

Bay Area Air Quality Management District
375 Beale Street
San Francisco, CA 94105

Assembly Bill 617
Industrial Cap-and-Trade Sources
Expedited BARCT Implementation Schedule



STAFF REPORT
October 2018

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ACKNOWLEDGEMENTS

The following people contributed to development this Staff Report for an Expedited BARCT Implementation Schedule that meets the requirements of Assembly Bill 617. Each deserves recognition for their important contributions.

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ATTACHMENT A: Scope Papers for Potential Rule Development Projects in Expedited BARCT Implementation Schedule

ATTACHMENT B: Proposed AB 617 Expedited BARCT Implementation Schedule

ATTACHMENT C: Additional Source Categories for Further Study and Consideration with Local Community Emission Reduction Plans

I. EXECUTIVE SUMMARY

Assembly Bill 617 (AB 617), approved July 26, 2017, amends California Health and Safety Code section 40920.6 et seq. and requires each air district that is a nonattainment area for one or more air pollutants to adopt an expedited schedule for implementation of best available retrofit control technology (BARCT) on specified facilities by the earliest feasible date, but no later than December 31, 2023. Local air districts are required to adopt this schedule before January 1, 2019. This requirement applies to each industrial source subject to California Greenhouse Gas (GHG) Cap-and-Trade requirements. The schedule must give priority to any sources that have not had emissions limits modified for the greatest period of time. The schedule does not apply to sources that have implemented BARCT since 2007.

The overall purpose of BARCT implementation is to reduce criteria pollutant emissions from significant industrial sources that currently participate in the GHG Cap-and-Trade system. The Cap-and-Trade system is designed to address and limit GHG emissions and allows sources to comply with Cap-and-Trade limits by either reducing emissions at the source or purchasing GHG emission allowances. Emissions of criteria pollutants and toxic air contaminants are often associated with GHG emissions, and these criteria and toxic pollutants may impact local communities that are already suffering a disproportionately higher burden from air pollution.

The Bay Area Air Quality Management District (Air District) is proposing an Expedited BARCT Implementation Schedule to meet the requirements of AB 617. This action is required because the Air District is in nonattainment for ozone (O₃) and particulate matter (PM).^{1,2} Staff conducted background research and analysis to identify pollutants of concern and affected sources, conduct preliminary BARCT evaluations, and identify and prioritize potential BARCT rule development projects. The schedule includes six potential rule development projects to address emissions from 1) organic liquid storage tanks; 2) petroleum wastewater treating; 3) Portland cement manufacturing; 4) refinery fluid catalytic crackers and carbon monoxide (CO) gas boilers; 5) refinery heavy liquid leaks; and 6) petroleum coke calcining. Staff recommends the Board of Directors adopt the proposed Expedited BARCT Implementation Schedule and certify the associated CEQA Environmental Impact Report at the Public Hearing scheduled for December 2018.

The Air District invites all interested members of the public to review and provide comments on the proposed Expedited BARCT Implementation Schedule and this Staff Report, and to participate in the Public Hearing. Air District staff will accept written comments, will respond to comments received, and will present final proposals to the Air District's Board of Directors for their consideration. For further information in advance of

¹ United States Environmental Protection Agency (EPA), 2018a. Eight-Hour Ozone (2015) Nonattainment Areas by State/County/Area. Data is current as of September 30, 2018.
<https://www3.epa.gov/airquality/greenbook/jncty.html>

² United States Environmental Protection Agency (EPA), 2018b. PM-2.5 (2006) Designated Area Area/State/County Report, Data is current as of September 30, 2018.
https://www3.epa.gov/airquality/greenbook/rbca.html#PM-2.5.2006.San_Francisco

the Public Hearing, please contact David Joe, Principal Air Quality Engineer, at (415) 749-8623 or djoe@baaqmd.gov.

II. BACKGROUND

Regulatory framework

California's air quality programs have significantly improved public health through statewide and regional air quality planning requirements, advancement of technology-based solutions, and risk reduction efforts. However, certain communities continue to experience a disproportionately higher burden from air pollution, including communities near ports, rail yards, warehouses, and freeways and areas with high concentrations of industrial facilities. AB 617 requires new community-focused and community-driven action to reduce air pollution and improve public health in communities that experience disproportionately higher burdens from exposure to air pollutants. AB 617 directs air districts to apply BARCT to all industrial sources subject to Cap-and-Trade, and to identify communities with a "high cumulative exposure burden" to air pollution. Districts must then prioritize these communities for community air monitoring projects and/or emission reduction programs, which must be developed through a community-based process. Implementing and updating BARCT controls at industrial sources should also provide some emission reductions for these community programs.

The Air District 2017 Clean Air Plan includes a long-range goal to eliminate disparities in air pollution exposure in the San Francisco Bay Area. The Air District has been explicitly working towards this goal since 2006, with the initiation of the Community Air Risk Evaluation (CARE) program. The CARE program identifies and assists communities that have higher air pollution levels and may experience more air pollution-related health impacts. Emissions from mobile sources, small and large stationary sources, and goods-movement related indirect sources can have localized impacts on pollution levels or contribute to cumulative levels of pollution that are experienced by nearby communities. The CARE program provides a framework for the Air District to target its incentive and enforcement efforts in the most impacted communities. However, many communities remain overburdened and there is more that must be learned and done. The Air District, through a partnership with local communities and the state, has an opportunity to better understand local air pollution, its sources, and impacts, and to develop strategies to better reduce people's exposure to air pollution.

AB 617 Overview

AB 617 requires the following:

- Air districts in nonattainment areas must implement BARCT on all industrial sources subject to the AB 32 Cap-and-Trade Program (the subject of this Staff Report).
- The California Air Resources Board (CARB) must establish and maintain a clearinghouse of best available control technology (BACT), and best available retrofit control technology (BARCT).
- Maximum penalties for air pollution violations are increased and will adjust with inflation.
- CARB must prepare an air monitoring plan for all areas of the state by October 1, 2018.

- Based on air monitoring plan information, CARB must select communities with high cumulative exposure burden from both toxic and criteria air pollutants by July 1, 2019.
 - Each air district with a high cumulative burden community must deploy a community air monitoring system in that community within one year of selection and provide the air quality data to CARB for publication.
- By January 1, 2020, and each January 1 thereafter, CARB will select additional communities with high cumulative exposure burden.
 - Each air district with a high burden community must deploy a community air monitoring system in that community within one year of selection and provide the air quality data to CARB for publication.
- CARB must prepare a state-wide strategy to reduce emissions of toxic and criteria pollutants in communities affected by high cumulative exposure burden, by October 1, 2018, and update the strategy every five years. The state-wide strategy must include:
 - A methodology for assessing and identifying contributing sources and estimating their relative contribution to elevated exposure (source apportionment);
 - An assessment of whether an air district should update and implement the risk reduction audit and emissions reduction plan for any facility if the facility causes or significantly contributes to the high cumulative exposure burden;
 - An assessment of available measures for reducing emissions including BACT, BARCT, and best available control technology for toxics (TBACT); and
 - A priority on disadvantaged communities and sensitive receptor locations.
- CARB will select locations for preparation of Community Emission Reduction Plans by October 1, 2018. CARB will select additional locations annually thereafter.
 - Within one year of selection, the air district will adopt Community Emission Reduction Plans in consultation with CARB, individuals, community-based organizations, affected sources, and local governmental bodies.
 - The Community Emission Reduction Plans must be consistent with the state-wide strategy, and include emission reduction targets, specific reduction measures, a schedule for implementation of the measures, and an enforcement plan.
 - The Community Emission Reduction Plans must be submitted to CARB for review and approval.
 - CARB must initiate a public process to achieve an approvable Community Emission Reduction Plan if the Plan is initially not approvable.
 - CARB must develop and implement applicable mobile source elements in the Community Emission Reduction Plans to achieve emission reductions.
 - The Community Emission Reduction Plans must achieve emission reductions in the community, based on monitoring or other data.

- The air district must prepare an annual report summarizing the results and actions taken to further reduce emissions.
- CARB will provide grants to community-based organizations for technical assistance and to support community participation in the identification of communities with high exposure burden, and development and implementation of the Community Emission Reduction Plans.

AB 617 represents a significant enhancement to the approach that CARB and local air districts take in addressing local air quality issues. The Air District has implemented and established a number of programs that support the goals and intent of AB 617; these programs include the Community Air Risk Evaluation (CARE) Program, Health Risk Assessments for the AB 2588 Air Toxics “Hot Spots” Program, and Air District Regulation 11, Rule 18: Reduction of Risk from Air Toxic Emissions at Existing Facilities. However, the requirements of AB 617 formalize new programs and establish challenging goals and timelines for implementation.

AB 617 Expedited BARCT Implementation Schedule Requirements

AB 617 requires each air district that is in nonattainment for one or more air pollutants to adopt an expedited schedule for implementation of BARCT by the earliest feasible date, but no later than December 31, 2023. The expedited schedule must be adopted no later than January 1, 2019. The BARCT requirements apply to each industrial source subject to California GHG Cap-and-Trade requirements. The schedule must give priority to any sources that have not had emissions limits modified for the greatest period of time and does not apply to sources that have implemented BARCT since 2007. When developing and adopting an expedited schedule, air districts should take into account the local public health and clean air benefits to the community, cost effectiveness of control options, and air quality and attainment benefits of control options.

BARCT is defined in the California Health and Safety Code as 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.³ The Air District typically determines BARCT during the rulemaking process for a given source category on a pollutant-by-pollutant basis, and develops and adopts rules reflecting BARCT. AB 617 does not expand or limit the Air District’s ability to adopt or amend rules; but it does set a requirement for developing an expedited schedule for rule development and places a priority on adopting rules requiring BARCT implementation on sources at industrial Cap-and-Trade facilities.

Technical review

Air District staff conducted a review of all affected industrial sources and developed preliminary BARCT evaluations to determine which sources are appropriate for rule

³ California Health and Safety Code § 40406.

development. Staff's process for identifying potential BARCT rule development projects and developing the expedited schedule involved:

- Identifying pollutants of concern and affected facilities and sources
- Identifying sources subject to the expedited schedule requirements and sources with the greatest potential BARCT emission reductions
- Conducting preliminary BARCT evaluations
- Identifying and prioritizing potential BARCT rule projects

Pollutants of Concern

The Bay Area air basin is in attainment with both the National Ambient Air Quality Standards and California Ambient Air Quality Standards for carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and lead. The air basin is designated as nonattainment for ozone (O₃) and particulate matter (PM_{2.5} and PM₁₀) California Ambient Air Quality Standards; therefore, the BARCT review was conducted focusing on the following pollutants:

- Nitrogen Oxides (NO_x)
- Reactive Organic Gases (ROG)
- Particulate Matter less than 10 microns (PM₁₀)
- Particulate Matter less than 2.5 microns (PM_{2.5})
- Sulfur Dioxide (SO₂).

Note that NO_x and ROG are included because they are precursors for ozone formation. SO₂ may contribute to the formation of condensable PM (i.e. formed in the emissions plume from the stack) at certain types of sources, so PM control strategies may include SO₂ limits. Preliminary studies and testing indicate that these condensable PM emissions may be substantial, therefore SO₂ sources that are likely to form condensable PM are included in this BARCT determination study. Sulfur dioxide can also be a precursor for secondary PM (i.e. ammonium sulfate formed in the atmosphere through reactions with ambient ammonia); however, these secondary PM impacts from SO₂ may not be a significant contributor to exceedances of PM ambient air quality standards. Therefore, SO₂ sources that do not have condensable PM potential are not included in this BARCT review and evaluation study at this time.

Affected Facilities and Sources

A list of facilities that are subject to Cap-and-Trade, including sources and emissions, was developed from the 2016 Reporting Year Emissions Inventory. The Bay Area has 80 facilities that are subject to Cap-and-Trade, which encompass 3,246 individual sources in 61 source categories. AB 617 requires that the expedited schedule for BARCT implementation apply to each industrial source subject to the Cap-and-Trade program. The term "industrial source" is not explicitly defined in the AB 617 language, however the Cap-and-Trade program does include particular provisions that refer to "industrial sectors", "industrial covered entities", "industry assistance", and "industrial facilities."⁴ These provisions relate the term "industrial" to certain covered entities or facilities that are eligible for free allowance allocation under the Cap-and-Trade program.⁵ Under the Cap-

⁴ 17 CCR §§ 95870, 95890, and 95891.

⁵ 17 CCR §§ 95870(e) and 95891(a).

and-Trade program, these free allowance allocations are provided to certain industrial sectors to minimize potential leakage of economic activity and emissions.⁶ The usage of the term “industrial sources” in the AB 617 language has subsequently been clarified by CARB staff,⁷ and is understood to be consistent with the usage of the term “industrial” in the Cap-and-Trade program. CARB provided a list of these “industrial” facilities that includes all covered entities that are eligible for free allowance allocations in accordance with the Cap-and-Trade requirements based on their engagement in an activity within a particular North American Industrial Code System (NAICS) Code listed in Table 8-1 of the Cap-and-Trade regulation.⁸ The list excludes opt-in covered entities,⁹ and any industrial sources that became subject to the Program after January 1, 2017. This screening for “industrial sources” reduces the number of affected facilities to 19 industrial Cap-and-Trade facilities, which encompass 1,899 individual sources in 50 source categories.

Source Screenings

Staff performed pollutant-by-pollutant screenings on this population of potentially affected sources to determine which sources and source categories required further BARCT evaluation. Staff initially identified and included sources where potential emission reductions from additional controls may be cost effective. Controls that are not cost effective would not meet the criteria to be considered BARCT. In such cases, the source would already be considered to be implementing and achieving BARCT, and therefore no further BARCT controls would be required. Staff identified and included sources that emit more than 10 pounds per day of a given pollutant (1.8 tons per year). This level of emissions is consistent with the Air District’s threshold for new sources required to install best available control technology (BACT) per Rule 2-2: New Source Review, Section 2-2-301. Given that sources below this threshold would have relatively low annual emissions, potential emissions reductions at these sources would be small and are not likely to be cost effective. This approach reduced the population of sources as shown in Table 1.

⁶ “Leakage” refers to potential production shifts away from a jurisdiction due to increased compliance costs and prices. The reduction in production and emissions in the implementing jurisdiction may be offset by increased production and emissions elsewhere.

⁷ Email correspondence between K. Magliano, CARB and A. Abbs, CAPCOA, “BARCT List.” June 18, 2018.

⁸ 17 CCR § 95890(a).

⁹ 17 CCR § 95802(a)(259).

Table 1: AB 617 BARCT Initial Screening Results for Affected Industrial Sources

Pollutant	Number of Source Categories	Number and Percentage of Sources¹⁰	Amount and Percentage of Emissions¹¹
NO _x	24	214 / 41%	5,722 tpy / 98%
ROG	23	259 / 16%	4,430 tpy / 93%
PM	17	126 / 16%	1,857 tpy / 92%
SO ₂	16	104 / 19%	5,043 tpy / 98%

As shown in Table 1, the resulting population of sources accounts for a large majority of the total emissions at affected industrial Cap-and-Trade facilities (92 to 98 percent). These results also indicate that the low emitting sources, while numerous, account for only a small percentage of the total emissions at affected industrial Cap-and-Trade facilities. Given the relatively small total emissions from the low emitting sources, additional controls on these sources would have limited potential to achieve substantial emission reductions and effectively provide meaningful air quality and attainment benefits. As discussed previously, additional controls on low emitting sources are also not likely to be cost-effective, and therefore would not be anticipated to meet the criteria to be considered BARCT.

Staff then selected sources where BARCT has not already been applied for each nonattainment pollutant. Per AB 617, the requirements for an expedited BARCT schedule do not apply to sources where BARCT implementation has occurred since 2007. Regulations with emission limits that have been amended and/or adopted since 2007 are generally considered to reflect current BARCT levels for that pollutant, and sources subject to these limits are therefore already assumed to meet BARCT for those nonattainment pollutants. In such cases, no further BARCT determination or rulemaking is required for the expedited schedule. After selecting sources where BARCT has not already been achieved for the given pollutant, the population of sources was reduced as shown in Table 2.

¹⁰ Percentage values shown indicate the percentage relative to the total number of sources at affected industrial Cap-and-Trade facilities

¹¹ Percentage values shown indicate the percentage relative to the total emissions at affected industrial Cap-and-Trade facilities

Table 2: AB 617 BARCT Final Screening Results for Affected Industrial Sources

Pollutant	Number of Source Categories	Number and Percentage of Sources¹²	Amount and Percentage of Emissions¹³
NO _x	21	73 / 34%	1,764 tpy / 30%
ROG	23	259 / 16%	4,430 tpy / 93%
PM	16	124 / 15%	1,851 tpy / 92%
SO ₂	15	102 / 19%	3,651 tpy / 71%

These sources and source categories require further evaluation and BARCT determination.

BARCT Determination Process

Staff reviewed available information on current achievable emission limits and potential controls for each source category and each nonattainment pollutant. This information included guidelines and recent determinations of BACT, reasonably available control technology (RACT), and lowest achievable emission rate (LAER) from EPA, CARB, and other air districts. Staff determined:

- Current levels of BACT/RACT/LAER controls and emissions (and next more stringent levels of BACT/RACT/LAER controls, if available);
- Potential emission reductions (and incremental additional potential emission reductions, if available); and
- Estimated capital and annual costs for retrofit of controls to existing facilities.

Preliminary estimates of cost effectiveness (and incremental cost effectiveness, where appropriate) were calculated, and any controls and emission limits with a cost effectiveness within reasonable bounds, consistent with recent BARCT determinations, were considered for potential rule development projects. Additional information on the estimates of emissions reductions and control costs can be found in Section IV and in the project scopes included in Attachment A.

Based on these preliminary BARCT determinations, staff proposes six potential high priority rule development projects for inclusion in the Expedited BARCT Implementation Schedule. Criteria for the selection and prioritization of these six projects include:

- Potential for localized clean air and public health benefits through reduction of localized exposure to harmful pollutants, including potential toxic emission reduction co-benefits;
- Potential for substantial emissions reductions (greater than ten tons per year), with a focused consideration of potential PM emissions reductions for reducing localized PM health impacts;
- Prioritization of source categories where BARCT rules have not been adopted or evaluated for the greatest period of time; and
- Cost effectiveness of potential rule development project controls.

¹² Percentage values shown indicate the percentage relative to the total number of sources at affected industrial Cap-and-Trade facilities

¹³ Percentage values shown indicate the percentage relative to the total emissions at affected industrial Cap-and-Trade facilities

High priority potential rule development projects are shown in Table 3. Project scope descriptions for each of these projects are included in Attachment A.

Table 3: Potential Rule Development Projects

Rule Development Projects		PM	NO _x	ROG	SO ₂
1	Organic Liquid Storage Tanks			X	
2	Petroleum Wastewater Treating			X	
3	Portland Cement Manufacturing	X			X
4	Refinery Fluid Catalytic Crackers and CO Boilers	X			X
5	Refinery Heavy Liquid Leaks			X	
6	Petroleum Coke Calcining		X		

Through this BARCT evaluation and review process, staff also identified 12 additional source categories for further study and consideration, as shown in Attachment C. Based on the preliminary review process, staff believes that there is limited potential to apply additional BARCT controls and achieve substantial reductions at these sources. Staff identified a number of factors that may limit the potential emissions reductions and efficacy of further controls at these sources:

- Potential emissions reductions are relatively small;
- Estimates of emissions and emissions reductions may be uncertain and require further study;
- Control options may not be technologically feasible or may not be suitable for retrofit; and
- Many control options identified may not meet BARCT cost effectiveness requirements.

Additionally, further controls on these sources may have limited potential to effectively impact localized exposures in communities and attainment of ambient air quality standards. Based on the limited potential for substantial controls and emissions reductions, staff does not recommend that these potential rule projects be included as priority rule development projects in the Expedited BARCT Implementation Schedule at this time. Staff believes that these projects merit further study, and actions on these source categories may be more appropriately considered during development of local Community Emission Reduction Plans. Staff anticipates that further evaluation and study during the AB 617 community-based monitoring, modeling, and planning activities, will inform future potential actions for these source categories. Further information on these 12 additional source categories can be found in Attachment C.

III. PROPOSED EXPEDITED BARCT IMPLEMENTATION SCHEDULE

Rule Development Project Schedules

Figure 1 shows the estimated schedule for each of the six potential rule development projects. This schedule is also included in Attachment B. This schedule assumes the Air District rule development group operates at full staffing, with various phases of the different rule development process occurring in parallel over four consecutive years. Note that staff anticipates that these projects would be developed along with other rule development projects outside of the Expedited BARCT Implementation Schedule, including rules currently being developed as part of the 2017 Clean Air Plan implementation.

Figure 1: Expedited BARCT Implementation Schedule

Project	2018			2019			2020			2021		
Organic Liquid Storage Tanks												
Petroleum Wastewater Treating												
Portland Cement Manufacturing												
Refinery Fluid Catalytic Crackers and CO Boilers												
Refinery Heavy Liquids Leaks												
Petroleum Coke Calcining												

Rule Development Project Timelines

Most rule development projects take approximately 12 months from initiation to rule adoption at a Public Hearing. Staff assumes the first nine months of a project require a full-time staff person to perform and coordinate regulatory development activities, which may include:

- Establishing scope with internal workgroup
- Identifying all affected sources
- Verifying and refining emissions estimates
- Completing research on possible controls
- Refining estimates of emission reductions
- Confirming and refining capital and annual cost estimates
- Determining cost effectiveness (and incremental cost effectiveness, if applicable)
- Working with and gathering input from affected parties
- Drafting rule language and workshop report
- Reviewing/revising workshop documents
- Conducting workshops
- Initiating California Environmental Quality Act (CEQA) and Socioeconomic Analyses
- Receiving and incorporating comments from workshops into final documents
- Reviewing CEQA and Socioeconomic Analyses
- Finalizing Public Hearing documents

Staff assumes the remaining three months of the project require about half-time staff person to complete the public hearing, assist in implementation, and submit proper documentation to CARB.

Staff recognizes that some rule development projects may take more time during the technical assessment phase, especially if emission estimates from various sources are inconsistent, or additional source testing or emissions profile testing is required. This information gathering phase can extend a project timeline from six to 12 months. As shown in the Expedited BARCT Implementation Schedule in Figure 1, staff anticipates that additional emissions information gathering and/or testing will be required for rule development projects regarding Organic Liquid Storage Tanks, Petroleum Wastewater Treating, Cement Manufacturing, and Refinery Fluid Catalytic Crackers and CO Boilers. Further information on additional data collection and other testing considerations for each rule development project can be found in the project scope descriptions in Attachment A.

IV. EMISSION REDUCTION BENEFITS & COMPLIANCE COSTS

This section of the Staff Report summarizes the methods used to estimate emission reductions that can occur when applying BARCT to sources emitting nonattainment pollutants. More detailed information on the current emissions, potential emission limits, emission reductions, and costs and cost effectiveness for each specific priority rule development project can be found in the project scopes in Attachment A.

Current Emissions

Current emissions are based on Reporting Year 2016 Emissions Inventory reported to CARB by August 1, 2017. These emissions are based on operating year 2015 for most facilities.

Potential Emission Limits

As described in Section II, staff reviewed available information on current achievable emission limits and potential controls for each source category and each nonattainment pollutant. This information included guidelines and recent determinations of best available control technology (BACT), reasonably available control technology (RACT), and lowest achievable emission rate (LAER) from EPA, CARB, and other air districts. These determinations often provide limits in the form of emission factors (e.g., mass of pollutant emitted per unit of input or per unit of output) and describe the type of controls typically required to achieve the stated emission limit. Where there is a wide array of emission limits for a given control technique, staff typically used the average level of control achieved, leading to somewhat conservative estimates for potential emission reductions.

This BACT/RACT/LAER information is available in the EPA clearinghouse, CARB clearinghouse, or through BACT determinations available from California air districts. Note that the Air District has been coordinating and collaborating with CARB and other California air districts to support CARB's efforts to improve availability and access of this information.

Emission Reduction Estimates

Staff estimated potential emission reductions based on the current performance of the affected sources and the potential limit or level of control identified in the preliminary BARCT review. Current performance of the affected sources was based on Air District 2016 Reporting Year emissions, as well as other additional supplemental information available. The difference between the current performance and the preliminary BARCT level identified was used to calculate potential emission reductions from BARCT implementation. Priority rule development projects included in the Expedited BARCT Implementation Schedule were identified to have potential emission reductions greater than 10 tons per year (tpy) and provide a significant opportunity for emission reductions and public health benefits. Estimates of potential emission reductions for the rule development projects (where available) are shown in Table 4. More detailed information and further discussion on potential emission reductions for the rule development projects can be found in the individual project scopes available in Attachment A.

Capital and Operating Cost Estimates

Staff estimated control costs using a variety of sources. Costs of controls are most often obtained from the EPA Cost Models,¹⁴ readily available on the EPA website. Control cost data are also available from cost studies performed and published by EPA, CARB, or other air districts, often as part of the evaluation and analysis of regulations, rules, and engineering determinations. Control equipment vendors and affected industries may also generate estimates for control costs. These estimates may need to be adjusted to account for cost uncertainties, as well as differences and changes in market conditions. Although these studies and cost estimates are often updated regularly, cost estimates may sometimes need to be reassessed to reflect today's changing conditions and actual costs. The Chemical Engineering Magazine Plant Cost Index can be used to adjust historical costs to today's cost values. Costs may also need to be adjusted to reflect higher costs in the San Francisco Bay Area, as cost models and estimates may differ when compared to lower cost regions throughout the country. Staff typically applies additional factors to capital and/or operating costs to reflect these uncertainties, market differences, and other adjustments.

Capital costs are normally amortized based on control equipment project life and prevailing interest rates, and assumptions and opinions on these parameters may vary. For this preliminary BARCT evaluation, amortized capital cost estimates are based on 11 percent amortization, 1 percent tax, 1 percent insurance, and 2 percent maintenance costs, totaling 15 percent amortization of capital. More detailed or specific amortization data and assumptions may also be used where appropriate. Operating costs are normally based on costs for energy, water, air, catalyst/reagent, and labor costs in the cost models or cost estimates. For preliminary BARCT evaluations where these operating cost data were not available, any control system that is likely to require significant energy, utilities, or catalyst usage is estimated to have total operating costs equal to 5 percent of capital cost. This approach provides a conservative initial estimate of operating costs for all the but most

¹⁴ United States Environmental Protection Agency (EPA), 2018c. Cost Analysis Models/Tools for Air Pollution Regulations, <https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-analysis-modelstools-air-pollution>. Updated May 23, 2018.

energy intensive control methods.

Cost Effectiveness and Incremental Cost Effectiveness

California Health and Safety Code (H&SC), Section 40703 requires the Air District to consider the cost effectiveness of a control measure when adopting any regulation. Cost effectiveness is calculated by dividing the annual costs (including capital amortization and operating costs) by the total number of tons of emission reductions expected each year. The result is the cost effectiveness of implementing the control method retrofit at the existing source.

H&SC Section 40920.6 requires the Air District to identify one or more potential alternative control method that achieves the emission reduction objectives of the rule or regulation and estimate the incremental cost effectiveness between the proposal and the alternative. Incremental cost effectiveness is calculated when two (or more) control methods are being considered. First, cost effectiveness is calculated for the less stringent control method, as described above. Incremental cost effectiveness is then calculated by: 1) calculating the incremental increase in cost between the first control method and the second more stringent control method, and 2) dividing the incremental increase in cost by the incremental increase in emission reductions from the second more stringent control method. This analysis is used to help determine which controls should be recommend when multiple options are available.

Estimates of cost effectiveness for the rule development projects (where available) are shown in Table 4. More detailed information and further discussion on costs and cost effectiveness for the rule development projects can be found in the individual project scopes in Attachment A.

Table 4: Potential Emission Reductions and Cost Effectiveness

Rule Development Projects		Potential Emission Reductions (tpy) ¹⁵	Cost Effectiveness (\$/ton) ¹⁶
1	Organic Liquid Storage Tanks	ROG: 75 to 125 tpy	ROG: \$10,000 to \$20,000 per ton
2	Petroleum Wastewater Treating	ROG: Unknown	ROG: Unknown
3	Portland Cement Manufacturing	PM: Unknown SO ₂ : 698 tpy	PM: Unknown SO ₂ : \$2,100 per ton
4	Refinery Fluid Catalytic Crackers and CO Boilers	PM: Unknown SO ₂ : 567 tpy	PM: Unknown SO ₂ : \$4,000 to \$47,000 per ton
5	Refinery Heavy Liquid Leaks	ROG: Unknown	ROG: Unknown
6	Petroleum Coke Calcining	NOx: Unknown	NOx: Unknown

¹⁵ More detailed information and further discussion on potential emission reductions for the rule development projects can be found in the individual project scopes in Attachment A.

¹⁶ More detailed information and further discussion on costs and cost effectiveness for the rule development projects can be found in the individual project scopes in Attachment A.

Note that for some of the potential rule development projects in Table 4, estimates of emission reductions and cost effectiveness may be unknown or uncertain at this time. For particular sources or pollutants, there may be uncertainties associated with emission estimates or the level of control and emission reductions achievable, and further study and evaluation would be required to develop more detailed estimates. For example, potential emission reductions of condensable PM are often difficult to quantify due to the complex nature of condensable PM formation. This formation can be highly dependent on site-specific source parameters, including flue gas properties and composition. Because control strategies typically involve the reduction of condensable components and precursors (such as ammonia and SO₂) instead of a direct limit on condensable PM, reductions of condensable PM emissions associated with these precursor controls may be difficult to estimate without further characterization and evaluation. More detailed information and further discussion on the potential emission reductions, costs, and cost effectiveness for the rule development projects can be found in the individual project scopes in Attachment A.

V. ENVIRONMENTAL IMPACTS

Review of Potential Environmental Impacts Under CEQA

The California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., requires that the potential environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid identified significant adverse environmental impacts of these projects be identified. The Air District contracts with an independent consultant to conduct a CEQA analysis of potential environmental impacts from any rule making projects. Since the Expedited BARCT Implementation Schedule would consist of the implementation of several rule development projects to fulfill the requirements of AB 617, a CEQA analysis was conducted for the entire suite of potential rule development projects.

The Air District prepared a Notice of Preparation and an Initial Study (NOP/IS) for the Draft Environmental Impact Report (DEIR) for the Expedited BARCT Implementation Schedule. The NOP/IS was distributed to interested parties and published on the Air District's website on August 7, 2018 for review and comment. A CEQA scoping meeting was conducted on August 24, 2018, where minimal public comments were received. Written comments were accepted through September 7, 2018. The Air District prepared a Draft Environmental Impact Report to address the potential environmental impacts associated with the Expedited BARCT Implementation Schedule. The Draft EIR was published on October 23, 2018 for review and comment. Air quality impacts during the construction of additional pollution control equipment were found to remain potentially significant after mitigation and cumulatively considerable. Hydrology and water quality impacts associated with water demand from the operation of control equipment were found to remain potentially significant after mitigation and cumulatively considerable.

VI. SCHEDULE DEVELOPMENT/PUBLIC CONSULTATION PROCESS

Schedule Development Process

The process for development of the AB 617 Expedited BARCT Implementation Schedule has been adjusted slightly from the typical rule development process. Because AB 617 requires the Air District to develop a schedule for developing BARCT rules before developing the individual rules themselves, the development of the Expedited BARCT Implementation Schedule is more comparable in scope to an air quality plan, such as the Air District's 2017 Clean Air Plan. Similar to an air quality plan, the Expedited BARCT Implementation Schedule identifies and describes potential regulatory strategies, rules, and rule amendments, which would be further developed in the future. Therefore, development of the Expedited BARCT Implementation Schedule follows most of the Air District's typical steps for developing rules and plans.

Air District staff initially reviewed requirements of AB 617, including markups of the pertinent sections of the H&SC. Staff developed the emissions inventory information for affected facilities to perform the preliminary BARCT review and evaluation. This process involved screening sources to identify source categories with significant potential for emission reductions, researching BACT/RACT/LAER controls and emissions levels, identifying a preliminary BARCT level, and determining potential emission reductions. Staff also estimated retrofit capital costs and annual cost of controls, and calculated cost effectiveness of emission reductions. Staff then identified and prioritized the potential rule development projects based on health benefits, air quality impacts, cost effectiveness, and the length of time since these sources had last been addressed through rules or permit limits. Staff developed detailed project scope papers for each potential rule development project to further discuss the preliminary evaluation process, and to identify and review current source information, available controls and costs, potential emission limits, cost effectiveness, and any further considerations and issues. Finally, staff developed a concept paper describing the BARCT determination process and potential rule development projects included in the Expedited BARCT implementation schedule.

Air District staff published the concept paper and rule development project scope papers for the draft schedule on the Air District website on May 24, 2018 and accepted written comments on the documents through June 15, 2018. Staff also met with representatives from affected facilities and industries, such as refinery and cement manufacturing plant representatives. Staff discussed this AB 617 Expedited BARCT Implementation Schedule with community members and environmental groups and presented on the status of the project at a Board of Directors Stationary Source Committee meeting on May 21, 2018.

Staff received input from these sources and prepared an Initial Staff Report and revised rule development scope papers. Staff published these documents on the Air District website on September 5, 2018 and accepted comments on these documents through October 5, 2018. An update on the Expedited BARCT Implementation Schedule was presented at the Air District's Board of Directors meeting on September 5, 2018.

Air District staff considered input received on the Initial Staff Report and related materials, and continued to conduct further analysis, coordinate with CARB and other air districts, and meet with affected facilities and industries. Staff prepared the proposed Expedited BARCT Implementation Schedule and Staff Report and anticipates presenting the final proposal to the Air District's Board of Directors for their consideration at a Public Hearing.

Air District staff will publish the Public Hearing package for the proposed Expedited BARCT Implementation Schedule. Air District staff will accept written comments, will respond to all comments received, and will present final proposals to the Air District's Board of Directors for their consideration. At the Public Hearing, the Air District Board of Directors will consider the final proposal and receive public input before taking any action on the Expedited BARCT Implementation Schedule.

Note that each individual rule development project will also follow the standard rule development process. As described in the schedule, rule development activity is anticipated to occur throughout the period from 2018 to 2021.

Public Outreach and Consultation

In developing the proposed Expedited BARCT Implementation Schedule and Staff Report materials, staff solicited public comments on the concept paper and Initial Staff Report and conducted early stakeholder engagement with affected facilities, as described above. Air District staff will accept comments on the proposed Expedited BARCT Implementation Schedule and rule development project scopes to solicit input and identify any potential issues and concerns. The Air District will use the public's input, along with further investigation and analysis by staff, to develop the final proposals for consideration by the Air District's Board of Directors. Throughout the outreach process for the development of the schedule, Air District staff may engage in additional outreach for individual rule development projects as those projects progress.

VII. CONCLUSION/RECOMMENDATIONS

The AB 617 requirements for the Expedited BARCT Implementation Schedule are described in H&SC 40920.6(c). This section requires that each air district in nonattainment for one or more air pollutants adopt an expedited schedule for implementation of BARCT by the earliest feasible date, but no later than December 31, 2023. The Air District is in non-attainment for ozone and PM.^{17,18} The expedited schedule must be adopted no later than January 1, 2019. The section states that the schedule shall apply to each industrial source subject to California GHG Cap-and-Trade requirements and must give priority to any sources that have not had emissions limits modified for the greatest period of time. The schedule shall not apply to sources that have implemented BARCT since 2007. As described in Section II and Section III of this report, Air District staff has evaluated and

¹⁷ United States Environmental Protection Agency (EPA), 2018a. Eight-Hour Ozone (2015) Nonattainment Areas by State/County/Area. Data is current as of September 30, 2018.
<https://www3.epa.gov/airquality/greenbook/jncty.html>

¹⁸ United States Environmental Protection Agency (EPA), 2018b. PM-2.5 (2006) Designated Area Area/State/County Report, Data is current as of September 30, 2018.
https://www3.epa.gov/airquality/greenbook/rbca.html#PM-2.5.2006.San_Francisco

identified sources subject to these requirements and conducted analyses to determine the appropriate applicability of the schedule. The proposed schedule identifies the potential rule development projects that would evaluate and implement BARCT controls at the affected sources and includes timelines for the rule development process to address these AB 617 requirements no later than December 31, 2023.

The AB 617 requirements for adoption of the Expedited BARCT Implementation Schedule are described in H&SC 40920.6(d). This section states that prior to adopting the schedule, the Air District shall hold a public meeting and take into account the local public health and clean air benefits to the surrounding community, the cost effectiveness of control options, and air quality and attainment benefits of control options. As described in Section II and Section III of this report, the staff's process for reviewing BARCT controls and developing the proposed BARCT schedule involved evaluating potential emission reductions, identifying the potential for toxic emission reduction co-benefits, and considering the cost-effectiveness of control options. These are further described for the potential rule development projects in their respective individual project scopes included in Attachment A. As such, these considerations were taken into account during the development of the proposed Expedited BARCT Implementation Schedule and support the adoption of the proposed schedule. The Air District will present the final proposal to the Air District Board of Directors at a Public Meeting for consideration. In addition, the Air District solicited comments from the public and affected facilities and industries throughout the development process, held a CEQA Scoping Meeting on August 24, 2018, and presented updates on the development of the Expedited BARCT Implementation Schedule at the Air District Stationary Source Committee and Board of Directors meetings, as described in Section VI of this report.

Staff recommends the Air District Board of Directors adopt the proposed Expedited BARCT Implementation Schedule and certify the associated CEQA Environmental Impact Report.

VIII. REFERENCES

Email correspondence between K. Magliano, CARB and A. Abbs, CAPCOA, “BARCT List.” June 18, 2018.

United States Environmental Protection Agency (EPA), 2018a. Eight-Hour Ozone (2015) Nonattainment Areas by State/County/Area. Data is current as of September 30, 2018. <https://www3.epa.gov/airquality/greenbook/jncty.html>

United States Environmental Protection Agency (EPA), 2018b. PM-2.5 (2006) Designated Area Area/State/County Report, Data is current as of September 30, 2018. https://www3.epa.gov/airquality/greenbook/rbca.html#PM-2.5.2006.San_Francisco

United States Environmental Protection Agency (EPA), 2018c. Cost Analysis Models/Tools for Air Pollution Regulations, <https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-analysis-modelstools-air-pollution>. Updated May 23, 2018.

ATTACHMENT A

Scope Papers for Potential Rule Development Projects in Expedited BARCT Implementation Schedule

1. Organic Liquid Storage Tanks
2. Petroleum Wastewater Treating
3. Portland Cement Manufacturing
4. Refinery Fluid Catalytic Crackers and CO Boilers
5. Refinery Heavy Liquid Leaks
6. Petroleum Coke Calcining

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ATTACHMENT B

Proposed AB 617 Expedited BARCT Implementation Schedule

Rule Development Project	Pollutants Addressed	Anticipated Development Schedule	2018				2019				2020				2021					
Organic Liquid Storage Tanks	ROG	Q4 2018 – Q1 2020																		
Petroleum Wastewater Treating	ROG	Q1 2019 – Q3 2020																		
Portland Cement Manufacturing	PM, SO ₂	Q2 2019 – Q2 2021																		
Refinery Fluid Catalytic Crackers and CO Boilers	PM, SO ₂	Q1 2019 – Q4 2020																		
Refinery Heavy Liquids Leaks	ROG	Q1 2019 – Q4 2019																		
Petroleum Coke Calcining	NO _x	Q3 2020 – Q3 2021																		

ATTACHMENT C

Additional Source Categories for Further Study and Consideration with Local Community Emission Reduction Plans

<u>Other Source Categories Being Considered</u>	PM	NOx	ROG	SO ₂
Cooling Towers	X			
Fuel Gas Combustion Practices				
• Boilers				
• Gas Turbines	X		X	
• Hydrogen Furnaces				
• Process Heaters				
Internal Combustion (Reciprocating) Engines			X	
Incinerators		X		
Marine Terminal Loading			X	
Natural Gas Furnaces		X	X	
Natural Gas Dryers		X	X	
Refinery Flares		X	X	
Solvent Cleaning			X	
Sulfur Plants	X	X		
Thermal Oxidizers		X		
Wallboard Manufacturing	X			

As shown in the table above, Air District staff identified 12 additional source categories for further study and consideration. Based on the preliminary review process, staff believes that there is limited potential to apply additional BARCT controls and achieve substantial reductions at these sources. Staff identified a number of factors that may limit the potential emissions reductions and efficacy of further controls at these sources:

- **Potential emissions reductions are relatively small** – For many of the source categories identified, staff’s research indicates that more stringent controls or limits may have been achieved at other facilities, but potential emission reductions from current levels may be relatively small or incremental in nature due to the existing controls or limits at affected facilities. In such cases, implementation of additional controls may not achieve substantial emission reductions and may be constrained by issues regarding technological feasibility and cost effectiveness.
- **Estimates of emissions and emissions reductions may be uncertain and require further study** – Certain emissions and emission sources have historically been difficult to characterize and quantify, resulting in uncertainties regarding

current impacts and potential reductions. For example, PM emissions from cooling towers have been difficult to accurately measure and estimate due to the large physical size of the source, configuration of cooling tower emissions points that prevent proper source testing, and the nature of the organic and inorganic salt content of these PM emissions. Current emissions estimates may not adequately reflect the actual emissions and efficacy of existing controls, therefore additional research and study would be needed to evaluate potential emission reductions and control options.

- **Control options may not be technologically feasible or may not be suitable for retrofit** – Some control options may not be feasible for retrofit at certain sources. For some sources with existing control equipment, it may be possible to upgrade, modify, or add capacity to the existing control system, however there may be cases where an additional level of control would require complete rebuilding or replacing control equipment. In such cases, these additional considerations may result in certain control options being deemed infeasible or not cost effective.
- **Many control options identified may not meet cost effectiveness criteria to be considered BARCT** – Cost effectiveness is calculated by dividing the annual control costs by the annual tons of anticipated emission reductions. Because the potential emission reductions identified for these sources are small and incremental in nature, many control options that involve substantial capital and operating costs would not meet the cost effectiveness criteria to be considered BARCT.

Additionally, further controls on these sources may have limited potential to effectively impact localized exposures in communities or attainment of ambient air quality standards. Based on the limited potential for substantial controls and emissions reductions, staff does not recommend that these potential rule projects be included as priority rule development projects in the Expedited BARCT Implementation Schedule at this time. Staff believes that these projects merit further study, and actions on these source categories may be more appropriately considered during development of local Community Emission Reduction Plans. Staff anticipates that further evaluation and study, during the AB 617 community-based monitoring, modeling, and planning activities, will inform future potential regulatory actions for these source categories.