State of Utah
SPENCER J. COX
Governor
DEIDRE HENDERSON
Lieutenant Governor

Department of
Environmental Quality
Kimberly D. Shelley
Executive Director
DIVISION OF AIR QUALITY
Bryce C. Bird
Director

RN147800003

January 29, 2024

Jim Davidson
United States Bakery dba Franz Bakery, Salt Lake City
315 NE 10th Avenue
Portland, OR 97232
Jim.Davidson@usbakery.com

Dear Jim Davidson,

Re: Engineer Review:
Modification to AO DAQE-AN147800002-20 for an Increase in Production of Bread and Buns
Project Number: N147800003

The DAQ requests a company representative review and sign the attached Engineer Review (ER). This ER identifies all applicable elements of the New Source Review permitting program. United States Bakery dba Franz Bakery, Salt Lake City should complete this review within **10 business days** of receipt.

United States Bakery dba Franz Bakery, Salt Lake City should contact **John Persons** at (385) 306-6503 if there are questions or concerns with the review of the draft permit conditions. Upon resolution of your concerns, please email **John Persons** at **jpersons@utah.gov** the signed cover letter. Upon receipt of the signed cover letter, the DAQ will prepare an ITA for a 30-day public comment period. At the completion of the comment period, the DAQ will address any comments and will prepare an Approval Order (AO) for signature by the DAQ Director.

If United States Bakery dba Franz Bakery, Salt Lake City does not respond to this letter within **10 business days,** the project will move forward without source concurrence. If United States Bakery dba Franz Bakery, Salt Lake City has concerns that cannot be resolved and the project becomes stagnant, the DAQ Director may issue an Order prohibiting construction.

Approval Signature ____
(Signature & Date)

UTAH DIVISION OF AIR QUALITY
ENGINEER REVIEW

SOURCE INFORMATION

Project Number	N147800003
Owner Name	United States Bakery dba Franz Bakery, Salt Lake City
Mailing Address	315 NE 10th Avenue Portland, OR, 97232
Source Name	United States Bakery
Source Location	8556 South 2940 West West Jordan, UT 84088
UTM Projection	418,501 m Easting, 4,494,291 m Northing
UTM Datum	NAD83
UTM Zone	UTM Zone 12
SIC Code	2051 (Bread & Other Bakery Products, Except Cookies & Crackers)
Source Contact	Jim Davidson
Phone Number	(503) 813-0382
Email	Jim.Davidson@usbakery.com
Billing Contact	Jim Davidson
Phone Number	(503) 813-0382
Email	Jim.Davidson@usbakery.com
Project Engineer	John Persons, Engineer
Phone Number	(385) 306-6503
Email	jpersons@utah.gov
Notice of Intent (NOI) Submitted	August 10, 2023
Date of Accepted Application	October 30, 2023

SOURCE DESCRIPTION

General Description
United States Bakery (USB), dba Franz Bakery, Salt Lake City, operates a bakery to make bread, buns, cookies, muffins, and donuts. Dry or moist ingredients are mixed, divided, and rounded. molded, and proofed. The ingredients are then baked or fried. Emissions include natural gas combustion from boilers, ovens, fryers, deep frying operations, material loading/unloading and mixing, and yeast fermentation processes.

NSR Classification:
Minor Modification at Minor Source

Source Classification
Located in , Southern Wasatch Front O3 NAA, Salt Lake City UT $PM_{2.5}$ NAA, Salt Lake County SO_2 NAA,
Salt Lake County
Airs Source Size: B

Applicable Federal Standards
None

Project Proposal
Modification to AO DAQE-AN147800002-20 for an Increase in Production of Bread and Buns

Project Description
United States Bakery (USB) has requested to modify its current AO (DAQE-AN147800002-20) for its West Jordan Bakery to increase the production of bread and buns. USB has requested to increase its annual production of bread by 1,340 tpy and buns by 2,010 tpy. This change increases the VOC PTEs by 7.96 tpy.

EMISSION IMPACT ANALYSIS

The emission increases in criteria pollutants and HAPs from this modification are less than the modeling threshold values listed in R307-410; therefore, modeling is not required for this modification. [Last updated January 9, 2024]

SUMMARY OF EMISSIONS

The emissions listed below are an estimate of the total potential emissions from the source. Some rounding of emissions is possible.

Criteria Pollutant	Change (TPY)	Total (TPY)
CO_2 Equivalent	0	9404.00
Carbon Monoxide	0	5.77
Nitrogen Oxides	0	6.87
Particulate Matter - PM_{10}	0.01	1.09
Particulate Matter - $PM_{2.5}$	0.01	1.09
Sulfur Dioxide	0	0.04
Volatile Organic Compounds	7.96	49.50

Hazardous Air Pollutant	Change (lbs/yr)	Total (lbs/yr)
Generic HAPs (CAS #GHAPS)	0	260
	Change (TPY)	**Total (TPY)**
Total HAPs	0	0.13

Note: Change in emissions indicates the difference between previous AO and proposed modification.

Review of BACT for New/Modified Emission Units

1. **BACT review regarding VOC emission from Yeast Production**
United States Bakery (USB) has requested to increase its bread and bun production at its West Jordan Bakery. This change will result in an increase in VOCs and trace amounts of PM_{10} and $PM_{2.5}$. These emissions increases will result from two things: Yeast Development and Mixers/Silos. These two sources of pollution will be analyzed below.

Yeast Production

The Yeast Production process has the potential to emit VOCs. USB researched various control technologies that could be used to control these emissions. These technologies include carbon adsorption, catalytic oxidizers, condensation units, thermal oxidizers, proper cleaning operation, and wet-packed-bed scrubbers.

The use of carbon adsorption is technically infeasible because oils and fats emitted from ovens and fryers will clog the pores of the activated carbon, which reduces the life of the system and also makes the system significantly less efficient. The use of condensation units is technically infeasible because of the bakery ovens' high airflow rates. Based on research of similar sources condensation has not proven to be feasible for controlling VOCs from bakery ovens. The use of wet-packed-bed scrubbers is not technically feasible because installing wet-packed-bed scrubbers would require the source to further install a wastewater treatment plant of an ethanol recovery unit. Even though this might technically be feasible there is no chance that implementation of this would prove to be cost-effective because the only emissions that could be used in the cost feasibility equation are the increase in VOCs. The use of catalytic oxidizers, thermal oxidizers, and proper cleaning operations are all technically feasible.

List of remaining control technologies listed by control efficiently (1 - most efficient):
Catalytic Oxidizer (95-99%)
Thermal Oxidizer (95%)
Proper Cleaning Operations

The use of catalytic oxidizers is economically infeasible. Based on manufacturers' costs collected by USB it would cost $44,193 per ton of VOCs removed. The use of thermal oxidizers is economically infeasible. Based on manufacturers' costs collected by USB it would cost $34,562 per ton of VOCs removed. The use of proper cleaning operations is economically feasible. Proper cleaning operations includes weekly removal of dough/bread from ovens and proof boxes by scraping and sweeping. It also includes monthly removal of oil, dough, bread, and other accumulated waste from the interior and exterior of the ovens and proof boxes.

The DAQ selects the following BACT:
The owner/operator shall operate the ovens and proof boxes according to the proper cleaning operational guidelines. Proper cleaning operations includes weekly removal of dough/bread from ovens and proof boxes by scraping and sweeping. It also includes monthly removal of oil, dough, bread, and other accumulated waste from the interior and exterior of the ovens and proof boxes
[Last updated January 29, 2024]

2. **BACT review regarding PM emissions from mixers and silos**
This modification will increase PM_{10} and $PM_{2.5}$ emissions from the mixers and silos onsite. The PM_{10} and $PM_{2.5}$ will both increase by 0.01 tpy. This increase is trivial and no further emissions control technologies exist that would be cost-effective based on the minimal emissions increase.

The DAQ requires no further control technologies.
[Last updated January 9, 2024]

SECTION I: GENERAL PROVISIONS

The intent is to issue an air quality AO authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. **(New or Modified conditions are indicated as "New" in the Outline Label):**

I.1	All definitions, terms, abbreviations, and references used in this AO conform to those used in the UAC R307 and 40 CFR. Unless noted otherwise, references cited in these AO conditions refer to those rules. [R307-101]
I.2	The limits set forth in this AO shall not be exceeded without prior approval. [R307-401]
I.3	Modifications to the equipment or processes approved by this AO that could affect the emissions covered by this AO must be reviewed and approved. [R307-401-1]
I.4	All records referenced in this AO or in other applicable rules, which are required to be kept by the owner/operator, shall be made available to the Director or Director's representative upon request, and the records shall include the two-year period prior to the date of the request. Unless otherwise specified in this AO or in other applicable state and federal rules, records shall be kept for a minimum of two (2) years. [R307-401-8]
I.5	At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this AO, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Director which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded. [R307-401-4]
I.6	The owner/operator shall comply with UAC R307-107. General Requirements: Breakdowns. [R307-107]
I.7	The owner/operator shall comply with UAC R307-150 Series. Emission Inventories. [R307-150]

SECTION II: PERMITTED EQUIPMENT

The intent is to issue an air quality AO authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. **(New or Modified conditions are indicated as "New" in the Outline Label):**

II.A THE APPROVED EQUIPMENT

II.A.1	**United States Bakery** Bakery
II.A.2	**Misc. Natural Gas Combustion Equipment** Including boilers, ovens, and fryers. Each equipment is rated less than 5 MMBtu/hr; Total rated capacity is 21 MMBtu/hr or less
II.A.3	**Three (3) Mixers** Venting to the inside of building Listed for information only
II.A.4	**Three (3) Flour Silos** Each is rated at 50 tons or less Emissions from the silos are controlled with a baghouse

SECTION II: SPECIAL PROVISIONS

The intent is to issue an air quality AO authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. **(New or Modified conditions are indicated as "New" in the Outline Label):**

II.B REQUIREMENTS AND LIMITATIONS

II.B.1	**Source-Wide Requirements**
II.B.1.a	The owner/operator shall control emissions from the flour silos with a baghouse during loading/unloading operations. [R307-401-8]
II.B.1.b	The owner/operator shall not allow visible emissions from any emission unit on site to exceed 10% opacity. [R307-401-8]
II.B.1.b.1	Opacity observations of emissions from stationary sources shall be conducted according to 40 CFR 60, Appendix A, Method 9. [R307-401-8]
II.B.2 NEW	**Oven and Proof Box Requirements**
II.B.2.a NEW	The owner/operator shall remove dough and bread from ovens and proof boxes by scraping and sweeping weekly. [R307-401-8]
II.B NEW	The owner/operator shall remove oil, bread, dough, and other accumulated waste from the interior and exterior of ovens and proof boxes monthly. [R307-401-8]
II.B.1	**VOC Limit**

II.B.1.a NEW	The owner/operator shall not allow VOC emissions from yeast-raised bread baking operations to exceed 49.50 tons per rolling 12-month period. [R307-401-8]
II.B.1.a.1	Compliance with the limitation shall be determined on a rolling 12-month total. No later than 28 days after the end of each month a new 12-month total shall be calculated using data from previous 12 months. [R307-401-8]
II.B.1.a.2	VOC emissions from yeast-raised bread baking operations shall be calculated using the following formula: VOC emissions = (Daily tons of baked products)(VOC emission factor)/2000 Where: VOC emissions in tons per day Daily tons of baked products include bread, buns, and donuts VOC emission factor in lbs of VOC per ton of baked products. [R307-401-8]
II.B.1.a.3	VOC emission factor from yeast-raised bread baking operations shall be calculated using the following formula: VOC emission factor = 0.95Yi + 0.195ti - 0.51S - 0.86ts + 1.90 Where: VOC emission factor in lbs of VOC per ton of baked products Yi = initial baker's percent of yeast ti = total yeast action time in hours S = final (spike) baker's percent of yeast, and ts = spiking time in hours. [R307-401-8]
II.B.1.a.4	The owner/operator shall maintain daily records of the above parameters used to calculate the VOC emissions and VOC emission factor. The records of baked products shall include bread, buns and donuts and shall be determined by sales records. All the records shall be kept on a daily basis. [R307-401-8]

PERMIT HISTORY

When issued, the approval order shall supersede (if a modification) or will be based on the following documents:

Supersedes	AO DAQE-AN147800002-20 dated December 10, 2020
Is Derived From	NOI dated August 10, 2023
Incorporates	Additional Information dated October 30, 2023

REVIEWER COMMENTS

1. **Comment regarding Production Increases:**
United States Bakery has requested to increase its annual production of bread by 1,340 tpy and buns by 2,010 tpy at its West Jordan Bakery. This change increases the VOC PTEs by 7.96 tpy. There are no limits in the permit specifically limiting the tpy of bread and bun production, instead, the DAQ is using a VOC limit to ensure compliance with production throughputs.
[Last updated January 9, 2024]

2. **Comment regarding emission calculations:**
Particulate and VOC emission factors for deep frying operations are obtained from AP-42 Chapter 9, Table 9.13.3-2&3. $PM_{2.5}$ emissions are conservatively assumed to be the same as PM_{10}. Emissions are calculated using the dough through-put multiplied by the emission factors.

Particulate emissions from silo loading/unloading emissions are calculated using emission factors in AP-42 Chapter 11.12-2 for cement supplement to elevated storage silos. Emissions from the loading/unloading operations are controlled with a baghouse.

VOC emissions from fermentation are divided in four (4) production lines. Emission factors are obtained from the Alternative Control Technology Document for Bakery Oven Emissions (EPA 453/R-92-017, December 1992).
[Last updated January 9, 2024]

3. **Comment regarding NSPS and MACT :**
Non-Applicability of 40 CFR 60 (NSPS) Subpart DC and 40 CFR 63 (MACT) Subpart JJJJJJ.

40 CFR 60 Subpart Dc applies to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h). All the natural gas-fired equipment at this facility is rated at less than 5 MMBtu/hr; therefore, Subpart Dc does not apply to any natural gas combustion equipment on site.

40 CFR 63 Subpart JJJJJJ applies to the boilers located at an area source of HAPs. However, this subpart does not apply to boilers that only burn natural gas as fuel. The emergency boiler at this facility burns only natural gas as fuel and therefore, it is not subject to Subpart JJJJJJ. [Last updated January 9, 2024]

4. **Comment regarding Title V Applicability :**

Title V of the 1990 Clean Air Act (Title V) applies to the following:

1. Any major source
2. Any source subject to a standard, limitation, or other requirement under Section 111 of the Act, Standards of Performance for New Stationary Sources;
3. Any source subject to a standard or other requirement under Section 112 of the Act, Hazardous Air Pollutants.
4. Any Title IV affected source.

This source is not a major source, not subject to any federal standard, and not a Title IV-affected source. Therefore, Title V does not apply to the source. [Last updated January 9, 2024]

ACRONYMS

The following lists commonly used acronyms and associated translations as they apply to this document:

40 CFR	Title 40 of the Code of Federal Regulations
AO	Approval Order
BACT	Best Available Control Technology
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CDS	Classification Data System (used by EPA to classify sources by size/type)
CEM	Continuous emissions monitor
CEMS	Continuous emissions monitoring system
CFR	Code of Federal Regulations
CMS	Continuous monitoring system
CO	Carbon monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent - 40 CFR Part 98, Subpart A, Table A-1
COM	Continuous opacity monitor
DAQ/UDAQ	Division of Air Quality
DAQE	This is a document tracking code for internal UDAQ use
EPA	Environmental Protection Agency
FDCP	Fugitive dust control plan
GHG	Greenhouse Gas(es) - 40 CFR 52.21 (b)(49)(i)
GWP	Global Warming Potential - 40 CFR Part 86.1818-12(a)
HAP or HAPs	Hazardous air pollutant(s)
ITA	Intent to Approve
LB/HR	Pounds per hour
LB/YR	Pounds per year
MACT	Maximum Achievable Control Technology
MMBTU	Million British Thermal Units
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOI	Notice of Intent
NO_x	Oxides of nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
PM_{10}	Particulate matter less than 10 microns in size
$PM_{2.5}$	Particulate matter less than 2.5 microns in size
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
R307	Rules Series 307
R307-401	Rules Series 307 - Section 401
SO_2	Sulfur dioxide
Title IV	Title IV of the Clean Air Act
Title V	Title V of the Clean Air Act
TPY	Tons per year
UAC	Utah Administrative Code
VOC	Volatile organic compounds

RN147800003

April 4, 2024

Jim Davidson
United States Bakery dba Franz Bakery, Salt Lake City
315 NE 10th Avenue
Portland, OR 97232
Jim.Davidson@usbakery.com

Dear Jim Davidson,

Re: Engineer Review:
Modification to AO DAQE-AN147800002-20 for an Increase in Production of Bread and Buns
Project Number: N147800003

The DAQ requests a company representative review and sign the attached Engineer Review (ER). This ER identifies all applicable elements of the New Source Review permitting program. United States Bakery dba Franz Bakery, Salt Lake City should complete this review within **10 business days** of receipt.

United States Bakery dba Franz Bakery, Salt Lake City should contact **John Persons** at (385) 306-6503 if there are questions or concerns with the review of the draft permit conditions. Upon resolution of your concerns, please email **John Persons** at **jpersons@utah.gov** the signed cover letter. Upon receipt of the signed cover letter, the DAQ will prepare an ITA for a 30-day public comment period. At the completion of the comment period, the DAQ will address any comments and will prepare an Approval Order (AO) for signature by the DAQ Director.

If United States Bakery dba Franz Bakery, Salt Lake City does not respond to this letter within **10 business days,** the project will move forward without source concurrence. If United States Bakery dba Franz Bakery, Salt Lake City has concerns that cannot be resolved and the project becomes stagnant, the DAQ Director may issue an Order prohibiting construction.

Approval Signature Jim Davidson April 5, 2024
(Signature & Date)

UTAH DIVISION OF AIR QUALITY
ENGINEER REVIEW

SOURCE INFORMATION

Project Number	N147800003
Owner Name	United States Bakery dba Franz Bakery, Salt Lake City
Mailing Address	315 NE 10th Avenue Portland, OR, 97232
Source Name	United States Bakery
Source Location	8556 South 2940 West West Jordan, UT 84088
UTM Projection	418,501 m Easting, 4,494,291 m Northing
UTM Datum	NAD83
UTM Zone	UTM Zone 12
SIC Code	2051 (Bread & Other Bakery Products, Except Cookies & Crackers)
Source Contact	Jim Davidson
Phone Number	(503) 232-2191 Ext 4228
Email	Jim.Davidson@usbakery.com
Billing Contact	Jim Davidson
Phone Number	(503) 232-2191 ext. 4228
Email	Jim.Davidson@usbakery.com
Project Engineer	John Persons, Engineer
Phone Number	(385) 306-6503
Email	jpersons@utah.gov
Notice of Intent (NOI) Submitted	August 10, 2023
Date of Accepted Application	October 30, 2023

SOURCE DESCRIPTION

General Description
United States Bakery (USB), dba Franz Bakery, Salt Lake City, operates a bakery to make bread, buns, cookies, muffins, and donuts. Dry or moist ingredients are mixed, divided, and rounded. molded, and proofed. The ingredients are then baked or fried. Emissions include natural gas combustion from boilers, ovens, fryers, deep frying operations, material loading/unloading and mixing, and yeast fermentation processes.

NSR Classification:
Minor Modification at Minor Source

Source Classification
Located in , Northern Wasatch Front O3 NAA, Salt Lake City UT $PM_{2.5}$ NAA, Salt Lake County SO_2 NAA,
Salt Lake County
Airs Source Size: B

Applicable Federal Standards

Project Proposal
Modification to AO DAQE-AN147800002-20 for an Increase in Production of Bread and Buns

Project Description
United States Bakery (USB) has requested to modify its current AO (DAQE-AN147800002-20) for its West Jordan Bakery to increase the production of bread and buns. USB has requested to increase its annual production of bread by 1,340 tpy and buns by 2,010 tpy. This change increases the VOC PTEs by 7.96 tpy.

EMISSION IMPACT ANALYSIS

The emission increases in criteria pollutants and HAPs from this modification are less than the modeling threshold values listed in R307-410; therefore, modeling is not required for this modification. [Last updated January 9, 2024]

SUMMARY OF EMISSIONS

The emissions listed below are an estimate of the total potential emissions from the source. Some rounding of emissions is possible.

Criteria Pollutant	Change (TPY)	Total (TPY)
CO_2 Equivalent	0	9404.00
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Nitrogen Oxides	0	6.87
Particulate Matter - PM_{10}	0.01	1.09
Particulate Matter - $PM_{2.5}$	0.01	1.09
Sulfur Dioxide	0	0.04
Volatile Organic Compounds	7.96	49.50

Hazardous Air Pollutant	Change (lbs/yr)	Total (lbs/yr)
Generic HAPs (CAS #GHAPS)	0	260
	Change (TPY)	**Total (TPY)**
Total HAPs	0	0.13

Note: Change in emissions indicates the difference between previous AO and proposed modification.

Review of BACT for New/Modified Emission Units

1. **BACT review regarding VOC emission from Yeast Production**

United States Bakery (USB) has requested to increase its bread and bun production at its West Jordan Bakery. This change will result in an increase in VOCs and trace amounts of PM_{10} and $PM_{2.5}$. These emissions increases will result from two things: Yeast Development and Mixers/Silos. These two sources of pollution will be analyzed below.

Yeast Production

The Yeast Production process has the potential to emit VOCs. USB researched various control technologies that could be used to control these emissions. These technologies include carbon adsorption, catalytic oxidizers, condensation units, thermal oxidizers, proper cleaning operation, and wet-packed-bed scrubbers.

The use of carbon adsorption is technically infeasible because oils and fats emitted from ovens and fryers will clog the pores of the activated carbon, which reduces the life of the system and also makes the system significantly less efficient. The use of condensation units is technically infeasible because of the bakery ovens' high airflow rates. Based on research of similar sources condensation has not proven to be feasible for controlling VOCs from bakery ovens. The use of wet-packed-bed scrubbers is not technically feasible because installing wet-packed-bed scrubbers would require the source to further install a wastewater treatment plant of an ethanol recovery unit. Even though this might technically be feasible there is no chance that implementation of this would prove to be cost-effective because the only emissions that could be used in the cost feasibility equation are the increase in VOCs. The use of catalytic oxidizers, thermal oxidizers, and proper cleaning operations are all technically feasible.

List of remaining control technologies listed by control efficiently (1 - most efficient):
Catalytic Oxidizer (95-99%)
Thermal Oxidizer (95%)
Proper Cleaning Operations

The use of catalytic oxidizers is economically infeasible. Based on manufacturers' costs collected by USB it would cost $44,193 per ton of VOCs removed. The use of thermal oxidizers is economically infeasible. Based on manufacturers' costs collected by USB it would cost $34,562 per ton of VOCs removed. The use of proper cleaning operations is economically feasible. Proper cleaning operations includes weekly inspection and subsequent removal of dough/bread from ovens and proof boxes by scraping and sweeping, as needed. It also includes monthly inspection and subsequent removal of oil, dough, bread, and other accumulated waste from the interior and exterior of the ovens and proof boxes, as needed.

The DAQ selects the following BACT:
The owner/operator shall operate the ovens and proof boxes according to the proper cleaning operational guidelines. Proper cleaning operations includes weekly inspection and subsequent removal of dough/bread from ovens and proof boxes by scraping and sweeping, as needed. It also includes monthly inspection and subsequent removal of oil, dough, bread, and other accumulated waste from the interior and exterior of the ovens and proof boxes, as needed.
[Last updated April 4, 2024]

2. **<u>BACT review regarding PM emissions from mixers and silos</u>**

This modification will increase PM_{10} and $PM_{2.5}$ emissions from the mixers and silos onsite. The silos are currently controlled by a baghouse. The PM_{10} and $PM_{2.5}$ will both increase by 0.01 tpy. This increase is very small, and no further emissions control technologies exist that would be cost-effective based on the minimal emissions increase.

The DAQ requires no further control technologies than what is already listed in the current AO. [Last updated February 15, 2024]

SECTION I: GENERAL PROVISIONS

The intent is to issue an air quality AO authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. **(New or Modified conditions are indicated as "New" in the Outline Label):**

I.1	All definitions, terms, abbreviations, and references used in this AO conform to those used in the UAC R307 and 40 CFR. Unless noted otherwise, references cited in these AO conditions refer to those rules. [R307-101]
I.2	The limits set forth in this AO shall not be exceeded without prior approval. [R307-401]
I.3	Modifications to the equipment or processes approved by this AO that could affect the emissions covered by this AO must be reviewed and approved. [R307-401-1]
I.4	All records referenced in this AO or in other applicable rules, which are required to be kept by the owner/operator, shall be made available to the Director or Director's representative upon request, and the records shall include the two-year period prior to the date of the request. Unless otherwise specified in this AO or in other applicable state and federal rules, records shall be kept for a minimum of two (2) years. [R307-401-8]
I.5	At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this AO, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Director which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded. [R307-401-4]
I.6	The owner/operator shall comply with UAC R307-107. General Requirements: Breakdowns. [R307-107]
I.7	The owner/operator shall comply with UAC R307-150 Series. Emission Inventories. [R307-150]

SECTION II: PERMITTED EQUIPMENT

The intent is to issue an air quality AO authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. **(New or Modified conditions are indicated as "New" in the Outline Label):**

II.A THE APPROVED EQUIPMENT

II.A.1	**United States Bakery** Bakery
II.A.2	**Misc. Natural Gas Combustion Equipment** Including boilers, ovens, and fryers. Each equipment is rated less than 5 MMBtu/hr; Total rated capacity is 21 MMBtu/hr or less
II.A.3	**Three (3) Mixers** Venting to the inside of building Listed for information only
II.A.4	**Three (3) Flour Silos** Each is rated at 50 tons or less Emissions from the silos are controlled with a baghouse

SECTION II: SPECIAL PROVISIONS

The intent is to issue an air quality AO authorizing the project with the following recommended conditions and that failure to comply with any of the conditions may constitute a violation of the AO. **(New or Modified conditions are indicated as "New" in the Outline Label):**

II.B REQUIREMENTS AND LIMITATIONS

II.B.1	**Source-Wide Requirements**
II.B.1.a	The owner/operator shall control emissions from the flour silos with a baghouse during loading/unloading operations. [R307-401-8]
II.B.1.b	The owner/operator shall not allow visible emissions from any emission unit on site to exceed 10% opacity. [R307-401-8]
II.B.1.b.1	Opacity observations of emissions from stationary sources shall be conducted according to 40 CFR 60, Appendix A, Method 9. [R307-401-8]
II.B.2 NEW	**Oven and Proof Box Requirements**
II.B.2.a NEW	The owner/operator shall inspect ovens and proof boxes weekly and remove dough and bread by scraping and sweeping, as needed. [R307-401-8]

II.B.2.a.1 NEW	The owner/operator shall: A. Record the date and time the ovens and proof boxes were inspected each week and whether they were scrapped and swept B. Keep the inspection, scrapping, and sweeping records onsite at all times the the facility is in operation. [R307-401-8]
II.B.2.b NEW	The owner/operator shall inspect the interior and exterior of ovens and proof boxes monthly and remove oil, bread, dough, and other accumulated waste, as needed. [R307-401-8]
II.B.2.b.1 NEW	The owner/operator shall: A. Record the date and time of inspection and whether the oil, bread, dough, and other accumulated waste was removed B. Keep the records onsite at all times the facility is in operation. [R307-401-8]
II.B.3	**VOC Limit**
II.B.3.a NEW	The owner/operator shall not emit more than 49.50 tons of VOC per rolling 12-month period from its operations. [R307-401-8]
II.B.3.a.1	Compliance with the limitation shall be determined on a rolling 12-month total. No later than 28 days after the end of each month a new 12-month total shall be calculated using data from previous 12 months. [R307-401-8]
II.B.3.a.2	VOC emissions from yeast-raised bread baking operations shall be calculated using the following formula: VOC emissions = (Daily tons of baked products)(VOC emission factor)/2000 Where: VOC emissions in tons per day Daily tons of baked products include bread, buns, and donuts VOC emission factor in lbs of VOC per ton of baked products. [R307-401-8]
II.B.3.a.3	VOC emission factor from yeast-raised bread baking operations shall be calculated using the following formula: VOC emission factor = 0.95Yi + 0.195ti - 0.51S - 0.86ts + 1.90 Where: VOC emission factor in lbs of VOC per ton of baked products Yi = initial baker's percent of yeast ti = total yeast action time in hours S = final (spike) baker's percent of yeast, and ts = spiking time in hours. [R307-401-8]

II.B.3.a.4	The owner/operator shall maintain daily records of the above parameters used to calculate the VOC emissions and VOC emission factor. The records of baked products shall include bread, buns and donuts and shall be determined by sales records. All the records shall be kept on a daily basis. [R307-401-8]

PERMIT HISTORY

When issued, the approval order shall supersede (if a modification) or will be based on the following documents:

Supersedes	AO DAQE-AN147800002-20 dated December 10, 2020
Is Derived From	NOI dated August 10, 2023
Incorporates	Additional Information dated October 30, 2023

REVIEWER COMMENTS

1. **Comment regarding Production Increases:**
United States Bakery has requested to increase its annual production of bread by 1,340 tpy and buns by 2,010 tpy at its West Jordan Bakery. This change increases the VOC PTEs by 7.96 tpy. There are no limits in the permit specifically limiting the tpy of bread and bun production, instead, the DAQ is using a VOC limit to ensure compliance with production throughputs.
[Last updated January 9, 2024]

2. **Comment regarding emission calculations:**
Particulate and VOC emission factors for deep frying operations are obtained from AP-42 Chapter 9, Table 9.13.3-2&3. $PM_{2.5}$ emissions are conservatively assumed to be the same as PM_{10}. Emissions are calculated using the dough through-put multiplied by the emission factors.

   Particulate emissions from silo loading/unloading emissions are calculated using emission factors in AP-42 Chapter 11.12-2 for cement supplement to elevated storage silos. Emissions from the loading/unloading operations are controlled with a baghouse.

   VOC emissions from fermentation are divided in four (4) production lines. Emission factors are obtained from the Alternative Control Technology Document for Bakery Oven Emissions (EPA 453/R-92-017, December 1992).
[Last updated January 9, 2024]

3. **Comment regarding NSPS and MACT :**
Non-Applicability of 40 CFR 60 (NSPS) Subpart DC and 40 CFR 63 (MACT) Subpart JJJJJJ.

   40 CFR 60 Subpart Dc applies to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 million British thermal units per hour (MMBtu/h)) or less, but greater than or equal to 2.9 MW (10 MMBtu/h). All the natural gas-fired equipment at this facility is rated at less than 5 MMBtu/hr; therefore, Subpart Dc does not apply to any natural gas combustion equipment on site.

   40 CFR 63 Subpart JJJJJJ applies to the boilers located at an area source of HAPs. However, this subpart does not apply to boilers that only burn natural gas as fuel. The emergency boiler at this facility burns only natural gas as fuel and therefore, it is not subject to Subpart JJJJJJ. [Last updated January 9, 2024]

4. **Comment regarding Title V Applicability :**

Title V of the 1990 Clean Air Act (Title V) applies to the following:

1. Any major source
2. Any source subject to a standard, limitation, or other requirement under Section 111 of the Act, Standards of Performance for New Stationary Sources;
3. Any source subject to a standard or other requirement under Section 112 of the Act, Hazardous Air Pollutants.
4. Any Title IV affected source.

This source is not a major source, not subject to any federal standard, and not a Title IV-affected source. Therefore, Title V does not apply to the source. [Last updated January 9, 2024]

ACRONYMS

The following lists commonly used acronyms and associated translations as they apply to this document:

40 CFR	Title 40 of the Code of Federal Regulations
AO	Approval Order
BACT	Best Available Control Technology
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CDS	Classification Data System (used by EPA to classify sources by size/type)
CEM	Continuous emissions monitor
CEMS	Continuous emissions monitoring system
CFR	Code of Federal Regulations
CMS	Continuous monitoring system
CO	Carbon monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent - 40 CFR Part 98, Subpart A, Table A-1
COM	Continuous opacity monitor
DAQ/UDAQ	Division of Air Quality
DAQE	This is a document tracking code for internal UDAQ use
EPA	Environmental Protection Agency
FDCP	Fugitive dust control plan
GHG	Greenhouse Gas(es) - 40 CFR 52.21 (b)(49)(i)
GWP	Global Warming Potential - 40 CFR Part 86.1818-12(a)
HAP or HAPs	Hazardous air pollutant(s)
ITA	Intent to Approve
LB/HR	Pounds per hour
LB/YR	Pounds per year
MACT	Maximum Achievable Control Technology
MMBTU	Million British Thermal Units
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOI	Notice of Intent
NO_x	Oxides of nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
PM_{10}	Particulate matter less than 10 microns in size
$PM_{2.5}$	Particulate matter less than 2.5 microns in size
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
R307	Rules Series 307
R307-401	Rules Series 307 - Section 401
SO_2	Sulfur dioxide
Title IV	Title IV of the Clean Air Act
Title V	Title V of the Clean Air Act
TPY	Tons per year
UAC	Utah Administrative Code
VOC	Volatile organic compounds

UTAH DIVISION OF AIR QUALITY – NOTICE OF INTENT

Modification of DAQE-AN147800002-20

United States Bakery – West Jordan, Utah

Prepared By:
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Suite 200
Salt Lake City, UT 84124
(801) 272-3000

August 2023

Project 234502.0002

TABLE OF CONTENTS

1. EXCECUTIVE SUMMARY

This Notice of Intent (NOI) is being submitted to the Utah Division of Air Quality (UDAQ) by Trinity Consultants (Trinity) on behalf of United States Bakery (USB), dba Franz Family Bakeries, to modify USB's West Jordan, Utah Bakery (the Utah Bakery) located at 8556 South 2940 West, West Jordan, Utah 84088. The Utah Bakery operates under Approval Order (AO) DAQE-AN147800002-20, issued December 10, 2020, by UDAQ. The purpose of this NOI air permit application is to increase annual throughputs of bread and buns at the Utah Bakery.

The Utah Bakery utilizes mixers, proof boxes, ovens, and fryers to produce an assortment of baked products. The annual increase in throughputs associated with this project is 1,340 tons per year (tpy) of bread and 2,010 tpy of buns. This will result in the following production limits for bread and buns at the Utah Bakery, respectively: 8,890 tpy and 11,070 tpy. This increase in throughput will result in an increase in emissions generated by material handling operations (e.g., silo loading of raw materials, loading and unloading, and mixing operations) and dough-raising emissions.

Criteria pollutants that will experience an increase in emissions under this project are: particulate matter (PM) with an aerodynamic diameter of 10 microns or less (PM_{10}), PM with an aerodynamic diameter of 2.5 microns ($PM_{2.5}$), and Volatile Organic Compounds (VOCs). The increase in potential-to-emit (PTE) will be as follows: PM_{10} = 0.01 tpy; $PM_{2.5}$ = 0.01 tpy; and VOCs = 7.96 tpy. As all other equipment at the Utah Bakery has previously been permitted at 8,760 hours per year, no increase in other criteria pollutants will occur under this project.

This NOI air permit application has been developed pursuant to UAC R307-401-5 and Utah's NOI air permit application guidance. It includes required supporting information for the modifications specified above, namely:

- NOI Forms and Fees;
- Process Description;
- Site Plan;
- Potential Emission Calculations;
- Best Available Control Technology (BACT) Analysis;
- Applicable Regulatory Requirements; and
- Emission Impact Analysis.

2. GENERAL INFORMATION

The following section contains the information requested under the “Source Identification Information” section of UDAQ Form 1 Notice of Intent (NOI) Application Checklist.

2.1. Description of Facility

- Company Name: United States Bakery, dba Franz Family Bakeries
- Address: 8556 South 2940 West, West Jordan, UT 84088
- County: Salt Lake County
- UTM Coordinates: Easting: 418,501 m, Northing: 4,494,291 m, Zone 12
- Primary SIC Code: 2051 (Bread & Other Bakery Products, Except Cookies & Crackers)
- Additional SIC Code: 2052 (Cookies and Crackers)

All correspondence regarding this submission should be addressed to:

- Mr. Jim Davidson
- Corporate Environmental, Health, & Safety Manager
- Office Phone: (503) 232-2191, ext. 4228
- Mobile Phone: (503) 449-5654
- Email: Jim.Davidson@usbakery.com

- Mr. Micah Stevens
- Operations Manager
- Office Phone: (801) 304-0400
- Mobile Phone: (801) 898-1489
- Email: Micah.Stevens@usbakery.com

2.1.1. Attainment Status

The Utah Bakery is located within an area of Salt Lake County that is classified as attainment for all pollutants with exception to the following: (1) $PM_{2.5}$, for which it is classified as a serious nonattainment area of the 24-hour NAAQS; (2) for the 2015 8-hour Ozone Standard, which is designated as moderate nonattainment[1]; and (3) a marginal nonattainment area of SO_2. The PM_{10} nonattainment area was redesignated as attainment by the EPA effective as of March 27, 2020.

2.1.2. Source Size Determination

The Utah Bakery’s PTE is less than major source thresholds, as described in the following NOI air permit application, and is therefore subject to minor New Source Review (NSR).

- Precursors to $PM_{2.5}$ (nitrogen oxides [NO_x], SO_2, VOC, and ammonia [NH_3]) are less than 70 tpy[2];
- NO_X and VOCs are less than 2015 8-hour ozone moderate nonattainment thresholds of 100 tpy, each;
- PM_{10} and carbon monoxide (CO) are less than 250 tpy, as the Utah Bakery is not a listed source; and
- Individual hazardous air pollutants (HAPs) and aggregate HAPs are below 10 and 25 tpy; respectively.

Therefore, the Utah Bakery will continue to be classified as a minor source.

[1] Based on report from UDAQ on July 6, 2021: https://deq.utah.gov/air-quality/ozone-overview-and-standard-moderate-area-ozone-sip

[2] The Utah Bakery is located in an area that is classified as serious nonattainment for $PM_{2.5}$ and its precursors. As a result, major source thresholds are 70 tpy.

Figure 2-1. Site Location

2.2. Fees

USB will use the UDAQ's Payment Portal to prepay the following UDAQ NOI air permit application fees associated with this submittal:

- "Application Filing Fee" for the "New Minor Source or Minor Modification at Minor or Major Source" category = $500
- "Application Review Fee" for the "New Minor Source or Minor Modification at Minor or Major Source" category in maintenance or nonattainment areas = $2,300
- Total UDAQ fees = $2,800

USB understands that the total permit review fee is based on the total actual time spent by UDAQ staff processing this NOI air permit application, and that, if the total review time is more than 20 standard hours, UDAQ will invoice USB at $115 per hour for the additional time above 20 standard hours.

2.3. Forms

The following UDAQ forms are included in Appendix A to this application:

- Form 1: Notice of Intent Application
- Form 2: Company Information
- Form 3: Process Information
- Form 4: Project Information
- Form 5: Emissions Information

3. DESCRIPTION OF PROJECT AND PROCESS

3.1. Description of Project

USB proposes to increase bread and bun production by 1,340 tpy and 2,010 tpy, respectively; this will result in a total potential annual throughput of 8,890 tpy and 11,070 tpy, respectively. The increase in throughput will result in an increase in potential emissions through dough raising (yeast development) and material handling at the silos and mixers. This project includes only an increase in throughputs and associated potential emissions; no equipment will be added or modified at the Utah Bakery. As all natural gas combustion equipment at the Utah Bakery is already permitted at 8,760 hours per year, no increase in potential emissions will result from those units under this project. All increased potential emissions associated with this project update come from increased yeast development and its associated operations (e.g., mixing).

3.2. Description of Process

This section contains the information required by UDAQ Form 1, (R307-401-5(2)(a) and (e)).

3.2.1. Bread Production

USB uses a straight-dough process to make bread in which all ingredients are mixed together at one time rather than in a series (spiking), thus reducing fermentation time, and, consequently, VOC emissions. The process starts with flour being loaded into a silo, followed by mixing of ingredients in a mixer. The mixed dough is then sent through a mechanical process that divides, rounds, and molds the dough. As the dough mixer is located inside the Utah Bakery's building, and the process contains wet ingredients, there are few air emissions associated with this portion of the bread-making process; although they are accounted for in the project's PTE.

The dough is then transferred to a proof box, where the product is exposed to heated and humidified conditions that allow the yeast to ferment and the dough to rise. Heating and humidification of the proof box is provided by steam from the main boiler. The boilers produce steam by heating water in a natural gas-fired process. Byproducts of the natural gas combustion process are exhausted through a stack on the boiler.

Once the dough rises, the dough is transferred to a tunnel oven for baking. The oven is fired by natural gas. The byproducts generated from the natural gas combustion are exhausted through exhaust stacks on the tunnel oven. The process exhaust is vented through the roof of the Utah Bakery's building and released into the atmosphere.

The finished product is allowed to cool and the product is later sliced, packaged, and shipped off-site for sale and consumption. There are no emissions associated with the packaging process.

It should be noted that emissions for both loading and unloading activities are vented indoors.

A process flow diagram (PFD) for the bread making operation is shown in Figure 3-1 at the end of this section.

3.2.2. Bun Production

USB uses a straight-dough process to make buns. Operations for buns are similar to those of bread production, listed above. The process starts with flour being loaded into a silo, followed by mixing of ingredients. After mixing, the dough is divided, rounded, and placed into a proof box to rise. The buns are later baked in a tray oven, sliced, packaged, and shipped off-site for sale or sold on site at the outlet store.

A PFD of the bun-making operation is shown in Figure 3-2 at the end of this section.

3.2.3. Process Flow Diagrams

PFDs for bread and bun production are set out below.

Figure 3-1. Bread Production

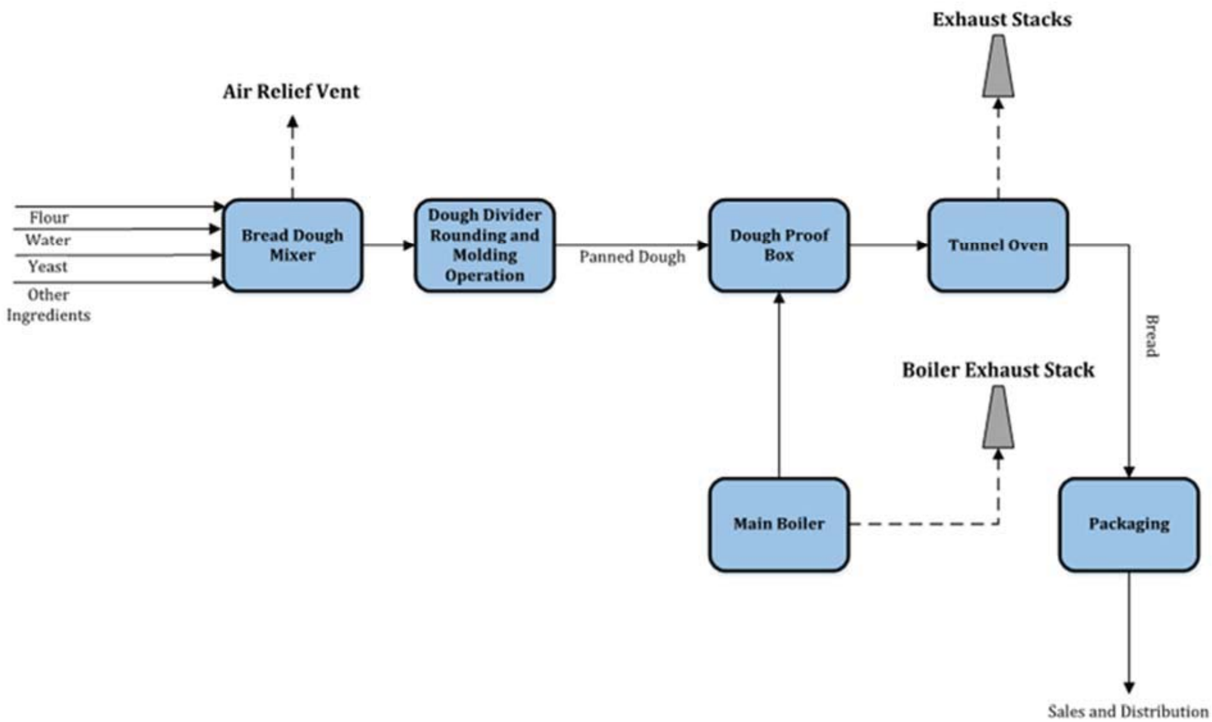
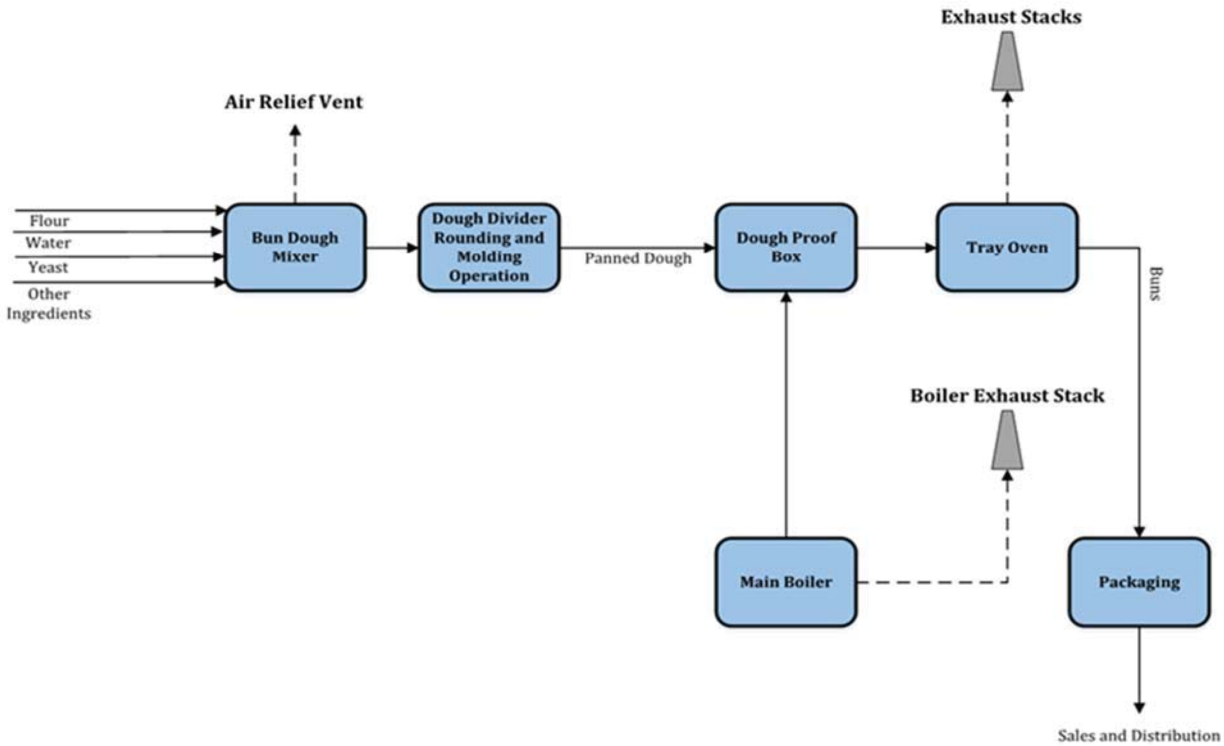


Figure 3-2 Bun Production



4. EMISSIONS RELATED INFORMATION

This section details the methodology used to calculate controlled and uncontrolled emissions for criteria pollutants, greenhouse gases, and HAPs associated with the increase in throughputs and associated emissions, as regulated by R307-401-5(2)(b). Additionally, a comparison to major source thresholds is conducted. Detailed emission calculation tables are included at the end of this section.

4.1. Yeast Development

Yeast development is the primary emission source at bakeries, emitting VOCs in the form of ethanol. In yeast-leavened breads, yeast metabolizes sugar in an anaerobic fermentation process, producing carbon dioxide (CO_2) which is largely responsible for the dough rising. Besides the CO_2, equimolar amounts of ethanol and small amounts of other glycerols, organic acids, aldehydes, and various minor compounds are produced.

The baking ovens at the Utah Bakery are fired by natural gas. In such ovens, the ethanol vapors from the bread, buns, and other bakery products, along with by-product gases from combustion are routed to exhaust stacks and emitted into the atmosphere. Potential VOC emissions from baking are calculated and the methodology for these calculations is explained below. The term "bread" used throughout this section represents bread or buns.

To determine the VOC emissions from the bread production process, emission factors are calculated based on the equation presented in AP-42 Chapter 9.9.6. The VOC emission factor equation used in the subsequent calculations conform to the specifications required by UDAQ, per their communication with USB on March 15, 2023. The VOC emission factors and subsequent VOC emissions from bread production were calculated as follows:

$$\text{VOC E.F.} = 0.95Y_i + 0.195t_i - 0.51S - 0.86t_s + 1.90$$

Where,

VOC EF =	VOC emission factor (lb VOC/ton baked bread)
Y_i =	Initial baker's percent of yeast to the nearest tenth of a percent
t_i =	Total yeast action time in hours to the nearest tenth of an hour (fermentation time + floor time + intermediate proof time + final proof time)
S =	Final (spike) baker's percent of yeast to the nearest tenth of a percent
t_s =	Spiking time in hours to the nearest tenth of an hour (floor time + intermediate proof time + final proof time)

Subsequently,

$$\text{VOC Baking Emissions} = \text{VOC EF}\left(\frac{\text{lb VOC}}{\text{ton baked bread}}\right) \times \text{BP (tpy)} \times \text{Conversion}\left(\frac{\text{ton}}{\text{lb}}\right)$$

Where,

VOC Baking Emissions =	VOCs emitted (tpy)
VOC EF =	VOC emission factor (lb VOC/ton baked bread)
BP =	Bread production in tons per year (tpy)

4.2. Material Handling

The Utah Bakery is equipped with three (3) silos for flour storage. Flour is loaded and unloaded from these silos on a regular basis. As such, the Utah Bakery will have emissions of PM_{10} and $PM_{2.5}$ associated with flour loading/unloading activities under this project.

There are also $PM_{2.5}$ and PM_{10} emissions associated with mixing flour with other baking ingredients. The Utah Bakery is equipped with three (3) mixers that emit PM_{10} and $PM_{2.5}$. As such, the potential PM emissions associated with handling flour is calculated in association with this project. Methods for calculating potential emissions associated with loading/unloading activities and mixing ingredients are detailed below. Emissions are calculated for both loading and unloading activities and mixing.

4.2.1. Loading/Unloading Activities

It is assumed that emissions from fugitive flour dust would be similar to emissions from fugitive dust for activities at a concrete batch plant as the material characteristics including particle size are similar. As such, emission factors associated with loading/unloading activities are from AP-42 Table 11.12-2 Emission Factors for Concrete Batching: Concrete for Cement Supplement to Elevated Storage Silo. Where $PM_{2.5}$ emission factors are not provided, it is assumed that emission factors for $PM_{2.5}$ are equal to emission factors for PM_{10}. Potential hourly emissions are calculated as follows:

$$\text{Hourly Emissions}\left(\frac{\text{lb}}{\text{hr}}\right) = \frac{\text{EF}\left(\frac{\text{lb PM}}{\text{ton throughput}}\right) \times \text{Annual Throughput(tpy)}}{\text{Hourly Operation}\left(\frac{\text{hr}}{\text{yr}}\right)}$$

Annual emissions are similarly computed using the following formula:

$$\text{Annual Emissions (tpy)} = \text{EF}\left(\frac{\text{lb PM}}{\text{ton throughput}}\right) \times \text{Annual Throughput (tpy)} \times \text{Conversion}\left(\frac{\text{ton}}{\text{lb}}\right)$$

4.2.2. Mixing

Similar to loading/unloading activities, mixing activities at the Utah Bakery are evaluated using emission factors associated with cement manufacturing. Specifically, the emission factors are extracted from AP-42 Section 11.12-2 Emission Factors for Concrete Batching: Mixer Loading. The potential emissions are calculated as follows:

Hourly Emissions:

$$\text{Hourly Emissions}\left(\frac{\text{lb}}{\text{hr}}\right) = \text{EF}\left(\frac{\text{lb PM}}{\text{ton throughput}}\right) \times \text{Mixer Capacity}\left(\frac{\text{lb throughput}}{\text{hr}}\right) \times \text{Conversion}\left(\frac{\text{ton}}{\text{lb}}\right)$$

Annual Emissions:

$$\text{Annual Emissions (tpy)} = \text{EF}\left(\frac{\text{lb PM}}{\text{ton throughput}}\right) \times \text{Annual Throughput}\left(\frac{\text{ton}}{\text{yr}}\right) \times \text{Conversion}\left(\frac{\text{ton}}{\text{lb}}\right)$$

4.3. Source Size Determination

As presented in the emission calculations summary in this NOI air permit application, proposed emissions at the Utah Bakery are less than major source thresholds (MST) (i.e., 250 tons for any criteria pollutant with exception to direct $PM_{2.5}$ and its precursors for which the MST is 70 tpy[3], 10 tons for any HAP, 25 tons for all HAPs combined, and 75,000 tons for CO_2e). Therefore, the Utah Bakery will continue to be classified as a minor source.

Table 4-1. Projected Emissions for Source Size Determination

Emission Point	PTE Emission Rate (tpy)							
	PM_{10}	$PM_{2.5}$	SO_2	NO_X	VOC	CO	Total HAPs	CO_2e
Total Project Increase	0.01	0.01	0.00	0.00	7.96	0.00	0.00	0.00
Current Permitted PTE[1]	1.08	1.08	0.04	6.87	41.54	5.77	0.13	9,404
Post-Project PTE	1.09	1.09	0.04	6.87	49.50	5.77	0.13	9,404
Major Source Threshold[2]	250	70	70	70	70	250	10/25	75,000
Major Source Threshold Exceeded?	No	No	No	No	No	No	No	No

1. Approval Order DAQE-AN147800002-20.
2. Major source emission thresholds are defined by 40 CFR 51.165(a)(1)(iv)(A), definition of a *Major stationary source*, for $PM_{2.5}$ and its precursors. Major source emission thresholds are defined by 40 CFR 52.21(b)(1)(i)(b) for PM_{10} and CO, i.e., pollutants for which Salt Lake County is in attainment. Total HAP threshold is given in 40 CFR 63.2 under definition of a *Major source*.

[3] USB is located in the Salt Lake Nonattainment area for $PM_{2.5}$. Since the Salt Lake $PM_{2.5}$ nonattainment area has been designated as serious nonattainment, the major source threshold is 70 tpy for direct $PM_{2.5}$ and its precursors (NO_X, SO_2, VOCs, and NH_3).

5. BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

In the State of Utah, under R307-401-5(2)(d), Notice of Intent, every facility, operation, or process that proposes any activity that would emit an air contaminant into the air, must consider BACT for a proposed new source or modification to an existing source. The BACT analysis prepared for this application only addresses units which will be modified, installed, or otherwise addressed in the modified Approved Order. Specifically, the BACT analysis addresses PM_{10}, $PM_{2.5}$, and VOC emissions from the bakery equipment. The analysis follows the United States Environmental Protection Agency's (EPA's) preferred "top-down" methodology.[4]

5.1. Yeast Development

5.1.1. Yeast Development VOC BACT

The production of VOC emissions at the Utah Bakery, primarily in the form of ethanol, result from the yeast fermentation. Yeast is primarily fermented in the proof boxes at the Utah Bakery, although some fermenting also occurs in the ovens. The exhaust from ovens and proof boxes are similar, and therefore, for purposes of this NOI air permit application, are considered in the same BACT analysis for VOCs. The increase in VOC emission rates from the permitted 2020 PTE to the proposed 2023 PTE is 7.96 tpy from yeast development (in ovens and proof boxes combined). The combustion of natural gas by the ovens remains unchanged and is therefore not considered in this BACT analysis.

Step 1 – Identify All Available Control Technologies

The first step in the BACT analysis is to identify all available control technologies. VOC control technologies were identified from Trinity's search based on the following references:

- Bay Area Air Quality Management District (BAAQMD),
- South Coast Air Quality Management District (SCAQMD),
- San Joaquin Valley Air Pollution Control District (SJVAPCD), and
- Search of the RACT/BACT/LAER Clearinghouse (RBLC), conducted on May 11, 2023.

From this review, Trinity identified five (5) available control technologies, which are described below.

Carbon Adsorption Unit

A carbon adsorption unit is a means of emission control that consists of one to several beds of activated carbon, through which exhaust passes. Activated carbon adsorbs the VOCs in the exhaust onto its large surface area, resulting in clean air for emission. Over time, the bed or beds become saturated as the VOCs fill in carbon surface area, reducing efficiency. The carbon beds are regenerated by passing steam through them, stripping the VOCs from the carbon particles. VOCs are recovered from the steam by condensing the mixture, allowing for disposal or recovery. Carbon adsorption units typically achieve up to 95% VOC reduction efficiencies.[5]

Catalytic Oxidizer

Catalytic oxidation is the process of oxidizing organic contaminants in a waste gas stream within a heated chamber that contains a catalyst bed. This is done in the presence of oxygen to allow for sufficient time to

[4] EPA. Office of Air and Radiation. Memorandum from J.C. Potter to the Regional Administrators. Washington D.C. December 1, 1987.
[5] Chapter 1: Carbon Adsorbers, EPA's Monitoring by Control Technique publication

completely oxidize the organic contaminants of the waste gas stream into carbon dioxide and water. The catalyst is used to lower the activation energy of the oxidation reaction. The residence time, temperature, flow velocity, mixing, oxygen concentration, and type of catalyst used in the combustion chamber all affect the oxidation rate and destruction/conversion efficiency. Catalytic oxidizers typically require combustion of an auxiliary fuel (e.g., natural gas) to maintain the combustion chamber temperature high enough to completely oxidize the contaminant gases, and as with thermal oxidizers, fume preheating devices are commonly used to minimize operating costs. Catalytic oxidizers are typically designed to have a residence time of 0.5 seconds or less and combustion chamber temperatures between 600 and 1,200 degrees Fahrenheit (°F). Catalytic oxidizers have a VOC control efficiency of 95-99%.

Condensation Unit

Emissions sources that have low flow rates of high-concentration VOCs (up to 100%), such as tank vents, are ideal applications for refrigerated and cryogenic condensers. The condensed liquid is returned to the process, and non-condensable liquids (with low levels of VOCs) are vented to the atmosphere.

- **Single stage condensing systems**, which can reduce the vented gas stream to minus 20°F, can be used for high boiling compounds (such as gasoline tank vapors from tank transfer operations), and can achieve 90-95% control efficiencies. High control efficiencies require lower temperatures and more complexity, such as multiple stages and pumping systems.

- **Cascade (multi-stage) condensing systems** use cryogenics that can produce temperatures as low as minus 120°F. These systems are required for lower molecular weight VOCs with high vapor pressures, or for vent streams with significant condensables, such as nitrogen from air.

Regular Cleaning Operations

Regular cleaning operations reduce the production of VOC emissions by preventing fermentation from occurring during times when bakery operations are not occurring. By removing excess yeast-containing materials, the fermentation process is halted, thus stopping the production of VOCs. Regular cleaning operations, in accordance with the standard that has been found in the RBLC search, include:

- Weekly Cleaning:
  Removal of dough and/or bread from the ovens and proof boxes whether by scraping and sweeping, or otherwise.

- Monthly Cleaning:
  Wiping off the interior of the ovens and proof boxes where necessary;
  Removal of oil, dough, bread, or other accumulated waste from the interior and exterior of the ovens and proof boxes.

Thermal Oxidizer

Thermal oxidizers (TOs) regularly achieve up to 98% destruction efficiencies because of the inherent efficiency of the combustion processes.[6] TOs typically consist of an enclosed combustion chamber with an auxiliary burner fired with a conventional fuel. The firing rate of the burner is automatically controlled to maintain a preset combustion-chamber temperature. TOs provide maximum operating flexibility because they can handle CO and most known VOCs at a wide range of concentrations and flows. However, TOs require relatively high fuel input because of operating temperatures. Heat recovery is frequently used with TO systems to minimize the fuel operating cost, especially with low concentrations of VOC. Heat recovery

[6] Per EPA *Air Pollution Control Technology Fact Sheet*, Thermal Incinerator. EPA-452/F-03-022.

devices used in VOC systems are most commonly indirect recuperative heat exchangers or thermal mass regenerative heat exchangers.

The three (3) main types of TO systems include direct flame, regenerative TO, and recuperative TO, which are differentiated by the type of heat recovery equipment used.

- Direct Flame: A direct flame thermal oxidizer consists of only a combustion chamber with no heat recovery equipment.

- Regenerative Thermal Oxidizers: These systems employ a large thermal mass to collect heat and return it to the incoming fume. Each oxidizer is supplied with several large "cells" which are filled with ceramic packing. The cells are alternated from heat-up to cool-down cycles for fume preheating by a series of dampers and ducts on the outlet side of the system. These units can achieve high removal efficiencies (95- 98%) at relatively low temperatures (1,400-1,500°F) because of the thorough mixing in the ceramic packing sections. These systems are more maintenance-intensive than recuperative types because of the mechanical system that performs the alternating of cells.

- Recuperative Thermal Oxidizers: These systems employ an indirect heat exchanger device to preheat the VOC and CO-laden fume. They are applied to oxidizers that operate at temperatures as high as 1,800°F. The maximum design efficiency is usually dictated by the exchanger outlet temperature and the VOC content in the stream.

In general, TOs are less efficient at treating waste gas streams with highly variable flow rates, since the variable flow rate results in varying residence times, combustion chamber temperature, and poor mixing.

Wet Packed-Bed Scrubber

A wet packed-bed scrubber is an air pollution control device that removes VOCs from stationary point source waste streams. VOCs are primarily removed through the impaction, diffusion, interception, and/or absorption of the pollutant onto droplets of liquid. This weighs the droplets down, such that they fall back to the surface of the packed bed. Wet packed-bed scrubbers can typically attain removal efficiencies greater than 90% for VOCs in general.[7]

Step 2 – Eliminate Technically Infeasible Options

In the second step of the BACT analysis, Trinity eliminated all available control options that are technically infeasible.

Carbon Adsorption Unit

Carbon adsorption control units are technologically infeasible for bakery operations for several reasons. First, ethanol is the primary organic gas present in exhaust from baking operations; ethanol has a high affinity to carbon, meaning that it is not easily stripped from the activated carbon particles once it is adsorbed. This leads to lower control efficiencies after initial use, decreasing more and more as the particles are further used. In addition, oils and fats present in oven exhaust clog the pores of the carbon particles, which also reduces the life and utility of the unit. Carbon adsorption units are therefore technologically infeasible for bakery operations and not a viable control technology for the Utah Bakery.[7]

Catalytic Oxidizer

Catalytic oxidizers are typically designed to have a residence time of 0.5 seconds or less, and combustion chamber temperatures between 600-1,200°F. This is technically feasible for the ovens and proof boxes.

[7] Per EPA *Air Pollutaion Control Technology Fact Sheet*, Packed-Bed/Packed-Tower Wet Scrubber. EPA-452/F-03-015.

Condensation Unit

Emissions sources that have low flow rates of high concentration VOCs (up to 100%) such as tank vents are ideal applications for refrigerated and cryogenic condensers. Because the Bakery's ovens are neither, a condensation unit is not an optimal control technology. From the RBLC search, condensation has not proven technologically feasible for the control of VOCs in bakery ovens, in part because of their high airflow rates. Additionally, there is an added difficulty in the treatment and disposal of the resulting wastewater. For these reasons, condensation units are not technically feasible at the Bakery.

Regular Cleaning Operations

Regular Cleaning Operations to remove excess yeast-containing materials are technically feasible to mitigate VOC emissions during times when bakery operations are not occurring.

Thermal Oxidizer

Based on Trinity's research, thermal oxidizing controls are considered technically feasible at the Bakery and have higher control efficiencies than do catalytic oxidizers. However, TOs operate at higher operating temperatures than catalytic oxidizers, which requires higher volumes of natural gas consumption.

Wet Packed Bed Scrubber

Wet packed-bed scrubbers are technically feasible as a control method for VOC emissions at the Utah Bakery.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

Trinity ranked the potential control technologies presented above based on control efficiencies documented in EPA's Fact Sheets, as described in Table 5-1.

Table 5-1. Summary for Ovens and Proof Boxes VOC Emission Control

Control Technologies	Rank	Percent Control (%)
Catalytic Oxidizer	1	95-99
Thermal Oxidizer	2	95
Wet Packed-Bed Scrubbers	3	90
Proper Cleaning Operations	4	Variable

Step 4– Evaluate Most Effective Controls

Catalytic Oxidation

Trinity estimated the flow rate, destruction efficiency, and cost of a catalytic oxidation control system based on units installed at similar facilities within the SCAQMD and the Puget Sound Clean Air Agency areas. Based on a comparison of size and operating parameters, Trinity developed an estimated minimum cost of a catalytic oxidizer at the Utah Bakery. All cost estimate information and details are provided in Appendix C of this NOI air permit application.

This analysis is based on information given by EPA in Chapter 2 of its Cost Reports and Guidance for Air Pollution Regulations manual, where the annualized cost of a piece of equipment is given in the following equation:

$$PMT = NPV \times \left(\frac{i}{1-(1+i)^{-n}}\right)$$

Where,

> PMT = Equivalent uniform payment amount over the life of the control equipment, in US dollars;
> NPV = Net Present Value, in US dollars;
> i = Interest rate; and
> n = Life of the control equipment

This chapter states that the life of a piece of equipment (n) is twenty (20) years, unless specifically given. The default interest rate (i) is assumed to be the current average Small Business Administration (SBA) Loan Rate of 7.00%. Other costs described in Chapter 2 of EPA's Air Pollution Control Cost Manual were also included in the economic evaluation, such as labor costs, utility costs, equipment costs, installation costs, etc.

In EPA's Air Pollution Control Technology Fact Sheet for Catalytic Incinerators (i.e., catalytic oxidizers), the destruction efficiencies of catalytic oxidizers are given for VOCs, which is given as 99%.[8] The PMT equation was used for the combined increase of VOCs resulting from an increase in product throughput, which is emitted from the ovens and proof boxes.

Table 5-2. Annual Costs of Catalytic Oxidizer Operation

Costs	
Total Capital Investment ($)[9]	$353,472
Total Annual Cost ($)	$348,260
Cost per Ton of Pollutant Removed ($/ton)	$44,193

The costs listed above were calculated using information from catalytic oxidizers at similar bakeries as a conservative approach. At $44,193 per ton of VOCs removed, catalytic oxidizers are not an economically feasible control technology for VOCs.

Thermal Oxidizer

The economic feasibility analysis was done as described above in the catalytic oxidizer's description.

Table 5-3. Annual Costs of Thermal Oxidizer Operation

Costs	
Total Capital Investment ($)[10]	$594,386
Total Annual Cost ($)	$261,360
Cost per Ton of Pollutant Removed ($/ton)	$34,562

The costs listed above were calculated using information from TOs at similar operations, as a conservative approach, which has demonstrated to be economically infeasible. The resulting value of $34,562 per ton of VOCs removed renders TOs as an economically infeasible control technology for VOCs at the Bakery.

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[8] From EPA's *Air Pollution Control Technology Fact Sheet*, Catalytic Incinerator.
[9] Costs are representative of U.S. EPA OAQPS, EPA Air Pollution Control Cost Manual (6th Edition), January 2002, Section 3.2, Chapter 2, Equation 2.38. and are scaled based on the gas flow rates of Puget Sound Clean Air Agency Permit to Construct 11331, and SCAQMD Permit to Construct 184003. This approach was chosen to demonstrate the minimum cost of control, i.e., a conservative approach to the BACT economics analysis, as a site-specific design has not been developed, and additional cost factors have not been included.
[10] Ibid.

Wet Packed Bed Scrubber

The use of scrubbing control technology introduces issues associated with substantial water needs and wastewater production/disposal. The process produces wastewater that requires the use or installation of a wastewater treatment plant or ethanol recovery unit, arguably outweighing the benefits from its VOC absorption. This waste must be properly handled, treated, and disposed of at a waste treatment facility or landfill. For these reasons, a wet packed-bed scrubber as VOC control technology has been eliminated from further consideration.

Proper Cleaning Operations

There are no environmental, energetic, or economic reasons that proper cleaning operations cannot be employed at the Utah Bakery.

Step 5 - Select BACT

As regular cleaning operations are the only control method considered technologically and economically feasible, they are selected as BACT for the project.

5.2. Mixers and Silos

5.2.1. Mixers and Silos PM_{10} and $PM_{2.5}$ BACT

Steps 1- 5

Two (2) mixers and two (2) silos within the Utah Bakery will be affected by this project, and all are completely contained within the Utah Bakery's building. Because the mixers are enclosed, the Utah Bakery qualifies for a widely used PM_{10} and $PM_{2.5}$ control technology that consists of confining emissions to an enclosed area prohibiting particulate emissions from reaching ambient air. The control efficiencies of enclosures range from 50-100%, with 100% emission control achieved where the equipment resides within totally enclosed structures. As this is the case for the mixers and the silos at the Utah Bakery, enclosures are considered BACT for PM_{10} and $PM_{2.5}$ emissions from this equipment.

6.1. Comparison to Modeling Thresholds

As noted in the emission calculations and described below, the proposed site-wide emission changes are less than the UDAQ modeling thresholds contained in UAC R307-410-4. As a result, no criteria pollutant modeling analysis is required.

Table 6-1 compares criteria pollutant total proposed emissions to applicable modeling thresholds contained in R307-403-4 through 7, and R307-410-4.

Table 6-1. Projected Emissions Summary of the Project

Emission Point	PTE Emission Rate (tpy)							
	PM_{10}	$PM_{2.5}$	SO_2	NO_X	VOC	CO	Total HAPs	CO_2e
Material Handling Increase	0.01	0.01	-	-	-	-	-	-
Yeast Products Increase	-	-	-	-	7.96	-	-	-
Total Project Increase	**0.01**	**0.01**	**0.00**	**0.00**	**7.96**	**0.00**	**0.00**	**0.00**
Maximum Emission Increase without Modeling[1]	5/15[2]	N/A	40	40	N/A	100	HAP specific	N/A
Modeling Required?	No	No	No	No	N/A	No	No	N/A
Current Permitted PTE[3]	1.08	1.08	0.04	6.87	41.54	5.77	0.13	9,404
Post-Project PTE	1.09	1.09	0.04	6.87	49.50	5.77	0.13	9,404
Major Source Threshold[4]	250	70	70	70	70	250	10/25	75,000
Major Source Threshold Exceeded?	No	No	No	No	No	No	No	No

1. New and modified source modeling thresholds are provided per UDAQ Emissions Impact Assessment Guidelines, Table 1.
2. Modeling thresholds are specific to the emission type, with five (5) tpy for fugitive emissions and 15 tpy for non-fugitive emissions.
3. Approval Order DAQE-AN147800002-20.
4. Major source emission thresholds are defined by 40 CFR 51.165(a)(1)(iv)(A), definition of a *Major stationary source*, for $PM_{2.5}$ and its precursors. Major source emission thresholds are defined by 40 CFR 52.21(b)(1)(i)(b) for PM_{10} and CO, i.e., pollutants for which Salt Lake County is in attainment. Total HAP threshold is given in 40 CFR 63.2 under definition of a *Major source*.

Trinity's analysis of the increased throughputs at the Utah Bakery indicates that the project's emission increases are below UDAQ modeling thresholds. Therefore, modeling is not required.[11]

[11] UAC R307-406-2.

7. NONATTAINMENT/MAINTENANCE AREAS - OFFSETTING

Per UDAQ's Form 1 for NOI and R307-420 and R307-421, Appendix F should include offset requirements for nonattainment and maintenance areas.

$PM_{2.5}$ Offsets

$PM_{2.5}$ offsets are applicable to major sources located within or impacting a $PM_{2.5}$ nonattainment area of the NAAQS. A major source in a serious nonattainment area is defined in R307-403-5(2)(b) as "any stationary source of air pollutants which emits or has the [PTE] 70 [TPY] or more of direct $PM_{2.5}$ or any individual $PM_{2.5}$ precursor as defined in R307-403-1(4)(c) [i.e., SO_2, NO_x, VOCs, and ammonia]."

The PTE increase presented in Section 6 demonstrates PM_{10}, $PM_{2.5}$, and $PM_{2.5}$ precursors below the defined major source thresholds; therefore, the Utah Bakery is not subject to the offset requirements of R307-403.

PM_{10} Offsets

PM_{10} offsets are applicable to new major sources that have a PTE - or modified sources which would produce an emission increase - equal to or exceeding the tonnage total of sulfur dioxide (SO_2) or NO_X, as follows, and that are located in or impact a PM_{10} Nonattainment Area (UAC R307-421-3):

- For a total of 50 tpy or more, the established offset ratio of 1.2:1 is required; and
- For a total of 25 tpy but less than 50 tpy, the established offset ratio of 1:1 of the emission increase is required.

The Utah Bakery's PTE increase, as presented in Section 6, has a total tonnage of less than 25 tpy for SO_2 and for NO_X; therefore, it is not subject to the offset requirements for PM_{10}.

Ozone Offsets

Ozone Offset requirements in the Utah Administrative Code (UAC) R307-420-3(2) VOC offsets are applicable to significant sources located within or impacting an ozone nonattainment area of the NAAQS. In summary, significant sources located in Davis County or Salt Lake County shall offset the proposed increase in VOC emissions by a ratio of 1.2:1 before the Director may issue an approval order to construct, modify, or relocate under R307-401.

"Significant" means, for the purposes of determining what is a significant emission increase or a significant net emission increase and therefore a major modification, a rate of emissions that would equal or exceed any of the following rates:

(1) for VOCs, 25 tons per year,
(2) for NO_X, 40 tons per year.

The PTE increase presented in Section 6 is less than 25 tpy of VOCs; therefore, ozone offsets do not apply.

8. APPLICABLE REGULATIONS

In accordance with UDAQ's Form 1, this NOI air permit application includes a discussion of Federal and State requirements and their applicability to the project. The regulations that Trinity reviewed include NAAQS, State Implementation Plans (SIP), New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAP) and Utah Air Quality Regulations.

8.1. General Introduction – Utah Regulations

Trinity evaluated the applicability of each rule under the UAC Title R307. The rules applicable to the modification of the Utah Bakery's AO have been addressed in the table below.

Table 8-1. Evaluation of UDAQ Air Quality Rules (Specific to this Modification)

Reference		Regulation Name	Applicability	
			Yes	No
R307-101	[1]	General Requirements	X	
R307-102	[1]	General Requirements: Broadly Applicable Requirements	X	
R307-103	[1]	Administrative Procedures	X	
R307-104		Conflict of Interest		X
R307-105	[1]	General Requirements: Emergency controls	X	
R307-107		General Requirements: Breakdowns	X	
R307-110	[1]	General Requirements: State Implementation Plan	X	
R307-115	[1]	General Conformity	X	
R307-120		General Requirements: Tax Exemption for Air Pollution Control Equipment		X
R307-121		General Requirements: Clean Air and Efficient Vehicle Tax Credit		X
R307-122		General Requirements: Heavy Duty Vehicle Tax Credit		X
R307-123		General Requirements: Clean Fuels and Vehicle Technology Grant and Loan Program		X
R307-124		General Requirements: Conversion to Alternative Fuel Grant Program		X
R307-125		Clean Air Retrofit, Replacement, and Off-Road Technology Program		X
R307-130		General Penalty Policy		X
R307-135		Enforcement Policy for Asbestos Hazard Emergency Response Act		X
R307-150	[1]	Emission Inventories	X	
R307-165		Emission Testing		X

Reference		Regulation Name	Applicability	
			Yes	No
R307-170		Continuous Emission Monitoring Program		X
R307-201	[1]	Emission Standards: General Emission Standards	X	
R307-202		Emission Standards: General Burning		X
R307-203		Emission Standards: Sulfur Content of Fuels		X
R307-204		Emission Standards: Smoke Management		X
R307-205		Emission Standards: Fugitive Emissions and Fugitive Dust	X	
R307-206		Emission Standards: Abrasive Blasting		X
R307-207		Residential Fireplaces and Solid Fuel Burning Devices		X
R307-208		Outdoor Wood Boilers		X
R307-210	[2]	Standards of Performance for New Stationary Sources	X	
R307-214	[2]	National Emission Standards for Hazardous Air Pollutants	X	
R307-220		Emission Standards: Plan for Designated Facilities		X
R307-221		Emission Standards: Emission Controls for Existing Municipal Solid Waste Landfills		X
R307-222		Emission Standards: Existing incinerator for Hospital, Medical, Infectious Waste		X
R307-223		Emission Standards: Existing Small Municipal Waste Combustion Units		X
R307-224		Mercury Emission Standards: Coal Fired Electric Generating Units		X
R307-230		NO_X Emission Limits for Natural Gas-Fired Water Heaters		X
R307-250		Western Backstop Sulfur Dioxide Trading Program		X
R307-301		Utah and Weber Counties: Oxygenated Gasoline Program as a Contingency Measure		X
R307-302		Solid Fuel Burning Devices		X
R307-303		Commercial Cooking		X
R307-304		Solvent Cleaning	X	
R307-305		Nonattainment and Maintenance Areas for PM_{10}: Emission Standards	X	
R307-306		PM_{10} Nonattainment and Maintenance Areas: Abrasive Blasting		X
R307-307		Road Salting and Sanding		X

Reference	Regulation Name	Applicability	
		Yes	No
R307-309	Nonattainment and Maintenance Areas for PM_{10} and $PM_{2.5}$: Fugitive Emissions and Fugitive Dust	X	
R307-310	Salt Lake County: Trading of Emission Budgets for Transportation Conformity		X
R307-311	Utah County: Trading of Emission Budgets for Transportation Conformity		X
R307-312	Aggregate Processing Operations for $PM_{2.5}$ Nonattainment Areas		X
R307-320	Ozone Maintenance Areas and Ogden City: Employer Based Trip Reduction		X
R307-325	Ozone Nonattainment and Maintenance Areas: General Requirements	X	
R307-326	Ozone Nonattainment and Maintenance Areas: Control of Hydrocarbon Emissions in Petroleum Refineries		X
R307-327	Ozone Nonattainment and Maintenance Areas: Petroleum Liquid Storage		X
R307-328	Gasoline Transfer and Storage		X
R307-335	Degreasing		X
R307-341	Ozone Nonattainment and Maintenance Areas: Cutback Asphalt		X
R307-342	Adhesives and Sealants		X
R307-343	Wood Furniture Manufacturing Operations		X
R307-344	Paper, Film, and Foil Coatings		X
R307-345	Fabric and Vinyl Coatings		X
R307-346	Metal Furniture Surface Coatings		X
R307-347	Large Appliance Surface Coatings		X
R307-348	Magnet Wire Coatings		X
R307-349	Flat Wood Panel Coating		X
R307-350	Misc. Metal Parts and Product Coating		X
R307-351	Graphic Arts		X
R307-352	Metal Container, Closure, and Coil Coatings		X
R307-353	Plastic Parts Coatings		X
R307-354	Automotive Refinishing Coatings		X
R307-355	Aerospace Manufacture and Rework Facilities		X
R307-356	Appliance Pilot Light		X
R307-357	Consumer Products		X
R307-361	[1] Architectural Coatings	X	

Reference	Regulation Name	Applicability	
		Yes	No
R307-401	Permit: New and Modified Sources	X	
R307-403	Permits: New and Modified Sources in Nonattainment and Maintenance Areas		X
R307-405	Permits: Major Sources in Attainment or Unclassified Areas (PSD)		X
R307-406	Visibility		X
R307-410	Permits: Emission Impact Analysis		X
R307-414	Permits: Fees for Approval Orders	X	
R307-415	Permits: Operating Permit Requirements		X
R307-417	Permits: Acid Rain Sources		X
R307-420	Permits: Ozone Offset Requirements in Salt Lake County and Utah County		X
R307-421	Permits: PM_{10} Offset Requirements in Salt Lake County and Utah County		X
R307-424	Permits: Mercury Requirements for Electric Generating Units		X
R307-501 to 505	Oil and Gas Industry		X
R307-801	Utah Asbestos Rule		X
R307-840	Lead-Based Paint Program Purpose, Applicability, and Definitions		X
R307-841	Residential Property and Child-Occupied Facility Renovation		X
R307-842	Lead-Based Paint Activities		X

1. The subject rule is applicable to USB; however, this rule is not specific to operational compliance requirements, and is therefore not discussed in this NOI air permit application.
2. Applicable NSPS and NESHAP regulations are detailed under appropriate project headings.

8.1.2. UAC R307-107 General Requirements: Breakdowns

USB will report breakdowns at the Utah Bakery within 24 hours via telephone, electronic mail, fax, or other similar method and provide detailed written description within 14 days of the onset of the incident to UDAQ.

8.1.3. UAC R307-205

USB will comply and conform to the definitions, terms, abbreviations, and references used in the UAC R307-205 and 40 CFR.

8.1.4. UAC R307-304 Solvent Cleaning

In the event that USB uses more than 55 gallons of VOC-containing solvent products for solvent cleaning operations, USB will comply with the following VOC content limits listed in this rule:

Solvent Cleaning VOC Limits (excluding water and exempt solvents from the definition of VOCs found in R307-101-2

Solvent Cleaning Category	VOC Limit:	(lb/gal)	(g/L)
Tool, equipment and machinery		6.7	800
General surface cleaning		5.0	600

USB will store used applicators in closed, fireproof containers. USB will also maintain records of the VOC content or composite vapor pressure of the solvent product applied, for at least two (2) years.

8.1.5. UAC R307-305 Nonattainment and Maintenance Areas for PM_{10}: Emission Standards

Visible emissions from existing installations (except diesel engines) shall be of a shade or density no darker than 20% opacity, except for starting motion no farther than 100 yards or for stationary operation not exceeding three minutes in any hour. Visible emissions shall be measured using EPA Method 9.

Visible emissions exceeding the opacity standards for short time periods as the result of initial warm-up, soot blowing, cleaning of grates, building of boiler fires, cooling, etc., caused by start-up or shutdown of a facility, installation or operation, or unavoidable combustion irregularities which do not exceed three minutes in length are not to be deemed in violation provided that the director finds that adequate control technology has been applied. The owner or operator shall minimize visible and non-visible emissions during start-up or shutdown of a facility, installation, or operation through the use of adequate control technology and proper procedures.

The Utah Bakery is located in Salt Lake County, which is currently in nonattainment for PM_{10}. USB will comply with the requirements described in UAC R307-305.

8.1.6. UAC R307-309 Nonattainment and Maintenance Areas for PM_{10} and $PM_{2.5}$: Fugitive Emissions and Fugitive Dust

Fugitive emissions from any source (e.g., mixers) shall not exceed 15% opacity. Opacity observations of fugitive emissions from stationary sources shall be conducted in accordance with EPA Method 9. For intermittent sources, the requirement for Method 0 observations to be made at 15 second intervals over a six-minute period shall not apply. The number of observations and the time period shall be determined by the length of the intermittent operation.

8.1.7. UAC R307-325 Ozone Nonattainment and Maintenance Areas: General Requirements

The Utah Bakery is located in the Northern Wasatch Front Ozone Nonattainment area and produces VOCs as part of its operations. This rule is therefore applicable. USB will ensure that VOCs are not spilled, discarded, stored in open containers, or handled in any other manner that would result in greater evaporation of VOCs than would have if reasonably available control technology (RACT) had been applied.

8.1.8. UAC R307-401-8: Approval Order

USB's NOI air permit application to modify its AO meets the conditions required under R307-401-8 for UDAQ to approve the NOI air permit application because:

1. The degree of pollution control for emissions, including for fugitive emissions and fugitive dust, that can be met for the modified source is at least best available control technology, where applicable.
2. The best available control technology for a new or modified source in an ozone nonattainment or maintenance area that will emit volatile organic compounds or nitrogen oxides, that can be met for the

modified source is at least as stringent as described in any Control Technique Guidance document that has been published by EPA and that is applicable to the added equipment.

3. All pollution control equipment at the Utah Bakery is properly maintained, as applicable.
4. Applicable provisions of R307 or SIP can be met for the modified source.
5. The modified source can meet the requirements of the Approved Order.

8.1.9. UAC R307-414-Permits: Fees for Approval Orders

USB will comply and conform to the definitions, terms, abbreviations, and references used in the UAC R307-414 and 40 CFR.

8.2. Federal Regulations

The Utah Bakery is not subject to NSPS Subpart Dc Small Industrial-Commercial-Institutional Steam Generating Units because the Bakery's boilers each have a maximum design heat input of less than 10 MMBtu/hr. The Utah Bakery is also not subject to NESHAP Subpart JJJJJJ Industrial, Commercial, and Institutional Boilers Area Sources because its boilers meet the definition of a "gas-fired unit".

APPENDIX A: FORMS

Form 1
Notice of Intent (NOI) Application Checklist

Date August 2023

Company United States Bakery

Utah Division of Air Quality
New Source Review Section

AIR QUALITY

Source Identification Information [R307-401-5]

1. Company name, mailing address, physical address and telephone number ☑
2. Company contact (Name, mailing address, and telephone number) ☑
3. Name and contact of person submitting NOI application (if different than 2) ☑
4. Source Universal Transverse Mercator (UTM) coordinates ☑
5. Source Standard Industrial Classification (SIC) code ☑
6. Area designation (attainment, maintenance, or nonattainment) ☑
7. Federal/State requirement applicability (NAAQS, NSPS, MACT, SIP, etc.) ☑
8. Source size determination (Major, Minor, PSD) ☑
9. Current Approval Order(s) and/or Title V Permit numbers ☑

NOI Application Information: [R307-401]

1. Detailed description of the project and source process ☑
2. Discussion of fuels, raw materials, and products consumed/produced ☑
3. Description of equipment used in the process and operating schedule ☑
4. Description of changes to the process, production rates, etc. ☑
5. Site plan of source with building dimensions, stack parameters, etc. ☑

6. Best Available Control Technology (BACT) Analysis [R307-401-8]
   A. BACT analysis for all new and modified equipment ☑

7. Emissions Related Information: [R307-401-2(b)]
   A. Emission calculations for each new/modified unit and site-wide (Include PM_{10}, $PM_{2.5}$, NO_x, SO_2, CO, VOCs, HAPs, and GHGs) ☑
   B. References/assumptions, SDS, for each calculation and pollutant ☑
   C. All speciated HAP emissions (list in lbs/hr) ☑

8. Emissions Impact Analysis – Approved Modeling Protocol [R307-410]
   A. Composition and physical characteristics of effluent (emission rates, temperature, volume, pollutant types and concentrations) ☑

9. Nonattainment/Maintenance Areas – Major NSR/Minor (offsetting only) [R307-403]
   A. NAAQS demonstration, Lowest Achievable Emission Rate, Offset requirements ☐ N/A ☑
   B. Alternative site analysis, Major source ownership compliance certification ☐ N/A ☑

10. Major Sources in Attainment or Unclassified Areas (PSD) [R307-405, R307-406]
    A. Air quality analysis (air model, met data, background data, source impact analysis) ☐ N/A ☑
    B. Visibility impact analysis, Class I area impact ☐ N/A ☑
11. Signature on Application ☑

Note: The Division of Air Quality will not accept documents containing confidential information or data. Documents containing confidential information will be returned to the Source submitting the application.

Form 2
Company Information/Notice of Intent (NOI)

Date August 2023

Utah Division of Air Quality
New Source Review Section

AIR QUALITY

Application for: ☑ **Initial Approval Order** ☑ **Approval Order Modification**

General Owner and Source Information

1.Company name and mailing address: United States Bakery 315 NE 10th Avenue Portland, OR 97232 Phone No.: (503) 813-0382 Fax No.: (503) 731-5680	2. Company** contact for environmental matters: Jim Davidson Phone no.: Email: Jim.Davidson@usbakery.com *** Company contact only; consultant or independent contractor contact information can be provided in a cover letter*
3. Source name and physical address (if different from above): 8556 South 2940 West West Jordan, UT 84088 Phone no.: (801) 304-0400 Fax no.:	4. Source Property Universal Transverse Mercator coordinates (UTM), including System and Datum: UTM: 12 X: 418501 Y: 4494291
5. The Source is located in: Salt Lake County	6. Standard Industrial Classification Code (SIC) 2 0 5 1

7. If request for modification, AO# to be modified: DAQE # AN147800002-20 DATED: 12 /10 /20

8. Brief (50 words or less) description of process.

Bakery that prepares bread, buns, cookies, muffins, and doughnuts for sale.

Electronic NOI

9. A complete and accurate electronic NOI submitted to DAQ Permitting Mangers Jon Black (*jlblack@utah.gov*) or Alan Humpherys (ahumpherys@utah.gov) can expedite review process. Please mark application type.

Hard Copy Submittal ☐ Electronic Copy Submittal ☑ Both ☐

Authorization/Singnature

I hereby certify that the information and data submitted in and with this application is completely true, accurate and complete, based on reasonable inquiry made by me and to the best of my knowledge and belief.

Signature: Mike Petitt Title: Chief Financial Officer

Mike Petitt Name (Type or print)	Telephone Number: (503) 813-0382 Email: Mike.Petitt@usbakery.com	Date: 9/10/23

Form 4
Project Information

Company United States Bakery

Site Utah Bakery

Utah Division of Air Quality
New Source Review Section

Process Data - For Modification/Amendment ONLY
1. Permit Number DAQE-AN147800002-20
If submitting a new permit, then use Form 3

Requested Changes

2. Name of process to be modified/added:

Increasing production of baked goods

End product of this process:

Modification will result in increase of bread and buns. As a whole, the Utah Bakery produces bread, buns, cookies, muffins, doughnuts.

3. Permit Change Type:

	New	Increase*
Equipment	☐	☐
Process	☐	☑

Condition Change ____________

Other ____________

Other ____________

Other ____________

4. Does new emission unit affect existing permitted process limits?

Yes ☐ No ☐

5. Condition(s) Changing:

Throughput and emission limits.

6. Description of Permit/Process Change**

Increase in bread and buns throughput.

7. New or modified materials and quantities used in process. **

Material	Quantity Annually
See NOI Air Permit Application	

8. New or modified process emitting units **

Emitting Unit(s)	Capacity(s)	Manufacture Date(s)
See NOI Air Permit Application		

**If the permit being modified does not include CO_2e or $PM_{2.5}$, the emissions need to be calculated and submitted to DAQ, which may result in an emissions increase and a public comment period.*

***If additional space is required, please generate a document to accommodate and attach to form.*

Form 5
Emissions Information
Criteria/GHGs/ HAP's
Utah Division of Air Quality
New Source Review Section

Company US Bakery

Site Utah Bakery

Potential to Emit* Criteria Pollutants & GHGs			
Criteria Pollutants	**Permitted Emissions (tons/yr)**	**Emissions Increases (tons/yr)**	**Proposed Emissions (tons/yr)**
PM_{10} Total			
PM_{10} Fugitive			
$PM_{2.5}$		See Attached for	
NO_x			
SO_2		Emission Information	
CO			
VOC			
VOC Fugitive			
NH_3			
Greenhouse Gases	**CO_2e**	**CO_2e**	**CO_2e**
CO_2			
CH_4			
N_2O		See Attached for	
HFCs			
PFCs		Emission Information	
SF_6			
Total CO2e			

Potential to emit to include pollution control equipment as defined by R307-401-2.

Hazardous Air Pollutants** (**Defined in Section 112(b) of the Clean Air Act)				
Hazardous Air Pollutant* **	**Permitted Emissions (tons/yr)**	**Emission Increase (tons/yr)**	**Proposed Emission (tons/yr)**	**Emission Increase (lbs/hr)**
		See Attached for		
		Emission Information		
Total HAP				

**** Use additional sheets for pollutants if needed*

APPENDIX B: EMISSIONS CALCULATIONS

Table B-1. Silo Throughput Inputs

Equipment	Storage Capacity (tons)	Pounds per Load	Loads per Week	Increase in Annual Tons Loaded (tpy)
Silo 1	50.0	45,000	2	1,340
Silo 2	37.50	45,000	1	2,010

Table B-2. Product Throughput Increase

Product	Hourly Throughput Increase (lb/hr)[1]	Operating Hours/Year	Annual Throughput Increase (tpy)
Bread	429	6,240	1,340
Buns	537	7,488	2,010

Table B-3. Projected Facility-wide Emissions Summary

Emission Point	PTE Emission Rate (tpy)							
	PM_{10}	$PM_{2.5}$	SO_2	NO_X	VOC	CO	Total HAPs	CO_2e
Material Handling Increase	0.01	0.01	-	-	-	-	-	-
Yeast Products Increase	-	-	-	-	7.96	-	-	-
Total Project Increase	**0.01**	**0.01**	**0.00**	**0.00**	**7.96**	**0.00**	**0.00**	**0.00**
Maximum Emission Increase without Modeling[1]	5/15	NA	40	40	N/A	100	HAPs specific	N/A
Modeling Required?	No	No	No	No	N/A	No	No	N/A
Current Permitted PTE[2]	1.08	1.08	0.04	6.87	41.54	5.77	0.13	9,404
New PTE	1.09	1.09	0.04	6.87	49.50	5.77	0.13	9,404
Major Source Threshold[3]	250	70	100	70	70	250	10/25	75,000
Major Source Threshold Exceeded?	No	No	No	No	No	No	No	No

1. New and modified source modeling thresholds are provided per UDAQ Emissions Impact Assessment Guidelines, Table 1. Modeling thresholds are specific to the emission type, with five (5) tpy for fugitive emissions and 15 tpy for non-fugitive emissions.

2. Approval Order DAQE-AN147800002-20.

3. Major source emission thresholds are defined by 40 CFR 51.165(a)(1)(iv)(A), definition of a *Major stationary source*, for PM2.5 and its precursors. Major source emission thresholds are defined by 40 CFR 52.21(b)(1)(i)(b) for PM10 and CO, i.e., pollutants for which Salt Lake County is in attainment. Total HAP threshold is given in 40 CFR 63.2 under definition of a *Major source.*

Table B-4. Flour Usage Parameters

Equipment	Total Storage Capacity (tons)	Annual Throughput Increase (tpy)
Silo 1	50	1,340
Silo 2	37.5	2,010
Equipment	**Capacity (lb/hr)**	**Annual Throughput Increase (tpy)**
Mixer 1	425	1,340
Mixer 2	425	2,010

Table B-5. Material Handling Controlled Emission Factors[1]

Parameter	PM (lb/ton)	PM_{10} (lb/ton)	$PM_{2.5}$ (lb/ton)
Loading/Unloading[2,3]	9.90E-04	3.40E-04	3.40E-04
Mixers[4]	1.84E-02	5.50E-03	5.50E-03

1. Where $PM_{2.5}$ and/or PM_{10} are not specified, it is conservatively estimated that $PM_{2.5}$ = PM_{10} = PM.

2. Loading/unloading emission factors per US EPA AP-42 Section 11.12-2 concrete for cement supplement to elevated storage silo.

3. All silos emissions are routed to a baghouse. Typical baghouse efficiencies range from 99-99.5%. However, it is conservatively estimated that emissions relative to silo loading/unloading are uncontrolled.

4. Mixer emission factors per US EPA AP-42 Section 11.12-2.

Table B-6. Emissions Increase from Material Handling

Equipment	PM (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Silo 1	1.51E-04	5.20E-05	5.20E-05	1.33E-03	4.56E-04	4.56E-04
Silo 2	2.27E-04	7.80E-05	7.80E-05	1.99E-03	6.83E-04	6.83E-04
Mixer 1	3.91E-03	1.17E-03	1.17E-03	1.23E-02	3.68E-03	3.68E-03
Mixer 2	3.91E-03	1.17E-03	1.17E-03	1.85E-02	5.53E-03	5.53E-03
Increase in Material Handling Emissions	**8.20E-03**	**2.47E-03**	**2.47E-03**	**0.03**	**1.04E-02**	**1.04E-02**

1. Maximum Hourly loading emissions are conservatively estimated with one (1) loading/unloading operation occuring per hour. Notably, US Bakery anticipates two (2) loadings weekly for Silo 1.

2. Total annual emissions are calculated as follows:
Total Emissions (tpy) = Emission Factor (lbs/ton) × Annual Loading Quantity (tpy) × 1 ton / 2000 lbs × 2
Where unloading emissions are incorporated by multiplying by two.

Table B-7. Projected Increase in Yeast Fermentation Emissions

Emission Source	Dough Throughput Increase (lb/hr)	Dough Throughput Increase (tpy)	Baker's Percent of Yeast (%)	Total Yeast Action Time[1] (hrs)	VOC Emission Factor[2] (lb/ton)	VOC Emissions (lb/hr)[3]	VOC Emissions (tpy)[3]
Yeast Fermentation - Bread	429	1,340	0.95	1.08	3.01	0.65	2.02
Yeast Fermentation - Buns	537	2,010	4.00	1.08	5.91	1.59	5.94
Increase in Annual VOC Emissions from Yeast (tpy)							**7.96**

1. Yeast action time does not include retard time when yeast is not expected to be active.

2. VOC emission factors associated with fermentation are calculated using the following equation per *Alternative Control Technology Document for Bakery Oven Emissions* (EPA 453/R-92-017, December 1992): Emission Factor (lb/ton) = 0.95 × Baker's Percent of Yeast (%) + 0.195 × Total Yeast Action Time (hrs) + 1.9

3. Hourly and Annual VOC emissions were calculated using the following equations:
Hourly Emissions (lb/hr) = Dough Throughput (lb/hr) × 1 ton / 2,000 lbs × Emission Factor (lb/ton)
Annual Emissions (tpy) = Dough Throughput (tpy) × Emission Factor (lb/ton) × 1 ton / 2,000 lbs

APPENDIX C: BACT ECONOMIC ANALYSIS

BACT CONTROL COST EVALUATION

Client Name	**United States Bakery**	**Technology:**	Regenerative Thermal Oxidizer
Address	**8556 South 2940 West**	**Application:**	Bakery
City, State	**West Jordan, UT**	**Pollutants:**	Volatile Organic Compounds (VOCs)
Permit ID No.	**DAQE-AN147800002-20**		

Regenerative Thermal Oxidizer

Key Assumptions	Scenario 1	Notes
Process Information		
Uncontrolled Emissions (tpy)	7.96	
Exhaust Airflow (scfm)	4,500	Per Puget Sound Clean Air Agency Permit to Construct 11331, and SCAQMD Permit to Construct 184003.
Capture Efficiency (%)	100%	Industry standard for closed system.
Control Efficiency (%)	95%	Per EPA-452/F-03-018.
Electrical Consumption (kWh/year)	146,051	
Gas Consumption (MMBtu/year)	9,329	
Water Consumption (Mgal/year)	0	
Utility Costs		
Electricity ($/kWh)	$ 0.070	Average Utah Prices (Feb 2023)
Natural Gas ($/MMBtu)	$ 10.35	Average Utah Prices (Feb 2023)
Water ($/Mgal)	$ 33.45	Sandy Utah (2" Meter, July 2016)
Labor Costs		
Operator ($/hour)	$ 26.70	Per EPA *Air Pollution Control Cost Manual*, Chapter 2.
Supervisor ($/hour)	$ 4.01	Per EPA *Air Pollution Control Cost Manual*, Chapter 2.
Maintenance ($/hour)	$ 27.25	Per EPA *Air Pollution Control Cost Manual*, Chapter 2.
Economic Factors		
Dollar Inflation (2002 to 2022)	1.6270	U.S. Consumer Price Index, 2022
Equipment Life Expectancy (Years)	20	Per EPA Air Pollution Control Cost Manual, Chapter 2, Table 2.12.
Interest Rate (%)	7.00%	Current Avg SBA Loan Rates, April 2023
Capital Recovery Factor (CRF)	0.0944	

DIRECT COSTS

Capital Cost	Scenario 1	Notes
Purchased Equipment Costs		
Total Equipment Cost[1]	305,111	A
Instrumentation	30,511	0.10 × A
Sales Tax	18,307	0.06 × A
Freight	15,256	0.05 × A
Total Purchased Equipment Costs	*369,184*	*B = 1.18 × A*
Direct Installation Costs[2]		
Foundations and Supports	29,535	0.08 × B
Handling and Erection	51,686	0.14 × B
Electrical	14,767	0.04 × B
Piping	7,384	0.02 × B
Insulation	3,692	0.01 × B
Painting	3,692	0.01 × B
Site Preparation & Buildings	-	No estimate / Site specific
Additional duct work	-	No estimate / Site specific
Total Direct Installation Costs	*110,755*	*C = 0.30 × B*
Indirect Installation Costs[2]		
Engineering	36,918	0.10 × B
Construction and Field Expense	18,459	0.05 × B
Contractor Fees	36,918	0.10 × B
Start-up	7,384	0.02 × B
Performance Test	3,692	0.01 × B
Process Contingencies	11,076	0.03 × B
Total Indirect Installation Costs	*114,447*	*D = 0.31 × B*
Total Capital Investment ($)	**594,386**	**TCI = B + C + D**

ANNUAL COSTS

Operating Cost	Scenario 1	Notes[1]
Direct Annual Costs[3]		
Operating Labor (0.5 hr, per 8-hr shift)	14,618	E
Supervisory Labor (15% operating labor)	2,193	F = 0.15 × E
Maintenance Labor (0.5 hr, per 8-hr shift)	14,919	G
Maintenance Materials	14,919	H = G
Electricity	10,253	I
Natural Gas	96,587	J
Water	0	K
Total Direct Annual Costs	*153,489*	*DAC = E + F + G + H + I + J + K*
Indirect Annual Costs[3]		
Overhead	27,990	M = 0.60 × (E + F + G + H)
Administrative Charges	11,888	N = 0.02 × TCI
Property Tax	5,944	O = 0.01 × TCI
Insurance	5,944	P = 0.01 × TCI
Capital Recovery[4]	56,106	Q
Total Indirect Annual Costs	*107,871*	*IDAC = K + L + M + N + O + P + Q*
Total Annual Cost ($)	**261,360**	*TAC = DAC + IDAC*
Pollutant Removed (tpy)	7.56	
Cost per ton of Pollutant Removed ($)	**34,562**	*$/ton = TAC / Pollutant Removed*

1. U.S. EPA OAQPS, EPA Air Pollution Control Cost Manual (6th Edition), January 2002, Section 3.2, Chapter 2, Equation 2.33
Note that this is the estimated minimum cost of control; various other costs have not been included in order to present a conservative cost analysis.
2. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, January 2002, Section 3.2, Chapter 2, Table 2.8.
3. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, January 2002, Section 3.2, Chapter 2, Table 2.10.
4. Capital Recovery factor calculated based on Equation 2.8a (Section 1, Chapter 2, page 2-21) and Table 1.13 (Section 2, Chapter 1, page 1-52) of U.S. EPA OAQPS, EPA Air Pollution Control Cost Manual (6th Edition), January 2002.

BACT CONTROL COST EVALUATION

Client Name	**United States Bakery**	**Technology:**	Catalytic Oxidizer
Adress	**8556 South 2940 West**	**Application:**	Bakery
City, State	**West Jordan, UT**	**Pollutants:**	Volatile Organic Compounds (VOCs)
Permit ID N	**DAQE-AN147800002-20**		

Catalytic Oxidizer

Key Assumptions	Scenario 1	Notes
Process Information		
Uncontrolled Emissions (tpy)	7.96	
Exhaust Airflow (scfm)	4,500	Per Puget Sound Clean Air Agency Permit to Construct 11331, and SCAQMD Permit to Construct 184003.
Capture Efficiency (%)	100%	Industry standard for closed system.
Control Efficiency (%)	99%	Per EPA-452/F-03-018
Electrical Consumption (kWh/year)	176,799	
Gas Consumption (MMBtu/year)	14,016	Per Puget Sound Clean Air Agency
Water Consumption (Mgal/year)	0	
Utility Costs		
Electricity ($/kWh)	$ 0.070	Average Utah Prices (Feb 2023)
Natural Gas ($/MMBtu)	$ 10.35	Average U.S. Prices (Feb 2023)
Water ($/Mgal)	$ 33.45	Sandy Utah (2" Meter, July 2016)
Labor Costs		
Operator ($/hour)	$ 26.70	Per EPA *Air Pollution Control Cost Manual*, Chapter 2.
Supervisor ($/hour)	$ 4.01	Per EPA *Air Pollution Control Cost Manual*, Chapter 2.
Maintenance ($/hour)	$ 27.25	Per EPA *Air Pollution Control Cost Manual*, Chapter 2.
Economic Factors		
Dollar Inflation (2002 to 2022)	1.6270	U.S. Consumer Price Index, 2022
Equipment Life Expectancy (Years)	20	Per EPA Air Pollution Control Cost Manual, Chapter 2, Table 2.12.
Interest Rate (%)	7.00%	Current Avg SBA Loan Rate, April 2023
Capital Recovery Factor (CRF)	0.0944	

DIRECT COSTS

Capital Cost	Scenario 1	Notes
Purchased Equipment Costs		
Total Equipment Cost[1]	181,445	A
Instrumentation	18,144	0.10 × A
Sales Tax	10,887	0.06 × A
Freight	9,072	0.05 × A
Total Purchased Equipment Costs	*219,548*	*B = 1.18 × A*
Direct Installation Costs[2]		
Foundations and Supports	17,564	0.08 × B
Handling and Erection	30,737	0.14 × B
Electrical	8,782	0.04 × B
Piping	4,391	0.02 × B
Insulation	2,195	0.01 × B
Painting	2,195	0.01 × B
Site Preparation & Buildings	-	No estimate / Site specific
Additional duct work	-	No estimate / Site specific
Total Direct Installation Costs	*65,864*	*C = 0.30 × B*
Indirect Installation Costs[2]		
Engineering	21,955	0.10 × B
Construction and Field Expense	10,977	0.05 × B
Contractor Fees	21,955	0.10 × B
Start-up	4,391	0.02 × B
Performance Test	2,195	0.01 × B
Process Contingencies	6,586	0.03 × B
Total Indirect Installation Costs	*68,060*	*D = 0.31 × B*
Total Capital Investment ($)	**353,472**	**TCI = B + C + D**

ANNUAL COSTS

Operating Cost	Scenario 1	Notes
Direct Annual Costs		
Operating Labor (0.5 hr, per 8-hr shift)	14,618	E
Supervisory Labor (15% operating labor)	2,193	F = 0.15 × E
Maintenance Labor (0.5 hr, per 8-hr shift)	14,919	G
Maintenance Materials	14,919	H = G
Electricity	12,411	I
Natural Gas	145,107	J
Water	0	K
Catalyst Replacement (Costs x CRF, 3 years)	68,598	L
Total Direct Annual Costs	*272,766*	*DAC = E+F+ G+ H+ I+ J+ K+ L*
Indirect Annual Costs		
Overhead	27,990	M = 0.60 × (E + F + G + H)
Administrative Charges	7,069	N = 0.02 × TCI
Property Tax	3,535	O = 0.01 × TCI
Insurance	3,535	P = 0.01 × TCI
Capital Recovery4	33,365	Q
Total Indirect Annual Costs	*75,494*	*IDAC = M+ +N +O+ P+ Q*
Total Annual Cost ($)	**348,260**	*TAC = DAC + IDAC*
Pollutant Removed (tpy)	7.88	
Cost per ton of Pollutant Removed ($)	**44,193**	*$/ton = TAC / Pollutant Removed*

1. U.S. EPA OAQPS, EPA Air Pollution Control Cost Manual (6th Edition), January 2002, Section 3.2, Chapter 2, Equation 2.38
Note that this is the estimated minimum cost of control; various other costs have not been included in order to present a conservative cost analysis.
2. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, January 2002, Section 3.2, Chapter 2, Table 2.8
3. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)*, January 2002, Section 3.2, Chapter 2, Table 2.10
4. Capital Recovery factor calculated based on Equation 2.8a (Section 1, Chapter 2, page 2-21) and Table 1.13 (Section 2, Chapter 1, page 1-52) of U.S. EPA OAQPS, EPA Air Pollution Control Cost Manual (6th Edition), January 2002.