

Instructions for Attachment G-G3: Best Available Control Technology (BACT) Determination Forms

Use these instructions to complete Attachments G-G3: Best Available Control Technology (BACT) Determination Form. The following forms must be filled out to complete the BACT Analysis, as applicable:

<i>Attachment G</i>	<i>Analysis of Best Available Control Technology</i>	<i>DEEP-NSR-APP-214a</i>
<i>Attachment G1</i>	<i>Background Search – Existing BACT Determinations</i>	<i>DEEP-NSR-APP-214b</i>
<i>Attachment G2</i>	<i>Cost/Economic Impact Analysis</i>	<i>DEEP-NSR-APP-214c</i>
<i>Attachment G3</i>	<i>Summary of Best Available Control Technology Reviews</i>	<i>DEEP-NSR-APP-214d</i>

Complete one set of forms for each BACT analysis required. An individual BACT analysis should contain information regarding only one pollutant-emissions unit combination. Therefore, a facility with multiple pollutants subject to BACT would have multiple BACT determination forms for that facility.

Questions? Visit the [Air Permitting](#) web page or contact the Air Permitting Engineer of the Day at 860-424-4152 (between 8:30 AM and 4:30 PM, Monday through Friday).

Attachment G: Analysis of Best Available Control Technology

Complete this form for each proposed construction or modification project that is subject to one or more BACT analyses.

Applicant Name - Provide the applicant name as indicated in the New Stationary Source Application Form, (DEEP-NSR-APP-200).

Unit No. - Provide the identification number assigned to the unit. The unit number should remain the same throughout all the application forms.

Unit Description - Enter the description of the equipment to be controlled, e.g., gas turbine, coating line, etc.

Pollutant - Enter the pollutant for which the BACT analysis is being completed, e.g., NO_x, VOC, etc.

If there are multiple pollutants subject to a BACT requirement for an emissions unit, a separate BACT analysis must be performed for each emissions unit-pollutant combination.

Part I: Identify All Control Technologies/Options

Provide the following information for all control technologies with practical potential application similar to your unit.

Note that the applicant should not limit the search to facilities identical to the proposed facility; the applicant should consider technology transfer applications as well. Also, the available control options may include any technologies or techniques with a practical

potential for application to the proposed facility and regulated pollutant under evaluation, including technologies employed outside of the United States that have been demonstrated in practice and/or innovative technologies. The options may also include the operating limitation of the equipment.

Source - Indicate the unit or process to which the BACT/LAER determination is applicable. At this point in the analysis, all possible options should be considered including but not limited to transferable technologies, inherently lower emitting processes, add-on controls, and combinations of inherently lower emitting processes and add-on controls

Facility - Provide the name of the company or plant at which the unit is located.

Control Technology - Provide a brief description of the control technology and the emissions limitations determined to be BACT/LAER for the unit.

Reference - Provide the sources of information used to obtain the BACT/LAER analysis information. Common references used include but are not limited to the U.S. EPA RACT, BACT, LAER Clearinghouse (RBLC), the DEEP BACT Database, and other federal, state, and local new source review permits.

NOTE: The RACT/BACT/LAER Clearinghouse (RBLC) database on EPA's Technology Transfer Network (TTN), Clean Air Technology Center (CATC) website may be accessed at: <http://cfpub.epa.gov/rblc/>.

When using the RLBC database, select the "Find Lowest Emissions Rate" search option. Choose the process type and pollutant from the dynamic menu, then "run report now". The results will be sorted by the emissions limit from the lowest to highest. You may print this list and attach it to this form.

Part II: Rank All Control Options by Technical Feasibility and Control Effectiveness

List all Control Options considered in Part I and identify which options are technically feasible. First list the technically feasible control options in descending order of Overall Pollution Reduction Efficiency and then list the technically infeasible options. If a control option is determined to be technically infeasible, specify the reason in the Comments/Rationale column. DO NOT list the Allowable Emissions Rate, Emissions Reduction, and the Overall Pollution Reduction Efficiency (%) for technically infeasible control options. Technically infeasibility should be based on physical, chemical, and engineering principles that would preclude the successful use of the control option on the emissions unit under review.

Baseline Emissions Rate (BER) - Provide the estimated PTE in tons per year for the pollutant of concern from the affected unit before implementation of the BACT option.

BACT Option - List the control equipment or emissions limitation options that will be considered in determining a BACT recommendation for the affected unit. .

Technically Feasible? - Indicate whether the options being considered are technically feasible for the unit.

Allowable Emissions Rate (Post-BACT Emissions Rate) (AER) - For all technically feasible options, provide the projected PTE in tons per year for the pollutant of concern from the unit after implementation of each BACT option.

Emissions Reduction (ER) - For all technically feasible options, provide the emissions reduction expected in tons per year based on the PTE before and after implementation of each BACT option. ER is the difference in PTE before and after BACT is implemented

(ER = BER - AER).

Overall Pollution Reduction Efficiency (E) - Provide the overall pollution reduction efficiency as a percent based on the PTE before and after implementation of each BACT option. E is a measure of the effectiveness of the BACT option calculated using the following equation:
 $E (\%) = (ER/BER) * 100.$

Comments/Rationale - For each option indicated to be technically infeasible, provide a brief explanation in the space provided. Provide a more detailed explanation of the determination of technical infeasibility in a separate attachment to this form.

In addition, complete *Attachment G1: Background Search – Existing BACT determinations (DEEP-NSR-APP-214b)* to provide more detailed information regarding each of the technically feasible options listed.

Part III: Economic Impacts/ Cost Effectiveness

Is the proposed BACT the top control option?

If “Yes”, go to Part IV. If there is more than one option with the top-ranked emissions limit, the applicant can choose one of the options.

If “No”, continue on to complete Part III of this form.

For each technically feasible BACT options from Part II, complete *Attachment G2: Cost/Economic Impact Analysis Form (DEEP-NSR-APP-214c)* prior to completing the table in Part III.

Provide the following information for each of the BACT options listed in Part II for which economic impacts are to be considered.

BACT Option - List the technically feasible BACT options from Part II in the same order.

Total Annualized Cost (TAC) - Provide the TAC as calculated in Table H, item 3 of *Attachment G2: Cost/Economic Impact Analysis (DEEP-NSR-APP-214c)* for each BACT option. TAC is the sum of the annualized total capital investment and the total annual costs.

Cost Effectiveness – Provide the average and incremental cost effectiveness in \$/ton. Cost Effectiveness is the annualized cost associated with implementation of a BACT option in dollars per ton of pollutant emissions reduced.

Average - Provide the average cost effectiveness as calculated in Table I, item 4 of *Attachment G2: Cost/Economic Impact Analysis Form (DEEP-NSR-APP-214c)*, for each of the BACT options. Average Cost Effectiveness (ACE) is the TAC for a BACT option divided by the emissions reduction for that BACT option (from Part II): $ACE = TAC/ER.$

Incremental (ICE) - Providing the ICE is optional and may be used to justify the recommendation to eliminate a more stringent BACT option. The ICE compares the TAC and Allowable emission rate (i.e., AER of a BACT option to that of the next most stringent option:
 $ICE = (TAC1 - TAC2) / (AER1 - AER2).$

Comments/Rationale - For each option determined to be economically infeasible, provide a brief explanation in the space provided. Provide a more detailed explanation of the determination of economic infeasibility in a separate attachment in Part IV of Attachment G2, DEEP-NSR-APP-214c.

Part IV: Environmental Impact Analysis

Environmental impacts of the BACT option consist of effects other than impacts on air quality standards due to emissions of the regulated pollutant in question (e.g., solid or hazardous waste generation, discharges of

polluted water from a control device, visibility impacts, or emissions of other regulated or unregulated pollutants). Provide the following information regarding environmental impacts for each of the technically feasible BACT options listed in Part II.

BACT Option - List the technically feasible BACT options from Part II in the same order.

Toxics Impact - Indicate by “Yes/No” whether air toxics or hazardous air pollutants with emissions of 500 lb/yr or more, including those not regulated under the Clean Air Act, are generated or eliminated due to implementation of the BACT option. If “Yes”, quantify the amount generated or eliminated per ton of pollutant controlled.

Adverse Impact - Indicate by “Yes/No” whether other adverse environmental impacts are generated or eliminated due to implementation of the BACT option. If “Yes”, quantify the amount of additional waste/emissions generated or eliminated per ton of pollutant controlled.

Comments/Rationale - For each option determined to be environmentally infeasible, provide a brief explanation in the space provided. Provide a more detailed explanation of the determination of environmental infeasibility in a separate attachment to this Part IV of this form.

Part V: Energy Impact Analysis

Energy impacts are the difference between the baseline total project energy requirements (without the BACT option being considered) and the projected total project energy requirements with the BACT option implemented. Provide the following information regarding the energy impacts of each of the BACT options listed in Part II.

Baseline - Provide the energy requirements for the project that is being evaluated (prior to application of any BACT).

BACT Option - List the technically feasible BACT options from Part II in the same order.

Incremental increase over baseline - For each BACT option, quantify any changes in energy requirements that could result from applying the BACT option. Use the same units of energy as for the baseline energy requirements.

Comments/Rationale - For each option infeasible because of the energy impact, provide a brief explanation in the space provided. Provide a more detailed explanation of the determination of energy infeasibility in a separate attachment to this form.

Part VI: BACT Recommendation

BACT Option Recommended - Indicate the control requirement or limitation option recommended as BACT for the unit.

Justification - If the top option was not selected, indicate why the more stringent BACT option(s) was (were) eliminated. Provide additional pages of explanation as necessary.

Part VII: Additional Forms/Attachments:

Attachment G1: Background Search – Existing BACT Determinations (DEEP-NSR-APP-214b) - Indicate that a summary of the technically feasible BACT Options from Part II of the form. This form is mandatory whenever a BACT analysis is performed. One form needs to be completed for each of the technically feasible BACT options. **The BACT application is incomplete if these forms are not submitted.**

Attachment G2: Cost/Economic Impact Analysis (DEEP-NSR-APP-214c) - Indicate the number of Cost/Economic Analyses included as part of this BACT Analysis. This form is mandatory for each BACT option in which costs and economic impacts are to be

considered. **The BACT application is incomplete if these forms are not submitted.**

Attachment G3: Summary of Best Available Control Technology Review (DEEP-NSR-APP-214d) - Indicate that a summary of all BACT analyses performed under the project is provided with this application. This form is mandatory whenever a BACT analysis is performed. Only one form needs to be completed per permit as long as all relevant information is provided. **The BACT application is incomplete if this form is not submitted.**

Additional Attachments - Indicate the number of additional attachments included as part of this BACT analysis, and provide a listing of these supplemental documents along with the total number of pages of each in the space provided. Include the facility name, unit No., and pollutant on each page of the attachments. **The BACT application may be deemed incomplete if sufficient documentation is not submitted.**

Attachment G1: Background Search – Existing BACT Determinations

Submit one form for each of the BACT determinations listed in Part I of *Attachment G: Analysis of Best Available Control Technology, DEEP-NSR-APP-214a*.

Provide the following information regarding the top BACT determinations from five sources with a facility similar to your own.

Applicant Name - Provide the Applicant name as indicated in the New Stationary Source Application Form, (DEEP-NSR-APP-200).

Unit No. - Provide the identification number assigned to the unit. The unit number should remain the same throughout all the application forms.

Unit Description - Enter the description of the equipment to be controlled, e.g., gas turbine, coating line, etc.

Pollutant - Enter the pollutant for which the BACT analysis is being completed, e.g., NO_x, VOC, etc. If there are multiple pollutants subject to a BACT requirement for a facility, a separate BACT analysis must be performed for each facility-pollutant combination.

BACT Option - Indicate the BACT option to which this economic analysis applies.

For each source, indicate if the determination is BACT or LAER and complete the following:

Source - Indicate the affected emission unit or process to which the BACT determination is applicable.

Facility/ Location - Provide the name of the company or plant and the city and state where it is located.

Permitting Authority - Indicate the permitting authority that issued the BACT analysis. Examples include U.S. EPA, State of Connecticut, etc.

Permit No. - Provide the identification number of the permit for the affected emission unit or process.

Capacity - Provide the appropriate capacity (e.g., raw material input, maximum production, or fuel usage rates, etc.), and specify the appropriate units for capacity.

BACT/LAER Determination - Provide the control requirements and/or limitations determined to be BACT/LAER for the unit. Include relevant details such as control/destruction efficiencies, capture efficiencies, and units. Include separate attachments as necessary.

Compliance Achieved? - Indicate whether or not the unit has achieved compliance with the BACT determination requirements in practice/operation.

Method of Compliance Determination - If compliance was achieved, provide the method of compliance determination, such as a stack test, continuous emission monitoring system (CEMS) data, etc.

Actions Taken for Non-compliance - If compliance was not achieved initially, indicate any actions taken to bring the source into compliance, such as revising the BACT, process adjustments, etc.

Baseline Emissions Rate (BER) - Provide the estimated PTE for the pollutant of concern from the unit before implementation of the BACT option (specify units).

Allowable Emissions Rate (Post-BACT Emissions Rate) (AER) - Provide the projected PTE for the pollutant of concern from the unit after implementation of the BACT option (specify units).

Emissions Reduction Potential (P) - Provide the P, which is a measure of the effectiveness of the BACT option calculated with the following equation: $P (\%) = ((BER - AER) / BER) * 100$.

Cost Effectiveness - Provide the overall cost effectiveness in dollars per ton of pollutant removed for the referenced BACT analysis.

Reference - Provide the sources of information used to obtain the BACT analysis information. Common references used include but are not limited to the U.S. EPA RACT, BACT, LAER Clearinghouse (RBLC), the South Coast Air Quality Management District (SCAQMD), and other federal, state, and local new source review permits.

Repeat Attachment G1 for the other BACT/LAER determinations.

Attachment G2: Cost/Economic Impact Analysis

Complete this form for each BACT option in which cost and economic impacts are to be considered. If the applicant is recommending the top technically feasible BACT option under Part II of *Attachment G: Analysis of Best Available Control Technology, DEEP-NSR-APP-214a*, it is not necessary to complete this form.

NOTE: Refer to the most recent edition of the United States Environmental Protection Agency (US EPA) document entitled, "[Office of Air Quality Planning and Standards \(OAQPS\) Control Cost Manual](#)" for additional guidance, definition of terms, and default values. Also refer to the most recent edition of the US EPA document entitled, "[Escalation Indices for Air Pollution Control Costs](#)" for additional default values.

Identify the applicable costs in the "Item" column, and specify the cost estimates in the "Cost Estimate" column. Specify the references/sources of the cost estimates (i.e., vendor/contractor quotes (preferred), OAQPS Control Cost Manual, etc.) in the "Reference/Source of the Cost Estimate" column.

On this form, do not include costs that would be incurred regardless of whether the BACT option is chosen. If the particular item is not applicable to the BACT option being evaluated, indicate "Not Applicable" (N/A) in the appropriate blanks, and provide an explanation in the Reference/Comments column. Copy the forms as necessary.

Source Information

The Source Information table includes general facility and BACT option information so that the permit reviewer can match and compare the

cost/economic impact analysis to the proper BACT option.

Applicant Name - Provide the Applicant name as indicated in the New Stationary Source Application Form, (DEEP-NSR-APP-200).

Unit No. - Provide the identification number assigned to the unit. The unit number should remain the same throughout all the application forms.

Pollutant - Enter the pollutant for which the BACT analysis is being completed, e.g., NOx, VOC, etc.

BACT Option - Indicate the BACT option to which this economic analysis applies.

Part I: Total Capital Investment

Total Capital Investment (TCI) is the total direct and indirect capital costs associated with implementation of a BACT option. Use Tables A and B to indicate the direct and indirect capital costs that would be incurred above the baseline project costs. Summarize the total capital costs in Part III.

Table A. Direct Capital Costs

Direct capital costs include the purchased equipment costs and direct installation costs associated with implementation of a BACT option.

Purchased Equipment Costs

Purchased equipment costs include all costs that may be incurred from purchasing equipment required for implementation of the BACT option.

1. Equipment Costs - Provide an itemized list of the equipment required for the BACT option (e.g., incinerator, auxiliary equipment, fabric filter, bags, etc.). Include the costs for each piece of equipment listed.

2. Instrumentation - Indicate the cost of the instrumentation required to operate the BACT option equipment. If instrumentation was included in the purchased equipment cost, do not repeat those costs here. If a factor is used to calculate this cost based on the baseline equipment cost, the justification for using the factor must be given in the Reference/Comments column.

3. Sales Tax - Indicate the amount of sales tax that would be charged on the purchased equipment and instrumentation.

4. Freight - Indicate the cost associated with shipping the purchased equipment. If a factor is used to calculate this cost based on the baseline equipment cost, the justification for using the factor must be given in the Reference/Comments column.

5. Other - Identify and quantify any additional costs related to the direct purchase costs that will be incurred if this BACT option is chosen.

6. Purchased Equipment Subtotal - Sum the costs from Table A, items 1 through 5 above, and record the result in the "Cost Estimate" column of this line.

Direct Installation Costs

Direct installation costs include the costs of labor and materials for installing equipment associated with implementation of a BACT option.

7. Foundations and Supports - Indicate the cost of foundations and supports that will be incurred if this BACT option is chosen.

8. Auxiliaries - Indicate the cost of installing auxiliary equipment such as duct work and fittings.

9. Handling and Erection - Indicate any special handling and/or erection costs that

may be incurred due to need for special equipment to transport, unload, or place the equipment (e.g., “tight fit” in retrofit installations requiring special crane to lift equipment and place).

10. Piping - Indicate the amount and type of piping required and the cost estimate for the piping (e.g., 15 feet of 6-inch PVC piping).

11. Insulation and Painting - Indicate the cost associated with insulation and painting activities.

12. Electrical - Indicate the cost associated with electrical work.

13. Site Preparation - Indicate the cost associated with special site preparation activities.

14. Other - Identify and quantify any additional site specific direct installation activities that will be incurred if this BACT option is chosen.

15. Direct Installation Costs Subtotal - Sum the costs from Table A, items 7 through 14 above, and record the result in the “Cost Estimate” column of this line.

16. Direct Capital Costs Subtotal - Sum the costs from Table A, items 6 and 15, and record the result in the “Cost Estimate” column of this line.

Table B. Indirect Installation Costs

Indirect installation costs include the indirect costs for installing equipment associated with implementation of the BACT option.

1. Engineering and Supervision - Provide cost estimates for the engineering and supervisory costs associated with the installation activities.

2. Lost Production - Provide cost estimates for lost production resulting from shutting

down a process (if applicable) to complete the installation of the BACT option. In addition, provide an explanation of why the process must be shut down during production time to install the BACT option and why it is not possible to schedule it during planned down-time.

3. Construction and Field Expenses - Indicate the costs for construction and field expenses (i.e., costs for construction supervisory personnel, office personnel, rental of temporary offices, etc.).

4. Contractor Fees - Provide estimates of contractor fees (i.e., fees for construction and engineering firms involved in the installation).

5. Start-up and Performance Tests - Provide cost estimates of start-up and performance tests required to verify that the control system is properly installed and that it meets performance guarantees (if applicable).

6. Over-all Contingencies - Provide a cost estimate for over-all contingencies (e.g., project delays, increased expenses). Justify the estimate with an explanation of the value provided in the Reference/Comments column.

7. Working Capital - Provide a cost estimate for the working capital (e.g., initial costs of fuel, chemicals, other materials, labor, and maintenance) required during start-up of the BACT option equipment.

8. Other - Identify and quantify any additional site-specific, indirect installation costs that will be incurred if this option is chosen. Indicate the cost of each of these additional indirect capital expenditures.

9. Indirect Installation Costs Subtotal - Sum the costs from Table B, items 1 through 8 above, and record the result in the Reference/Comments column.

Table C. Capital Cost Summary

1. *Total Capital Investment (TCI) Subtotal* - Sum the costs from Table A, item 16, and Table B, item 9, and record the result on this line.

2. *Capitol Recovery Factor (CRF)* - Calculate the capital recovery factor (CRF) for the control system using the following equation: $CRF = [i*(1+i)^n] / [(1+i)^n - 1]$, where “i” is the interest rate and “n” is the economic lifetime, explained in Chapter 2 of the “OAQPS Control Cost Manual”.

a. *Interest Rate* - Specify the interest rate used to calculate the capital recovery factor. Justify the use of this interest rate value in the Reference/Comments column.

b. *Economic Lifetime* - Specify the economic lifetime in years of the BACT option used to calculate the capital recovery factor. Justify the use of this time period in the Reference/Comments column.

3. *Capital Recovery Cost (CRC)* - CRC is the uniform end-of-year payment necessary to repay the TCI over the lifetime of the equipment at a set interest rate. Calculate the CRC in dollars per year (i.e., annualize the capital costs over the lifetime of the BACT option) using the following equation: $CRC = CRF*[TCI - (C_p + C_{pl})]$. C_p and C_{pl} are the terms defined on page 2-25 of the “OAQPS Control Cost Manual” that account for the cost of those parts (including sales tax and freight) that would be replaced during the useful life of the control system and the labor for replacing them, respectively, such that the parts will not be double-counted in the total annualized costs. The “OAQPS Control Cost Manual” provides guidance on annualizing the capital costs in accordance with the equivalent uniform annualized cost method.

Part II: Total Annual Cost

Total Annual Cost includes the direct and indirect costs and recovery credits associated with implementation of a BACT option. Use Tables D and E to indicate the annual costs that would be incurred above the baseline project costs. Use Table F to indicate the recovery credits that would be realized after implementation of the BACT option. Summarize the total annual costs in Table G.

Table D. Direct Annual Costs

Direct annual costs include the costs of the labor, materials, replacement parts, utilities, and waste treatment and disposal directly associated with implementation of a BACT option.

1. *Operating Labor* - Itemize by job classification the operating labor costs required for the BACT option as the total working hours necessary per shift (e.g., two operators for three 8-hour shifts at \$20 per hour, one supervisor for one 8-hour shift at \$40 per hour, etc.).

2. *Maintenance Labor* - Itemize by job classification the maintenance labor costs required for the BACT option as the total working hours necessary per shift (e.g., two maintenance personnel for two 8-hour shifts at \$20 per hour, one supervisor for one 8-hour shift at \$40 per hour, etc.).

3. *Materials* - Identify and quantify the materials required annually for implementation of the BACT option (e.g., maintenance materials, chemicals required).

4. *Utilities* - Identify the utility requirements for implementation of the BACT option (e.g., electricity, natural gas), and quantify the associated energy requirements and costs.

5. *Waste Treatment and Disposal* - List the waste treatment and disposal requirements

for implementation of the BACT option (e.g., absorber effluent, spent catalyst). Specify the quantities of waste materials to be treated or disposed and the respective costs.

6. Replacement Parts - Identify the replacement parts required for implementation of the BACT option, and estimate the total annual costs for replacement parts.

7. Other - Identify and quantify any other direct annual costs that will be incurred if this BACT option is chosen.

8. Direct Annual Costs Subtotal - Sum the costs from Table D, items 1 through 7 above, and record the result in the "Cost Estimate" column of this line.

Table E. Indirect Annual Costs

Indirect annual costs include the costs of the administrative requirements, taxes and other overhead incurred as a result of implementation of the BACT option.

1. Overhead - Indicate the annual cost of overhead (e.g., additional personnel for the administrative activities associated with the plant and payroll).

2. Property Taxes, Insurance, and Administrative Charges - Indicate the annual cost of property taxes, insurance and other administrative charges associated only with the BACT option.

3. Other - Identify and quantify any other indirect annual costs associated with the BACT option.

4. Indirect Annual Costs Subtotal - Sum the costs from Table E, items 1 through 3 above, and record the result in the "Cost Estimate" column of this line.

Table F. Recovery Credits

Recovery credits include the credits and/or profits realized from the recovery of materials and/or energy as a result of implementation of the BACT option.

1. Materials Recovered - Indicate the annual credit due to materials recovered as a result of implementing this BACT option. Examples include but are not limited to credit for materials recovered by the control system that can be sold, recycled to the process, or reused elsewhere at the site minus costs for processing, storage, and transportation.

2. Energy Recovered - Indicate the annual credit due to energy recovered as a result of implementing this BACT option.

3. Other - Identify and quantify any other annual credits that would result from the implementation of the BACT option.

4. Recovery Credits Subtotal - Sum the credits from Table F, items 1 through 3 above, and record the result in the "Credit Estimate" column of this line.

Table G. Total Annual Cost Summary

1. Direct Annual Costs Subtotal - Record the value from Table D, item 8.

2. Indirect Annual Costs Subtotal - Record the value from Table E, item 4.

3. Recovery Credits Subtotal - Record the value from Table F, item 4.

4. Total Annual Cost Subtotal - The Total Annual Cost Subtotal is the sum of the direct and indirect annual cost subtotals in items 1 and 2, minus the recovery credits from item 3. Transfer this result to Table H, item 2.

Part III. Cost/Economic Impact Summary

Use Table H to sum the annualized costs associated with the BACT option. Use Table I to quantify the average cost effectiveness of the BACT option.

Table H. Total Annualized Cost Summary

1. *Capital Recovery Cost* - Record the value from Table C, item 3.
2. *Total Annual Cost Subtotal* - Record the value from Table G, item 4.
3. *Total Annualized Cost* - Total Annualized Cost (TAC) is the sum of the Capital Recovery Cost and the Total Annual Cost Subtotal, item 1 plus item 2.

Table I. Cost Effectiveness

Cost effectiveness is the annualized cost associated with implementation of the BACT option in dollars per ton of pollutant emissions reduced.

1. *Baseline Emissions Rate (BER)* - Provide the estimated PTE in tons per year for the pollutant of concern from the unit before implementation of the BACT option.
2. *Allowable Emissions Rate (Post-BACT Emissions Rate) (AER)* - Provide the projected PTE in tons per year for the pollutant of concern from the unit after implementation of the BACT option.
3. *Total Pollutant Removed* - Subtract Table I, item 2, from Table I, item 1, and record the result on this line.
4. *Average Cost Effectiveness* - Divide the value in Table H, item 3 by Table I, item 3, and record the result on this line.

Part IV: Attachments

In the space provided, list all supplemental documents submitted with this Cost/Economic

Analysis along with the total number of pages in each. Include the Applicant name, unit no., and pollutant on each page of the attachments. The BACT application may be deemed incomplete if sufficient documentation is not submitted.

Attachment G3: Summary of Best Available Control Technology Review

Complete this form for each proposed construction or modification project that is subject to one or more BACT analyses. Copy the form as necessary.

Unit Description - Enter the description of the equipment to be controlled, e.g., gas turbine, coating line, etc. One line should be filled out for each permit being obtained in this application.

Unit No. - Provide the identification number assigned to the unit. The unit number should remain the same throughout all the application forms.

Pollutants Subject to BACT - For each facility subject to BACT, indicate with an "x" whether a BACT analysis was performed for each of the criteria pollutants emitted from the facility.

Baseline Project Emissions Total (tpy) - Indicate the estimated total baseline (before BACT) Potential Emissions (PTE) for the criteria pollutants emitted from the project in tons per year.

Allowable Project Emissions Total (tpy) - Indicate the projected total Allowable (after all BACTs are considered) PTE for the criteria pollutants emitted from the project in tons per year.

Additional Information

[New Source Review \(NSR\) Workshop Manual](#)
(Draft edition, October 1990)

Refer to Chapter B of the NSR Workshop Manual for detailed guidance on performing a BACT analysis.

[Office of Air Quality Planning and Standards \(OAQPS\) Control Cost Manual](#) (5th edition, February 1996)

Cost effectiveness Guidance:

- GHG BACT permitting Guidance (appendix K)
<https://www.epa.gov/sites/production/files/2015-07/documents/ghgguid.pdf>
- California Cost Effectiveness Guidelines
<https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook>

NOTE: The above links represent the most recent edition of the OAQPS Control Cost Manual and Escalation Indices as of the date these forms were published. The most current manual and escalation indices can be found available at EPAs [Clean Air Technology Center](#) website.

[NESCAUM BACT Guideline](#) (1991)

[EPA RACT/BACT/LAER \(RBLC\) Database](#)

[DEEP Air Permits Website](#)