLV regenerative Amine scrubber (SO2 removal) with BELCO pre-scrubber (PM and SO3 removal)	50 ppm SO2 @ 0% O2 on a 7-day average basis 25 ppm SO2 @ 0% O2 on a 365 day basis (est. annual emissions: 416 TPY) (baseline ~ 6222 TPY)	Scrubber	(est. annual emissions: 116 TPY) (baseline ~ 179 TPY)	limits incorporated in Title V Permit by December 31, 2013	Federally enforceable permit conditions Terms of Consent Decree