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MARICOPA COUNTY AIR QUALITY DEPARTMENT
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REQUIREMENTS, PROCEDURES AND GUIDANCE IN SELECTING BACT and RACT

1. GENERAL

Maricopa County Air Quality Department (MCAQD), Rule 241 Section 300, specifies Best Available Control Technology (BACT) and Reasonably Available Control Technology (RACT) requirements for new sources and modifications to existing sources of air pollution requiring permits or permit revisions.

2. APPLICABILITY

This policy applies to all stationary sources of air pollution within Maricopa County.

Exemption:

The Provisions of Rule 241 do not apply to new major sources and major modifications to existing major sources subject to the requirements of MCAQD Rule 240.

3. BEST AVAILABLE CONTROL TECHNOLOGY – RULE 241 §304

BACT is defined as the most stringent limitation or control technique that is technologically feasible, cost-effective and has been achieved in practice for such emissions unit and class of source. The control equipment or technology must be commercially available, and have been demonstrated to be effective and reliable on a full scale unit and shown to be cost-effective on a dollars-per-ton of pollutant removed basis. The term “achieved in practice” applies to the most effective emission control device already in use, or the most stringent emission limit achieved in the field for the type and capacity of equipment comprising the source under review and operating under similar conditions.

304 BEST AVAILABLE CONTROL TECHNOLOGY (BACT) REQUIRED: An applicant for a permit or permit revision subject to Rules 210 or 220 of these rules shall implement BACT for each pollutant emitted which exceeds any of the threshold limits set forth in any one of the following criteria:

- 304.1** Any new stationary source which emits:
- a. 40 or more tons/yr of volatile organic compounds; or
 - b. 40 or more tons/yr of nitrogen oxides; or
 - c. 40 or more tons/yr of sulfur dioxide; or
 - d. 15 or more tons/yr of PM₁₀; or
 - e. 100 or more tons/yr of carbon monoxide; or
 - f. 10 or more tons/yr of PM_{2.5}; or

g. 0.3 or more tons/yr of lead.

304.2 Any modified existing stationary source if the modification causes an increase in the source's potential to emit in any of the amounts listed in Sections 304.2(a)-(g) of this rule. BACT is only required for the emission unit or group of emission units being modified.

a. 40 or more tons/yr of volatile organic compounds; or

b. 40 or more tons/yr of nitrogen oxides; or

c. 40 or more tons/yr of sulfur dioxide; or

d. 15 or more tons/yr of PM₁₀; or

e. 100 or more tons/yr of carbon monoxide; or

f. 10 or more tons/yr of PM_{2.5}; or

g. 0.3 or more tons/yr of lead.

314 CIRCUMVENTION: The submission of applications for permits or permit revisions for new or modified sources in phases so as to circumvent the requirements of this section is prohibited. The burden of proof to show that an application for a permit or permit revision is not being submitted as a phase of a larger project shall be upon the applicant. A person shall not build, erect, install, or use any article, machine, equipment, condition, or any contrivance, the use of which, without resulting in a reduction in the total release of air contaminants to the atmosphere, conceals or dilutes an emission which would otherwise constitute a violation of this section. A person shall not circumvent this section to dilute air contaminants by using more emission openings than is considered normal practice by the industry or by the activity in question.

BACT requirements apply to either NEW or MODIFIED sources.

- **NEW STATIONARY SOURCE:** Per Rule 100 §200, a new source is defined as any facility that existed after the initial adoption of the rule. The BACT Rule 241 was adopted on July 1, 1988. Any facility that existed after that date is considered "new" for the purpose of the applicability analysis.
- **MODIFIED STATIONARY SOURCE:** Once a facility has been permitted, any proposed modifications to the facility may be subject to BACT requirements if the proposed modification (not the entire source) is above the BACT threshold. The terms modification and major modification are defined in Rule 100 §200 and the Department will use both definitions for the purposes of determining whether the BACT requirement becomes applicable to a source due to a facility change. A source that has engaged in a physical modification such as the installation of new equipment or addition of a new facility is generally accepted as a modified stationary source. BACT applicability is evaluated for each modification individually and only applies to the source(s) being modified. Sources are not allowed to circumvent BACT requirements by dividing the modification into separate permit applications (Rule 241§314).

4. SOURCE OBLIGATION

A Permittee may accept legally and practically enforceable limits on the operation of their source in order to restrict emissions to below the BACT thresholds and avoid imposition of BACT in accordance with Rule 220, Section 304.

At such time as the applicability of any requirement of Rule 241 would be triggered by an existing source, solely by virtue of a relaxation of any enforceable limitation on the capacity of the source to emit a pollutant, then the requirements of Rule 241 will apply to the source in the same way as they would apply to a new or modified source otherwise subject to the Rule.

5. REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT)

The Department requires all sources to apply RACT until the emission level reaches the appropriate BACT thresholds.

Rule 241 Section 305, provides for the following RACT requirements:

305 REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) REQUIRED: An applicant for a permit or permit revision for a new or modified existing stationary source which emits or causes an increase in the source's potential to emit in any of the following amounts shall implement RACT for each pollutant emitted from said new or modified existing stationary source:

305.1 Less than 40 tons/yr of volatile organic compounds; or

305.2 Less than 40 tons/yr of nitrogen oxides; or

305.3 Less than tons/yr of sulfur dioxide; or

305.4 Less than 15 tons/yr of PM₁₀; or

305.5 Less than 100 tons/yr of carbon monoxide; or

305.6 Less than 10 tons/yr of PM_{2.5}; or

305.7 Less than 0.3 tons/yr of lead.

RACT requirements apply to both NEW and MODIFIED sources (definitions of NEW and MODIFIED sources are provided above).

Before the source reaches the appropriate BACT thresholds, all sources are required to comply with Regulation III of the MCAQD Rule and Regulations. The 300 series Maricopa County Rules under Regulation III are considered to be RACT requirements. **The Department has the primary responsibility to evaluate the source's proposed facility and operations in order to make a determination of compliance with RACT standards.**

For sources not subject to Regulation III, RACT determination may be made in accordance with MCAQD Regulation, Rule 100 Section 200 which states "*RACT for a particular facility, other than a facility subject to Regulation III of these rules, is determined on a case-by-case basis, considering the technological feasibility and cost-effectiveness of the application of the control technology to the source category*".

6. DETERMINATION OF EMISSION LEVEL

The source shall present an emission analysis using the following guidelines in order to determine whether the future emissions increase will trigger BACT requirements.

EMISSION INCREASE EVALUATION

The increase in emissions shall be calculated using the Potential to Emit (PTE) for each new source or modification to an existing source. PTE is defined in Rule 100 §200 as:

POTENTIAL TO EMIT: The maximum capacity of a stationary source to emit pollutants, excluding secondary emissions, under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design, if the limitation or the effect it would have on emissions is federally enforceable.

PTE may take the following into account:

- A RACT / BACT controlled emission level; or
- An emission level based on the use of a control device that is either part of the design or installed as an add-on control of the subject emission source, provided the requirement for the use of such control device and the effect on the reduction of emissions are incorporated into an enforceable permit condition; or
- An emission level based on restrictions such as physical, material, production and/or operational limitations that are incorporated into the permit as enforceable permit conditions.

Increase in Emissions = (Future PTE) – (Current PTE)

For a new, stand-alone unit or source, the emissions increase is simply the PTE of the subject unit or the allowable emissions (as agreed by the source).

For a limited modification of the existing unit or facility, the potential emissions increase will be calculated for that unit or facility alone.

If the modification/change is linked closely to other existing areas of the facility, the emissions need to be evaluated for all of the affected point sources. Keep in mind that the change must have a direct relationship to increased emissions in other areas. This can happen by either a debottleneck effect or if the modification can increase the utilization of another process line. The facility must show an analysis by quantifying the emissions increase in the entire affected area due to the modification.

- The “increase in emissions” shall be calculated by comparing the difference in emissions from the PTE before the modification/change to the PTE after the modification/change. The PTE may be substituted by new allowable emissions if the terms of the enforceable permit conditions are agreed to by the source.

- The fugitive emissions of a stationary source shall not be considered in determining whether it is subject to Rule 241 unless the source belongs to one of the categories of stationary sources in **Appendix A** of this policy.
- If a source asserts that a proposed modification is below the BACT trigger threshold, the source must include in their application a summary of all prior modifications within last 5 years. The source must demonstrate that the proposed modification is not part of a larger project that would be subject to BACT. Applicants are prohibited from circumventing BACT requirements by submitting applications for permits or permit revisions in phases. The burden of proof to show an application “for a proposed modification is not being submitted as a phase of a larger project” shall be upon the applicant per Rule 241 §314.
- Emission increases from all permit modifications shall be documented by the Permit Engineer as part of the Department’s technical evaluation.

7. TOP-DOWN BACT ANALYSIS

The source (not the Department) shall conduct a BACT analysis for each pollutant which exceeds the BACT threshold. **Once BACT is triggered, the source has the primary responsibility to research control options on a nationwide basis and present a complete BACT top-down/cost analysis for the Department’s review and approval.**

The selection of BACT should address the control of each emission point for the subject pollutant at a facility or the affected area in the case of modification. The Department’s final determination of BACT will be performed on a case-by-case basis considering energy, environmental, and economic impacts and other costs.

The following steps shall be documented in the top-down analysis:

1. Step 1 – Identify All Control Technologies

The first step in a top-down analysis is to identify, for the emissions unit in question, all “available” control options ranked in descending order of effectiveness. Available control options are those air pollution control technologies or techniques with a practical potential for application to the emissions unit and the regulated pollutant under evaluation.

2. Step 2 – Eliminate Technologically Infeasible Options

In the second step, the technological feasibility of the control options identified in Step 1 is evaluated with respect to the source-specific or emissions unit-specific factors. To exclude a control option, a demonstration of technical infeasibility must be clearly documented and should show, based on physical, chemical, and engineering principles, the technical difficulties would preclude the successful use of the control option for the emissions unit under review.

3. Step 3 – Rank Remaining Control Technologies by Control Effectiveness

All remaining control alternatives not eliminated in Step 2 must be ranked and then listed in order of overall control effectiveness for the pollutant under review, with the most effective control alternative at the top. A separate list should be prepared for each pollutant and for each emissions unit subject to the BACT requirement. The list should present the array of control alternatives and

should indicate the effectiveness of each alternative. The list should also indicate if the alternative has been achieved in practice for the class and category of source in question.

4. Step 4 – Cost Effectiveness Analysis

After the identification of available and technologically feasible control options, economic impacts are considered to arrive at the final level of control. After performing a cost effectiveness analysis, in accordance with the procedures outlined below, control options that are not cost effective may be eliminated from consideration upon approval by the Department.

The Annualized Cost Method: EPA, San Joaquin Valley Air Pollution Control District (SJVAPCD) and Bay Area Air Quality Management District (BAAQMD) use the following method to calculate the Control Cost for pollutant removal:

1. Calculate an equivalent annual cost from a capital cost using a capital recovery factor as shown below:

$$A = P \times \frac{i \times (1+i)^n}{(1+i)^n - 1} \quad \text{where;}$$

A = Equivalent Annual Control Equipment Capital Cost

P = Present value of the control equipment, including piping, instrumentation, electrical, structural design and start up cost, etc.

i = Interest rate (use 7%, or demonstrate why alternate is more representative of the specific operation).

n = Equipment life (assume 10 years or demonstrate why alternate is more representative of the specific operation).

2. Determine annual operating cost (labor, fuel, maintenance, utilities, etc.).
3. Calculate the Total Annual Cost by summing the equivalent annual control equipment cost and the annual operating cost (steps 1 and 2 above).
4. Calculate the Control Cost by dividing the Total Annual Cost (step 3 above) by the tons of pollutants controlled per year.

$$\text{Control Cost} \left(\frac{\$}{\text{ton}} \right) = \frac{\text{Total Annual Cost} \left(\frac{\$}{\text{yr}} \right)}{\text{Tons of Pollutants Controlled} \left(\frac{\text{tons}}{\text{yr}} \right)}$$

5. Step 5 – BACT Selection

The source shall select/apply the top-ranked control technology as the BACT unless the applicant demonstrates, and MCAQD agrees, that technical considerations, or energy, environmental, or

economic impacts justify a conclusion that the most stringent technology is not achievable in that case. If the most stringent technology is eliminated in this fashion, then the next most stringent alternative is considered, and so on.

8. ALTERNATIVE TO BACT TOP-DOWN COST ANALYSIS

To streamline the BACT selection process, the Department will accept a BACT control technology for the same category of industry as listed by the South Coast Air Quality Management District (SCAQMD), SJVACD, or the BAAQMD, or other regulatory agencies accepted by the Department as a viable alternative. Sources who opt to select control technology for the same or similar source category accepted by the air quality management districts in California may forgo the top-down analysis described above.

A list of BACT resources for air quality management districts in California are listed below:

- Bay Area Air Quality Management District
<http://www.baaqmd.gov/pmt/bactworkbook/default.htm>
- San Joaquin Valley Air Pollution Control District
<http://www.valleyair.org/busind/pto/bact/bactidx.htm>
- California Air Resources Board
<http://www.arb.ca.gov/bact/bact.htm>

9. APPLICABILITY OF BACT CONTROL TO LESS EFFECTIVE EMISSIONS POINTS

BACT control shall apply to all emissions points of the triggering pollutant emitted from the new or modified emissions unit. If the overall costs to control every emission point become prohibitive, the source shall include calculations in the cost analysis to justify whether the elimination of certain emissions points make the project feasible. The Department will take this cost effectiveness value under consideration in determining whether emissions points can be eliminated from the overall BACT control system.

The formula of “THE COST EFFECTIVENESS ANALYSIS FOR THE UNCONTROLLED PORTION” is shown in the following equation:

$$V = \frac{W - X}{Y - Z}$$

Where:

- V = Dollars per Ton (Uncontrolled Portion) of Pollutant
- W = Annualized Cost of Controlling All Emissions Points
- X = Annualized Cost of Controlling the Selected Emissions Points
- Y = Total Tons Removed from All Emissions Points
- Z = Tons Removed from the Selected Emissions Points

10. BACT IMPLEMENTATION PLAN

In addition to the information required by Sections 1-9 above, the source shall prepare and present a **BACT Implementation Plan** for the Department’s approval. This plan shall include:

- Individual emissions calculations for each emissions point that contribute to the BACT threshold exceedance.
- Identification of all emission points to be routed to the control system.
- If one or several emissions points are to be eliminated from control, the justification of such elimination must be provided.
- The BACT top-down or alternative control analysis.
- The expected effectiveness of the selected control in terms of emissions capture and destruction or control efficiency.
- Process design parameters for the control device.
- The control device installation plan and timeframe.

APPENDIX A

The following categories of stationary sources shall consider fugitive emissions in determining whether they are subject to Rule 241.

Fugitive emissions are those "...which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening." To the extent they are quantifiable, fugitive emissions are included in the potential to emit (and increases in same due to modification), if they occur at one of the following stationary sources:

- Coal cleaning plants (with thermal dryers)
- Kraft pulp mills
- Portland cement plants
- Primary zinc smelters
- Iron and steel mills
- Primary aluminum ore reduction plants
- Primary copper smelters
- Municipal incinerators capable of charging more than 50 tons of refuse per day
- Hydrofluoric, sulfuric, or nitric acid plants
- Petroleum refineries
- Lime plants
- Phosphate rock processing plants
- Coke oven batteries
- Sulfur recovery plants
- Carbon black plants (furnace process)
- Primary lead smelters
- Fuel conversion plants
- Sintering plants
- Secondary metal production plants
- Chemical process plants
- Fossil-fuel boilers (or combination thereof) totaling more than 250 million BTU per hour heat input
- Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
- Taconite ore processing plants
- Glass fiber processing plants
- Charcoal production plants
- Fossil fuel-fired steam electric plants of more than 250 million BTU per hour rated heat input

Any other stationary source category which, as of August 7, 1980, is being regulated under Section 111-Standards of Performance for New Stationary Sources of the Act or under Section 112-National Emission Standards For Hazardous Air Pollutants of the Act.