SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Rule 1109.1 Guidance Document

Implementation and Alternative Compliance Plans: I-Plan, B-Plan, and B-Cap



May 2022

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Introduction and Purpose

This document is intended to serve as guidance for the regulated facilities under Rule 1109.1 as they develop their plans, prepare to comply with Rule 1109.1, and prepare their alternative compliance plans. This document provides guidance on the regulatory compliance and implementation options allowed in Rule 1109.1. In addition, the document also addresses questions raised by the stakeholders to provide clarity on the requirements as facilities develop their specific plans for submittal. This document does not address the permitting process that an owner or operator must undertake to obtain an air quality permit. The intent of this document is to provide additional guidance on the rule requirements to help streamline plan approvals and is not intended to overrule the requirements in Rule 1109.1.

Background

Rule 1109.1 was adopted on November 5, 2021, to control NOx emissions and maintain CO emissions from sources at petroleum refineries and to facilitate the transition of petroleum refineries and facilities with related operations to petroleum refineries from the REgional Clean Air Incentives Market (RECLAIM) program to a command-and-control regulatory structure. The provisions of Rule 1109.1 are applicable to NOx emitting sources at petroleum refineries, petroleum coke calciners, sulfur recovery plants, asphalt plants, renewable fuels plant, hydrogen production plants, and sulfuric acid plants. The rule establishes NOx emission limits and regulates six major categories of equipment: boilers, flares, fluidized catalytic cracking (FCC) units, gas turbines, petroleum coke calciners, process heaters, steam methane reformer (SMR) heaters, sulfuric acid furnaces, sulfur recovery units/tail gas (SRU/TG) incinerators, and vapor incinerators. The rule sets NOx concentration limits for devices located at petroleum refineries and facilities with related operation. These NOx concentration limits are detailed in Table 1 and Table 2 of the rule. Table 1 NOx limits represent the Best Available Retrofit Control Technology (BARCT), and Table 2 conditional NOx limits reflect units for which it was not cost-effectiveness to retrofit to meet the Table 1 limits. In addition, the rule establishes provisions for monitoring, recordkeeping, and reporting, and provides several compliance implementation schedule options.

Rule 1109.1 includes two alternative compliance options for owners or operators with six or more units that provide an alternative to directly meeting the NOx concentration limits in Table 1 or Table 2 of the rule: BARCT Equivalent Compliance Plan (B-Plan) and BARCT Equivalent Mass Cap Plan (B-Cap). These alternative compliance options were developed to address the complexity of operations at petroleum refineries where achieving the NOx concentration limits may be more challenging for some units because new pollution control equipment must be integrated on existing units with limited plot space. The B-Plan is a compliance plan that allows an owner or operator to select “Alterative BARCT NOx Limits” for any or all units subject to the B-Plan that will achieve emission reductions that are greater in the aggregate than the mass emission reductions that would be achieved based on the NOx concentration limits in Rule 1109.1 Table 1 or Table 2. The B-Cap is a compliance plan that establishes a facility mass emission cap for all units subject to the B-Cap that, in the aggregate, is less than the emissions that would be achieved if the facility complied with the Rule 1109.1 Table 1 and Table 2 NOx limits.

In addition to the alternative compliance plans, Rule 1109.1 includes five different alternative implementation schedules or I-Plans. An I-Plan is a compliance plan that provides emission reduction targets and an alternative implementation schedule to the compliance schedule in paragraph (f)(1) of the rule which requires all permit applications for units that comply with Rule 1109.1 Table 1 to be submitted by July 1, 2023. Instead, the I-Plan allows refineries to implement projects within their turnaround schedules to minimize unplanned outages and operational disruptions. Staff consulted with refineries to develop the five I-Plan options, acceptable timeframes, and percent reductions. Each of the five I-Plan options specifies whether it is applicable to a B-Plan, a B-Cap, or meeting Table 1 and Table 2 NOx concentration limits. An I-Plan is required for facilities that elect to comply with either a B-Plan or a B-Cap or a facility that elects to have an alternative compliance schedule to the one outlined in paragraph (f)(1) of the rule for meeting Table 1 or Table 2 NOx concentration limits.

A separate document titled "Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated Under Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations" was also adopted by the South Coast AQMD Board as part of the Resolution on November 5, 2021. Pursuant to paragraph (h)(3) of the rule, the baseline NOx emissions and representative NOx concentrations for each facility by unit (listed by Device ID) approved by the South Coast AQMD shall be used for the plan calculations. This approach provides greater transparency and is expected to help expedite plan approvals.

Key Definitions used in B-Plan and B-Cap Calculation Sections

To provide further clarification, this section highlights key definitions of the rule that will be used in the B-Plan and B-Cap calculation sections of this document.

- ***ALTERNATIVE BARCT NOx LIMIT*** means a unit specific NOx concentration limit that is selected by an owner or operator of a facility for a B-Plan or B-Cap for Phase I, Phase II, or if applicable, Phase III of an I-Plan in Rule 1109.1 Table 6 – I-Plan Percent Reduction Targets of Required Reductions and Compliance Schedule. An Alternative BARCT NOx Limit is a concentration limit that meets the Best Available Retrofit Control Technology (BARCT) requirements in the aggregate
- ***BARCT B-CAP ANNUAL EMISSIONS*** means the sum of the mass emissions from the Unit B-Cap Annual Emissions for each phase of an I-Plan, that is based on the Alternative BARCT NOx Limits, decommissioned Units, and other emission reduction strategies to meet the respective Phase I, Phase II, or if applicable, Phase III Facility BARCT Emission Targets in an I-Plan as calculated pursuant to Attachment B of the rule.
- ***BARCT EQUIVALENT MASS EMISSIONS*** means the total Facility NOx mass emissions remaining in Phase I, Phase II, or if applicable, Phase III of an I-Plan option in Table 6 based on the Alternative BARCT NOx Limits, as calculated pursuant to Attachment B of this rule.
- ***BASELINE FACILITY EMISSIONS*** means the sum of all the Baseline Unit Emissions at a Facility, as calculated in Attachment B of Rule 1109.1.
- ***BASELINE UNIT EMISSIONS*** means emissions from a Unit as reported in the 2017 NOx Annual Emissions Report, or another representative year, as approved by the Executive Officer and included in "Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated Under Rule 1109.1 – Emissions of Oxides of

Nitrogen from Petroleum Refineries and Related Operations" pursuant to paragraph (h)(3) of Rule 1109.1.

- ***FACILITY BARCT EMISSION TARGET*** means the total remaining NOx mass emissions that are based on the Percent Reduction Targets in each phase of a Rule 1109.1 Table 6 I-Plan that are applied to the overall NOx emission reductions for the Units included in an approved B-Plan or B-Cap, as calculated pursuant to Attachment B of Rule 1109.1.
- ***FINAL PHASE FACILITY BARCT EMISSION TARGET*** means the total remaining NOx mass emissions that incorporates the NOx concentration limits in paragraph (h)(4) of Rule 1109.1 for all Units included in an I-Plan, B-Plan or B-Cap, calculated pursuant to Attachment B of this rule
- ***I-PLAN PERCENT REDUCTION TARGET*** means the percent reduction target for each phase of an I-Plan, as specified in Rule 1109.1 Table 6.
- ***OPTIONAL UNITS*** means any Boiler or Process Heater with a Rated Heat Input Capacity of less than 40 MMBtu/hour that will meet the NOx concentration limits pursuant to subparagraph (d)(2)(B) or (d)(2)(C) of Rule 1109.1.
- ***REPRESENTATIVE NOx CONCENTRATION*** means the most representative NOx emissions in the exhaust of a Unit as included in "Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated Under Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations" pursuant to paragraph (h)(3) of the rule.
- ***UNIT*** means, for the purpose of this rule, any Boilers, Flares, FCCUs, Gas Turbines, Petroleum Coke Calciners, Process Heaters, SMR Heaters, Sulfuric Acid Furnaces, SRU/TG Incinerators, or Vapor Incinerators that requires a South Coast AQMD permit and is not required to comply with a NOx concentration limit in another South Coast AQMD Regulation XI rule.
- ***UNIT BARCT B-CAP ANNUAL EMISSIONS*** means the remaining estimated annual NOx mass emissions for a Unit that is determined based on the Alternative BARCT NOx Limits, decommissioned Units, and other emission reduction strategies, as calculated pursuant to Attachment B of Rule 1109.1.
- ***UNIT REDUCTION*** means the potential NOx emission reduction for a unit if the NOx emissions for that Unit were reduced from the representative NOx concentration to the applicable NOx concentration limit in Rule 1109.1 Table 1 based on the Baseline Unit Emissions calculated pursuant to Attachment B of Rule 1109.1.

Section 1: B-Plan and I-Plan Requirements

A facility with six or more units may elect to comply with a B-Plan. The requirements for the B-Plan are included in paragraphs (g)(1) and (g)(2) of the rule and explained as follows:

Part 1.1: B-Plan and I-Plan Submittal Date

Paragraph (i)(1) for I-Plan and Paragraph (i)(2) for B-Plan

A facility that elects to use a B-Plan must submit the B-Plan and the I-Plan to the South Coast AQMD on or before September 1, 2022. The following items must be submitted:

- Three South Coast AQMD Forms:
  - 400-A, *Application Form for Permit or Plan Approval*, for I-Plan
  - 400-A, *Application Form for Permit or Plan Approval*, for Option with B-Plan or Option with Table 1 or Table 2 concentration limits
  - 400-A, *Application Form for Permit or Plan Approval*, for Title V Amendment
- The Rule 1109.1 B-Plan and I-Plan Submittal Checklists. These forms were developed by staff to provide a check list to ensure that facilities meet all the requirements of the B-Plan and the I-Plan. The plan submittal checklist form will need to be submitted in conjunction with the 400-A forms. The checklist is included in the Attachment section of this document and is available on the Rule 1109.1 homepage located under support documents. Link to the page is below:

  http://www.aqmd.gov/home/rules-compliance/compliance/1109-1/supportdocs

- The main component of the B-Plan is a spreadsheet the facilities will use to demonstrate that upon implementation of their plan, their emissions will be lower in the aggregate than if all the units met Table 1 or Table 2 NOx limits. South Coast AQMD provided each facility with an Excel spreadsheet that serves as the template for the B-Plan. The spreadsheet includes all units at the facility or facilities under common ownership subject to Rule 1109.1, the Device Identification Numbers (Device ID), whether units have combined stacks, the equipment category, size, and baseline unit emissions in tons per year, and representative NOx concentrations in ppmv. The baseline unit emissions and representative NOx concentrations were pre-populated with the representative NOx and baseline emissions as presented in the "Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated under Rule 1109.1" that was included in the Rule 1109.1 Governing Board Package.

Part 1.2: Submittal of a B-Plan and Approval or Disapproval

The facility that elects to implement an approved B-Plan must submit the B-Plan, I-Plan, and associated forms to the South Coast AQMD on or before September 1, 2022.

The Executive Officer will notify the facility in writing if the submitted plans are approved or disapproved. The plan approval will include a plan approval conditions and the compliance plan that has been submitted, reviewed, approved by U.S. EPA and included in Section I of the facility permit. Plans approval will be based on the criteria listed in paragraph (i)(4) of Rule 1109.1 and the steps previously outlined in this document. The submitted plans are subject to disapproval if any of the criteria are not met or there are any deficiencies in the submitted plans. If a plan is disapproved, a facility will have 45 days from the date of receiving written notification to correct the deficiencies and re-submit the plan (Rule 1109.1 paragraph (i)(5)).

If the facility receives a second written notification of disapproval, the facility must comply with the NOx limits in Table 1 or Table 2 of the rule based on the compliance schedule of the selected I-Plan option (Rule 1109.1 paragraph (i)(6)).

Public Notification of Pending Approval of an I-Plan, B-Plan, or B-Cap – Paragraph (i)(9)

The Executive Officer will make the plans or plan modifications available to the public on the South Coast AQMD website 30 days prior to approval. Purpose of this provision is to provide an opportunity for the public to view the plans prior to approval.

Part 1.3: Identify which Units will be included in the B-Plan

Subparagraph (g)(1)(B)

Under the B-Plan, facilities must include all units at the facility, with the option to exclude the following units:

- Optional units which are defined as boilers or process heaters with a rated heat input capacity of less than 40 MMBtu/hour that are required to meet the NOx concentration limits upon burner replacements (subparagraphs (d)(2)(B) and (d)(2)(C)). These units may be excluded from the B-Plan because the timing of burner replacement may fall outside the compliance schedule. A facility may opt to include these units by utilizing early adoption of the next generation ultra-low NOx burners. These reductions could be used to offset higher NOx limits on other units in the B-Plan.
- Units that will be decommissioned 54 months from the permit application submittal date of Phase I of the selected I-Plan. The B-Plan does not allow facilities to take emissions credit for decommissioned units pursuant to clause (g)(1)(B)(ii); however, units that will be decommissioned within the first phase of an I-Plan may be excluded from the plan, so the facility does not have to retrofit those units or offset the emissions.
- Units that are exempt from the NOx concentration limits because they are low-use including:
    - Low-use boilers less than 40 MMBtu/hr (Rule 1109.1 paragraph (o)(2));
    - Startup boilers or process heaters used only for an FCCU (Rule 1109.1 paragraph (o)(5));
    - Startup or shutdown boilers and process heaters at sulfuric acid plants using less than 90,000 MMBtu annually (Rule 1109.1 paragraph (o)(6));
    - Flares that emit less than or equal to 550 pounds of NOx per year (Rule 1109.1 paragraph (o)(8)); and
    - Vapor incinerators less than 2 MMBtu/hour emitting less than 100 pounds of NOx per year for unlimited exemption or less than 1,000 pound of NOx per year for limited exemption) (Rule 1109.1 paragraph (o)(9)).
- Boilers or process heaters less than or equal to 2 MMBtu/hr used for comfort heating cannot be included in the B-Plan as those units are subject to Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters.

Part 1.4: Select I-Plan Option

Paragraph (h)(2)

The facility must identify the I-Plan Option selection using the I-Plan Submittal Check list. The I-Plan must include all the units included in the accompanying B-Plan. The main component of the

I-Plan is the same spreadsheet the facilities used to develop the B-Plan which will also be used to demonstrate compliance with each phase of the selected I-Plan.

The following are the I-Plan options available to a facility that elects to comply with either Table 1 and Table 2 limits or a B-Plan:

- A facility that elects to comply with Table 1 and Table 2 limits instead of a B-Plan or a B-Cap, may select either I-Plan Option 1 or Option 5.
- A facility that elects to comply with B-Plan may select either I-Plan Option 1, 2, 3, or 5.

I-Plan Option 2 and Option 3 are only available to a facility that is achieving a NOx emission rate of less than 0.02 pound per million BTU of heat input for all the boilers and process heaters greater than or equal to 40 MMBtu/hour or any boiler or process heater less than 40 MMBtu/hours that operates with a certified CEMS. The facility would be required to perform a one-time demonstration that their applicable boilers and process heaters meet the 0.02 pound per million BTU emission rate based on the 2021 annual emissions for those units as reported in the 2021 Annual Emissions Report (Rule 1109.1 subparagraph (h)(2)(E)).

One-Time Eligibility Demonstration for I-Plan Option 2 or Option 3

A facility shall conduct a one-time eligibility demonstration for I-Plan Option 2 or Option 3 using the calculation methodology below:

1. **Hourly Mass Emissions (pounds/hour)** is calculated by summing the 2021 annual emissions as reported in the facility's South Coast AQMD Annual Emissions Reports of all boilers and process heaters greater than or equal to 40 MMBtu/hour, divided by 8,760 hours.
2. **Combined Maximum Rated Heat Input Capacity (MMBtu/hour**) is calculated by summing the maximum rated heat input capacity based on a 24-hour average or one-hour average, whichever is lower for all boilers and process heaters with a rated heat input capacity of greater than or equal to 40 MMBtu/hour.
3. **NOx Emission Rate (pounds/MMBtu)** eligibility is calculated by dividing the Hourly Mass Emissions calculated from (1) by the Combined Maximum Rated Heat Input Capacity in calculated in (2) to determine if the NOx emission rate is less than 0.02 pounds per million BTU.

Table 6 in the rule includes the following key elements of the each of the I-Plan options:

- "Percent Reduction Targets" are the percent reduction for each phase of the selected I-Plan that are applied to the total reductions calculated in step seven below;
- "Permit Application Submittal Date" is the date that permit application must be submitted to establish the NOx Limit; and
- "Compliance Schedule" is the timeframe the facility must meet the NOx Limit for each Phase.

Table 1: I-Plan Percent Reduction Targets of Required Reductions and Compliance Schedule

I-Plan Option	Key Elements	Phase I	Phase II	Phase III
I-Plan Option 1 for B-Plan or Concentration Limits in Table 1 or Table 2	**Percent Reduction Targets**	**80**	**100**	**N/A**
	Permit Application Submittal Date	January 1, 2023	January 1, 2031	N/A
	Compliance Schedule	No later than 36 months after a Permit to Construct is issued		N/A
I-Plan Option 2 for B-Plan Only pursuant to subparagraph (h)(2)(E)	**Percent Reduction Targets**	**65**	**100**	**N/A**
	Permit Application Submittal Date	July 1, 2024	January 1, 2030	N/A
	Compliance Schedule	No later than 36 months after a Permit to Construct is issued		N/A
I-Plan Option 3 for B-Plan or B-Cap pursuant to subparagraph (h)(2)(E)	**Percent Reduction Targets**	**40**	**100**	**N/A**
	Permit Application Submittal Date	July 1, 2025	July 1, 2029	N/A
	Compliance Schedule	No later than 36 months after a Permit to Construct is issued		N/A
	B-Cap Effective Date of the Facility BARCT Emission Target	January 1, 2030	January 1, 2034	N/A
I-Plan Option 4 for B-Cap Only	**Percent Reduction Targets**	**50**	**80**	**100**
	Permit Application Submittal Date	N/A	January 1, 2025	January 1, 2028
	Compliance Schedule	January 1, 2024	No later than 36 months after a Permit to Construct is issued	
	B-Cap Effective Date of the Facility BARCT Emission Target	January 1, 2024	July 1, 2029	July 1, 2032
I-Plan Option 5 for B-Plan Only or Concentration Limits in Table 1 or Table 2	**Percent Reduction Targets**	**50**	**70**	**100**
	Permit Application Submittal Date	January 1, 2023	January 1, 2025	July 1, 2028
	Compliance Schedule	No later than 36 months after a Permit to Construct is issued		

Part 1.5: B-Plan Calculations

Subparagraph (g)(1)(C)

The facilities must determine BARCT Equivalent Mass Emissions for each unit pursuant to Attachment B of the rule. To do this, the facility must first determine which units must comply with Table 1 NOx limits and which units qualify for Table 2 NOx limits. Below is a step-by-step example of how to perform the calculations for the B-Plan.

Step One: Baseline Facility Emissions

The first step is to establish the Baseline Facility Emissions. The B-Plan Spreadsheet will already be populated with the baseline unit emissions. Those emission are based on the *Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated under Rule 1109.1* document. Once the facility identifies the units that will be included in the B-Plan, they will sum the *Baseline Unit Emissions* column.

Example Calculation

Table 1. Calculating the Baseline Facility Total

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)
D1	D1	Heater	320	245	100
D2	D2	Boiler	210	126	38
D3	D3	SMR Heater	450	97	48
D4	D4	FCCU		83	11
D5	D5	Heater	290	54	18
D6	D6	Heater	135	29	33
D7	D7	Heater	80	24	65
D8	D8	Heater	67	14	48
D9	D9	Heater	108	12	22
D10	D10	Boiler	330	11	10
D11	D11 and D12	Heater	75	8	16
D12	D11 and D12	Heater	75	8	16
D13	D13	Heater	64	3	8
D14	D14	Thermal Oxidizer	4	3	43
D15	D15	Heater	17	3	12
D16	D16	Sulfur Recovery Unit	40	10	35
Baseline Facility Emissions			Baseline Facility Emissions	730	

Step Two: Remaining Emissions

The B-Plan Spreadsheets supplied to the facilities includes columns with the Table 1 limits and remaining NOx emissions, Table 2 limits, if applicable, and remaining emissions, and a column indicating the eligibility for each unit to use Table 2 limits. Note that not all equipment categories have Table 2 NOx limits and therefore it shows as N/A. The calculations have already been completed in the spreadsheet. An example is provided below:

$$\sum_{i=1}^{N}\left(\frac{C_{\text{Table 1 or Table 2}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions}\right)_i$$

Where:

N = Number of included Units in B-Plan

$C_{\text{Table 1 or Table 2}}$ = The applicable NOx Concentration Limit in Table 1 or Table 2 for each Unit i included in B-Plan

C_{Baseline} = Representative NOx Concentration as defined in subdivision (c) for Unit i included in B-Plan

Baseline Unit Emissions = Baseline Unit Emissions for Unit i as defined in subdivision (c) and included in the I-Plan, B-Plan as determined pursuant to section (B-1).

Example Calculation

The NOx emissions are calculated first assuming the unit meets Table 1 limits, and then calculated assuming the unit meets Table 2 limits. The Baseline Unit emissions are ratioed by the Table 1 or Table 2 NOx concentration to the representative NOx concentration in the *Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated under Rule 1109.1* document.

Table 1 and Table 2 Remaining Emissions

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions Tons/Year)	PR 1109.1 Table 2 NOx	PR 1109.1 Table 2 Remaining Emissions Tons/Year)
D1	D1	Heater	320	245	100	5.0	12.3	22.0	53.9
D2	D2	Boiler	210	126	38	5.0	16.6	7.5	24.9
D3	D3	SMR Heater	450	97		5.0			15.2
D4	D4	FCCU		83		5.0			60.4
D5	D5	Heater	290	54		5.0			66.0
D6	D6	Heater	135	29		5.0			19.3
D7	D7	Heater	80	24	65	5.0	1.8	18.0	6.6
D8	D8	Heater	67	14	48	5.0	1.5	18.0	5.3
D9	D9	Heater	108	12	22	5.0	2.7	18.0	9.6
D10	D10	Boiler	330	11	10	5.0	5.5	7.5	8.3
D11	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0
D12	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0
D13	D13	Heater	64	3	8	5.0	1.9	18.0	6.8
D14	D14	Thermal Oxidizer	4	3	43	30.0	2.1	40.0	2.8
D15	D15	Heater	17	3	12	9.0	2.3	N/A	N/A
D16	D16	Sulfur Recovery Unit	40	10	35	30.0	8.6	N/A	N/A
Baseline Facility Emissions				**730**					

NOx Emissions if Unit Meets 5 ppmv

NOx Emissions if Unit Meets 22

(Table 1 Limit/Representative NOx)*Baseline Unit Emissions) (5/100)*245)= 12.3 tons/year

(Table 2 Limit/Representative NOx)*Baseline Unit Emissions) (22/100)*245)= 53.9 tons/year

Step Three: Eligibility for Table 2 Conditional NOx Limit

Final Phase Facility BARCT Emissions Target that a facility must meet is based on if the individual units is subject to Table 1 NOx limits or if it qualifies for Table 2 Conditional Limits. There are two pathways that an operator can take to qualify for the Conditional Limits in Table 2.

The first pathway is for units that are identified in Table D-1 of Attachment D of the rule. Any unit listed in Table D-1 is "pre-qualified" and the facility owner or operator could calculate their Final Phase Facility BARCT Emission Target using the Conditional NOx Limits for these units. Table D-1 is the only "pre-qualified" list for a facility using a B-Plan or facilities using I-Plan Option 3 with B-Cap and includes boilers and process heater greater than or equal to 40 MMBtu/hour. Table D-2 only applies to facilities using I-Plan Option 4 with a B-Cap. Note: further information on the B-Cap is discussed in Section 2 of this Guidance Document.

The second pathway is that the operator demonstrates that the unit meets the conditional concentration limits requirements listed in Rule 1109.1 paragraph (d)(3) and submits a permit application on or before June 1, 2022 for a permit condition to limit the NOx to not exceed the applicable conditional NOx Concentration Limit (Rule 1109.1 subparagraph (f)(3)(A)). The conditions listed in paragraph (d)(3) include:

- A permit to construct for post combustion control, e.g., permit for a new SCR, was not issued after December 4, 2015;
- For process heaters with rated heat input between 40 to 110 MMBtu/hour, the potential emission reduction, referred to as the Unit Reduction, must be less than 10 tons per year (*see calculation formula below*);
- For process heaters with a rated heat input greater than 110 MMBtu/hour, the potential emission reduction, referred to as the Unit Reduction, must be less than 20 tons per year (*see calculation formula below*);
- The unit must not have an existing permit limit at or below the Table 1 NOx limit;
- The unit must not be operating at or below the Table 1 limit based on the representative NOx concentration listed in the Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated under Rule 1109.1; and
- The unit is not identified as being decommissioned.

There are two requirements regarding the Alternative BARCT Limit for units that are eligible for conditional limits that staff would like to note:

1. The Alternative NOx Limit for a unit that qualifies for the conditional limit based on the second pathway listed above must be determined at or below the corresponding NOx limit in Table 2. The Alternative NOx Limit cannot exceed the Table 2 limit pursuant to subparagraph (g)(1)(C). Units that are eligible for conditional limits based on Table D-1 may exceed the NOx limit in Table 2.
2. Regarding the plan review and approval, South Coast AQMD staff will only be verifying and evaluating a unit's *eligibility* for Table 2 conditional NOx limit based on the requirements in paragraph (d)(3) or inclusion in Table D-1 of Attachment D. There will be a separate evaluation conducted during the permitting process at which time the facility may also be required to submit technical data to confirm the unit's ability to meet the facility's selected Alternative NOx Concentration Limit. Technical data submitted may include one or more of the following, but is not limited to:

- Up to 12 months of operational data such as CEMS, source test data, and any emissions data associated with the unit;
- Less than 12 months of operational data may be acceptable if the unit has been tuned or upgraded within those 12 months;
- Design specifications that include engineering design calculations, documents, and diagrams which further substantiate the unit's eligibility;
- Manufacturer or vendor guarantees that the change or modification to the unit will meet the selected Table 2 conditional limit; and
- Further supporting technical data may also be requested at the time of permitting.

A Facility with a unit in a B-Plan demonstrating that the Unit Reduction is less than the thresholds pursuant to Rule 1109.1 subparagraphs (d)(3)(B) and (d)(3)(C) shall calculate the Unit Reduction using the following equation:

$$\text{Unit Reduction} = \left(1 - \frac{C_{\text{Table 1}}}{C_{\text{Baseline}}}\right) \times \text{Baseline Unit Emissions}$$

Where:

$C_{\text{Table 1}}$ = The applicable NOx Concentration Limit in Table 1 for the Unit

C_{Baseline} = Representative NOx Concentration for the Unit

Baseline Unit Emissions = Baseline Unit Emissions.

Example Calculation

The Unit with device identification number "D1" has potential emission reductions of 232.7 tons/year (i.e., '245 tons/year baseline - 12.3 tons/year remaining') once meeting Table 1 NOx Limit which is greater than 20 tons/year. Thus, it will be flagged as "Not Eligible" in the B-Plan Spreadsheet.

Eligibility for Table 2 Conditional Limits

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions (Tons/Year)	PR 1109.1 Table 2 NOx Limit (ppmv)	PR 1109.1 Table 2 Remaining Emissions (Tons/Year)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)
D1	D1	Heater	320	245	100	5.0	12.3	22.0	53.9	Not Eligible, Red > 20 TPY
D2	D2	Boiler	210	126	38	5.0	16.6	7.5	24.9	Not Eligible, Red > 20 TPY
D3	D3	SMR Heater	450	97	48	5.0	10.1	7.5		Not Eligible, Red > 20 TPY
D4	D4	FCCU		83	11	2.0	15.1	8.0		Possibly Eligible
D5	D5	Heater	290	54	18	5.0				Possibly Eligible
D6	D6	Heater	135	29	33	5.0				t Eligible, Red > 20 TPY
D7	D7	Heater	80	24	65	5.0	1.8	18.0	6.6	Not Eligible, Red > 10 TPY
D8	D8	Heater	67	14	48	5.0	1.5	18.0	5.3	Not Eligible, Red > 10 TPY
D9	D9	Heater	108	12	22	5.0	2.7	18.0	9.6	Possibly Eligible
D10	D10	Boiler	330	11	10	5.0	5.5	7.5	8.3	Possibly Eligible
D11	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Possibly Eligible
D12	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Eligible
D13	D13	Heater	64	3	8	5.0	1.9	18.0	6.8	Eligible
D14	D14	Thermal Oxidizer	4	3	43	30.0	2.1	40.0	2.8	Possibly Eligible
D15	D15	Heater	17	3	12	9.0	2.3	N/A	N/A	No Table 2 Limit
D16	D16	Sulfur Recovery Unit	40	10	35	30.0	8.6	N/A	N/A	No Table 2 Limit
Baseline Facility Emissions				**730**						

245 tons/year -12.3 tons/year = 232.8 tons/year
Not Eligible, 232.8>20 tons/year

Step Four: Optional Units NOx limit

If a facility elects to include any of the "optional units", e.g., boilers and heaters less than 40 MMBtu/hour in their B-Plan, the following NOx limits must be used for establishing the phase target (paragraphs (h)(4)(C) through (h)(4)(E)):

- 5 ppmv for boilers <40 MMBtu/hour
- 40 ppmv for process heaters <40 MMBtu/hour if the unit is achieving greater than or equal to 75 ppmv based on the baseline, provided:
  - The units must be included in Phase I of an I-Plan
  - No additional NOx reductions will be applied to the Facility BARCT Emission Target in a later phase of the I-Plan
- 9 ppmv for process heaters <40 MMBtu/hour if the unit is achieving less than 75 ppmv

Step Five: NOx Limits to Determine the Facility BARCT Target

In step five, the facility must select either Table 1 or Table 2 NOx limits based on eligibility in column L of the spreadsheet. Staff will verify that the units identified as Table 2 meet the conditions by either being listed in Table D-1 or that a complete permit application was submitted by June 1, 2022, and the unit meets the conditions under Rule 1109.1 paragraph (d)(3).

Note on Selecting the NOx Limit for the Gas Turbine Category

For the gas turbine category, Rule 1109.1 has two different NOx limits: 2 ppmv NOx for units that operate on natural gas and 3 ppmv for units that operate on any other gaseous fuels. There is also a conditional limit of 2.5 ppmv for units that operate on natural gas. Facilities that operate gas turbines on any fuel other than natural gas would be subject to the 3 ppmv limit when calculating the Facility BARCT Target. Facilities that operate on natural gas would be subject to 2 ppmv unless they qualify for the Table 2 conditional limit.

Most gas turbines located at a petroleum refinery have a duct burner venting to a common stack that is connected downstream. The duct burner is used for supplementary firing to increase the heat energy of the gas turbine exhaust and uses a small fraction of the fuel that is combusted in the gas turbine and have much lower NOx emissions. The NOx limits for the gas turbine category were based on the BARCT assessment for the gas turbines; therefore, if a gas turbine is permitted to combust natural gas but the duct burner is permitted to combust different fuels, the natural gas limit applies to that unit and would be used when calculating the Facility BARCT Target. The following summarizes the gas turbine NOx limits the facility must use when calculating the Facility BARCT Target:

- 3 ppm, if the gas turbine is permitted to operate on multiple fuels such as refinery gas, natural gas, propane, butane, pentanes, and/or combination of fuels regardless of the fuel permitted for the duct burner (if applicable);
- 2 ppm, if the gas turbine is permitted to operate strictly on natural gas regardless of the fuel permitted for the duct burner (if applicable); and
- 2.5 ppm, if the gas turbine is permitted to operate strictly on natural gas and meets the conditions specified in Rule 1109.1 paragraph (d)(3) for Table 2 conditional limits.

Example Calculation

The owner identifies four process heaters (D9, D11, D12 and D13), the FCCU (D4), and a Thermal Oxidizer (D14) as potential devices that qualify for Table 2 NOx limits. Therefore, the emissions of these units in the Final Phase Facility BARCT Emission Target are based on emissions reduction from these units to meet the applicable limits in Rule 1109.1 Table 2.

Calculating the Remaining Emissions Based on Table 1 or, if Eligible, Table 2

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions (Tons/Year)	PR 1109.1 Table 2 NOx Limit (ppmv)	PR 1109.1 Table 2 Remaining Emissions (Tons/Year)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(3))	NOx Lmit Based Selected Table 1 or Table 2 Limits (ppmv)	Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)
D1	D1	Heater	320	245	100	5.0	12.3	22.0	53.9		Table 1	5.0	12.3
D2	D2	Boiler	210	126	38	5.0	16.6	7.5	24.9		Table 1	5.0	16.6
D3	D3	SMR Heater	450	97	48	5.0	10.1	7.5	15.2		Table 1	5.0	10.1
D4	D4	FCCU		83	11	2.0	15.1	8.0	60.4		Table 2	8.0	60.4
D5	D5	Heater	290	54	18	5.0	15.0	22.0	66.0				15.0
D6	D6	Heater	135	29	33	5.0	4.4	22.0	19.3	Not Eligible, Red > 20 TPY			4.4
D7	D7	Heater	85	24	65	5.0	1.8	18.0	6.6	Not Eligible, Red > 10 TPY			1.8
D8	D8	Heater	67	14	48	5.0	1.5	18.0	5.3	Not Eligible, Red > 10 TPY			1.5
D9	D9	Heater	108	12	22	5.0	2.7	18.0	9.6	Possibly Eligible	Table 2	18.0	9.6
D10	D10	Boiler	330	11	10	5.0	5.5	7.5	8.3	Possibly Eligible	Table 1	5.0	5.5
D11	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Possibly Eligible	Table 2	18.0	9.0
D12	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Eligible	Table 2	18.0	9.0
D13	D13	Heater	64	3	8	5.0	1.9	18.0	6.8	Eligible	Table 2	18.0	6.8
D14	D14	Thermal Oxidizer	4	3	43	30.0	2.1	40.0	2.8	Possibly Eligible	Table 1	30.0	2.1
D15	D15	Heater	17	3	12	9.0	2.3	N/A	N/A	No Table 2 Limit	Table 1	9.0	2.3
D16	D16	Sulfur Recovery Unit	40	10	35	30.0	8.6	N/A	N/A	No Table 2 Limit	Table 1	30.0	8.6
Baseline Facility Emissions				730									175.0

Initial Screening Based on Unit Reductions Only - Must Verify Other Conditions Met

Remaining NOx Based on Table 1 or, if eligible, Table 2

PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions (Tons/Year)	PR 1109.1 Table 2 NOx Limit (ppmv)	PR 1109.1 Table 2 Remaining Emissions (Tons/Year)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(3))	NOx Lmit Based Selected Table 1 or Table 2 Limits (ppmv)	Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)
5.0	12.3	22.0	53.9		Table 1	5.0	12.3
5.0	16.6	7.5	24.9		Table 1	5.0	16.6
5.0	10.1	7.5	15.2		Table 1	5.0	10.1
2.0	15.1	8.0	60.4		Table 2	8.0	60.4
5.0	15.0	22.0	66.0				15.0
5.0	4.4	22.0	19.3	Not Eligible, Red > 20 TPY			4.4
5.0	1.8	18.0	6.6	Not Eligible, Red > 10 TPY			1.8
5.0	1.5	18.0	5.3	Not Eligible, Red > 10 TPY			1.5
5.0	2.7	18.0	9.6	Possibly Eligible	Table 2	18.0	9.6
5.0	5.5	7.5	8.3	Possibly Eligible	Table 1	5.0	5.5
5.0	2.5	18.0	9.0	Possibly Eligible	Table 2	18.0	9.0
5.0	2.5	18.0	9.0	Eligible	Table 2	18.0	9.0
5.0	1.9	18.0	6.8	Eligible	Table 2	18.0	6.8
30.0	2.1	40.0	2.8	Possibly Eligible	Table 1	30.0	2.1
9.0	2.3	N/A	N/A	No Table 2 Limit	Table 1	9.0	2.3
30.0	8.6	N/A	N/A	No Table 2 Limit	Table 1	30.0	8.6
							175.0

Step Six: Facility Target

Once the facility selects Table 1 or Table 2 NOx limits, they sum "Remaining Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)" (column O) to determine the Final Phase Facility BARCT Emission Target. The equation is B-2 in Attachment B of the rule and included below:

$$\text{Final Phase Facility BARCT Emission Target} = \sum_{i=1}^{N} \left(\frac{C_{\text{Table 1 or Table 2}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions} \right)_i$$

Where:

N	=	Number of included Units in B-Plan or B-Cap
$C_{\text{Table 1 or Table 2}}$	=	The applicable NOx Concentration Limit in Table 1 or Table 2 for each Unit i included in B-Plan or B-Cap
C_{Baseline}	=	Representative NOx Concentration as defined in subdivision (c) for Unit i included in B-Plan or B-Cap
Baseline Unit Emissions	=	Baseline Unit Emissions for Unit i as defined in subdivision (c) and included in the I-Plan, B-Plan or B-Cap as determined pursuant to section (B-1).

Example Calculation

For this example, the Final Phase Target is 175 tons per year

Calculating Facility Final Phase Target

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions (Tons/Year)	PR 1109.1 Table 2 NOx Limit (ppmv)	PR 1109.1 Table 2 Remaining Emissions (Tons/Year)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(3))	NOx Limit Based Selected Table 1 or Table 2 Limits (ppmv)	Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)
D1	D1	Heater	320	245	100	5.0	12.3	22.0	53.9	Not Eligible, Red > 20 TPY	Table 1	5.0	12.3
D2	D2	Boiler	210	126	38	5.0	16.6	7.5	24.9	Not Eligible, Red > 20 TPY	Table 1	5.0	16.6
D3	D3	SMR Heater	450	97	48	5.0	10.1	7.5	15.2	Not Eligible, Red > 20 TPY	Table 1	5.0	10.1
D4	D4	FCCU		83	11	2.0	15.1	8.0	60.4	Possibly Eligible	Table 2	8.0	60.4
D5	D5	Heater	290	54	18	5.0	15.0	22.0	66.0	Possibly Eligible	Table 1	5.0	15.0
D6	D6	Heater	135	29	33	5.0	4.4	22.0	19.3	Not Eligible, Red > 20 TPY	Table 1	5.0	4.4
D7	D7	Heater	80	24	65	5.0	1.8	18.0	6.6	Not Eligible, Red > 10 TPY	Table 1	5.0	1.8
D8	D8	Heater	67	14	48	5.0	1.5	18.0	5.3	Not Eligible, Red > 10 TPY	Table 1	5.0	1.5
D9	D9	Heater	108	12	22	5.0	2.7	18.0	9.6	Possibly Eligible	Table 2	18.0	9.6
D10	D10	Boiler	330	11	10	5.0	5.5	7.5	8.3	Possibly Eligible	Table 1	5.0	5.5
D11	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Possibly Eligible	Table 2	18.0	9.0
D12	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Eligible	Table 2	18.0	9.0
D13	D13	Heater	64	3	8	5.0	1.9	18.0	6.8	Eligible	Table 2	18.0	6.8
D14	D14	Thermal Oxidizer	4	3	43	30.0	2.1	40.0	2.8	Possibly Eligible	Table 1	30.0	2.1
D15	D15	Heater	17	3	12	9.0	2.3	N/A	N/A	No Table 2 Limit	Table 1	9.0	2.3
D16	D16	Sulfur Recovery Unit	40	10	35	30.0	8.6	N/A	N/A	No Table 2 Limit	Table 1	30.0	8.6
Baseline Facility Emissions		Facility Baseline		730							Facility Final Phase Target		175.0

Step Seven: Facility Emission Reductions

The Total Facility NOx Emission Reductions are the difference between the Baseline Facility Emissions and the Final Phase Facility BARCT Emission Target. The equation is B-3.1 of Attachment B of the rule and is included below:

$$\text{Total Facility NOx Emission Reductions} = \text{Baseline Facility Emissions} - \text{Final Phase Facility BARCT Emission Target}$$

Example Calculation

Based on the calculated Baseline Emissions (section B-1) and Final Phase Facility BARCT Emission (section B-2) for this example, the Facility Total NOx Emission Reductions is: 555.0 tons/year (730 tons/year – 175.0 tons/year).

Facility Total NOx Emission Reductions

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (tons/yr)	Representative NOx (ppmv)	PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions (tons/yr)	PR 1109.1 Table 2 NOx Limit (ppmv)	PR 1109.1 Table 2 Remaining Emissions (tons/yr)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(3))	Remaining Emissions Based on Selected Table 1 or Table 2 Limits (tons/yr)
D1	D1	Heater	320	245	100	5.0	12.3	22.0	53.9		Table 1	12.3
D2	D2	Boiler	210	126	38	5.0	16.6	7.5	24.9	Not Eligible, Red > 20 TPY	Table 1	16.6
D3	D3	SMR Heater	450	97	48	5.0	10.1	7.5	15.2	Not Eligible, Red > 20 TPY	Table 1	10.1
D4	D4	FCCU		83	11	2.0	15.1	8.0	60.4	Possibly Eligible	Table 2	60.4
D5	D5	Heater	290	54	18	5.0	15.0	22.0	66.0	Possibly Eligible	Table 1	15.0
D6	D6	Heater	135	29	33	5.0	4.4	22.0	19.3	Not Eligible, Red > 20 TPY	Table 1	4.4
D7	D7	Heater	80	24	65	5.0	1.8	18.0	6.6	Not Eligible, Red > 10 TPY	Table 1	1.8
D8	D8	Heater	67	14	48	5.0	1.5	18.0	5.3	Not Eligible, Red > 10 TPY	Table 1	1.5
D9	D9	Heater	108	12	22	5.0	2.7	18.0	9.6	Possibly Eligible	Table 2	9.6
D10	D10	Boiler	330	11	10	5.0	5.5	7.5	8.3	Possibly Eligible	Table 1	5.5
D11	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Possibly Eligible	Table 2	9.0
D12	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Eligible	Table 2	9.0
D13	D13	Heater	64	3	8	5.0	1.9	18.0	6.8	Eligible	Table 2	6.8
D14	D14	Thermal Oxidizer	4	3	43	30.0	2.1	40.0	2.8	Possibly Eligible	Table 1	2.1
D15	D15	Heater	17	3	12	9.0	2.3	N/A	N/A	No Table 2 Limit	Table 1	2.3
D16	D16	Sulfur Recovery Unit	40	10	35	30.0	8.6	N/A	N/A	No Table 2 Limit	Table 1	8.6
Baseline Facility Emissions				730								175.0

Total Facility NOx Emission Reductions
730 tons/year - 175.7 tons/year = 555 tons/year

Step Eight: Phase I, Phase II and Phase III BARCT Emission Target

The next step is to calculate the Facility BARCT Emission Target for each phase of the selected I-Plan option. The I-Plan percent reduction is applied to the total Facility Emission Reduction calculated in step seven using the equation B-4 in Attachment B of the rule and is included below:

$$\text{Phase I Facility BARCT Emission Target}_{\text{B-Plan}} = \text{Baseline Emissions} - (\text{Phase I Percent Reduction Target} \times \text{Total Facility NOx Emission Reductions})$$

Example Calculation

If the owner chooses to proceed with an I-Plan Option 1, there are two phases, and the Phase I emission reduction target is 70%. The Phase I BARCT Emission Target calculations will be as follows:

Phase I Facility BARCT Emission Target$_{B-Plan}$ = 730 − (555 × 0.7) = 341.5 tons/year

Phase II (Final Phase) Facility BARCT Emission Target$_{B-Plan}$ = 175.0 tons/year

Step Nine: Alternative BARCT NOx Limits

In the next step, the facility must select Alternative BARCT NOx Limits for each unit in the B-Plan. Facilities must ensure that the Alternative BARCT NOx Limits, in the aggregate, achieve at least the same emission reductions as if they were complying with Table 1 and Table 2 for all units in the B-Plan. The calculation to demonstrate that equivalency is included in Step Twelve.

There are further requirements on the Alternative BARCT NOx limits for units that qualify for conditional limits:

- For units that are "pre-qualified" for Conditional Table 2 limits (e.g., the units listed in Table D-1 of Attachment D of the rule), the Alternative BARCT NOx Limits can exceed the Table 2 Conditional NOx provided that the emissions in aggregate are below the Phase Facility BARCT Emission Target.
- For units that are not "pre-qualified" for Conditional Table 2 limits (e.g., units the meet the conditions of Rule 1109.1 paragraph (d)(3) and the facility submitted a permit by June 1, 2022), the Alternative BARCT NOx Limit cannot exceed the Table 2 NOx Concentration Limit pursuant to subparagraph (g)(1)(C).

Step Ten: BARCT Equivalent Mass Emissions

The methodology for calculating the BARCT Equivalent Mass Emissions is presented in Attachment B of the rule.

$$\text{Alternative NOx Equivalent Mass Emissions}_{\text{B-Plan}} = \sum_{i=1}^{N} \left(\frac{C_{\text{Alternative NOx Limit}} \; \boldsymbol{OR} \; C_{\text{Baseline}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions} \right)_i$$

Where:

N	=	Number of included Units in B-Plan
$C_{\text{Alternative NOx Limit}}$	=	The applicable Alternative BARCT NOx Limit for an approved B-Plan for unit i included in the B-Plan
C_{Baseline}	=	The representative NOx Concentration for unit i included in the B-Plan
Baseline Unit Emissions	=	The 2017 NOx baseline emissions for unit i included in the B-Plan

Example Calculation

After a facility selects an alternative NOx limit for each of the units, the facility calculates the equivalent mass emissions using the equation (B-6) in Attachment B of the rule. The facility then demonstrates that the equivalent remaining emissions using the alternative NOx limit is less than the final facility target.

Demonstrating Equivalent Remaining Mass Emissions

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions (Tons/Year)	PR 1109.1 Table 2 NOx Limit (ppmv)	PR 1109.1 Table 2 Remaining Emissions (Tons/Year)	Units Possibly Eligible for Conditional Limit Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for Conditions)	Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(3))	NOx Limit Based Selected Table 1 or Table 2 Limits (ppmv)	Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)	Phase II Alternative BARCT Emission Limit (ppmv)	Phase II BARCT Equivalent Emissions (Tons/Year)
D1	D1	Heater	320	245	100	5.0	12.3	22.0	53.9	Not Eligible, Red > 20 TPY	Table 1	5.0	12.3	5.0	12.3
D2	D2	Boiler	210	126	38	5.0	16.6	7.5	24.9	Not Eligible, Red > 20 TPY	Table 1	5.0	16.6	5.0	16.6
D3	D3	SMR Heater	450	97	48	5.0	10.1	7.5	15.2	Not Eligible, Red > 20 TPY	Table 1	5.0	10.1	10.0	20.2
D4	D4	FCCU		83	11	2.0	15.1	8.0	60.4	Possibly Eligible	Table 2	8.0	60.4	7.0	52.8
D5	D5	Heater	290	54	18	5.0	15.0	22.0	66.0	Possibly Eligible	Table 1	5.0	15.0	6.0	18.0
D6	D6	Heater	135	29	33	5.0	4.4	22.0	19.3	Not Eligible, Red > 20 TPY	Table 1	5.0	4.4	4.0	3.5
D7	D7	Heater	80	24	65	5.0	1.8	18.0	6.6	Not Eligible, Red > 10 TPY	Table 1	5.0	1.8	9.0	3.3
D8	D8	Heater	67	14	48	5.0	1.5	18.0	5.3	Not Eligible, Red > 10 TPY	Table 1	5.0	1.5	9.0	2.6
D9	D9	Heater	108	12	22	5.0	2.7	18.0	9.6	Possibly Eligible	Table 2	18.0	9.6	18.0	9.6
D10	D10	Boiler	330	11	10	5.0	5.5	7.5	8.3	Possibly Eligible	Table 1	5.0	5.5	8.0	8.8
D11	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Possibly Eligible	Table 2	18.0	9.0	12.0	6.0
D12	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Eligible	Table 2	18.0	9.0	20.0	10.0
D13	D13	Heater	64	3	8	5.0	1.9	18.0	6.8	Eligible	Table 2	18.0	6.8	8.0	3.0
D14	D14	Thermal Oxidizer	4	3	43	30.0	2.1	40.0	2.8	Possibly Eligible	Table 1	30.0	2.1	10.0	0.7
D15	D15	Heater	17	3	12	9.0	2.3	N/A	N/A	No Table 2 Limit	Table 1	9.0	2.3	9.0	2.3
D16	D16	Sulfur Recovery Unit	40	10	35	30.0	8.6	N/A	N/A	No Table 2 Limit	Table 1	30.0	8.6	14.0	4.0
Baseline Facility Emissions		Facility Baseline		730							Facility Final Phase Target		175.0	Equivalent Remaining Emissions	173.8

Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(3))	NOx Lmit Based Selected Table 1 or Table 2 Limits (ppmv)	Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)	Phase II Alternative BARCT Emission Limit (ppmv)	Phase II BARCT Equivalent Emissions (Tons/Year)
Table 1	5.0	12.3	5.0	12.3
Table 1	5.0	16.6	5.0	16.6
Table 1	5.0	10.1	10.0	20.2
Table 2	8.0	60.4	7.0	52.8
Table 1	5.0	15.0	6.0	18.0
Table 1	5.0	4.4	4.0	3.5
Table 1	5.0	1.8	9.0	3.3
Table 1	5.0	1.5	9.0	2.6
Table 2	18.0	9.6	18.0	9.6
Table 1	5.0	5.5	8.0	8.8
Table 2	18.0	9.0	12.0	6.0
Table 2	18.0	9.0	20.0	10.0
Table 2	18.0	6.8	8.0	3.0
Table 1	30.0	2.1	10.0	0.7
Table 1	9.0	2.3	9.0	2.3
Table 1	30.0	8.6	14.0	4.0
Facility Final Phase Target		175.0	Equivalent Remaining Emissions	173.8

Step Eleven: Phase I, Phase II and Phase III BARCT Equivalent Mass Emissions

After the Phase I and II Facility BARCT Emission Targets are established, the facility calculates the BARCT Equivalent Mass Emissions. The facility must identify which units will fall into each phase to meet the Percent Reduction Targets. The spreadsheet includes columns for the facility to enter the Alternative BARCT NOx Limits in Phase I, Phase II, and Phase III if applicable.

The BARCT Equivalent Mass Emissions for each phase of the I-Plan is calculated using equations B-6.1 and B-6.2 in Attachment B of the rule. The Phase I and Phase II (if not the final phase) BARCT Equivalent Mass Emissions for the B-Plan equation is shown below. Any unit that will not be modified or retrofit in the first two phase for an I-Plan with three phases, or the first phase for I-Plan with only two phases, the Representative NOx Concentration will be used to calculate the BARCT Equivalent Mass Emissions. Final Phase BARCT Equivalent Mass Emissions are calculated using only the Alternative BARCT Emission Limits pursuant to clause (g)(1)(C)(iv).

$$\text{Phase I and Phase II BARCT Equivalent Mass Emissions}_{\text{B-Plan}} = \sum_{i=1}^{N} \left(\frac{C_{\text{Phase I Alternative BARCT NOx Limit}} \; \boldsymbol{OR} \; C_{\text{Baseline}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions} \right)_i$$

Where:

N	=	Number of included units in B-Plan under Phase I
$C_{\text{Phase I Alternative BARCT Emission Limit}}$	=	The applicable Alternative BARCT NOx Limit for Phase I in an approved B-Plan for unit i included in the B-Plan
C_{Baseline}	=	The NOx concentration in the flue gas for unit i included in the B-Plan
Baseline Unit Emissions	=	The 2017 NOx baseline emissions for unit i included in the B-Plan.

Example Calculation

In the example below, the Phase I BARCT Equivalent Emissions are 288.9 tons/year and the Phase II BARCT Equivalent Emissions are 173.8 tons/year.

Calculating Phase I BARCT Equivalent Mass Emissions for B-Plan

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Specifies if Unit will be Decommissioned (Yes/No)	Phase I Alternative BARCT Emission Limit (ppmv)	Phase I BARCT Equivalent Emissions (Tons/Year)	Phase II Alternative BARCT Emission Limit (ppmv)	Phase II BARCT Equivalent Emissions (Tons/Year)
D1	D1	Heater	320	245	100	Not Eligible, Red > 20 TPY	N/A	15.0	36.8	5.0	12.3
D2	D2	Boiler	210	126	38	Not Eligible, Red >		15.0	49.7	5.0	16.6
D3	D3	SMR Heater	450	97	48	Not Eligible, Red >		10.0	20.2	10.0	20.2
D4	D4	FCCU		83	11	Possibly Eligib		7.0	52.8	7.0	52.8
D5	D5	Heater	290	54	18	Possibly Eligib		6.0	18.0		18.0
D6	D6	Heater	135	29	33	Not Eligible, Red > 20 TPY	N/A	33.0	29.0		3.5
D7	D7	Heater	80	24	65	Not Eligible, Red > 10 TPY	N/A	65.0	24.0		3.3
D8	D8	Heater	67	14	48	Not Eligible, Red > 10 TPY	N/A	9.0	2.6		2.6
D9	D9	Heater	108	12	22	Possibly Eligible	N/A	18.0	9.6		9.6
D10	D10	Boiler	330	11	10	Possibly Eligible	N/A	10.0	11.0		3.8
D11	D11 and D12	Heater	75	8	16	Possibly Eligible	N/A	12.0	6.0	12.0	6.0
D12	D11 and D12	Heater	75	8	16	Eligible	N/A	20.0	10.0	20.0	10.0
D13	D13	Heater	64	3	8	Eligible	N/A	8.0	3.0	8.0	3.0
D14	D14	Thermal Oxidizer	4	3	43	Possibly Eligible	N/A	43.0	3.0	10.0	0.7
D15	D15	Heater	17	3	12	No Table 2 Limit	N/A	12.0	3.1	9.0	2.3
D16	D16	Sulfur Recovery Unit	40	10	35	No Table 2 Limit	N/A	35.0	10.0	14.0	4.0
Baseline Facility Emissions		Facility Baseline		730			Phase I BARCT Equivalent Emissions		288.9		173.8

Operator selects Alternative BARCT Emission Limit for Each Unit

Phase I BARCT Equivalent Emissions are the sum of the mass emission for each unit using the Alternative BARCT

Step Twelve: Demonstrating the BARCT Equivalent Mass Emissions are Less than the Facility BARCT Emission Target

The last step is to demonstrate that the BARCT Equivalent Mass Emissions are less than the Facility BARCT Emission Target for each phase.

Example Calculation

As shown in the table below:

- Phase I BARCT Equivalent Emissions are 288.9 tons/year which are less than the Phase I Facility BARCT Emission Target of **341.5** tons/year; and
- Phase II BARCT Equivalent Mass Emissions are 173.8 tons/year which are less than the Phase II Facility BARCT Emission Target of **175.0** tons/year.

If the BARCT Equivalent Mass Emissions are greater than the Facility BARCT Emission Target, then the operator will need to lower the Alternative BARCT Emission Limits for all or part of the included units in the corresponding phase. The Facility BARCT Emission Targets are used to demonstrate that the Alternative BARCT emission limits are, in aggregate, greater than the reductions that would occur if the facility complied with Table 1 and Table 2 limits. Operators using an approved B-Plan are not required to adhere to a facility-wide emission cap but must accept a permit condition that limits the NOx to the Alternative BARCT Emission Limits for each unit.

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Specifies if Unit will be Decommissioned (Yes/No)	Phase I Alternative BARCT Emission Limit (ppmv)	Phase I BARCT Equivalent Emissions (Tons/Year)	Phase II Alternative BARCT Emission Limit (ppmv)	Phase II BARCT Equivalent Emissions (Tons/Year)
D1	D1	Heater	320	245	100	Not Eligible, Red > 20 TPY	N/A	15.0	36.8	5.0	12.3
D2	D2	Boiler	210	126	38	Not Eligible, Red > 20 TPY	N/A	15.0	49.7	5.0	16.6
D3	D3	SMR Heater	450	97	48	Not Eligible, Red > 20 TPY	N/A	10.0	20.2	10.0	20.2
D4	D4	FCCU		83	11	Possibly Eligible	N/A	7.0	52.8	7.0	52.8
D5	D5	Heater	290	54	18	Possibly Eligible	N/A	6.0	18.0	6.0	18.0
D6	D6	Heater	135	29	33	Not Eligible, Red > 20 TPY	N/A	33.0	29.0	4.0	3.5
D7	D7	Heater	80	24	65	Not Eligible, Red > 10 TPY	N/A	65.0	24.0	9.0	3.3
D8	D8	Heater	67	14	48	Not Eligible, Red > 10 TPY	N/A	9.0	2.6	9.0	2.6
D9	D9	Heater	108	12	22	Possibly Eligible	N/A	18.0	9.6	18.0	9.6
D10	D10	Boiler	330	11	10	Possibly Eligible	N/A	10.0	11.0	8.0	8.8
D11	D11 and D12	Heater	75	8	16	Possibly Eligible	N/A	12.0	6.0	12.0	6.0
D12	D11 and D12	Heater	75	8	16	Eligible	N/A	20.0	10.0	20.0	10.0
D13	D13	Heater	64	3	8	Eligible	N/A	8.0	3.0		3.0
D14	D14	Thermal Oxidizer	4	3	43	Possibly Eligible	N/A	43.0	3.0		0.7
D15	D15	Heater	17	3	12	No Table 2 Limit	N/A	12.0	3.1		2.3
D16	D16	Sulfur Recovery Unit	40	10	35	No Table 2 Limit	N/A	35.0	10.0		4.0
Baseline Facility Emissions				730			Phase I BARCT Equivalent Emissions		288.9		173.8
							Facility BARCT Emission Targets		341.5		175.0

Phase II BARCT Equivalent

Part 1.6: Implementation of a B-Plan and I-Plan,

Once the facility receives the written approval of the B-Plan, the facility is required to submit a complete permit application to apply for a condition that limits the NOx emissions to not exceed the Alternative BARCT NOx Limit based on the schedule in the approved I-Plan. The facility must not operate a unit unless the NOx emissions are below the Alternative BARCT NOx Limits. An Alternative BARCT NOx Limit is required for all units in the B-Plan/I-Plan, even if the unit is not modified by adding pollution controls. This ensures that each unit has an enforceable NOx concentration limit. A facility that is constructing and installing NOx control equipment for compliance with an applicable NOx concentration limit or Alternative NOx BARCT Limit will demonstrate compliance in accordance with paragraph (f)(8) and (f)(9) of the rule.

- Paragraph (f)(8) is applicable to any unit subject to an averaging time less than 365-day in Rule 1109.1 Table 1 or Table 2 that operates a CEMS. The owner or operator of such unit must demonstrate compliance with the applicable NOx concentration limit or Alternative NOx Limit in an approved B-Plan six months after one of the following, whichever occurs sooner:
  - The date the South Coast AQMD Permit to Operate issued;
  - 36 months after the Permit to Construct is issued; or
  - Completion of a compliance demonstration source test.
- Paragraph (f)(9) is applicable to any unit subject to a 365-day rolling average in Rule 1109.1 Table 1 or Table 2. The owner or operator of such unit shall demonstrate compliance with the applicable NOx concentration limit or Alternative NOx BARCT Limit in an approved B-Plan beginning 14 months after one of the following, whichever occurs sooner:
  - The date the South Coast AQMD Permit to Operate issued;
  - 36 months after the Permit to Construct is issued; or
  - Completion of a compliance demonstration source test.

Part 1.7: Modification of a B-Plan and I-Plan,

If a facility seeks to modify an approved plan, paragraph (i)(7) outlines the procedure the facilities must follow to apply for a plan modification. A facility must modify an approved plan for the following reasons:

- A unit identified as meeting Table 2 no longer meets the requirements of Rule 1109.1 paragraph (d)(3);
- A unit in an approved plan, identified as meeting Table 2 for establishing the Phase I, Phase II, or Phase III BARCT Facility Emission Target, is decommissioned;
- A higher Alternative BARCT NOx Limit will be proposed in the South Coast AQMD permit application than the Alternative BARCT NOx Limit for that unit in the currently approved plan;
- Any emission reduction project is moved to a later implementation phase, any emission reduction project is moved between phases, or any emission reduction project is removed from a phase;
- The facility receives written notification from the Executive Officer that modifications to the plan is needed; or
- A permit application is submitted for a new unit that meets at least one provision of subparagraph (g)(4)(E).

Rule 1109.1 paragraph (i)(8) specifies that the review and approval of modifications to an I-Plan, B-Plan, or B-Cap shall be based on the initial review and approval process pursuant to paragraph (i)(4) of the rule. Although there is no specified timeframe to submit a modification, the owner or operator is expected to submit a modification upon knowing one of the items under subparagraph (i)(7)(B) of the rule are triggered.

Section 2: B-Cap and I-Plan Requirements

A facility with six or more units may elect to comply with a B-Cap. The requirements for the B-Cap are included in Rule 1109.1 paragraphs (g)(3) and (g)(4).

Part 2.1: B-Cap and I-Plan Submittal Date

Paragraph (i)(1) for I-Plan and Paragraph (i)(3) for B-Cap

A facility that elects to use a B-Cap must submit the B-Cap and the I-Plan to the South Coast AQMD on or before September 1, 2022. The following items must be submitted:

- Three South Coast AQMD Forms:
  - 400-A, *Application Form for Permit or Plan Approval*, for I-Plan
  - 400-A, *Application Form for Permit or Plan Approval*, for Option with B-Cap
  - 400-A, *Application Form for Permit or Plan Approval*, for Title V Amendment
- The B-Cap and I-Plan Submittal Checklists. These forms were developed by staff to provide a check list to ensure that the facilities have met all the requirements of the B-Cap and the I-Plan. The plan submittal checklist form will need to be submitted in conjunction with the 400-A forms. The checklist is included in the Attachment section of this document and is available on the Rule 1109.1 homepage located under support documents. Link to the page is below:

  http://www.aqmd.gov/home/rules-compliance/compliance/1109-1/supportdocs

- The main component of the B-Cap is the spreadsheet provided to the facilities to demonstrate that upon implementation of plans, their emissions will be equal to or lower in the aggregate as if all the units met Table 1 or Table 2 NOx limits. South Coast AQMD provided the facilities with an Excel spreadsheet that serves as the template for the B-Cap. The spreadsheet includes every unit at the facility or facilities under common ownership subject to Rule 1109.1, the Device Identification Number (Device ID), whether the units have combined stacks, the equipment category, size, and baseline unit emissions in tons per year, and representative NOx concentration in ppmv. The baseline unit emissions and representative NOx concentrations were pre-populated with the representative NOx and baseline emissions from the "Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated under Rule 1109.1" that was included in the Rule 1109.1 Governing Board Package.

Part 2.2: Submittal of a B-Cap and Approval or Disapproval

The Executive Officer will notify the facility in writing if the submitted plans are approved or disapproved. The plan approval will include a plan approval conditions and the compliance plan that has been submitted, reviewed, and approved by U.S. EPA and included in Section I of the facility permit. Approval will be based on the criteria listed in Rule 1109.1 paragraph (i)(4) as outlined in this document. The submitted plans are subject to disapproval if any of the criteria are not met or there are any deficiencies in the submitted plans. If a plan is disapproved, a facility will have 45 days from receiving written notification to correct the deficiencies and re-submit the plan (Rule 1109.1 paragraph (i)(5)). If the facility receives a second written notification of disapproval, the facility must comply with the NOx limits in Table 1 or Table 2 of the rule based on the compliance schedule of the selected I-Plan option (Rule 1109.1 paragraph (i)(6)).

Public Notification of Pending Approval of an I-Plan, B-Plan, or B-Cap – Paragraph (i)(9)

The Executive Officer will make the plans or plan modifications available to the public on the South Coast AQMD website 30 days prior to approval. Purpose of this provision is to provide an opportunity for the public to view the plans prior to approval.

Part 2.3: Identify which Units will be included in the B-Cap

Paragraph (g)(3)

Under the B-Cap, facilities must include all units at the facility with the option to exclude the following units:

- Optional units which are defined as boilers or process heaters with a rated heat input capacity of less than 40 MMBtu/hour that are required to meet the NOx concentration limits upon burner replacements (subparagraphs (d)(2)(B) and (d)(2)(C)). These units may be excluded from the B-Cap because the timing of burner replacement may fall outside the compliance schedule. A facility may opt to include these units, by utilizing early adoption of the next generation ultra-low NOx burners. These reductions could be used to offset higher NOx limits on other units in the B-Cap.
- Units that are exempt from the NOx Concentration Limits because they are low-use including:
    - Low-use boilers less than 40 MMBtu/hr (paragraph (o)(2));
    - Startup boilers or process heaters used only for an FCCU (paragraph (o)(5));
    - Startup or shutdown boilers and process heaters at sulfuric acid plants using less than 90,000 MMBtu annually (paragraph (o)(6));
    - Flares that emit less than or equal to 550 pounds of NOx per year (paragraph (o)(8)); and
    - Vapor incinerators less than 2 MMBtu/hour emitting less than 100 pounds of NOx per year for unlimited exemption or less than 1,000 pound of NOx per year for limited exemption) (paragraph (o)(9)) and vapor incinerators exempt per (g)(3)(B)(ii).
- Boilers or process heaters less than or equal to 2 MMBtu/hr used for comfort heating cannot be included in the B-Cap as those units are subject to Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters.

Part 2.4: Select I-Plan Option

Paragraph (h)(2)

The facility must identify the I-Plan Option selection using the I-Plan Submittal Check list. The I-Plan must include all of the units included in the accompanying B-Cap. The main component of the I-Plan is the same spreadsheet the facilities used to develop the B-Cap which will also be used to demonstrate compliance with each phase of the selected I-Plan.

I-Plan option 3 and I-Plan Option 4 are available to a facility that elects to comply with a B-Cap (table below). I-Plan Option 3 is only available to a facility that is achieving a NOx emission rate of less than 0.02 pound per million BTU of heat input for all the Boilers and Process Heaters greater than or equal to 40 MMBtu/hour or any Boiler or Process Heater less than 40 MMBtu/hours that operates with a certified CEMS. The facility would be required to perform a one-time demonstration that their applicable boilers and process heaters meet the 0.02 pound per million BTU emission rate based on the 2021 annual emissions for those units as reported in the 2021 Annual Emissions Report (subparagraph (h)(2)(E)).

One-Time Eligibility Demonstration for I-Plan Option 3 with B-Cap

A facility shall conduct a one-time eligibility demonstration for I-Plan Option 3 with B-Cap using the calculation methodology below:

1. **Hourly Mass Emissions (pounds/hour)** is calculated by summing the 2021 annual emissions as reported in the facility's South Coast AQMD Annual Emissions Reports of all boilers and process heaters greater than or equal to 40 MMBtu/hour, divided by 8,760 hours.
2. **Combined Maximum Rated Heat Input Capacity (MMBtu/hour**) is calculated by summing the maximum rated heat input capacity based on a 24-hour average or one-hour average, whichever is lower for all boilers and process heaters with a rated heat input capacity of greater than or equal to 40 MMBtu/hour.
3. **NOx Emission Rate (pounds/MMBtu)** eligibility is calculated by dividing the Hourly Mass Emissions calculated from (1) by the Combined Maximum Rated Heat Input Capacity calculated in (2) to determine if the NOx emission rate is less than 0.02 pounds per million BTU.

Refer to Table 6 in the rule for the following key elements of each I-Plan options:

- "Percent Reduction Targets" are the percent reduction for each phase of the selected I-Plan that are applied to the total reductions calculated in step seven below;
- "Permit Application Submittal Date" is the date that permit application must be submitted to establish the NOx Limit for each unit (facility selected Alternative BARCT NOx limit); and
- "Compliance Schedule" is the timeframe that each unit must meet the NOx Limit specified in each Phase.

Table 2: I-Plan Percent Reduction Targets of Required Reductions and Compliance Schedule

I-Plan Option	Key Elements	Phase I	Phase II	Phase III
I-Plan Option 1 for B-Plan or Concentration Limits in Table 1 or Table 2	**Percent Reduction Targets**	**80**	**100**	**N/A**
	Permit Application Submittal Date	January 1, 2023	January 1, 2031	N/A
	Compliance Schedule	No later than 36 months after a Permit to Construct is issued		N/A
I-Plan Option 2 for B-Plan Only pursuant to subparagraph (h)(2)(E)	**Percent Reduction Targets**	**65**	**100**	**N/A**
	Permit Application Submittal Date	July 1, 2024	January 1, 2030	N/A
	Compliance Schedule	No later than 36 months after a Permit to Construct is issued		N/A
I-Plan Option 3 for B-Plan or B-Cap pursuant to subparagraph (h)(2)(E)	**Percent Reduction Targets**	**40**	**100**	**N/A**
	Permit Application Submittal Date	July 1, 2025	July 1, 2029	N/A
	Compliance Schedule	No later than 36 months after a Permit to Construct is issued		N/A
	B-Cap Effective Date of the Facility BARCT Emission Target	January 1, 2030	January 1, 2034	N/A
I-Plan Option 4 for B-Cap Only	**Percent Reduction Targets**	**50**	**80**	**100**
	Permit Application Submittal Date	N/A	January 1, 2025	January 1, 2028
	Compliance Schedule	January 1, 2024	No later than 36 months after a Permit to Construct is issued	
	B-Cap Effective Date of the Facility BARCT Emission Target	January 1, 2024	July 1, 2029	July 1, 2032
I-Plan Option 5 for B-Plan Only or Concentration Limits in Table 1 or Table 2	**Percent Reduction Targets**	**50**	**70**	**100**
	Permit Application Submittal Date	January 1, 2023	January 1, 2025	July 1, 2028
	Compliance Schedule	No later than 36 months after a Permit to Construct is issued		

Part 2.5: B-Cap Calculations

Below is a step-by-step example of how to perform the calculations for the B-Cap with the assumption that the facility is selecting I-Plan Option 4 with B-Cap and will be decommissioning a unit as one of the emissions reduction strategies.

Step One: Baseline Facility Emissions

The first step is to establish the Baseline Facility Emissions. The B-Cap Spreadsheet will already be populated with the baseline unit emissions. Those emissions are based on the "*Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated under Rule 1109.1*" document. Once the owner or operator of the facility identifies the units that will be included in the B-Cap, they will sum the *Baseline Unit Emissions* column.

Example Calculation

Table 2. Calculating the Baseline Facility Total

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)
D1	D1	Heater	320	245	100
D2	D2	Boiler	210	126	38
D3	D3	SMR Heater	450	97	48
D4	D4	FCCU		83	11
D5	D5	Heater	290	54	18
D6	D6	Heater	135	29	33
D7	D7	Heater	80	24	65
D8	D8	Heater	67	14	48
D9	D9	Heater	108	12	22
D10	D10	Boiler	330	11	10
D11	D11 and D12	Heater	75	8	16
D12	D11 and D12	Heater	75	8	16
D13	D13	Heater	64	3	8
D14	D14	Thermal Oxidizer	4	3	43
D15	D15	Heater	17	3	12
D16	D16	Sulfur Recovery Unit	40	10	35
Baseline Facility Emissions			Baseline Facility Emissions	**730**	

Step Two: Remaining Emissions

The B-Cap Spreadsheets supplied to the facilities include columns with the Table 1 limits and remaining NOx emissions, Table 2 limits, if applicable, and remaining NOx emissions, and a column indicating the eligibility for each unit to use Table 2 limits. Any decommissioned unit in the B-Cap will be reflected as a Table 1 limit pursuant to subparagraph (h)(4)(F). Note that not all equipment categories will have Table 2 NOx limits and therefore, it will show as N/A. The calculations have already been completed in the spreadsheet. An example calculation is provided below:

$$\sum_{i=1}^{N}\left(\frac{C_{\text{Table 1 or Table 2}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions}\right)_i$$

Where:

N = Number of included Units in B-Cap

$C_{\text{Table 1 or Table 2}}$ = The applicable NOx Concentration Limit in Table 1 or Table 2 for each Unit i included in B-Cap

C_{Baseline} = Representative NOx Concentration as defined in subdivision (c) for Unit i included in B-Cap

Baseline Unit Emissions = Baseline Unit Emissions for Unit i as defined in subdivision (c) and included in the I-Plan, B-Cap as determined pursuant to section (B-1).

Example Calculation

The NOx emissions are calculated first assuming that the unit meets Table 1 limits and then calculated assuming that the unit meets Table 2 limits. The Baseline Unit emissions are ratioed by the Table 1 or Table 2 NOx concentration to the representative NOx concentration in the *Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated under Rule 1109.1* document.

Table 1 and Table 2 Remaining Emissions

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions Tons/Year)	PR 1109.1 Table 2 NOx	PR 1109.1 Table 2 Remaining Emissions Tons/Year)
D1	D1	Heater	320	245	100	5.0	12.3	22.0	53.9
D2	D2	Boiler	210	126	38	5.0	16.6	7.5	24.9
D3	D3	SMR Heater	450	97					15.2
D4	D4	FCCU		83					60.4
D5	D5	Heater	290	54					66.0
D6	D6	Heater	135	29					19.3
D7	D7	Heater	80	24	65	5.0	1.8	18.0	6.6
D8	D8	Heater	67	14	48	5.0	1.5	18.0	5.3
D9	D9	Heater	108	12	22	5.0	2.7	18.0	9.6
D10	D10	Boiler	330	11	10	5.0	5.5	7.5	8.3
D11	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0
D12	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0
D13	D13	Heater	64	3	8	5.0	1.9	18.0	6.8
D14	D14	Thermal Oxidizer	4	3	43	30.0	2.1	40.0	2.8
D15	D15	Heater	17	3	12	9.0	2.3	N/A	N/A
D16	D16	Sulfur Recovery Unit	40	10	35	30.0	8.6	N/A	N/A
Baseline Facility Emissions				**730**					

NOx Emissions if Unit Meets 5 ppmv

NOx Emissions if Unit Meets 22

(Table 1 Limit/Representative NOx)*Baseline Unit Emissions) (5/100)*245)= 12.3 tons/year

(Table 2 Limit/Representative NOx)*Baseline Unit Emissions) (22/100)*245)= 53.9 tons/year

Step Three: Eligibility for Table 2 Conditional NOx limit

Subdivision (d) establishes the proposed BARCT NOx concentration limits for units in Rule 1109.1. Table 1 (Rule 1109.1 paragraph (d)(1)) lists the NOx Concentration limits for each class and category of equipment. Table 2 (Rule 1109.1 paragraph (d)(3)) provides conditional NOx limits for units which are currently operating at or below NOx Concentration Limits and includes conditions that a facility must meet if they elect to meet the conditional NOx concentration limits in Table 2, in lieu of the NOx concentration limits in Table 1.

There are two pathways that a facility can take to qualify to use the Conditional Limits in Table 2 to calculate the Final Phase Facility BARCT Emissions Target for a unit under a B-Cap. The first pathway is for an owner or operator of a facility complying with an I-Plan Option 3 or Option 4 with a B-Cap that includes any unit listed in Table D-1 or Table D-2 of Attachment D of the rule in their plan; these units are "pre-qualified" for Table 2 conditional limits (Rule 1109.1 clause (h)(4)(A)(ii) and subparagraph (h)(4)(B)). Table D-1 is for I-Plan Option 3 and Table D-2 is for I-Plan Option 4.

The second pathway is not available to a facility that selects to comply with I-Plan Option 4 but may be used for a facility that elects to comply with I-Plan Option 3 with a B-Cap. The facility must demonstrate that the unit will meet the requirements in Rule 1109.1 paragraph (d)(3) and submit a permit application on or before June 1, 2022. The conditions are listed in paragraph (d)(3) include:

- A permit to construct for the post combustion control, e.g., permit for a new SCR, was not issued on or after December 4, 2015;
- For process heaters with rated heat input between 40 to 110 MMBtu/hour, the potential emission reduction, referred to as the Unit Reduction, must be less than 10 tons per year (*see calculation formula below*)
- For process heaters with a rated heat input greater than 110 MMBtu/hour, the potential emission reduction, referred to as the Unit Reduction, must be less than 20 tons per year (*see calculation formula below*)
- The unit must not have an existing permit limit at or below the Table 1 NOx limit.
- The unit must not be operating at or below the Table 1 limit based on the representative NOx concentration listed in the Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated under Rule 1109.1; and
- The unit is not identified as being decommissioned.

A facility applying for a conditional limit for a unit must demonstrate that the Unit Reduction is less than the thresholds pursuant to subparagraphs (d)(3)(B) and (d)(3)(C) for the conditional limits based on the following equation:

Unit Reduction Calculation

$$\text{Unit Reduction} = \left(1 - \frac{C_{\text{Table 1}}}{C_{\text{Baseline}}}\right) \times \text{Baseline Unit Emissions}$$

Where:

$C_{\text{Table 1}}$ = The applicable NOx Concentration Limit in Table 1 for the Unit

C_{Baseline} = Representative NOx Concentration for the Unit

Baseline Unit Emissions = Baseline Unit Emissions.

Example Calculation

Unit with device identification number "D1" has potential emission reductions of 232.7 tons/year (245 tons/year baseline - 12.3 tons/year remaining once meeting Table 1. That unit will be flagged as "Not Eligible" the B-Cap spreadsheet.

Eligibility for Table 2 Conditional Limits

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions (Tons/Year)	PR 1109.1 Table 2 NOx Limit (ppmv)	PR 1109.1 Table 2 Remaining Emissions (Tons/Year)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)
D1	D1	Heater	320	245	100	5.0	12.3	22.0	53.9	Not Eligible, Red > 20 TPY
D2	D2	Boiler	210	126	38	5.0	16.6	7.5	24.9	Not Eligible, Red > 20 TPY
D3	D3	SMR Heater	450	97	48	5.0	10.1	7.5		Not Eligible, Red > 20 TPY
D4	D4	FCCU		83	11	2.0	15.1	8.0		Possibly Eligible
D5	D5	Heater	290	54	18	5.0				Possibly Eligible
D6	D6	Heater	135	29	33	5.0				t Eligible, Red > 20 TPY
D7	D7	Heater	80	24	65	5.0	1.8	18.0	6.6	Not Eligible, Red > 10 TPY
D8	D8	Heater	67	14	48	5.0	1.5	18.0	5.3	Not Eligible, Red > 10 TPY
D9	D9	Heater	108	12	22	5.0	2.7	18.0	9.6	Possibly Eligible
D10	D10	Boiler	330	11	10	5.0	5.5	7.5	8.3	Possibly Eligible
D11	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Possibly Eligible
D12	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Eligible
D13	D13	Heater	64	3	8	5.0	1.9	18.0	6.8	Eligible
D14	D14	Thermal Oxidizer	4	3	43	30.0	2.1	40.0	2.8	Possibly Eligible
D15	D15	Heater	17	3	12	9.0	2.3	N/A	N/A	No Table 2 Limit
D16	D16	Sulfur Recovery Unit	40	10	35	30.0	8.6	N/A	N/A	No Table 2 Limit
Baseline Facility Emissions				**730**						

245 tons/year -12.3 tons/year = 232.8 tons/year
Not Eligible, 232.8>20 tons/year

I-Plan Option 4

An owner or operator of a facility that selects the I-Plan Option 4 with B-Cap is only allowed to use conditional limits for units listed in Table D-2 in Attachment D of the rule. As mentioned previously, these units are "pre-qualified", and the facility may submit the permit application for these units to comply with Rule 1109.1 Table 5 limits during any of the phases in the I-Plan.

Please note for a unit that qualifies for a conditional limit, facility can choose an Alternative NOx Concentration Limit that is at or below the maximum allowed in Table 5 of the rule. Regarding the plan review and approval, South Coast AQMD staff will only be verifying and evaluating a

unit's eligibility for Table 2 conditional NOx limits based on the requirements in Rule 1109.1 paragraph (d)(3); or inclusion in Table D-2 if the facility selects I-Plan Option 4. There may be a separate evaluation during the permitting process at which the facility may also be required to submit technical data to confirm the unit's ability to meet the selected Alternative NOx Concentration Limit. Technical data submitted may include one or more of the following, but is not limited to:

- Up to 12 months of operational data such as CEMS, source test, and any emissions data associated with the unit;
- Less than 12 months of operational data may potentially be acceptable if the unit has been tuned or upgraded within those 12 months;
- Design specifications that include engineering design calculations, documents, and diagrams which further substantiate the unit's eligibility;
- Manufacturer or vendor guarantees that the change or modification to the unit will meet the selected Table 2 conditional limit; and
- Further supporting technical data may also be requested at the time of permitting.

Step Four: Optional Units NOx limit

If a facility elects to include any of the "optional units," e.g., boilers and heaters less than 40 MMBtu/hour, the following NOx limits must be used for establishing the target (paragraphs (h)(4)(C) through (h)(4)(E)):

- 5 ppmv for boilers <40 MMBtu/hour
- 40 ppmv for process heaters <40 MMBtu/hour if the unit is achieving greater than or equal to 75 ppmv based on the baseline emissions data, provided:
    - The units must be included in Phase I of an I-Plan
    - No additional NOx reductions will be applied to the Facility BARCT Emission Target for a later phase of the I-Plan
- 9 ppmv for process heaters <40 MMBtu/hour if the unit is achieving less than 75 ppmv

Step Five: NOx limits to Determine the Facility BARCT Target

For step five, the facility will select either Table 1 or Table 2 NOx limits based on eligibility in the spreadsheet. South Coast AQMD will verify that the units identified as meeting Table 2 limits are eligible by either complying with the conditions in Rule 1109.1 paragraph (d)(3) and a complete permit application submitted by June 1, 2022 or the units are listed in Table D-2. Any unit that will be decommissioned must select Table 1 limit (Rule 1109.1 subparagraph (h)(4)(F)) when calculating the Facility BARCT Target; however, decommissioned units can be included in any of the phase of the selected I-Plan.

Note on Selecting the NOx Limit for the Gas Turbine Category

For the gas turbine category, Rule 1109.1 has two different Table 1 NOx limits: 2 ppmv NOx for units that operate on natural gas and 3 ppmv for units that operate on any other gaseous fuels. There is also a conditional limit of 2.5 ppmv for units that operate on natural gas. Facilities that operate gas turbines on any fuel other than natural gas would be subject to the 3 ppmv limit when calculating the Facility BARCT Target. Facilities that operate on natural gas would be subject to 2 ppmv unless they qualify for the Table 2 conditional limit.

Most gas turbine located at a petroleum refinery have a duct burner that is connected downstream and vents to a common stack. The duct burner is used for supplementary firing to increase heat energy of the gas turbine exhaust and it uses a significantly smaller amount of fuel with much lower NOx emissions when compared to gas turbine. The NOx limits for the gas turbine category were based on the BARCT assessment for the gas turbines; therefore, if a gas turbine is permitted to combust natural gas but the duct burner is permitted to combust different fuels, the natural gas limit applies to that unit when calculating the Facility BARCT Target. The following summarizes the NOx limits the facility must use for gas turbines when calculating the Facility BARCT Target:

- 3 ppm, if the gas turbine is permitted to operate on multiple fuels such as refinery gas, natural gas, propane, butane, pentanes, and/or combination of fuels regardless of the fuel permitted for the duct burner (if applicable).
- 2 ppm, if the gas turbine is permitted to operate strictly on natural gas regardless of the fuel permitted for the duct burner (if applicable).
- 2.5 ppm, if the gas turbine is permitted to operate strictly on natural gas and meets the conditions specified in Rule 1109.1 paragraph (d)(3) for Table 2 conditional limits.

For any decommissioned unit under a B-Cap, a facility shall calculate the emission reductions from decommissioned units using the NOx concentration limits in Table 1 pursuant to subparagraph (h)(4)(F) of the rule and equation B-8 in Attachment B of the rule.

Example Calculation

The owner identifies four process heaters (D9, D11, D12 and D13), the FCCU (D4), and a Thermal Oxidizer (D14) as potential devices that qualify for Table 2 NOx limits. Therefore, the emissions of these units in the Final Phase Facility BARCT Emission Target are based on reduction from these units to meet the applicable limits in Rule 1109.1 Table 2.

Calculating the Remaining Emissions Based on Table 1 or, if Eligible, Table 2

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions (Tons/Year)	PR 1109.1 Table 2 NOx Limit (ppmv)	PR 1109.1 Table 2 Remaining Emissions (Tons/Year)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(3))	NOx Lmit Based Selected Table 1 or Table 2 Limits (ppmv)	Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)
D1	D1	Heater	320	245	100	5.0	12.3	22.0	53.9		Table 1	5.0	12.3
D2	D2	Boiler	210	120	38	5.0	16.6	7.5	24.9		Table 1	5.0	16.6
D3	D3	SMR Heater	450	97	48	5.0	10.1	7.5	15.2		Table 1	5.0	10.1
D4	D4	FCCU		83	11	2.0	15.1	8.0	60.4		Table 2	8.0	60.4
D5	D5	Heater	290	54	18	5.0	15.0	22.0	66.0				15.0
D6	D6	Heater	130	29	33	5.0	4.4	22.0	19.3	Not Eligible, Red > 20 TPY			4.4
D7	D7	Heater	80	24	65	5.0	1.8	18.0	6.6	Not Eligible, Red > 10 TPY			1.8
D8	D8	Heater	67	14	48	5.0	1.5	18.0	5.3	Not Eligible, Red > 10 TPY			1.5
D9	D9	Heater	108	12	22	5.0	2.7	18.0	9.6	Possibly Eligible	Table 2	18.0	9.6
D10	D10	Boiler	330	11	10	5.0	5.5	7.5	8.3	Possibly Eligible	Table 1	5.0	5.5
D11	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Possibly Eligible	Table 2	18.0	9.0
D12	D11 and D12	Heater	75	8	16	5.0	2.5	18.0	9.0	Eligible	Table 2	18.0	9.0
D13	D13	Heater	64	3	8	5.0	1.9	18.0	6.8	Eligible	Table 2	18.0	6.8
D14	D14	Thermal Oxidizer	4	3	43	30.0	2.1	40.0	2.8	Possibly Eligible	Table 1	30.0	2.1
D15	D15	Heater	17	3	12	9.0	2.3	N/A	N/A	No Table 2 Limit	Table 1	9.0	2.3
D16	D16	Sulfur Recovery Unit	40	10	35	30.0	8.6	N/A	N/A	No Table 2 Limit	Table 1	30.0	8.6
Baseline Facility Emissions				730									175.0

Initial Screening Based on Unit Reductions Only - Must Verify Other Conditions Met

Remaining NOx Based on Table 1 or, if eligible, Table 2

PR 1109.1 Table 1 NOx Limit (ppmv)	PR 1109.1 Table 1 Remaining Emissions (Tons/Year)	PR 1109.1 Table 2 NOx Limit (ppmv)	PR 1109.1 Table 2 Remaining Emissions (Tons/Year)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(3))	NOx Lmit Based Selected Table 1 or Table 2 Limits (ppmv)	Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)
5.0	12.3	22.0	53.9		Table 1	5.0	12.3
5.0	16.6	7.5	24.9		Table 1	5.0	16.6
5.0	10.1	7.5	15.2		Table 1	5.0	10.1
2.0	15.1	8.0	60.4		Table 2	8.0	60.4
5.0	15.0	22.0	66.0				15.0
5.0	4.4	22.0	19.3	Not Eligible, Red > 20 TPY			4.4
5.0	1.8	18.0	6.6	Not Eligible, Red > 10 TPY			1.8
5.0	1.5	18.0	5.3	Not Eligible, Red > 10 TPY			1.5
5.0	2.7	18.0	9.6	Possibly Eligible	Table 2	18.0	9.6
5.0	5.5	7.5	8.3	Possibly Eligible	Table 1	5.0	5.5
5.0	2.5	18.0	9.0	Possibly Eligible	Table 2	18.0	9.0
5.0	2.5	18.0	9.0	Eligible	Table 2	18.0	9.0
5.0	1.9	18.0	6.8	Eligible	Table 2	18.0	6.8
30.0	2.1	40.0	2.8	Possibly Eligible	Table 1	30.0	2.1
9.0	2.3	N/A	N/A	No Table 2 Limit	Table 1	9.0	2.3
30.0	8.6	N/A	N/A	No Table 2 Limit	Table 1	30.0	8.6
							175.0

Step Six: Facility Target

Once the facility selects Table 1 or Table 2 NOx limits, they sum "Remaining Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)" (column O) to determine the Final Phase Facility BARCT Emission Target, using Equation B-2.1 in Attachment B of the rule as shown below:

Final Phase Facility BARCT Emission Target

$$= \sum_{i=1}^{N} \left(\frac{C_{\text{Table 1 or Table 2}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions} \right)_i$$

Where:

N	=	Number of included Units in B-Plan or B-Cap
$C_{\text{Table 1 or Table 2}}$	=	The applicable NOx Concentration Limit in Table 1 or Table 2 for each Unit i included in B-Plan or B-Cap
C_{Baseline}	=	Representative NOx Concentration as defined in subdivision (c) for Unit i included in B-Plan or B-Cap
Baseline Unit Emissions	=	Baseline Unit Emissions for Unit i as defined in subdivision (c) and included in the I-Plan, B-Plan or B-Cap as determined pursuant to section (B-1).

Example Calculation

For this example, the Final Phase Target is 175 tons per year. Subparagraph (h)(4)(F) and section (B-8) in Appendix B of the rule specifies that a facility shall use the NOx concentration limit in Table 1 for the unit(s) that will be decommissioned. Since unit "D1" will be decommissioned, the remaining emissions is reflected as a Table 1 NOx concentration limit of 5 ppm and added to the Final Phase Facility Target.

Calculating Facility Final Phase Target

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all	Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(2))	NOx Lmit Based Selected Table 1 or Table 2 Limits (ppmv)	Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)
D1	D1	Heater	320	245	100	N	Table 1	5.0	12.3
D2	D2	Boiler	210	126	38	Not Eligible, Red > 20 TPY	Table 1	5.0	16.6
D3	D3	SMR Heater	450	97	48	Not Eligible, Red > 20 TPY	Table 1	5.0	10.1
D4	D4	FCCU		83	11	Possibly Eligible	Table 2	5.0	60.4
D5	D5	Heater	290	54	18	Possibly Eligible	Table 1	5.0	15.0
D6	D6	Heater	135	29	33	Not Eligible, Red > 20 TPY	Table 1	5.0	4.4
D7	D7	Heater	80	24	65	Not Eligible, Red > 10 TPY	Table 1	5.0	1.8
D8	D8	Heater	67	14	48	Not Eligible, Red > 10 TPY	Table 1	5.0	1.5
D9	D9	Heater	108	12	22	Possibly Eligible	Table 2	18.0	9.6
D10	D10	Boiler	330	11	10	Possibly Eligible	Table 1	5.0	5.5
D11	D11 and D12	Heater	75	8	16	Possibly Eligible	Table 2	18.0	9.0
D12	D11 and D12	Heater	75	8	16	Eligible	Table 2	18.0	9.0
D13	D13	Heater	64	3	8	Eligible	Table 2	18.0	6.8
D14	D14	Thermal Oxidizer	4	3	43	Possibly Eligible	Table 1	30.0	2.1
D15	D15	Heater	17	3	12	No Table 2 Limit	Table 1	9.0	2.3
D16	D16	Sulfur Recovery Unit	40	10	35	No Table 2 Limit	Table 1	30.0	8.6
Baseline Facility Emissions				**730**			**Final Phase Facility Target**		**175.0**

Unit "D1" will be decommissioned

12.3 was added to Target

Step Seven: Facility Emission Reductions

The Total Facility NOx Emission Reductions are the difference between the Baseline Facility Emissions and the Final Phase Facility BARCT Emission Target plus an additional 10 percent reduction for the B-Cap in accordance with paragraph (h)(4) of the rule.

Total Facility NOx Emission Reductions
= Baseline Facility Emissions
− (Final Phase Facility BARCT Emission Target x 0.9)

Example Calculation

In this example, Process Heater D1 will be decommissioned; therefore, the Final Phase Facility BARCT Target will be calculated based on the 5 ppm in Table 1. The Facility Total NOx Emission Reductions including the additional 10 percent reduction requirement for the B-Cap is equal to **572.6** tons/year (730 tons/year – (175.0 tons/year x 0.9)).

Facility Total NOx Emission Reductions

Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all	Operator Selects Table 1 or Table 2 Limits (Table 2 Must Meet (d)(2))	NOx Lmit Based Selected Table 1 or Table 2 Limits (ppmv)	Emissions Based on Selected Table 1 or Table 2 Limits (Tons/Year)
D1	D1	Heater	320	245	100	N	Table 1	5.0	12.3
D2	D2	Boiler	210	126	38	Not Eligible, Red > 20 TPY	Table 1	5.0	16.6
D3	D3	SMR Heater	450	97	48	Not Eligible, Red > 20 TPY	Table 1	5.0	10.1
D4	D4	FCCU		83	11	Possibly Eligible	Table 2	18.0	60.4
D5	D5	Heater	290	54	18	Possibly Eligible	Table 1	5.0	15.0
D6	D6	Heater	135	29	33	Not Eligible, Red > 20 TPY	Table 1	5.0	4.4
D7	D7	Heater	80	24	65	Not Eligible, Red > 10 TPY	Table 1	5.0	1.8
D8	D8	Heater	67	14	48	Not Eligible, Red > 10 TPY	Table 1	5.0	1.5
D9	D9	Heater	108	12	22	Possibly Eligible	Table 2	18.0	9.6
D10	D10	Boiler	330	11	10	Possibly Eligible	Table 1	5.0	5.5
D11	D11 and D12	Heater	75	8	16	Possibly Eligible	Table 2	18.0	9.0
D12	D11 and D12	Heater	75	8	16	Eligible	Table 2	18.0	9.0
D13	D13	Heater	64	3	8	Eligible	Table 2	18.0	6.8
D14	D14	Thermal Oxidizer	4	3	43	Possibly Eligible	Table 1	30.0	2.1
D15	D15	Heater	17	3	12	No Table 2 Limit	Table 1	9.0	2.3
D16	D16	Sulfur Recovery Unit	40	10	35	No Table 2 Limit	Table 1	30.0	8.6
Baseline Facility Emissions				**730**					**175.0**

Unit "D1" will be decommissioned

12.3 was added to Target

Total Facility NOx Emission Reductions
730 tons/year - (175 tons/year x 0.9) = 572.6 tons/year

Step Eight: Phase I, Phase II and Phase III BARCT Emission Target

The next step is to calculate the Facility BARCT Emission Target for each phase of the selected I-Plan option. The I-Plan percent reduction (e.g., if the Phase I emission reduction target was 50%) is applied to the total Facility Emission Reduction calculated in step seven using the equation B-4 in Attachment B of the rule, also included below:

$$\text{Phase I Facility BARCT Emission Target}_{\text{B-Cap}} = \text{Baseline Emissions} - (\text{Phase I Percent Reduction Target} \times \text{Total Facility NOx Emission Reductions})$$

Example Calculation

As shown previously in the step seven example, the calculated facility total emission reduction including the additional 10 percent for the B-Cap is **572.6 tons/year**. In this example, the owner chooses I-Plan Option 4 with B-Cap, the Phase I, II, and III BARCT Emission Target calculations will be calculated as follows:

Phase I Facility BARCT Emission Target $_{\text{B-Cap}} = 730 - (572.6 \times 0.5) = 443.7$ **tons/year**

Phase II Facility BARCT Emission Target$_{\text{B-Cap}} = 730 - (572.6 \times 0.8) = 272.0$ **tons/year**

Phase III Facility BARCT Emission Target$_{\text{B-Cap}} = 730 - (572.6 \times 1.0) = 157.5$ **tons/year**

Step Nine: Alternative BARCT NOx Limits and Other Emission Reduction Strategies

After the owner or operator of the facility calculates and establishes the BARCT Emission Targets for each phase, the facility must identify which units will fall into each phase of the I-Plan to meet the Percent Reduction Targets specified in Table 6 of the rule. The facility then selects an Alternative BARCT NOx Limit for each unit. The spreadsheet provided to each facility includes the respective columns for the facility to input the selected Alternative BARCT NOx Limits and/or the other emission reduction strategy in Phase I, Phase II, and Phase III if applicable that are reflected in the BARCT B-Cap Annual Emissions.

The selected Alternative BARCT NOx Limits and the other emission reduction strategies will be used to calculate the BARCT Equivalent Mass Emissions and B-Cap Annual Emissions in the following steps. When selecting the Alternative BARCT NOx Limit, there are further requirements on the Alternative BARCT NOx limits. Subparagraph (g)(3)(C) of the rule states that the *Alternative NOx BARCT Limit cannot exceed the limits specified in Table 5 of the rule, also presented below*.

Table 3: Maximum Alternative BARCT NOx Limit for B-Cap

Unit	Maximum Alternative BARCT NOx Limit	O_2 Correction (%)	Rolling Averaging Time[1]
Boilers and Process Heaters <40 MMBtu/hour	40 ppmv	3	24-hour
Boilers and Process Heaters ≥40 MMBtu/hour	50 ppmv	3	24-hour
FCCUs	8 ppmv	3	365-day
	16 ppm		7-day
Gas Turbines	5 ppmv	15	24-hour
Petroleum Coke Calciners	100 tons/year	N/A	365-day
SMR Heaters	12 ppm	3	24-hour
SRU/TG Incinerators	100 ppmv	3	24-hour
Vapor Incinerators	40 ppmv	3	24-hour

Example Calculation

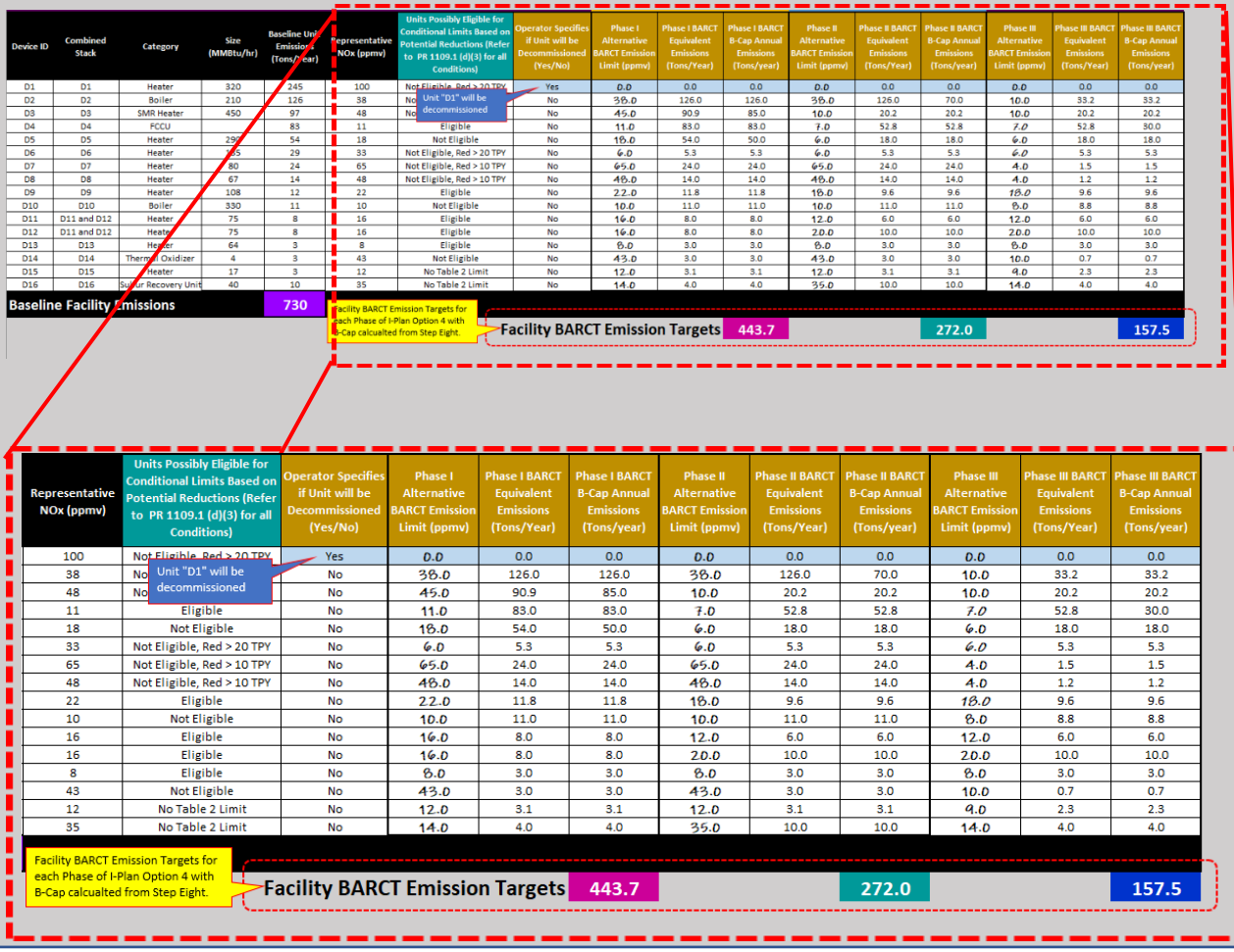
B-Cap Phases and Targets

For the following B-Cap example scenario, the facility will be selecting I-Plan Option 4 which consists of Phase I, Phase II, and Phase III. The facility:

- Determined which units will go into which Phase of the selected I-Plan and selects an Alternative BARCT NOx Limit for each unit in the B-Cap;
- Declared intention to decommission unit "D1" by selecting "Yes" in the designated column; and
- Reflected implementation of other emission reduction strategies in the BARCT B-Cap Annual Emissions to reduce emissions in each of the phases based on the Facility BARCT Emission Targets established for each phase.

From the previous example, the facility calculated and established the Facility BARCT Emission Targets for each Phase below:

- Phase I: 443.7 tons/year
- Phase II: 272 tons/year
- Phase III: 157.5 tons/year



Device ID	Combined Stack	Category	Size (MMBtu/hr)	Baseline Unit Emissions (Tons/Year)	Representative NOx (ppmv)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Specifies if Unit will be Decommissioned (Yes/No)	Phase I Alternative BARCT Emission Limit (ppmv)	Phase I BARCT Equivalent Emissions (Tons/Year)	Phase I BARCT B-Cap Annual Emissions (Tons/year)	Phase II Alternative BARCT Emission Limit (ppmv)	Phase II BARCT Equivalent Emissions (Tons/Year)	Phase II BARCT B-Cap Annual Emissions (Tons/year)	Phase III Alternative BARCT Emission Limit (ppmv)	Phase III BARCT Equivalent Emissions (Tons/Year)	Phase III BARCT B-Cap Annual Emissions (Tons/year)
D1	D1	Heater	320	245	100	Not Eligible, Red > 20 TPY	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D2	D2	Boiler	210	126	38	No	No	38.0	126.0	126.0	38.0	126.0	70.0	10.0	33.2	33.2
D3	D3	SMR Heater	450	97	48	No	No	45.0	90.9	85.0	10.0	20.2	20.2	10.0	20.2	20.2
D4	D4	FCCU	83	11		Eligible	No	11.0	83.0	83.0	7.0	52.8	52.8	7.0	52.8	30.0
D5	D5	Heater	290	54	18	Not Eligible	No	18.0	54.0	50.0	6.0	18.0	18.0	6.0	18.0	18.0
D6	D6	Heater	185	29	33	Not Eligible, Red > 20 TPY	No	6.0	5.3	5.3	6.0	5.3	5.3	6.0	5.3	5.3
D7	D7	Heater	80	24	65	Not Eligible, Red > 10 TPY	No	65.0	24.0	24.0	65.0	24.0	24.0	4.0	1.5	1.5
D8	D8	Heater	67	14	48	Not Eligible, Red > 10 TPY	No	48.0	14.0	14.0	48.0	14.0	14.0	4.0	1.2	1.2
D9	D9	Heater	108	12	22	Eligible	No	22.0	11.8	11.8	18.0	9.6	9.6	18.0	9.6	9.6
D10	D10	Boiler	330	11	10	Not Eligible	No	10.0	11.0	11.0	10.0	11.0	11.0	8.0	8.8	8.8
D11	D11 and D12	Heater	75	8	16	Eligible	No	16.0	8.0	8.0	12.0	6.0	6.0	12.0	6.0	6.0
D12	D11 and D12	Heater	75	8	16	Eligible	No	16.0	8.0	8.0	20.0	10.0	10.0	20.0	10.0	10.0
D13	D13	Heater	64	3	8	Eligible	No	8.0	3.0	3.0	8.0	3.0	3.0	8.0	3.0	3.0
D14	D14	Thermal Oxidizer	4	3	43	Not Eligible	No	43.0	3.0	3.0	43.0	3.0	3.0	10.0	0.7	0.7
D15	D15	Heater	17	3	12	No Table 2 Limit	No	12.0	3.1	3.1	12.0	3.1	3.1	9.0	2.3	2.3
D16	D16	Sulfur Recovery Unit	40	10	35	No Table 2 Limit	No	14.0	4.0	4.0	35.0	10.0	10.0	14.0	4.0	4.0
Baseline Facility Emissions				730												

Unit "D1" will be decommissioned

Facility BARCT Emission Targets for each Phase of I-Plan Option 4 with B-Cap calcualted from Step Eight.

Facility BARCT Emission Targets 443.7 272.0 157.5

Representative NOx (ppmv)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Specifies if Unit will be Decommissioned (Yes/No)	Phase I Alternative BARCT Emission Limit (ppmv)	Phase I BARCT Equivalent Emissions (Tons/Year)	Phase I BARCT B-Cap Annual Emissions (Tons/year)	Phase II Alternative BARCT Emission Limit (ppmv)	Phase II BARCT Equivalent Emissions (Tons/Year)	Phase II BARCT B-Cap Annual Emissions (Tons/year)	Phase III Alternative BARCT Emission Limit (ppmv)	Phase III BARCT Equivalent Emissions (Tons/Year)	Phase III BARCT B-Cap Annual Emissions (Tons/year)
100	Not Eligible, Red > 20 TPY	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	No	No	38.0	126.0	126.0	38.0	126.0	70.0	10.0	33.2	33.2
48	No	No	45.0	90.9	85.0	10.0	20.2	20.2	10.0	20.2	20.2
11	Eligible	No	11.0	83.0	83.0	7.0	52.8	52.8	7.0	52.8	30.0
18	Not Eligible	No	18.0	54.0	50.0	6.0	18.0	18.0	6.0	18.0	18.0
33	Not Eligible, Red > 20 TPY	No	6.0	5.3	5.3	6.0	5.3	5.3	6.0	5.3	5.3
65	Not Eligible, Red > 10 TPY	No	65.0	24.0	24.0	65.0	24.0	24.0	4.0	1.5	1.5
48	Not Eligible, Red > 10 TPY	No	48.0	14.0	14.0	48.0	14.0	14.0	4.0	1.2	1.2
22	Eligible	No	22.0	11.8	11.8	18.0	9.6	9.6	18.0	9.6	9.6
10	Not Eligible	No	10.0	11.0	11.0	10.0	11.0	11.0	8.0	8.8	8.8
16	Eligible	No	16.0	8.0	8.0	12.0	6.0	6.0	12.0	6.0	6.0
16	Eligible	No	16.0	8.0	8.0	20.0	10.0	10.0	20.0	10.0	10.0
8	Eligible	No	8.0	3.0	3.0	8.0	3.0	3.0	8.0	3.0	3.0
43	Not Eligible	No	43.0	3.0	3.0	43.0	3.0	3.0	10.0	0.7	0.7
12	No Table 2 Limit	No	12.0	3.1	3.1	12.0	3.1	3.1	9.0	2.3	2.3
35	No Table 2 Limit	No	14.0	4.0	4.0	35.0	10.0	10.0	14.0	4.0	4.0

Unit "D1" will be decommissioned

Facility BARCT Emission Targets for each Phase of I-Plan Option 4 with B-Cap calcualted from Step Eight.

Facility BARCT Emission Targets 443.7 272.0 157.5

Step Ten: Phase I, Phase II, and Phase III BARCT Equivalent Mass Emissions

BARCT Equivalent Mass Emissions

After the facility determined the units that go in each phase and the phase emission targets, the owner or operator of the facility must calculate BARCT Equivalent Mass Emissions for each unit of the I-Plan using equations (B-6.3) and (B-6.4) in Attachment B of the rule which are shown below. Equation B-6.3 is for Phase I and Phase II (if not the final phase) BARCT Equivalent Mass Emissions based on the selected Alternative NOx limits and emission reductions from decommissioned units, whereas equation B-6.4 is used for the Final Phase BARCT Equivalent Mass Emissions and is the same equation as equation B-6.3 but using **ONLY** the Alternative BARCT Emission Limits for the applicable phase (**Note:** using Representative NOx Concentrations is **NOT** allowed for the Final Phase BARCT Equivalent Mass Emissions).

If the facility selects I-Plan Option 3, the Final Phase will be Phase II so the facility will use equation B-6.4 for Phase II (Final Phase).

Equation B-6.3

$$\text{Phase I and Phase II BARCT Equivalent Mass Emissions}_{\text{B-Cap}} = \sum_{i=1}^{N}\left[\left(\frac{C_{\text{Phase I Alternative BARCT NOx Limit}}\ \boldsymbol{OR}\ C_{\text{Baseline}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions}\right)_i + (0_{\text{Decommissioned Units}})_i\right]$$

Where:

N = Number of included Units in B-Cap under Phase I

$C_{\text{Phase I Alternative BARCT NOx Limit}}$ = The applicable Alternative BARCT NOx Limit in an approved B-Plan for Unit i included in the B-Cap

C_{Baseline} = Representative NOx Concentration as defined in subdivision (c) for Unit i included in the B-Cap

$\text{Baseline Unit Emissions}$ = Baseline Unit Emissions for Unit i as defined in subdivision (c) and included in the B-Cap.

Equation B-6.4 below is the equation that the owner or operator of a facility will use to calculate the Final Phase BARCT Equivalent Mass Emissions. As mentioned earlier, using the Representative NOx is **NOT** allowed for the Final Phase and the facility must use the selected Alternative BARCT NOx Limit.

Equation B-6.4

$$\text{Final Phase BARCT Equivalent Mass Emissions}_{\text{B-Cap}} = \sum_{i=1}^{N}\left[\left(\frac{C_{\text{Phase I Alternative BARCT NOx Limit}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions}\right)_i + (0_{\text{Decommissioned Units}})_i\right]$$

Where:

N = Number of included Units in B-Cap under Phase I

$C_{\text{Phase I Alternative BARCT NOx Limit}}$ = The applicable Alternative BARCT NOx Limit in an approved B-Plan for Unit i included in the B-Cap

C_{Baseline} = Representative NOx Concentration as defined in subdivision (c) for Unit i included in the B-Cap

$\text{Baseline Unit Emissions}$ = Baseline Unit Emissions for Unit i as defined in subdivision (c) and included in the B-Cap.

Example Calculation

In the example below, based on the selected Alternative NOx BARCT Limits for each unit in each phase of the I-Plan, the facility calculates the BARCT Equivalent Mass Emissions for each unit using equation B-6.3 and B-6.4.

- The BARCT Equivalent Mass are based on the NOx Concentration Limits and emission reductions from the decommissioned unit which is unit "D1" highlighted in the blue cells.
- Units highlighted in the green cells represent units where NOx reductions will occur in later phases.
    - For example, units "D7"and "D8" will install NOx controls in Phase III or the Final Phase, so the "Representative NOx Concentration" is used for the BARCT Equivalent Mass Emissions calculation in Phase I and Phase II. This is consistent with subparagraph (g)(3)(C) of the rule where *the Representative NOx Concentration for each unit may exceed the Maximum Alternative BARCT NOx limit in Table 5 of the rule (in Phases I and II), but the facility's selected Alternative NOx BARCT Limit for the BARCT Equivalent Mass Emissions* ***CANNOT*** *exceed the limits specified in Table 5 of the rule (in Phase III).* The facility's selected Alternative NOx Limit in Phase III or final Phase for the respective units is 4 ppmv which is lower than the limits specified in Table 5 of the rule.

Selected Alternative NOx BARCT Limit for Phase I

Selected Alternative NOx BARCT Limit for Phase II

Selected Alternative NOx BARCT Limit for Phase III

Using the selected Alternative NOx BARCT Limit, the facility calculates the BARCT Equivalent Mass Emissions for each Phase.

Unit "D7",and "D8" will install NOx controls in Phase III or Final Phase, so representative NOx is used for Phase I and Phase II calculations.

Representative NOx (ppmv)	Units Possi... Conditional L... Potential Re... to PR 1109.1 (d)(3) for all Conditions)	...cifies Decommissioned (Yes/No)	Phase I Alternative BARCT Emission Limit (ppmv)	...RCT Equivalent Emissions (Tons/Year)	...RCT B-Cap Annual Emissions (Tons/year)	Phase II Alternative BARCT Emission Limit (ppmv)	...BARCT Equivalent Emissions (Tons/Year)	...BARCT B-Cap Annual Emissions (Tons/year)	Phase III Alternative BARCT Emission Limit (ppmv)	Phase III BARCT Equivalent Emissions (Tons/Year)	Phase III BARCT B-Cap Annual Emissions (Tons/year)
100	Not Eligible, Red > 20 TPY	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38		No	38.0	126.0	126.0	38.0	126.0	70.0	10.0	33.2	33.2
48		No	45.0	90.9	85.0	10.0	20.2	20.2	10.0	20.2	20.2
11		No	11.0	83.0	83.0	7.0	52.8	52.8	7.0	52.8	30.0
18			18.0	54.0	50.0	6.0	18.0	18.0	6.0	18.0	18.0
33		No	6.0	5.3	5.3	6.0	5.3	5.3	6.0	5.3	5.3
65	Not Eligible, Red > 10 TPY	No	65.0	24.0	24.0	65.0	24.0	24.0	4.0	1.5	1.5
48	Not Eligible, Red > 10 TPY	No	48.0	14.0	14.0	48.0	14.0	14.0	4.0	1.2	1.2
22			22.0	11.8	11.8	18.0	9.6	9.6	18.0	9.6	9.6
10			10.0	11.0	11.0	10.0	11.0	11.0	8.0	8.8	8.8
16			16.0	8.0	8.0	12.0	6.0	6.0	12.0	6.0	6.0
16			16.0	8.0	8.0	20.0	10.0	10.0	20.0	10.0	10.0
8			8.0	3.0	3.0	8.0	3.0	3.0	8.0	3.0	3.0
43	Not Eligible	No	43.0	3.0	3.0	43.0	3.0	3.0	10.0	0.7	0.7
12	No Table 2 Limit	No	12.0	3.1	3.1	12.0	3.1	3.1	4.0	2.3	2.3
35	No Table 2 Limit	No	14.0	4.0	4.0	35.0	10.0	10.0	14.0	4.0	4.0
		Facility BARCT Emission Targets	443.7					272.0			157.5

Step Eleven: Phase I, Phase II and Phase III BARCT B-Cap Annual Emissions

After the facility calculates the BARCT Equivalent Mass Emissions, the next step is to calculate the B-Cap Annual Emissions. The spreadsheet provided to the facilities includes the respective columns for the facility to input the selected Alternative BARCT NOx Limits and emission reduction strategy in Phase I, Phase II, and Phase III, if applicable.

B-Cap Annual Emissions

The facility will need to calculate the BARCT B-Cap Annual Emissions for each phase of the I-Plan using equation (B-7) in Appendix B of the rule. The BARCT B-Cap Annual Emissions for each phase are sum of the emissions for all units using the Baseline NOx emissions or selected Alternative BARCT Emission Limits, accounting for any emission reduction strategies which may include decommissioned unit, unit replacement, and throughput or capacity reduction. Equation B-7 in Attachment B of the rule is below:

Equation B-7.1

$$\text{Phase I and Phase II BARCT B-Cap Annual Emissions} = \sum_{i=1}^{N}\left[\left(\frac{C_{\text{Phase I Alternative BARCT NOx Limit}}\ \boldsymbol{OR}\ C_{\text{Baseline}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions}\right)_i + (0_{\text{Decommissioned Units}})_i - (\text{Throughput or Other Reductions})_i\right]$$

Where:

N = Number of included units in B-Cap under Phase I

$C_{\text{Phase I Alternative BARCT Emission Limit}}$ = The applicable Alternative BARCT NOx Limit for Phase I in an approved I-Plan for unit i included in the B-Cap

C_{Baseline} = The NOx concentration in the flue gas for unit i included in the B-Cap

Baseline Unit Emissions = The 2017 NOx baseline emissions for unit i included in the B-Cap

Throughput or Other Reductions = Emission reductions other than reducing the concentration limit.

After the facility calculates both the BARCT Equivalent Mass Emissions and the BARCT B-Cap Annual Emissions, any difference between the sum totals in each phase is due to emission reductions from throughput or any other emission reduction strategy. The facility is required to provide an explanation or justification to South Coast AQMD about these units for which the Unit BARCT B-Cap Annual Emissions are less than the BARCT Equivalent Mass Emissions.

If the BARCT B-Cap Annual Emissions for each Phase is greater than the established Facility BARCT Emission Targets for the respective phases, the facility must implement further NOx controls or other NOx reduction strategies to reduce mass emissions. Other NOx reductions strategies can include unit replacement, throughput, or utilization capacity reductions. These NOx emission reduction strategies or mechanisms will be reflected in the B-Cap Annual Emissions calculations and the facility must calculate BARCT B-Cap Annual Emissions for each unit in each phase of the I-Plan. The total emissions from each phase must be less than or equal to the Facility BARCT Emission Target for each phase.

Example Calculation

In this example, the facility calculates the BARCT B-Cap Annual Emissions using the Alternative BARCT NOx Limit and/or other emission reduction strategies and sum the total emissions for each phase. Any difference between the BARCT Equivalent Mass Emissions and BARCT B-Cap Annual Emissions in each phase is due to emission reductions from throughput or any other emission reduction strategy. The cell with Phase BARCT B-Cap Annual Emissions is highlighted in orange for the units for which such strategies are applied.

In the example below:

- Units "D3" and "D5" will achieve reduction by reducing capacity and throughput in Phase I and install NOx controls in Phase II;
- Unit "D2" will achieve emission reductions through unit replacement in Phase II and install additional NOx controls in Phase III; and
- Unit "D4" will install NOx controls in Phase II and achieve further NOx reduction in Phase III by reducing capacity and throughput.

Representative NOx (ppmv)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Specifies if Unit will be Decommissioned (Yes/No)	Phase I Alternative BARCT Emission Limit (ppmv)	Phase I BARCT Equivalent Emissions (Tons/Year)	Phase I BARCT B-Cap Annual Emissions (Tons/year)	Phase II Alternative BARCT Emission Limit (ppmv)	Phase II BARCT Equivalent Emissions (Tons/Year)	Phase II BARCT B-Cap Annual Emissions (Tons/year)	Phase III Alternative BARCT Emission Limit (ppmv)	Phase III BARCT Equivalent Emissions (Tons/Year)	Phase III BARCT B-Cap Annual Emissions (Tons/year)
100	Not Eligible, Red > 20 TPY	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	Not Eligible, Red > 20 TPY	No	38.0	126.0	126.0	38.0	126.0	70.0	10.0	33.2	33.2
48	Not Eligible, Red > 20 TPY	No	45.0	90.9	85.0	10.0	20.2	20.2	10.0	20.2	20.2
11				83.0	83.0	7.0	52.8	52.8	7.0	52.8	30.0
18			18.0	54.0	50.0	6.0		18.0	6.0	18.0	18.0
33	Not Eli		6.0	5.3	5.3			5.3	6.0		5.3
65	Not Eligible, Red > 10 TPY	No	65.0	24.0	24.0			24.0	4.0	1.5	1.5
48	Not Eligible, Red > 10 TPY	No	48.0	14.0	14.0			14.0			1.2
22	Eligible	No	22.0	11.8	11.8			9.6			9.6
10	Not Eligible	No	10.0	11.0	11.0	10.0	11.0	11.0			8.8
16	Eligible	No	16.0	8.0	8.0	12.0	6.0	6.0			6.0
16	Eligible	No	16.0	8.0	8.0	20.0	10.0	10.0			10.0
8	Eligible	No	8.0	3.0	3.0	8.0	3.0	3.0			3.0
43	Not Eligible	No	43.0	3.0	3.0	43.0	3.0	3.0	10.0	0.7	0.7
12	No Table 2 Limit	No	12.0	3.1	3.1	12.0	3.1	3.1	9.0	2.3	2.3
35	No Table 2 Limit	No	14.0	4.0	4.0	35.0	10.0	10.0	14.0	4.0	4.0
					439.1			260.0			149.7
				Facility BARCT Emission Targets	443.7			272.0			157.5

Unit "D3" and "D5" will achieve reduction by reducing capacity and throughput in Phase I.

Unit "D2" will achieve reduction through unit replacement in Phase II

Unit "D4" will install NOx controls in Phase II, but will further achieve reduction in phase III by reducing capacity and throughput.

Using the NOx reduction strategies, the BARCT B-Cap Annual Emissions for each Phase is calculated.

Step Twelve: Demonstrate the BARCT B-Cap Annual Emissions are Less than the Facility BARCT Emission

In the final step, the operator must demonstrate that the Phase I, Phase II, and Phase III (if applicable) BARCT B-Cap Annual Emissions is equal to or less than the respective Phase, I, Phase II, and Phase III Facility BARCT Emission Target. The BARCT B-Cap Annual Emissions for each facility is the total mass emissions at full implementation of control projects and must be calculated based on the Alternative BARCT NOx limits that will be reflected in the permit and other emission reduction strategies as shown in Attachment B of the rule. Under a B-Cap, the facility is required to take permit conditions for each of the selected Alternative NOx Limits which cannot exceed Table 5 of the rule, but is based on the averaging time specified in Table 1 for the applicable unit.

The second compliance demonstration for a facility complying through a B-Cap is to continuously demonstrate that the daily facility-wide emissions are below the Facility BARCT Emission Target for each phase upon completion of that phase.

Example Calculation

As shown in the example below:

- Phase I BARCT B-Cap Annual Emissions are 439.1 tons/year, which are less than Phase I Facility BARCT Emission Target of **443.7** tons/year;
- Phase II BARCT B-Cap Annual Emissions are 260 tons/year, which are less than Phase II Facility BARCT Emission Target of **272.0** tons/year; and
- Phase III BARCT B-Cap Annual Emissions are 149.7 tons/year, which are less than Phase III Facility BARCT Emission Target of **157.5** tons/year.

Representative NOx (ppmv)	Units Possibly Eligible for Conditional Limits Based on Potential Reductions (Refer to PR 1109.1 (d)(3) for all Conditions)	Operator Specifies if Unit will be Decommissioned (Yes/No)	Phase I Alternative BARCT Emission Limit (ppmv)	Phase I BARCT Equivalent Emissions (Tons/Year)	Phase I BARCT B-Cap Annual Emissions (Tons/year)	Phase II Alternative BARCT Emission Limit (ppmv)	Phase II BARCT Equivalent Emissions (Tons/Year)	Phase II BARCT B-Cap Annual Emissions (Tons/year)	Phase III Alternative BARCT Emission Limit (ppmv)	Phase III BARCT Equivalent Emissions (Tons/Year)	Phase III BARCT B-Cap Annual Emissions (Tons/year)
100	Not Eligible, Red > 20 TPY	Yes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	Not Eligible, Red > 20 TPY	No	38.0	126.0	126.0	38.0	126.0	70.0	10.0	33.2	33.2
48	Not Eligible, Red > 20 TPY	No	45.0	90.9	85.0	10.0	20.2	20.2	10.0	20.2	20.2
11	Eligible	No	11.0	83.0	83.0	7.0	52.8	52.8	7.0	52.8	30.0
18	Not Eligible	No	18.0	54.0	50.0	6.0	18.0	18.0	6.0	18.0	18.0
33	Not Eligible, Red > 20 TPY	No	6.0	5.3	5.3	6.0	5.3	5.3	6.0	5.3	5.3
65	Not Eligible, Red > 10 TPY	No	65.0	24.0	24.0	65.0	24.0	24.0	4.0	1.5	1.5
48	Not Eligible, Red > 10 TPY	No	48.0	14.0	14.0	48.0	14.0	14.0	4.0	1.2	1.2
22	Eligible	No	22.0	11.8	11.8	18.0	9.6	9.6	18.0	9.6	9.6
10	Not Eligible	No	10.0	11.0	11.0	10.0	11.0	11.0	8.0	8.8	8.8
16	Eligible	No	16.0	8.0	8.0	12.0	6.0	6.0	12.0	6.0	6.0
16	Eligible	No	16.0	8.0	8.0	20.0	10.0	10.0	20.0	10.0	10.0
8	Eligible	No	8.0	3.0	3.0	8.0	3.0	3.0	8.0	3.0	3.0
43	Not Eligible	No	43.0	3.0	3.0	43.0	3.0	3.0	10.0	0.7	0.7
12	No Table 2 Limit	No	12.0	3.1	3.1	12.0	3.1	3.1	4.0	2.3	2.3
35	No Table 2 Limit	No	14.0	4.0	4.0	35.0	10.0	10.0	14.0	4.0	4.0
					439.1			260.0			149.7
					443.7			272.0			157.5

BARCT B-Cap Annual Emissions Must be less than or equal to FAcility BARCT Emission Targets

Facility BARCT Emission Targets

Part 2.6: Addition of New Units to a B-Cap and I-Plan

Subparagraph (g)(4)(E) provides provisions for a facility seeking to add new unit(s) to an approved B-Cap. The facility must demonstrate one or more of the following criteria are met before a new unit can be added to the facility. The facility is also required to provide in writing, at the time the permit application is submitted for the new unit, which of the following conditions is met:

- The unit for which permit application is being submitted is not subject to Rule 1109.1 or is a unit that will meet an exemption pursuant to Rule 1109.1 paragraph (o)(1), (o)(2), (o)(5), (o)(6), (o)(8), or (o)(9). If the facility met this condition, the new unit would not be required to be included in the B-Cap. The new unit would be required to meet all permit condition for limiting hours of operation or fuel usage that is specified in Rule 1109.1 or other applicable rule(s).

- The BARCT Equivalent Mass Emissions, accounting for the new unit's mass emissions, is below the Facility BARCT Emission Target for the current and future phases of the I-Plan, as calculated in Attachment B of the rule. If the operator meets this condition, the new unit would not be required to be included in the B-Cap.
- The new unit is not functionally similar to any unit that was decommissioned in the approved B-Cap and the new unit will not increase the overall facility throughput. If the operator meets this condition, the new unit will not need to be added to the B-Cap.
- The total amount of NOx emission reductions from units that were decommissioned, represents 15 percent or less of the Final Phase Facility BARCT Emission Target in an approved B-Cap and the B-Cap is modified to include the new unit and the Facility BARCT Emission Target is adjusted to incorporate the new unit.
- The new unit is functionally similar to a unit that was decommissioned, and the B-Cap is modified with no increase in the Facility BARCT Emission Target. Any unit that was decommissioned had a share in the remaining emissions in the B-Cap that was based on the Table 1 NOx Concentration Limit. Any new unit that is functionally similar to the decommissioned unit, including units from different equipment categories with the same purpose, should not be allowed to have an additional share in the Facility BARCT Emission Target.

The provisions for new units and decommissioned units are to prevent a facility from shutting down units instead of installing controls on units. While shutting down a unit will result in emission reductions, the intent of Rule 1109.1 is to require facilities to have BARCT on all units, or BARCT equivalent emissions in the aggregate. If the owner or operator of a facility were to decommission a unit, take credit for the emission reductions in the B-CAP, and later install a functionally similar unit outside the B-Cap, the B-Cap would no longer be BARCT equivalent; it would not be equitable if the owner or operator uses the decrease in the remaining emissions resulted from decommissioning a unit to allow another unit to not install pollution controls, and later installs a unit that is functionally similar to the unit that was decommissioned.

Part 2.7: Implementation of a B-Cap and I-Plan

Once the facility receives the written approval of the B-Cap, the facility is required to submit a complete permit application to apply for a condition that limits the NOx emissions to not exceed the Alternative BARCT NOx Limit based on the schedule for the approved I-Plan (Rule 1109.1 paragraph (g)(4)). The facility must not operate a unit unless the NOx emissions are below the Alternative BARCT NOx Limits (Rule 1109.1 subparagraph (g)(4)(B)). Upon full implementation of the I-Plan, every unit is required to have a NOx permit limit, even if the unit is not modified by adding pollution controls.

Two Compliance Components of the B-Cap (Subparagraphs (h)(9)(A) through (h)(9)(C))

Under the B-Cap, there are two compliance components:

1. The facility must apply for a permit condition that limits the NOx emissions to the Alternative BARCT NOx Limit which are demonstrated according to the averaging time and oxygen correction specified for each equipment category in Table 1, Table 2, or Table 5 if applicable.

2. The facility must demonstrate that the actual mass emissions from all units under the B-Cap are below the Facility BARCT Emission Target. The on-going compliance demonstration of facility-wide mass emissions are based on a rolling 365-day average, each day as measured pursuant to Rule 1109.1 subdivision (k) and paragraph (n)(2), and the recordkeeping must be conducted based on the applicable schedule in subparagraph (h)(9)(C).
    - The 365-day rolling average compliance demonstration includes startup and shutdown emissions (clause (n)(2)(D)(i) and subparagraph (n)(2)(E)); however, the startup and shutdown emissions may be excluded when demonstrating compliance with the Alternative NOx concentration limits pursuant to Rule 429.1.

The first compliance component is based on Alternative BARCT NOx selected for each unit included in the B-Cap and based on the averaging time and oxygen correction for each equipment category in Table 1, Table 2, or Table 5 (if applicable) of the rule. A facility that is constructing and installing NOx control for compliance with an applicable NOx concentration limit or Alternative NOx BARCT Limit will demonstrate compliance in accordance with paragraph (f)(8) and (f)(9) of the rule.

- Paragraph (f)(8) is applicable to any unit subject to an averaging time less than 365-day in Rule 1109.1 Table 1, Table 2, or Table 5 (if applicable) that operates a CEMS. The owner or operator of such unit must demonstrate compliance with the applicable NOx concentration limit or Alternative NOx Limit in an approved B-Cap six months after one of the following, whichever occurs sooner:
    - The date the South Coast AQMD Permit to Operate issued; or
    - 36 months after the Permit to Construct is issued; or
    - Completion of a compliance demonstration source test.
- Paragraph (f)(9) is applicable to any unit subject to a 365-day rolling average in Rule 1109.1 Table 1, Table 2, or Table 5 (if applicable). The owner or operator of such unit shall demonstrate compliance with the applicable NOx concentration limit or Alternative NOx BARCT Limit in an approved B-Cap beginning 14 months after one of the following, whichever occurs sooner:
    - The date the South Coast AQMD Permit to Operate issued; or
    - 36 months after the Permit to Construct is issued or
    - Completion of a compliance demonstration source test.

The second compliance component is based on a 365-day emissions average; therefore, a full year of data will need to be collected prior to obtaining the first full rolling daily average after the unit has been retrofitted with NOx controls or implementation of other emission reductions strategies.

An additional component is included if a facility exits RECLAIM (i.e., becomes a former RECLAIM facility) before the Phase I of the selected I-Plan. In that instance, the facility will be subject to interim NOx limits, which for the B-Cap is the Baseline Facility Emissions. The Baseline Facility Emissions are based on the 2017 NOx emissions as specified in the "Baseline NOx Emissions and Representative NOx Concentrations for Facilities Regulated Under Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations". The 2017 Baseline Facility Emissions serve as the interim NOx limits for former RECLAIM facilities and is intended to prevent backsliding.

The following table provides the schedule of the effective dates for the two I-Plan options with a B-Cap, including the effective dates for the interim NOx limit.

Table 4: Compliance Dates for the Facility BARCT Emission Target for I-Plans and B-Cap

I-Plan Option	Interim NOx Limits (e.g., Baseline Facility Emissions)	Phase I	Phase II	Phase III
I-Plan Option 3	If the Facility is a Former RECLAIM Facility	On and after January 1, 2031 and before January 1, 2035	On and after January 1, 2035	Not Applicable
I-Plan Option 4	If the Facility is a Former RECLAIM Facility	On and after January 1, 2025 and before July 1, 2030	On and after July 1, 2030 and before July 1, 2033	On and after July 1, 2033

A facility electing to comply with a B-Cap will be held to the Baseline Facility Emissions as the interim limit as soon as becoming a former RECLAIM facility.

For I-Plan Option 3 with a B-Cap, the facility will be held to the Baseline Facility Emissions as the interim limit if the facility becomes a former RECLAIM facility before January 1, 2031. The facility will be held to the Phase I Facility BARCT Emission Target on January 1, 2031, and Phase II Facility BARCT Emission Target on January 1, 2035.

For I-Plan Option 4 with a B-Cap, the facility will be held to the Baseline Facility Emissions as the interim limit if the facility becomes a former RECLAIM facility before January 1, 2025. The Facility will be held to the Phase I Facility BARCT Emission Target on January 1, 2025, Phase II Facility BARCT Emission Target on July 1, 2030, and Phase III Facility BARCT Emission Target on July 1, 2033.

Part 2.8: Modification of a B-Cap and I-Plan

If a facility seeks to modify an approved I-Plan or B-Cap, Rule 1109.1 paragraph (i)(7) outlines the procedure the facilities must follow to apply for a plan modification. A facility must modify an approved plan for the following reasons:

- A unit identified as meeting Table 2 no longer meets the requirements of Rule 1109.1 paragraph (d)(3);
- A unit in an approved plan, identified as meeting Table 2 for establishing the Phase I, Phase II, or Phase III BARCT Facility Emission Target, is decommissioned;
- A higher Alternative BARCT NOx Limit will be proposed in the South Coast AQMD permit application than the Alternative BARCT NOx Limit for that unit in the currently approved plan;

- Any emission reduction project is moved to a later implementation phase, any emission reduction project is moved between phases, or any emission reduction project is removed from a phase;
- The facility receives written notification from the Executive Officer that modifications to the plan is needed; or
- A permit application is submitted for a new unit that meets at least one provision of Rule subparagraph (g)(4)(E).

Rule 1109.1 paragraph (i)(8) specifies that the review and approval of modifications to an I-Plan, B-Plan, or B-Cap shall be based on the initial review and approval process pursuant to paragraph (i)(4) of the rule. Although there is no specified timeframe to submit a modification, the owner or operator is expected to submit a modification as soon as possible upon knowing one of the items under subparagraph (i)(7)(B), also listed above, are triggered.

Attachment: Supplemental Plan Checklist Forms

South Coast Air Quality Management District

RULE 1109.1 I-PLAN WITH B-PLAN OR I-PLAN WITH TABLE 1 OR TABLE 2 SUBMITTAL CHECKLIST

Mail To: SCAQMD
21865 Copley Dr.
Diamond Bar, CA 91765

Submit this form by September 1, 2022.

Section A – Applicable Facility or Facilities Under the Same Ownership (check all that apply)

1. SCAQMD Facility Name and ID

- ☐ AltAir Paramount, LLC (187165)
- ☐ Chevron Products Co. (800030)
- ☐ Lunday-Thagard Co. DBA World Oil Refining (800080)
- ☐ Phillips 66 Company/LA Refinery Wilmington PL (171107)
- ☐ Phillips 66 Company/Los Angeles Refinery (171109)
- ☐ Tesoro Refining and Marketing Co., LLC – Carson (174655)
- ☐ Tesoro Refining and Marketing Co., LLC – Wilmington (800436)
- ☐ Tesoro Refining and Marketing Co., LLC – Sulfur Recovery Plant (151798)
- ☐ Tesoro Refining and Marketing Co., LLC, Calciner (174591)
- ☐ Torrance Refining Company LLC (181667)
- ☐ Ultramar Inc. (800026)
- ☐ Valero Wilmington Asphalt Plant (800393)

Section B – I-Plan Option Selection (select one)

Please Select One I-Plan Option:

- ☐ Option 1 with B-Plan
- ☐ Option 1 with Table 1 and/or Table 2 Limits
- ☐ Option 2 with B-Plan*
- ☐ Option 3 with B-Plan*
- ☐ Option 5 with B-Plan
- ☐ Option 5 with Table 1 and/or Table 2 Limits

*Note: Selection of I-Plan Option 2 or Option 3 requires a one-time demonstration pursuant to subparagraph (h)(2)(E)

Section C – I-Plan with B-Plan Submittal Requirements Checklist

- ☐ Verify the pre-populated information in provided spreadsheet list all units and the data is accurate
- ☐ Identify all units to be included in the selected I-Plan Option with B-Plan pursuant to subparagraph (g)(1)(B)
- ☐ For each unit included in plan, Identify which units qualify for Table1 and Table 2 NOx Limits
- ☐ Identify the anticipated start and end date (month and year) of the turnaround schedule for each unit
- ☐ Specify which phase of the selected I-Plan Option with B-Plan each permit application will be submitted for each unit
- ☐ Specify the Alternative BARCT NOx limit for each unit in the I-Plan Option with B-Plan
- ☐ Calculations for Phase I, Phase II, and if applicable, Phase III BARCT Equivalent Mass Emissions using the specified Alternative BARCT NOx Limit for each unit pursuant to Attachement B of the rule
- ○ Demonstrate that one of the following options is true:
  - ☐ I-Plan with Table 1 and/or Table 2 Limits: Mass Emissions for all units in each phase are less than the respective phase Facility BARCT Emission Target
  - ☐ I-Plan with B-Plan: BARCT Equivalent Mass Emissions for all units in each phase are less than the respective phase of the Facility BARCT Emission Target

Section D – Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

10. Signature of Responsible Official:	11. Title of Responsible Official:
12. Print Name:	13. Date:

SCAQMD USE ONLY	APPLICATION TRACKING #		EQUIPMENT CATEGORY CODE:	FEE $		VALIDATION
DATE A R	ENG.A R DATE	CLASS I III	ASSIGNMENT Unit Engineer	CHECK/MONEY ORDER #	AMOUNT $	TRACKING #

South Coast Air Quality Management District

RULE 1109.1 I-PLAN WITH B-CAP SUBMITTAL CHECKLIST

Mail To: SCAQMD
21865 Copley Dr.
Diamond Bar, CA 91765

Submit this form by September 1, 2022.

Section A – Applicable Facility or Facilities Under the Same Ownership (check all that apply)

1. SCAQMD Facility Name and ID

- ☐ AltAir Paramount, LLC (187165)
- ☐ Chevron Products Co. (800030)
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- ☐ Torrance Refining Company LLC (181667)
- ☐ Ultramar Inc. (800026)
- ☐ Valero Wilmington Asphalt Plant (800393)

Section B – I-Plan Option Selection (select one)

Please Select One I-Plan Option:

- ☐ Option 3 with B-Cap*
- ☐ Option 4 with B-Cap

*Note: Selection of I-Plan Option 2 or Option 3 requires a one-time demonstration pursuant to subparagraph (h)(2)(E)

Section C – I-Plan with B-Cap Submittal Requirements Checklist

- ☐ Verify the pre-populated information in provided spreadsheet list all units and that the data is accurate
- ☐ Identify all units to be included in the selected I-Plan pursuant to subparagraph (g)(3)(B)
- ☐ Identify any unit that will be decommissioned and the Phase of the I-Plan that the unit will be decommissioned
- ☐ For each unit included in I-Plan, identify which units qualify for Table1 and Table 2 NOx Limits
- ☐ Identify the anticipated start and expected end date (month and year) of the turnaround schedule for each unit
- ☐ Specify which phase of the selected I-Plan each permit application will be submitted for each unit
- ☐ Specify the Alternative BARCT NOx limit for each unit in the plan
- ☐ Verify and ensure that an additional 10% NOx reduction is incorporated to the Final Phase Facility Emission Target pursuant to paragraph (h)(4) of the rule
- ☐ Calculations for Phase I, Phase II, and if applicable, Phase III BARCT Equivalent Mass Emissions using the specified Alternative BARCT NOx Limit for each unit pursuant to subparagraph (g)(3)(C) and Attachement B of the rule
  - ☐ Demonstarte that the BARCT B-CAP Annual Emissions in each phase are less than the the Facility BARCT Emission Target for the respective phase.
  - ☐ Explanation of emission reduction strategy for any unit where the BARCT B-Cap Annual Emission values are less than the BARCT Equivalent Mass Emissions (additional documentation can be attached to this checklist firn document)

Section D – Authorization/Signature

I hereby certify that all information contained herein and information submitted with this application are true and correct.

10. Signature of Responsible Official:	11. Title of Responsible Official:
12. Print Name:	13. Date:

SCAQMD USE ONLY	APPLICATION TRACKING #		EQUIPMENT CATEGORY CODE:	FEE $	VALIDATION
A R DATE	ENG A R DATE	CLASS I II	ASSIGNMENT Unit Engineer	CHECK/MONEY ORDER #	AMOUNT $	TRACKING #