Rule 331
Best Available Control Technology Replacement Guidelines

1.0 Introduction

The purpose of this document is to provide guidance on meeting the Best Available Control Technology ("BACT") component replacement requirements of District Rule 331. This guidance provides a listing of acceptable "Candidate" BACT technology and performance standards, a process for proposing "Alternate" BACT technologies, and procedures for documenting BACT selection and installation.

These guidelines supersede those previously issued on January 18, 1994. The list of Candidate BACT technologies is an evolving process that the District updates as necessary. Applicants should reference BACT Guideline 1.2, found at https://www.ourair.org/bact/, for the most version of the Candidate BACT technology and performance standards.

Rule 331 requires that certain leaking valves, connections, pump seals, compressor seals, and pressure relief devices be replaced with BACT. The specific Rule 331 requirements that trigger BACT replacements are:

> Section D.4 (Recurrent Major Leakers): *Component or component parts which incur 5 repair actions for major gas or liquid leaks within a continuous twelve-month period shall be replaced with BACT equipment as determined by the District's New Source Review Rule.*
>
> Section E.1.b (Critical Component Leakers): *All leaks from critical components shall be minimized within one-hour to the extent possible and replaced with BACT as determined in accordance with the District's New Source Review Rule during the next process shutdown or within twelve months, whichever is sooner.*

When an operator is required by Rule 331 to replace a component with BACT, two options are available to identify the appropriate replacement equipment that will meet BACT technology and performance standards. These options are summarized below:

Option No. 1: Utilize Candidate BACT Technologies and Performance Standards

Use of listed Candidate BACT replacements is the most "streamlined" identification option available to operators. The operator should refer to the list of Candidate BACT replacements first, prior to considering any Alternate BACT technologies. The process for selecting Candidate BACT equipment can be found in Section 2.0 of this document. Reference BACT Guideline 1.2 at https://www.ourair.org/bact/ for the list of approved Candidate BACT equipment. Candidate BACT technologies and performance standards represent "achieved-in-practice" BACT standards for the classes and categories of equipment subject to Rule 331.

Option No. 2: Utilize Alternate Technologies and Performance Standards

Any operator that cannot install Candidate BACT listed technology or performance standards, must submit adequate information and obtain written approval from the District for any proposed Alternate BACT technique and performance standard prior to installation. Follow the procedures in Section 3.0 of these Guidelines for this process. Please be advised, Candidate BACT technologies and performance standards (see Section 2.0) must be utilized if it is technically feasible to do so. Any Alternate BACT technology must also be capable of meeting or exceeding the equivalent Section 2.0 listed technology's performance standards for the class of equipment.

2.0 Candidate Best Available Control Technology and Performance Standards

Please refer to BACT Guideline 1.2 found at https://www.ourair.org/bact/ for a listing of Candidate BACT equipment technology and performance standards. Operators must install any of the BACT Guideline 1.2 listed equipment unless it can be proven to the District that it is not technically or safely feasible to do so.

If Candidate BACT technology is selected for installation, the operator shall report and document Candidate BACT replacements as follows:

1. Within 30 days of the discovery of a component requiring BACT per Rule 331, complete the Rule 331 BACT Reporting *APCD-02A* form and send it to the District's Permit Compliance Section (email: pcomp@sbcapcd.org). A copy of this form is attached to these guidelines in the Appendices (Appendix 5.2);

2. Once received, the District will review the proposed installation, sign off in the appropriate box on the *APCD-02A* form, and return it to the operator;

3. Once the BACT installation has been completed in accordance with Rule 331 timelines, the operator shall sign off and date the "*BACT Replacement Installation Completed*" block of the *APCD-02A* form. A copy of this signed form shall be sent to the District offices within 30 days of completing the BACT installation. The District will file this signed off form to your project file and return a copy to you for your files; and

4. Operators shall also complete an update to the facility Rule 331 I&M Plan within 30 days of BACT component installation. This update shall document the installed BACT technology and performance standard (such as any BACT-equivalent leak detection and repair threshold)

Any operator that permanently installs Candidate BACT technology from the BACT Guideline 1.2 in effect on the date the Permit Compliance Section is notified of its selection, the operator will be considered to have installed BACT as required by either Section D.4 or E.1.b of Rule 331. Subsequent to installation, continued Rule 331 BACT compliance for the component will be based upon it meeting the associated BACT performance standards over the life of the facility.

As deemed necessary by District inspection staff, the operator may be directed to provide additional evidence of any BACT installation. Such evidence may include, but not necessarily be limited to: a) equipment purchase orders; b) completed work orders/receipts; or, c) actual physical inspections of the component.

3.0 Alternate Best Available Control Technologies and Performance Standards

In cases where the operator believes that none of the Candidate BACT technology and performance standards in Section 2.0 above are technically, safely, or otherwise (must specify) infeasible, the operator shall follow the procedures of this section to identify Alternate BACT. These procedures require that each Alternate BACT technology and performance standard be reviewed by the District on a case-by-case basis to ensure that BACT performance is utilized for the class of equipment. The operator must complete the following process:

1. Within 30 days of the discovery of a component requiring BACT replacement per Rule 331, the operator shall complete the Rule 331 Alternate BACT Proposal *APCD-02B* form (see Appendix 5.3) and submit it to the District's Permitting Compliance Section (email: pcomp@sbcapcd.org);

2. The District will complete its review of proposed Alternate BACT technologies within 30 days of receipt. By this date, the District will notify the operator of either: a) its approval of the Alternate BACT by returning a signed-off *APCD-02B* form; b) a request for additional information to complete its review; or c) a denial of the proposed Alternate BACT;

3. Upon receipt of either a request for additional information, or a denial of the proposed Alternate BACT, the operator shall respond to such inquiries/findings within 30 days of receipt;

4. Upon receiving written District approval of the proposed Alternate BACT replacement(s), the operator shall complete its installation consistent with the timelines of Rule 331;

5. Once the BACT installation has been completed in accordance with Rule 331 timelines, the operator shall sign off and date the "*BACT Replacement Installation Completed*" block of the *APCD-02B* form. A copy of this signed form shall be sent to the District offices within 30 days of completing the BACT installation. The District will file this signed off form to your project file and return a copy to you for your files; and lastly,

6. Operators shall also complete an update to the facility Rule 331 I&M Plan within 30 days of BACT component installation. This update shall document the installed BACT technology and performance standard (such as any BACT-equivalent leak detection and repair threshold)

Any operator that permanently installs District-approved Alternate BACT technology will be considered to have installed BACT as required by either Section D.4 or E.1.b of Rule 331. Subsequent to installation, continued Rule 331 BACT compliance for the component will be based upon it meeting the associated BACT performance standards over the life of the facility.

As deemed necessary by District inspection staff, the operator may be directed to provide additional evidence of any BACT installation. Such evidence may include, but not necessarily be limited to: a) equipment purchase orders; b) completed work orders/receipts; or, c) actual physical inspections of the component.

4.0 BACT Installation Timelines

Rule 331, sections D.4 and E.1.b dictate the installation timelines for Rule 331 BACT replacements. Described below are some clarifications on these timelines based upon whether a "Candidate" or an "Alternate" BACT replacement is under consideration.

4.1 Candidate BACT Replacements

Because these guidelines contain District "pre-approved" Candidate BACT replacements, operators shall install such equipment (where technically, safely and otherwise feasible) at the next scheduled process shutdown. Such installation is required even when such shutdown may be scheduled to occur within 30 days of the discovery that the Rule 331 BACT replacement is triggered for a component.

5.0 Appendices

5.1 Candidate BACT Replacement Technologies and Performance Standards (Updated as Neccessaery)
5.2 Candidate BACT Replacement Reporting Form– (APCD Form: *APCD-02A*)
5.3 Alternate BACT Replacement Proposal Form – (APCD Form: *APCD-02B*)

Appendix 5.1

Candidate BACT Replacement Technology and Performance Standards

Component	Technology & Code #		Performance Standard
Valve Stem Seal (Leakless or Seal-less Designs)	• Bellows	CBV-1	(a) Leak Detection and Repair Rate (LDAR[1]) of 100 ppmv or less; or (b) No LDAR reading above background
	• Diaphragm seal	CBV-2	
Valve Stem Seal (Low Emissions Packing Designs) [2]	• Spring-loaded packing; expandable packing; graphite packing; polytetrafluoroethylene (PTFE)-coated packing	CBV-3	LDAR of 100 ppmv or less
	• Precision machine stem	CBV-4	
	• Sealant injection	CBV-5	
Compressor Seal (Reciprocating Drives)	• Vented to vapor recovery [3]	CBC-1	LDAR of 100 ppmv or less
	• Elastomer bellows [4]	CBC-2	
	• O-ring seals	CBC-3	
	• Dry-running secondary containment seals	CBC-4	
Compressor Seal (Rotary Drives)	• Vented to vapor recovery or closed vent [3]	CBC-5	LDAR of 100 ppmv or less
	• Dual/tandem mechanical seals [4]	CBC-6	
	• Leakless designs (e.g. magnetic drive)	CBC-7	
Pump Seal	• Vented to vapor recovery or closed vent [3]	CBP-1	LDAR of 500 ppmv or less
	• Dual/tandem mechanical seals [4]	CBP-2	
	• O-ring seals	CBP-3	
	• Dry-running secondary containment seals	CBP-4	
	• Leakless designs (e.g. magnetic drive)	CBP-5	
Pressure Relief Valves/Devices ("PRDs")	• Vented to vapor recovery or closed vent [3]	CBPRD-1	(a) PRDs that are vented to VRS or closed vent system are not subject to LDAR - 100% control; or (b) LDAR of 100 ppmv or less
	• Equipped with rupture disk [5]	CBPRD-2	
	• Soft-seat designs	CBPRD-3	
Flange Connections	• Welded	CBF-1	LDAR of 100 ppmv or less
	• New gasket rated to 150% of process pressure at process temperature	CBF-2	
Other [6]	• Welded	CBO-1	LDAR of 100 ppmv or less
	• New gasket rated to 150% of process pressure at process temperature	CBO-2	

1. In this Appendix 5.1 table, LDAR means "Leak Detection and Repair." Repair actions consistent with Rule 331 timing requirements are required to a BACT component if the measured fugitive emission concentration (per Rule 331, §H.1 methods) at the subject leak-path exceeds the LDAR specifications in this Table. Note, the soap screening method of §H.1 cannot be used as it does not meet BACT requirements.

2. Valves stem seal (low emissions packing designs) BACT technologies and performance standard must be validated by the API 624 certification test using the same packing used during the certification test. Same is defined as the specific make and model of packing. Alternatively, the combination of API 622 certified graphite packing and manufacturer's emissions guarantee may be used to validate the BACT technologies and performance standard.

3. A "closed vent system" must route vapors to a control device such as a thermal oxidizer or flare.

4. These seals must be equipped with a barrier fluid system that either operates at a pressure greater than the pump or compressor discharge pressure, or is vented to a vapor recovery system.

5. Rupture disk equipped PRDs must be equipped with an integrity indicator system. Please supply additional information with any proposed rupture disk BACT system to describe how this integrity indicator system functions.

6. Component leak paths falling in the "other" Category means anything that does not clearly fit in the valve, compressor, pump, PRD or flange categories described above. "Other" components include the following:

    - Grease fittings
    - Threaded connections
    - Screwed couplings
    - Hatches
    - Meters
    - Sight Glasses
    - Level gauges
    - Diaphrams
    - Piping clamps

    For information tracking purposes, operators are requested to include a short description of the "other" component type in field #8 when completing the *Candidate BACT Replacement Reporting APCD-02* form.

Appendix 5.2
Rule 331 Candidate BACT Replacement
Reporting Form

APCD Form: APCD-02A

Rule 331 Candidate BACT Replacement Reporting Form

APCD Form: APCD-02A
Page 1 of 1

This form shall be used to document the proposed installation of Candidate BACT replacement technology identified in the BACT Guideline 1.2 document (link: https://www.ourair.org/bact/), when triggered by Rule 331 sections D.4, or E.1.b.

Item #	Item Description	Data or Information
1	Date	
2	Company Name	
3	Permit Type & Number (e.g. ATC xxxx)	
4	Facility/Stationary Source Name	
5	Form Completed By (whom) & Phone #	
6	Rule 331 I&M Plan, Leak-Path ID Number	
7	Date BACT Replacement Triggered	
8	Leak –Path Type (e.g., valve, flange, pump, compressor seal & others)	
9	Service (gas/light oil, oil, heavy oil)	
10	Rule 331.C.3 Component Class (major, minor, critical)	
11	Rule 331 BACT Replacement Triggered by Rule 331, Section #: (✓ box that applies)	☐ §D.4 (recurrent repair to major leaker) ☐ §E.1.b (critical component)
12	Candidate BACT Replacement Technology Code Number Installed (see Appendix 5.1) & Applicable LDAR for I&M	Code # | LDAR
13	BACT Equipment Make, Model Number, and other identifying information. (attach vendor or other information if warranted)	
14	Estimated Installation Cost ($) (material/installation labor/total)	Mtl. | Ins Lbr | Total
15	Proposed Installation Date	

District Approval by: Date:

BACT Replacement Installed on: _____

Signed: _____ Print Name: _____

NOTE: Within 30 days of replacement installation, return this signed form to the District offices.

Appendix 5.3
Rule 331 Alternate BACT
Replacement Proposal Form

APCD Form: APCD-02B

Rule 331 Alternate BACT Replacement Proposal Form

APCD Form: APCD-02B

This form and all required supporting information must be submitted to the District to obtain authorization from the District for installation of Alternate BACT in accordance with Rule 331.D.4 or E.1.b BACT replacement requirements. Alternate BACT installations will be considered by the District's Permit Compliance Section (email: pcomp@sbcapcd.org) on a case-by-case basis where Candidate BACT technology already identified in a published list cannot technically, safely, or otherwise reasonably be installed. A separate form must be completed for each separate "leak-path" being reviewed.

Item #	Item Description	Data or Information		
1	Date			
2	Company Name			
3	Permit Type & Number (e.g. ATC xxxx)			
4	Facility/Stationary Source Name			
5	Form Completed By (whom) & Phone #			
6	Rule 331 I&M Plan, Leak-Path ID Number			
7	Date BACT Replacement Triggered			
8	Leak –Path Type (e.g., valve, flange, pump, compressor seal & others)			
9	Service (gas/light oil, oil, heavy oil)			
10	Rule 331.C.3 Component Class (major, minor, critical)			
11	Rule 331 BACT Replacement Triggered by Rule 331, Section #: (✓ box that applies)	☐ §D.4 (recurrent repair to major leaker) ☐ §E.1.b (critical component)		
12	Alternate BACT Equipment Make, Model Number, and other identifying information. (attach vendor or other information if warranted)			
13	Estimated Installation Cost ($) (material/installation labor/total)	Mtl.	Ins Lbr	Total
14	Proposed Installation Date			
15	Go to Page 2 of this form and justify the need for and provide details on the proposed installation of Alternate BACT.			

District Approval by: Date:

BACT Replacement Installed on: _____

Signed: _____ Print Name: _____

NOTE: Within 30 days of replacement installation, return this signed form to the District offices.

Rule 331 Alternate BACT Replacement Proposal Form

APCD Form: APCD-02B

Please answer the following questions in regards to the proposed Alternate BACT replacement (use separate paper if needed):

1. Describe why Rule 331 Candidate BACT replacement technology and performance standards (see Appendix 5.1) cannot be installed? Is it technically infeasible, unsafe, or otherwise infeasible?

_____

_____

2. Describe the proposed Alternate BACT technology:

_____

_____

3. Will Rule 331.H.1 prescribed OVA-based THC measurement techniques (excepting soap screening) be utilized to verify the leakage rate from this Alternate BACT equipment performance?
☐ Yes ☐ No If no, detail why not, and what is proposed for use on separate paper.

4. What is the proposed Leak Detection and Repair ("LDAR") threshold, if Rule 331.H.1 OVA inspection techniques are used:
_____ ppmv THC as methane

5. BACT Selection Process: How was this proposed Alternate BACT replacement selected (✓ one):

☐ Discussions with District staff: _____ on: _____
☐ Reviewed CAPCOA, or EPA BACT databases. BACT ID#: _____
☐ Vendor or Manufacturer recommendation (please attach all pertinent information)
☐ Other (please describe fully on separate pages)

6. BACT Effectiveness: Usually BACT is effective over all operating ranges and process throughputs for equipment that emit fugitive emissions. Check (✓) the appropriate response below:

☐ Yes, the proposed Alternate BACT replacement will be effective in all operations.
☐ No, the proposed Alternate BACT will not be effective in certain operations scenarios (describe all and why on separate pages).

7. Operating Constraints: Identify all process variable for which operating limits need to be set to ensure compliance with the proposed Alternate BACT performance standard.

_____

_____

_____

Rule 331 BACT Guidelines Revision Summary

Version	Date	Reason for Changes
1.0	1/18/94	Initial version.
2.0	7/24/98	Guidelines updated to reflect performance based standards, and more streamlined identification and installation documentation process.
2.1	3/17/99	Semi-annual review and update to guidelines. Several typographical errors were corrected. No changes to the Appendix 5.1, Candidate BACT listed technology were identified. Note: Users may use either the Revision 2.0 or 2.1 guidelines until a future revision indicates otherwise.
2.2	3/17/17	Amendments made to clarify BACT for low-emissions valves. BACT technologies and standard must be validated through API 624 certified valves equipped with the same packing used during the certification test, or API 622 certified graphite packing and manufacturer's emissions guarantee. Adding website link to BACT Guideline 1.2.