Statement of Basis

Permit to Construct No. P-2010.0043
Project ID 62519

The Amalgamated Sugar Company LLC - Paul
Paul, Idaho

Facility ID 067-00001

Final

May 3, 2021

Kelli Wetzel KW
Permit Writer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

TABLE OF CONTENTS

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE 3
FACILITY INFORMATION 5
Description 5
Permitting History 5
Application Scope 6
Application Chronology 6
TECHNICAL ANALYSIS 7
Emissions Units and Control Equipment 7
Emissions Inventories 7
Ambient Air Quality Impact Analyses 12
REGULATORY ANALYSIS 12
Attainment Designation (40 CFR 81.313) 12
Facility Classification 13
Permit to Construct (IDAPA 58.01.01.201) 13
Tier II Operating Permit (IDAPA 58.01.01.401) 14
Visible Emissions (IDAPA 58.01.01.625) 14
Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70) 14
PSD Classification (40 CFR 52.21) 14
NSPS Applicability (40 CFR 60) 14
NESHAP Applicability (40 CFR 61) 14
MACT/GACT Applicability (40 CFR 63) 14
Permit Conditions Review 14
PUBLIC REVIEW 15
Public Comment Period 15
APPENDIX A – EMISSIONS INVENTORIES
APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES
APPENDIX C – FACILITY DRAFT COMMENTS
APPENDIX D – PROCESSING FEE

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
Btu	British thermal units
CAA	Clean Air Act
CaO	Calcium oxide
CAS No.	Chemical Abstracts Service registry number
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GACT	Generally Available Control Technology
gph	gallons per hour
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
hr/yr	hours per consecutive 12 calendar month period
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
mg/dscm	milligrams per dry standard cubic meter
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O&M	operation and maintenance
O_2	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

POM	polycyclic organic matter
ppm	parts per million
ppmw	parts per million by weight
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
TASCO	The Amalgamated Sugar Company LLC
U.S.C.	United States Code
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

The Amalgamated Sugar Company LLC (TASCO) operates an existing beet sugar manufacturing plant that is located in Paul, Idaho. Operations at the plant can be divided into the beet end and sugar end processes. At the facility the lime kiln produces calcium oxide (CaO) and concentrated carbon dioxide (CO_2) gas for juice purification. The CaO from the kiln is transferred to Slaker No. 1 (S-K2) to produce milk of lime. The CO_2 gas from the kiln passes through a two-stage high efficiency scrubbing system (A-K1). The gas washer scrubs and cools the exhaust gas prior to the compressors. The compressors convey the CO_2 gas to the first and second carbonation tanks in parallel. The gas is bubbled through the juice from the bottom of the carbonation tanks.

Permitting History

The following information was derived from a review of the permit files available to DEQ. Permit status is noted as active and in effect (A) or superseded (S).

March 19, 1981	13-1020-0001-00, Air pollution source permit which established requirements for the boilers, Permit status (S)
January 1, 1984	1020-0001, Permit revision which established requirements for the pulp dryers, Permit status (S)
September 23, 2002	P-020407, PTC modification to add No. 6 evaporator and establish throughput limits, Permit status (S)
December 12, 2002	T1-9503-039-1, Initial T1 operating permit, Permit status (S)
February 3, 2005	P-050401, Revised PTC to replace the sugar production limit with a stead production limit, Permit status (S)
July 27, 2005	P-050406, Initial PTC for the Nebraska boiler (backup), Permit status (S)
September 23, 2005	T1-030416, Renewal and administrative amendment T1 to incorporate compliance schedule and revisions resulting from an appeal, Permit status (S)
November 17, 2005	P-050424, Initial PTC to add temporary emergency generator, Permit status (T) (terminated)
December 15, 2005	P-050421, Revised PTC to increase daily throughput limit, Permit status (S)
June 14, 2006	P-060404, Revised PTC to increase annual throughput limit, Permit status (S)
May 16, 2007	P-2007.0023, Revised PTC to temporarily increase steam production in 2006, Permit status (S)
September 22, 2010	P-2010.0043, Initial PTC to replace lime kiln system, Permit status (S)
March 8, 2011	P-2011.0040, Revised PTC to revise campaign year definition, Permit status (S)
June 1, 2012	P-2011.0043, Revised PTC to revise slaker control equipment, Permit status (S)
June 11, 2012	P-2011.0040, Revised PTC to increase annual throughput and steaming rate limits, Permit status (S)
March 18, 2014	P-2010.0043, Revised PTC to remove slaker control equipment, Permit status (A, but will become S upon issuance of this permit)

August 13, 2014	P-2011.0040, Revised PTC to convert boilers to natural gas firing only and to establish limits to resolve a historic equipment review required by T1-030416 compliance schedule, Permit status (S)
October 15, 2014	T1-050414, Renewal T1 to incorporate CAM and PTC revisions, Permit status (A)
June 8, 2017	P-2011.0040, Revised PTC to increase the beet slice throughput limits, Permit status (S)
November 20, 2017	P-2017.0012, PTC to allow fulltime backup operation of the Nebraska boiler, Permit status (S)
February 23, 2018	T1-2017.0057, Administrate amendment to incorporate P-2017.0012, Permit status (S)
October 18, 2018	P-2017.0012, Modified PTC to replace the Erie City boiler with a Rentech boiler and increase the annual boiler therm limit, Permit status (S)
April 30, 2020	P-2017.0012, DEQ initiated permit revision to correct the NSPS requirements for the boilers, Permit status (A)
April 30, 2020	T1-2019.0020, Tier I renewal, Permit status (A)

Application Scope

This PTC is for a modification at an existing Tier I facility. The applicant has requested to process the PTC in accordance with IDAPA 58.01.01.209.05.c.

The applicant has proposed to increase the daily lime rock throughput from 770 tons to 810 tons, the annual rock lime kiln throughput from 146,300 tons to 178,200 tons, and increase the coal/coke input to 59.2 tons per day.

Application Chronology

September 23, 2020	DEQ received an application and an application fee.
October 20, 2020	DEQ determined that the application was incomplete.
October 28, 2020	DEQ received supplemental information from the applicant.
November 27, 2020	DEQ determined that the application was incomplete.
December 17, 2020	DEQ received supplemental information from the applicant.
January 15, 2021	DEQ determined that the application was complete.
February 18, 2021	DEQ made available the draft permit and statement of basis for peer and regional office review.
February 24, 2021	DEQ made available the draft permit and statement of basis for applicant review.
March 22 – April 21, 2021	DEQ provided a public comment period on the proposed action.
April 27, 2021	DEQ provided the proposed permit and statement of basis for EPA review.
March 4, 2021	DEQ received the permit processing fee.
May 3, 2021	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Sources	Control Equipment
Lime Kiln System (S-K1): Manufacturer: Eberhardt Model: KR 8.0 (forced draft, vertical) Manufacture Date: 2011 Max. production: 178,200 T/yr lime rock Fuel: anthracite coal and/or coke	Gas Washer First Carbonation Tank Second Carbonation Tank (A-K1)

Emissions Inventories

As presented in Table 6 the pre-project facility-wide potential to emit exceeds 250 T/yr for CO. Therefore, a PSD applicability analysis is required for this project.

Projected Actual Emissions

The procedure used by TASCO for calculating Projected Actual emissions was the calculation approach for existing units set forth in 40 CFR 52.21, beginning with definitions in 52.21(b)(41). Using these procedures, Projected Actual criteria pollutant emissions and fugitive source emissions were calculated. Projected Actual emissions are presented in the following table:

Table 2 PROJECTED ACTUAL EMISSIONS

Source	$PM_{10}/PM_{2.5}$	SO_2	NO_X	CO	VOC	CO_2e
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources Affected by this Permitting Action						
First Carbonation Tank	4.81	2.34	30.47	316.80	3.07	40,390.5
Second Carbonation Tank	0.53	0.26	3.39	35.20	0.34	
Compressor Pressure Relief Vent	0.0	0.0	0.0	0.0	0.0	
Total, Point Sources	**5.34**	**2.60**	**33.86**	**352.00**	**3.41**	**40,390.50**
Fugitive Sources						
Limerock Fugitive Emissions	0.44	0.0	0.0	0.0	0.0	0.0
Coke/Anthracite Fugitive Emissions	0.032	0.0	0.0	0.0	0.0	0.0
Total, Fugitive Sources	**0.47**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Facility Totals						
Total, Projected Actual Emissions	**5.81**	**2.60**	**33.86**	**352.00**	**3.41**	**40,390.50**

Baseline Actual Emissions

The procedure used by TASCO for calculating Baseline Actual emissions was the calculation approach for existing units set forth in 40 CFR 52.21, beginning with definitions in 52.21(b)(48). Using these procedures, Baseline Actual criteria pollutant emissions and fugitive source emissions were calculated using the 2018 and 2019 campaign years. Baseline Actual emissions are presented in the following table:

Table 3 BASELINE ACTUAL EMISSIONS

Source	$PM_{10}/PM_{2.5}$	SO_2	NO_X	CO	VOC	CO_2e
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources Affected by this Permitting Action						
First Carbonation Tank	3.83	1.56	24.25	252.04	2.04	26,922
Second Carbonation Tank	0.43	0.17	2.69	28.00	0.23	
Compressor Pressure Relief Vent	0.0	0.0	0.0	0.0	0.0	
Total, Point Sources	**4.26**	**1.73**	**26.94**	**280.04**	**2.27**	**26,922.00**
Fugitive Sources						
Limerock Fugitive Emissions	0.35	0.0	0.0	0.0	0.0	0.0
Coke/Anthracite Fugitive Emissions	0.022	0.0	0.0	0.0	0.0	0.0
Total, Fugitive Sources	**0.37**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Facility Totals						
Total, Baseline Actual Emissions	**4.63**	**1.73**	**26.94**	**280.04**	**2.27**	**26,922.00**

Project Emissions Increase

The project emissions increase is presented in the following table:

Table 4 PROJECT EMISSIONS INCREASE

Emissions	$PM_{10}/PM_{2.5}$	SO_2	NO_X	CO	VOC	CO_2e
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources						
Projected Actual Emissions	5.81	2.60	33.86	352.00	3.41	40,390.50
Baseline Actual Emissions	4.63	1.73	26.94	280.04	2.27	26,922.00
Project Emissions Increase	**1.18**	**0.87**	**6.92**	**71.96**	**1.14**	**13,468.50**

Comparison of the Project Emissions Increase to the PSD Significance Thresholds

The comparison of the change in projected actual emissions from baseline actual emissions to the PSD significance thresholds is presented in the following table.

Table 5 COMPARISON OF THE PROJECT EMISSIONS INCREASE TO THE PSD MAJOR MODIFICATION THRESHOLDS

Emissions	$PM_{10}/PM_{2.5}$	SO_2	NO_X	CO	VOC	CO_2e
	T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Point Sources						
Project Emissions Increase	**1.18**	**0.87**	**6.92**	**71.96**	**1.14**	13,468.50
PSD Significance Threshold	**15**	**40**	**40**	**100**	**40**	**100,000**
Does the Project Emissions Increase Exceed the PSD Major Modification Threshold?	No	No	No	No	No	No

As presented in the preceding table this project does not constitute a PSD Major Modification and is not subject to PSD permitting requirements.

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source.

Using this definition of Potential to Emit an emission inventory was developed for the lime kiln system at the facility (see Appendix A) associated with this proposed project. Emissions estimates of criteria pollutant, HAP, and TAP were based on actual emission factors from DEQ approved compliance tests, and process information specific to the facility for this proposed project.

Pre-Project Potential to Emit

The following table presents the pre-project potential to emit for all criteria pollutants from the lime kiln system as submitted by the Applicant and verified by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 6 PRE-PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]
First Carbonation Tank	2.02	4.61	0.64	1.50	14.15	32.26	482.80	1100.9	0.84	1.96
Second Carbonation Tank	0.40	0.92	0.13	0.30	2.83	6.45	96.56	220.18	0.17	0.39
Compressor Pressure Relief Vents	0.46	1.05	0.15	0.34	3.23	7.37	110.36	251.64	0.19	0.45
Pre-Project Totals	**2.88**	**6.58**	**0.92**	**2.14**	**20.21**	**46.08**	**689.72**	**1572.7**	**1.20**	**2.80**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.

Post Project Potential to Emit

Post project Potential to Emit is used to establish the change in emissions at a facility and to determine the facility's classification as a result of this project. Post project Potential to Emit includes all permit limits resulting from this project.

The following table presents the post project Potential to Emit for criteria pollutants from the lime kiln system as determined by DEQ staff. See Appendix A for a detailed presentation of the calculations of these emissions for each emissions unit.

Table 7 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]	lb/hr[(a)]	T/yr[(b)]
First Carbonation Tank	1.82	4.81	0.90	2.34	11.54	30.47	119.98	316.75	1.18	3.07
Second Carbonation Tank	0.20	0.53	0.10	0.26	1.28	3.39	13.33	35.19	0.13	0.34
Compressor Pressure Relief Vents	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Post Project Totals	**2.02**	**5.34**	**1.00**	**2.60**	**12.82**	**33.86**	**133.31**	**351.94**	**1.31**	**3.41**

a) Controlled average emission rate in pounds per hour is a daily average, based on the proposed daily operating schedule and daily limits.
b) Controlled average emission rate in tons per year is an annual average, based on the proposed annual operating schedule and annual limits.

Change in Potential to Emit

The change in facility-wide potential to emit is used to determine if a public comment period may be required and to determine the processing fee per IDAPA 58.01.01.225. The following table presents the facility-wide change in the potential to emit for criteria pollutants.

Table 8 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	$PM_{10}/PM_{2.5}$		SO_2		NO_X		CO		VOC	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Pre-Project Potential to Emit	2.88	6.58	0.92	2.14	20.21	46.08	689.72	1572.7	1.20	2.80
Post Project Potential to Emit	2.02	5.34	1.00	2.60	12.82	33.86	133.31	351.94	1.31	3.41
Changes in Potential to Emit	**-0.86**	**-1.24**	**0.08**	**0.46**	**-7.39**	**-12.22**	**-556.1**	**-1220**	**0.11**	**0.61**

Non-Carcinogenic TAP Emissions

A summary of the estimated PTE for emissions increase of non-carcinogenic toxic air pollutants (TAP) is provided in the following table. To be conservative, TASCO has set pre-project emissions at zero.

Pre- and post-project, as well as the change in, non-carcinogenic TAP emissions are presented in the following table:

Table 9 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR NON-CARCINOGENIC TOXIC AIR POLLUTANTS

Non-Carcinogenic Toxic Air Pollutants	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Acetone	0.00E-03	2.18E-02	2.18E-02	1.19E+02	No
Aluminum (metals and oxides)	0.00E-03	1.21E-01	1.21E-01	6.67E-01	No
Antimony	0.00E-03	7.94E-06	7.94E-06	3.30E-02	No
Barium	0.00E-03	0.00	0.00	3.30E-02	No
Carbon Disulfide	0.00E-03	1.42E-03	1.42E-03	2.00E+00	No
Chromium (total)	0.00E-03	1.15E-04	1.15E-04	3.30E-02	No
Cobalt	0.00E-03	4.41E-05	4.41E-05	3.30E-03	No
Copper (dust and mists)	0.00E-03	7.01E-04	7.01E-04	6.70E-02	No
Ethyl benzene	0.00E-03	9.31E-05	9.31E-05	2.90E+01	No
Heptane	0.00E-03	3.89E-04	3.89E-04	1.09E+02	No
Hexane	0.00E-03	5.73E-04	5.73E-04	1.20E+01	No
Manganese	0.00E-03	1.23E-02	1.23E-02	3.33E-01	No
Mercury	0.00E-03	1.13E-04	1.13E-04	7.00E-03	No
Molybdenum	0.00E-03	0.00	0.00	6.67E-01	No
Selenium	0.00E-03	5.73E-04	5.73E-04	1.30E-02	No
Silver	0.00E-03	4.83E-05	4.83E-05	7.00E-03	No
Toluene	0.00E-03	1.07E-03	1.07E-03	2.50E+01	No
1,2,4-Trimethylbenzene	0.00E-03	1.01E-04	1.01E-04	8.20E+00	No
Vanadium	0.00E-03	0.00	0.00	3.00E-03	No
Vinyl acetate	0.00E-03	2.87E-03	2.87E-03	---	No
Zinc (oxide dust)	0.00E-03	0.00	0.00	6.67E-01	No

All changes in emissions rates for non-carcinogenic TAP were below EL (screening emissions level) as a result of this project. Therefore, modeling is not required for any non-carcinogenic TAP because none of the 24-hour average non-carcinogenic screening ELs identified in IDAPA 58.01.01.585 were exceeded.

Carcinogenic TAP Emissions

A summary of the estimated PTE for emissions increase of carcinogenic toxic air pollutants (TAP) is provided in the following table. To be conservative, TASCO has set pre-project emissions at zero.

Table 6 PRE- AND POST PROJECT POTENTIAL TO EMIT FOR CARCINOGENIC TOXIC AIR POLLUTANTS

Carcinogenic Toxic Air Pollutants	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Arsenic Compounds	0.00E-03	1.67E-04	1.67E-04	1.50E-06	Yes
Benzene	0.00E-03	1.01E-03	1.01E-03	8.00E-04	Yes
Beryllium Compounds	0.00E-03	5.58E-06	5.58E-06	2.80E-05	No
Cadmium Compounds	0.00E-03	5.73E-05	5.73E-05	3.70E-06	Yes
Methylene Chloride	0.00E-03	1.27E-03	1.27E-03	1.60E-03	No
Nickel	0.00E-03	7.44E-05	7.44E-05	2.70E-05	Yes
PAH	0.00E-03	5.42E-06	5.42E-06	9.10E-05	No
POM[(a)]	0.00E-03	1.03E-07	1.03E-07	2.00E-06	No

a) Polycyclic Organic Matter (POM) is considered as one TAP comprised of: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)pyrene. The total is compared to benzo(a)pyrene.

Some of the PTEs for carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is required for arsenic, benzene, cadmium, and nickel because the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of $PM_{2.5}$, NO_2, and TAP from this project exceeded applicable screening emission levels (EL) and published DEQ modeling thresholds established in IDAPA 58.01.01.585-586 and in the State of Idaho Air Quality Modeling Guideline[1]. Refer to the Emissions Inventories section for additional information concerning the emission inventories.

The applicant has demonstrated pre-construction compliance to DEQ's satisfaction that emissions from this facility will not cause or significantly contribute to a violation of any ambient air quality standard. The applicant has also demonstrated pre-construction compliance to DEQ's satisfaction that the emissions increase due to this permitting action will not exceed any acceptable ambient concentration (AAC) or acceptable ambient concentration for carcinogens (AACC) for toxic air pollutants (TAP). A summary of the Ambient Air Impact Analysis for TAP is provided in Appendix A.

An ambient air quality impact analyses document has been crafted by DEQ based on a review of the modeling analysis submitted in the application. That document is part of the final permit package for this permitting action (see Appendix B).

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Minidoka County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

[1] Criteria pollutant thresholds in Table 2, State of Idaho Guideline for Performing Air Quality Impact Analyses, Doc ID AQ-011, September 2013.

Facility Classification

The AIRS/AFS facility classification codes are as follows:

For HAPs (Hazardous Air Pollutants) Only:

A = Use when any one HAP has permitted emissions > 10 T/yr or if the aggregate of all HAPS (Total HAPs) has permitted emissions > 25 T/yr.

SM80 = Use if a synthetic minor (uncontrolled HAPs emissions are > 10 T/yr or if the aggregate of all uncontrolled HAPs (Total HAPs) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits > 8 T/yr of a single HAP or ≥ 20 T/yr of Total HAPs.

SM = Use if a synthetic minor (uncontrolled HAPs emissions are > 10 T/yr or if the aggregate of all uncontrolled HAPs (Total HAPs) emissions are > 25 T/yr and permitted emissions fall below applicable major source thresholds) and the permit sets limits < 8 T/yr of a single HAP and/or < 20 T/yr of Total HAPs.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 10 and 25 T/yr HAP major source thresholds.

UNK = Class is unknown.

For All Other Pollutants:

A = Use when permitted emissions of a pollutant are > 100 T/yr.

SM80 = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are ≥ 80 T/yr.

SM = Use if a synthetic minor for the applicable pollutant (uncontrolled emissions are > 100 T/yr and permitted emissions fall below 100 T/yr) and permitted emissions of the pollutant are < 80 T/yr.

B = Use when the potential to emit (i.e. uncontrolled emissions and permitted emissions) are below the 100 T/yr major source threshold.

UNK = Class is unknown.

Table 11 REGULATED AIR POLLUTANT FACILITY CLASSIFICATION

Pollutant	Permitted PTE (T/yr)	Major Source Thresholds (T/yr)	AIRS/AFS Classification
PM	> 100	**100**	A
PM_{10}	> 100	**100**	A
$PM_{2.5}$	> 100	**100**	A
SO_2	> 100	**100**	A
NO_X	> 100	**100**	A
CO	> 100	**100**	A
VOC	> 100	**100**	A
HAP (single)	> 10	**10**	A
Total HAPs	> 25	**25**	A

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 .....Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for the modified emissions source. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Tier II Operating Permit (IDAPA 58.01.01.401)

IDAPA 58.01.01.401 .....Tier II Operating Permit

The application was submitted for a permit to construct (refer to the Permit to Construct section), and an optional Tier II operating permit has not been requested. Therefore, the procedures of IDAPA 58.01.01.400–410 were not applicable to this permitting action.

Visible Emissions (IDAPA 58.01.01.625)

IDAPA 58.01.01.625 .....Visible Emissions

The sources of PM emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Condition 2.7.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301 .....Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility have a potential to emit greater than 100 tons per year for CO or 10 tons per year for any one HAP or 25 tons per year for all HAP combined as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, this facility is classified as a major facility, as defined in IDAPA 58.01.01.008.10.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 .....Prevention of Significant Deterioration of Air Quality

The facility is classified as an existing major stationary source, because the estimated emissions of PM_{10}, SO_2, NO_X, CO, VOC, and HAP have the potential to exceed major stationary source thresholds. The facility is a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a).

NSPS Applicability (40 CFR 60)

The Nebraska and Rentech boilers are subject to the requirements of 40 CFR 60 Subpart Db – Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units because both boilers commenced construction after 1984 and have a heat input capacity greater than 100 MMBtu/hr. Because the boilers are not addressed in this permitting action, a breakdown of Subpart Db is not included.

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT/GACT Applicability (40 CFR 63)

The facility boilers (B&W Boiler, Rentech Boiler, and Nebraska Boiler) are subject to the requirements of 40 CFR 63 Subpart DDDDD - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters ("Boiler MACT"), because they are industrial boilers located at a major source of HAP. Because the boilers are not addressed in this permitting action, a breakdown of Subpart DDDDD is not included.

Permit Conditions Review

This section describes the permit conditions for this initial permit or only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action.

Revised Table 1.1

This table has been revised to reflect the increased maximum production of 178,200 tons per year of lime rock.

Revised Permit Condition 3.9

The permit condition has been revised to increase the lime rock throughput from 770 tons per day to 810 tons per day and from 146,300 tons per year to 178,200 tons per year as requested by the Applicant. In addition, the 5-day rolling average has been removed to a daily limit has been included to ensure that compliance can be demonstrated for the 24-hour ambient air standard.

Revised Permit Condition 3.10

This permit condition has been revised to increase the amount of fuel input to the kiln from 55.2 tons per day to 59.2 tons per day as requested by the Applicant.

Revised Permit Conditions 3.14 and 3.15

These permit conditions have been revised to remove any reference to a 5-day average and instead include a daily monitoring schedule.

PUBLIC REVIEW

Public Comment Period

A public comment period was made available to the public in accordance with IDAPA 58.01.01.209.01.c. During this time, comments were not submitted in response to DEQ's proposed action. Refer to the chronology for public comment period dates.

EPA Review

As required by IDAPA 58.01.01.366, DEQ provided the proposed permit to EPA Region 10 for its review and comment on April 27, 2021 via the online the Electronic Permit System (EPS). On April 28, 2021, EPA Region 10 responded to DEQ via e-mail indicating the permit was not reviewed and EPA will not object to its issuance.

APPENDIX A – EMISSIONS INVENTORIES

Attachment # 1

Eberhardt Lime Kiln
Lime Kiln Throughput Increase Project - Actual Emissions Changes
The Amalgamated Sugar Co. LLC
Mini Cassia Facility

Stack & ID	PM10		NOx		SO2		CO		VOC	
	(lbs/h)	(tons/y)	(lbs/h)	(tons/y)	(lbs/h)	(tons/y)	(lbs/h)	(tons/y)	(lbs/h)	(tons/y)
1st Carbonation Tank Stack (PK1/2A)	0.09	0.86	0.57	5.45	0.06	0.42	5.9	56.7	0.08	0.55
2nd Carbonation Tank Stack (PK1/2B)	0.01	0.10	0.06	0.61	0.01	0.05	0.7	6.3	0.01	0.06
Total	0.10	0.96	0.63	6.06	0.07	0.47	6.58	63.0	0.09	0.61

Eberhardt Lime Kiln
Lime Kiln Throughput Increase Project - Actual Emissions Changes
The Amalgamated Sugar Co. LLC
Mini Cassia Facility

Source Name	Source ID	Production				Emissions				Emissions	
		Hourly	Daily	Annual	Units	Parameter	Factor	Units	Reference	(lbs/h)	(tons/y)
Eberhardt Kiln	S-K1	1.7	40	31900	tons rock	PM & PM10	0.06	lbs/ton rock	Average EF based on compliance tests	0.10	0.96
		1.7	40	31900	tons rock	NOx	0.38	lbs/ton coal	Average EF based on compliance tests	0.63	6.06
		0.17	4.0	2329	tons coal	SO2	0.4	lbs/ton coal	AP-42, 9/98, Table 1.4-2 and 99% removal	0.07	0.47
		1.7	40	31900	tons rock	CO	3.95	lbs/ton rock	Average EF based on compliance tests	6.58	63.00
		0.17	4.0	2329	tons coal	VOC	0.524	lbs/ton coal	Engineering est. based on 2005 TF Stack Tests	0.09	0.61

Eberhardt Lime Kiln
Actual Emissions Factors NOx & CO
TASCO Mini-Cassia Facility

Test Date	NOx					CO (lbs/h)				
	1st Carb (lbs/h)	2nd Carb (lbs/h)	Combined (lbs/h)	Lime Rock (tons/h)	EF (lbs/ton)	1st Carb (lbs/h)	2nd Carb (lbs/h)	Combined (lbs/h)	Lime Rock (tons/h)	EF (lbs/ton)
11/20/2013	7.7	0.8	8.5	26.9		97.9	10.8	108.7	26.9	
11/15/2018	11.9	1.01	12.9	29.1		101.8	10.6	112.4	29.1	
Average	9.8	0.9	10.7	28.0	0.38	99.9	10.7	110.6	28.0	3.95

PM & PM_{10} Actual Emissions Factors
TASCO Mini-Cassia Facility

Test Date	PM_{10} (lbs/h)				
	1st Carb (lbs/h)	2nd Carb (lbs/h)	Combined (lbs/h)	Lime Rock (tons/h)	EF (lbs/ton)
12/4/2012	0.9	0.1	1.0	16.7	0.060

Eberhardt Lime Kiln - Production Rate Increase Project
TAPs Emissions Estimates
Mini Cassia Facility
October-20

	Eberhardt Kiln						Total	Screening Level	Exceeds Screening	AAC
	Coke and/or Coal			Lime Rock						
Non Carcinogens	EF	Annual Emissions	Hourly Emissions	Cont EF	Annual Emissions	Hourly Emissions	Hourly Emissions	(lb/h)	Level?	(mg/m3)
Acetone	4.95E-02	1.15E+02	2.2E-02				2.18E-02	119	No	89
Aluminum (metals and oxides)				2.00E-02	638	1.21E-01	1.21E-01	0.667	No	0.5
Antimony	1.80E-05	4.19E-02	7.9E-06				7.94E-06	0.033	No	0.025
Barium								0.033	No	0.025
Carbon Disulfide	3.23E-03	7.52E+00	1.4E-03				1.42E-03	2	No	1.5
Chromium (total)	2.60E-04	6.06E-01	1.1E-04				1.15E-04	0.033	No	0.025
Cobalt	1.00E-04	2.33E-01	4.4E-05				4.41E-05	0.0033	No	0.0025
Copper (dust and mists)				1.16E-04	3.70	7.01E-04	7.01E-04	6.70E-02	No	0.05
Ethyl Benzene	2.11E-04	4.91E-01	9.3E-05				9.31E-05	29	No	21.75
Heptane	8.83E-04	2.06E+00	3.9E-04				3.89E-04	109	No	82
Hexane	1.30E-03	3.03E+00	5.7E-04				5.73E-04	12	No	9
Manganese	4.90E-04	1.14E+00	2.2E-04	2.00E-03	64	1.21E-02	1.23E-02	0.333	No	0.25
Mercury	7.00E-05	1.63E-01	3.1E-05	1.36E-05	0.43	8.22E-05	1.13E-04	0.007	No	0.005
Molybdenum								0.667	No	0.5
Selenium	1.30E-03	3.03E+00	5.7E-04				5.73E-04	0.013	No	0.01
Silver (Ag)				8.00E-06	0.26	4.83E-05	4.83E-05	7.00E-03	No	0.005
Toluene	2.43E-03	5.66E+00	1.1E-03				1.07E-03	25	No	18.75
1,2,4-Trimethylbenzene	2.29E-04	5.33E-01	1.0E-04				1.01E-04	8.2	No	6.15
Xylene (total)	1.34E-03	3.12E+00	5.9E-04				5.91E-04	29	No	21.75
Vanadium								0.003	No	0.0025
Vinyl Acetate	6.50E-03	1.51E+01	2.9E-03				2.87E-03	NA	No	
Zinc								0.667	No	0.5
Compounds - Carcinogens										AACC (ug/m^3)
Arsenic Compounds	4.10E-04	9.55E-01	1.8E-04	1.60E-05	0.51	9.67E-05	1.67E-04	1.50E-06	Yes	2.30E-04
Benzene	3.79E-03	8.83E+00	1.7E-03				1.01E-03	8.00E-04	Yes	1.20E-01
Beryllium Compounds	2.10E-05	4.89E-02	9.3E-06				5.58E-06	2.80E-05	No	4.20E-03
Cadmium Compounds	5.10E-05	1.19E-01	2.2E-05	1.20E-05	0.38	7.25E-05	5.73E-05	3.70E-06	Yes	5.60E-04
Methylene Chloride	4.77E-03	1.11E+01	2.1E-03				1.27E-03	1.60E-03	No	2.40E-01
Nickel	2.80E-04	6.52E-01	1.2E-04				7.44E-05	2.70E-05	Yes	4.20E-03
PAHs	2.04E-05	4.75E-02	9.0E-06				5.42E-06	9.10E-05	No	1.40E-02
PAHs - 7	3.89E-07	9.06E-04	1.7E-07				1.03E-07	2.00E-06	No	3.00E-04

			Production Increase	
Source	Material	Units	Hourly	Annual
Eberhardt	Lime Rock	Tons	3.64	31,900
	Coke/Coke	tons	0.26	2,329
	Days			220

Lime Kiln
Estimated TAP's Emissions Factors
Coal Combustion (lbs per ton coal)

Non Carcinogens	Reference	Type	Cont EF
Acetone	a	VOC	4.95E-02
Aluminum (metals and oxides)		Trace Metal	
Antimony	b	Trace Metal	1.80E-05
Barium		Trace Metal	
Carbon Disulfide	a	VOC	3.23E-03
Chromium (total)	b	Trace Metal	2.60E-04
Cobalt	b	Trace Metal	1.00E-04
Copper (dust and mists)	b	Trace Metal	
Ethyl Benzene	a	VOC	2.11E-04
Heptane	a	VOC	4.86E-03
Hexane	a	VOC	1.30E-03
Lead		Trace Metal	
Manganese	b	Trace Metal	4.90E-04
Mercury	c	Trace Metal	7.00E-05
Molybdenum		Trace Metal	
Selenium	b	Trace Metal	1.30E-03
Silver (Ag)		Trace Metal	
Tin (Sn)		Trace Metal	
Toluene	a	VOC	2.43E-03
1,2,4-Trimethylbenzene	a	VOC	2.29E-04
Xylene (total)	a	VOC	1.34E-03
Vanadium		Trace Metal	
Vinyl Acetate	a	VOC	6.50E-03
Zinc		Trace Metal	
Compounds - Carcinogens			
Arsenic Compounds	b	Trace Metal	4.10E-04
Benzene	a	VOC	1.30E-03
Beryllium Compounds	b	Trace Metal	2.10E-05
Cadmium Compounds	b	Trace Metal	5.10E-05
Methylene Chloride	a	VOC	4.77E-03
Nickel	b	Trace Metal	2.80E-04
PAHs	d	VOC	2.04E-05
7-PAHs	d	VOC	3.89E-07

Lime Kiln
Estimated TAP's Emissions Factors
Lime Rock (lbs per ton rock)

Non Carcinogens	Reference	Type	Unc EF	Control Eff(%)	Cont EF
Acetone		VOC	no data	no data	
Aluminum (metals and oxides)	a	Trace Metal	2.00E+00	99	2.00E-02
Antimony		Trace Metal	no data	no data	
Barium		Trace Metal	no data	no data	
Carbon Disulfide		VOC	no data	no data	
Chromium (total)		Trace Metal	no data	no data	
Cobalt		Trace Metal	no data	no data	
Copper (dust and mists)	a	Trace Metal	1.16E-02	99	1.16E-04
Ethyl Benzene		VOC	no data	no data	
Hexane		VOC	no data	no data	
Lead	b	Trace Metal	1.80E-03	99	1.80E-05
Manganese	a	Trace Metal	2.00E-01	99	2.00E-03
Mercury	b	Trace Metal	1.36E-03	99	1.36E-05
Molybdenum		Trace Metal	no data	no data	
Selenium		Trace Metal	no data	no data	
Silver (Ag)	b	Trace Metal	8.00E-04	99	8.00E-06
Tin (Sn)	b	Trace Metal	2.00E-03	99	2.00E-05
Toluene		VOC	no data	no data	
1,2,4-Trimethylbenzene		VOC	no data	no data	
Xylene (total)		VOC	no data	no data	
Vanadium		Trace Metal	no data	no data	
Vinyl Acetate		VOC	no data	no data	
Zinc					
Compounds - Carcinogens					
Arsenic Compounds	b	Trace Metal	1.60E-03	99	1.60E-05
Benzene		VOC	no data	no data	
Beryllium Compounds		Trace Metal	no data	no data	
Cadmium Compounds	b	Trace Metal	1.20E-03	99	1.20E-05
Methylene Chloride		VOC	no data	no data	
Nickel		Trace Metal	no data	no data	
PAHs					
7-PAHs		VOC	no data	no data	

a. Oct 2005 Engineering Stack Test Data
b. AP-42, Table 1.1-18 Emissions Factors for Trace Metals from Controlled Coal Combus
c. Title V Permit Application & USGS Data

a. 10/18/06 Rock Analysis
b. 6/30/08 Rock Analysis

2010 Eberhardt Kiln Projected Emissions
Stack Emissions Estimates
Mini Cassia Facility

Stack & ID	Emissions (%)	PM & PM10 (lbs/h)	PM & PM10 (tons/y)	NOx (lbs/h)	NOx (tons/y)	SO2 (lbs/h)	SO2 (tons/y)	CO (lbs/h)	CO (tons/y)	VOC (lbs/h)	VOC (tons/y)
1st Carbonation Tank Stack (PK1/2A)	70	2.02	4.61	14.15	32.26	0.64	1.50	482.80	1100.91	0.84	1.96
2nd Carbonation Tank Stack (PK1/2B)	14	0.40	0.92	2.83	6.45	0.13	0.30	96.56	220.18	0.17	0.39
Compressor Pressure Relief Vent (PK1/2D)	16	0.46	1.05	3.23	7.37	0.15	0.34	110.36	251.64	0.19	0.45
Total	100	2.89	6.58	20.21	46.08	0.92	2.14	689.7	1572.7	1.21	2.80

2020 Eberhardt Lime Kiln Throughput Increase
Stack Emissions Estimates
Mini Cassia Facility

Stack & ID	Emissions (%)	PM10 (lbs/h)	PM10 (tons/y)	NOx (lbs/h)	NOx (tons/y)	SO2 (lbs/h)	SO2 (tons/y)	CO (lbs/h)	CO (tons/y)	VOC (lbs/h)	VOC (tons/y)
1st Carbonation Tank Stack (PK1/2A)	90	1.82	4.81	11.54	30.47	0.90	2.34	119.98	316.75	1.18	3.07
2nd Carbonation Tank Stack (PK1/2B)	10	0.20	0.53	1.28	3.39	0.10	0.26	13.33	35.19	0.13	0.34
Compressor Pressure Relief Vent (PK1/2D) [1]	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	100	2.03	5.35	12.83	33.86	1.00	2.60	133	352	1.31	3.41

[1] Assumes pressure relief valve is closed.

Lime Kiln Emission Changes
Stack Emissions Estimates
Mini Cassia Facility

Stack & ID	PM10 (lbs/h)	PM10 (tons/y)	NOx (lbs/h)	NOx (tons/y)	SO2 (lbs/h)	SO2 (tons/y)	CO (lbs/h)	CO (tons/y)	VOC (lbs/h)	VOC (tons/y)
1st Carbonation Tank Stack (PK1/2A)	-0.20	0.20	-2.60	-1.79	0.26	0.85	-362.8	-784.2	0.34	1.11
2nd Carbonation Tank Stack (PK1/2B)	-0.20	-0.39	-1.55	-3.07	-0.03	-0.04	-83.2	-185.0	-0.04	-0.05
Compressor Pressure Relief Vent (PK1/2D)	-0.46	-1.05	-3.23	-7.37	-0.15	-0.34	-110.4	-251.6	-0.19	-0.45
Total	-0.86	-1.24	-7.39	-12.23	0.08	0.47	-556	-1221	0.10	0.61

Eberhardt Lime Kiln 2010 Future Projected Emissions

The Amalgamated Sugar Co. LLC
Mini Cassia Facility

Source Name	Source ID	Production Hourly	Daily[1]	Annual	Units	Emissions Parameter	Factor	Units	Reference	Emissions (lbs/h)	(tons/y)
Eberhardt Kiln	S-K1	32.1	770	146300	tons rock	PM & PM10	0.09	lbs/ton rock	Engineering estimate and 99% removal	2.9	6.6
		32.1	770	146300	tons rock	NOx	0.63	lbs/ton coal	EPA AP42 Spreader Stoker Boilers Fired with Anthracite Coal - Table 1.2-1	20.2	46.1
		2.3	55.2	10680	tons coal	SO2	0.4	lbs/ton coal	AP-42, 9/98, Table 1.4-2 and 99% removal	0.9	2.1
		32.1	770	146300	tons rock	CO	21.5	lbs/ton rock	Engineering combustion evaluation & safety factor	689.7	1572.7
		2.3	55.2	10680	tons coal	VOC	0.524	lbs/ton coal	Engineering est. based on 2005 TF Stack Tests	1.2	2.8

[1] 5 day average

Eberhardt Lime Kiln 2020 Requested Throughput Increase

The Amalgamated Sugar Co. LLC
Mini Cassia Facility

Source Name	Source ID	Production Hourly	Daily[1]	Annual	Units	Emissions Parameter	Factor	Units	Reference	Emissions (lbs/h)	(tons/y)
Eberhardt Kiln	S-K1	33.8	810	178200	tons rock	PM & PM10	0.06	lbs/ton rock	Average EF based on complience tests	2.0	5.3
		33.8	810	178200	tons rock	NOx	0.38	lbs/ton coal	Average EF based on complience tests	12.8	33.9
		2.5	59.2	13009	tons coal	SO2	0.4	lbs/ton coal	AP-42, 9/98, Table 1.4-2 and 99% removal	1.0	2.6
		33.8	810	178200	tons rock	CO	3.95	lbs/ton rock	Average EF based on complience tests	133.3	351.9
		2.5	59.2	13009	tons coal	VOC	0.524	lbs/ton coal	Engineering est. based on 2005 TF Stack Tests	1.3	3.4

[1] 5 day average

Eberhardt Lime Kiln Baseline Emissions
Stack Emissions Estimates
Mini Cassia Facility

Stack & ID	Emissions (%)	PM10 (tons/y)	NOx (tons/y)	SO2 (tons/y)	CO (tons/y)	VOC (tons/y)
1st Carbonation Tank Stack (PK1/2A)	90	3.83	24.25	1.56	252.04	2.04
2nd Carbonation Tank Stack (PK1/2B)	10	0.43	2.69	0.17	28.00	0.23
Compressor Pressure Relief Vent (PK1/2D)	0	0.00	0.00	0.00	0.00	0.00
Total	100	4.25	26.94	1.73	280.0	2.27

Future Permitted Eberhardt Lime Kiln (with throughput increases)
Stack Emissions Estimates
Mini Cassia Facility

Stack & ID	Emissions (%)	PM10 (tons/y)	NOx (tons/y)	SO2 (tons/y)	CO (tons/y)	VOC (tons/y)
1st Carbonation Tank Stack (PK1/2A)	90	4.81	30.47	2.34	316.8	3.07
2nd Carbonation Tank Stack (PK1/2B)	10	0.53	3.39	0.26	35.2	0.34
Compressor Pressure Relief Vent (PK1/2D)	0	0.00	0.00	0.00	0.0	0.00
Total	100	5.35	33.86	2.60	351.9	3.41

Lime Kiln Emission Changes (Baseline vs Future Permitted)
Stack Emissions Estimates
Mini Cassia Facility

Stack & ID	Emissions (%)	PM10 (tons/y)	NOx (tons/y)	SO2 (tons/y)	CO (tons/y)	VOC (tons/y)
1st Carbonation Tank Stack (PK1/2A)	90	0.98	6.23	0.78	64.7	1.02
2nd Carbonation Tank Stack (PK1/2B)	10	0.11	0.69	0.09	7.2	0.11
Compressor Pressure Relief Vent (PK1/2D)	0	0.00	0.00	0.00	0.0	0.00
Total	100	1.09	6.92	0.87	71.9	1.14

Baseline Emissions - Eberhardt Lime Kiln Throughput Increase Project

The Amalgamated Sugar Co. LLC
Mini Cassia Facility

Source Name	Source ID	Production		Emissions				
		Annual[1]	Units	Parameter	Factor	Units	Reference	(tons/y)
Eberhardt Kiln	S-K1	141796	tons rock	PM & PM10	0.06	lbs/ton rock	Average EF based on complience tests	4.3
		141796	tons rock	NOx	0.38	lbs/ton coal	Average EF based on complience tests	26.9
		8671	tons coal	SO2	0.4	lbs/ton coal	AP-42, 9/98, Table 1.4-2 and 99% removal	1.7
		141796	tons rock	CO	3.95	lbs/ton rock	Average EF based on complience tests	280.0
		8671	tons coal	VOC	0.524	lbs/ton coal	Engineering est. based on 2005 TF Stack Tests	2.3

[3] Baseline years based on 2018 and 2019 campaign years.

Eberhardt Lime Kiln 2020 Requested Throughput Increase

The Amalgamated Sugar Co. LLC
Mini Cassia Facility

Source Name	Source ID	Production		Emissions				
		Annual	Units	Parameter	Factor	Units	Reference	(tons/y) (tons/y)
Eberhardt Kiln	S-K1	178200	tons rock	PM & PM10	0.06	lbs/ton rock	Average EF based on complience tests	5.3
		178200	tons rock	NOx	0.38	lbs/ton coal	Average EF based on complience tests	33.9
		13009	tons coal	SO2	0.4	lbs/ton coal	AP-42, 9/98, Table 1.4-2 and 99% removal	2.6
		178200	tons rock	CO	3.95	lbs/ton rock	Average EF based on complience tests	351.9
		13009	tons coal	VOC	0.524	lbs/ton coal	Engineering est. based on 2005 TF Stack Tests	3.4

Material Handling
PM10 Fugitive Dust Emissions Estimates
Lime Kiln Throughput Increase Project
Mini Cassia Facility

Limerock Fugitive Emissions

Description	Annual Production Baseline tons	Annual Production Future tons	Net tons	EF lb/ton	PM10 Emissions Baseline tons	PM10 Emissions Future Tons	PM10 Emissions Net tons
Truck belly dump conveyor to screening	141,796	178,200	36,404	8.29E-04	5.88E-02	7.39E-02	0.0151
Screening (covered 2 wall building)	141,796	178,200	36,404	8.29E-04	5.88E-02	7.39E-02	0.0151
Screening conveyor to pile	141,796	178,200	36,404	8.29E-04	5.88E-02	7.39E-02	0.0151
Front end loader to bunker	141,796	178,200	36,404	8.29E-04	5.88E-02	7.39E-02	0.0151
Conveyor Transfer to kiln	141,796	178,200	36,404	8.29E-04	5.88E-02	7.39E-02	0.0151
Kiln hopper to skip	141,796	178,200	36,404	8.29E-04	5.88E-02	7.39E-02	0.0151
			Estimated PM10 Fugitives		0.353	0.443	0.091

Coke/Anthracite Fugitive Emissions

Description	Annual Production Baseline tons	Annual Production Future tons	Net tons	EF lb/ton	PM10 Emissions Baseline tons	PM10 Emissions Future Tons	PM10 Emissions Net tons
Rail car unloading to pit	8,671	13,009	4,338	8.29E-04	3.59E-03	5.39E-03	0.0018
Pit conveyor to truck	8,671	13,009	4,338	8.29E-04	3.59E-03	5.39E-03	0.0018
Truck to pile	8,671	13,009	4,338	8.29E-04	3.59E-03	5.39E-03	0.0018
Front end loader transfer to bunker	8,671	13,009	4,338	8.29E-04	3.59E-03	5.39E-03	0.0018
Conveyor to kiln hopper	8,671	13,009	4,338	8.29E-04	3.59E-03	5.39E-03	0.0018
Kiln hopper to skip	8,671	13,009	4,338	8.29E-04	3.59E-03	5.39E-03	0.0018
			Estimated PM10 Fugitives		0.022	0.032	0.009
			Total Estimated PM10 Fugitives		0.374	0.476	0.100

Material Handling Fugitive Dust
Emissions Factors - Coke/Anthracite Coal & Lime Rock

Reference - EPA AP42 Section 13.2.4 page 3

E = k(0.0032) [(U/5)^1.3] / [(M/2)^1.4]

E = Emissions Factor in lbs/ton
k = Particle size multiplier (0.35) for PM10, (0.74) for PM 30 & (0.11) for PM 2.5
u = mean wind speed (mph)
M = material moisture content (%)

Parameter	Coke/ Anthracite Coal	Lime Rock
Particle Size Multiplier	0.350	0.350
Mean wind speed (mph)	10.644	10.644
Material moisture content (%)	5.000	5.000
Calculated emissions factor (lbs/ton)	8.292E-04	8.292E-04

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

M E M O R A N D U M

DATE: February 17, 2021

TO: Kelli Wetzel, Permit Writer, Air Program

FROM: Pao Baylon, Modeling Review Analyst, Air Program

PROJECT: P-2010.0043 PROJ 62519, Permit Modification to Increase Lime Kiln Throughput for The Amalgamated Sugar Company LLC (TASCO) Mini-Cassia Facility in Paul, Idaho.

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs) as it relates to air quality impact analyses.

Contents

Acronyms, Units, and Chemical Nomenclature 3

1.0 Summary 5

2.0 Background Information 7

2.1 Project Description 7

2.2 Facility Location and Area Classification 7

2.3 Air Impact Analyses Required for All Permits to Construct 7

2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses 8

2.5 Toxic Air Pollutant Analyses 10

3.0 Analytical Methods and Data 10

3.1 Emission Source Data 10

3.1.1 Criteria Pollutant Modeling Applicability and Modeled Emission Rates 11

3.1.2 TAPs Modeling Applicability and Modeled Emission Rates 13

3.1.3 Emission Release Parameters 14

3.1.4 Emission Release Parameter Justification 14

3.2 Background Concentrations 15

3.3 Impact Modeling Methodology 15

3.3.1 General Overview of Impact Analyses 15

3.3.2 Modeling Protocol 16

3.3.3 Modeling Methodology 16

3.3.4 Model Selection 16

3.3.5 Meteorological Data 16

3.3.6 Effects of Terrain on Modeled Impacts 17
3.3.7 Facility Layout and Downwash 18
3.3.8 NOx Chemistry 20
3.3.9 Ambient Air Boundary 20
3.3.10 Receptor Network 21
3.3.11 Good Engineering Practice Stack Height 21
4.0 NAAQS and TAPs Impact Modeling Results 22
4.1 Results for NAAQS Analyses 22
4.1.1 Significant Impact Level Analysis 22
4.1.2 Cumulative NAAQS Impact Analysis 23
4.2 Results for TAPs Impact Analyses 23
5.0 Conclusions 23
References 25

Acronyms, Units, and Chemical Nomenclature

AAC	Acceptable Ambient Concentration of a Non-carcinogenic TAP
AACC	Acceptable Ambient Concentration of a Carcinogenic TAP
acfm	Actual cubic feet per minute
AERMAP	The terrain data preprocessor for AERMOD
AERMET	The meteorological data preprocessor for AERMOD
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
Appendix W	40 CFR 51, Appendix W – Guideline on Air Quality Models
ASOS	Automated Surface Observing System
BPIP	Building Profile Input Program
BRC	Below Regulatory Concern
CFR	Code of Federal Regulations
CMAQ	Community Multi-Scale Air Quality Modeling System
CO	Carbon Monoxide
DEQ	Idaho Department of Environmental Quality
EL	Emissions Screening Level of a TAP
EPA	United States Environmental Protection Agency
GEP	Good Engineering Practice
hr	Hours
Idaho Air Rules	Rules for the Control of Air Pollution in Idaho, located in the Idaho Administrative Procedures Act 58.01.01
ISCST3	Industrial Source Complex Short Term 3 dispersion model
K	Kelvin
km	Kilometers
lb	Pounds
lb/hr	Pounds per hour
m	Meters
m/sec	Meters per second
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NW AIRQUEST	Northwest International Air Quality Environmental Science and Technology Consortium
O_3	Ozone
Pb	Lead
PM_{10}	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 10 micrometers
$PM_{2.5}$	Particulate matter with an aerodynamic particle diameter less than or equal to a nominal 2.5 micrometers
ppb	Parts per billion
PRIME	Plume Rise Model Enhancement
PSD	Prevention of Significant Deterioration

PTC	Permit to Construct
PTE	Potential to Emit
SIL	Significant Impact Level
SO_2	Sulfur Dioxide
Stantec	Stantec Consulting Services Inc. (permittee's modeling consultant)
T/day	Tons per day
TAP	Toxic Air Pollutant
TASCO	The Amalgamated Sugar Company LLC (permittee)
tpy	Tons per year
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compounds
º	Degrees Latitude or Longitude
ºF	Degrees Fahrenheit
$\mu g/m^3$	Micrograms per cubic meter of air

1.0 Summary

The Amalgamated Sugar Company LLC (TASCO) submitted a Permit to Construct (PTC) application in support of a modification to PTC No. P-2010.0043 for the Mini-Cassia facility in Paul, Idaho. TASCO is requesting to increase the lime rock throughput limits by 40 tons per day (T/day) and 31,900 tons per year (tpy) and to increase the coal and/or coke daily limit by 4 T/day. Project-specific air quality analyses involving atmospheric dispersion modeling of estimated emissions associated with the facility were submitted to the Idaho Department of Environmental Quality (DEQ) to demonstrate that applicable emissions do not result in violation of a National Ambient Air Quality Standard (NAAQS) or Toxic Air Pollutant (TAP) increment as required by the Idaho Administrative Procedures Act 58.01.01.203.02 and 203.03 (Idaho Air Rules Section 203.02 and 203.03). This memorandum provides a summary of the applicability assessment for analyses and air impact analyses used to demonstrate compliance with applicable NAAQS and TAP increments, as required by Idaho Air Rules Section 203.02 and 203.03.

TASCO and their modeling consultant, Stantec Consulting Services Inc. (Stantec), prepared the PTC application and performed ambient air impact analyses for this project. DEQ review of submitted data and DEQ analyses summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the air impact analyses used to demonstrate that estimated emissions associated with operation of the facility will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not address/evaluate compliance with other rules or analyses not pertaining to the air impact analyses. Evaluation of emission estimates was the responsibility of the DEQ permit writer and is addressed in the main body of the DEQ Statement of Basis, and emission calculation methods were not evaluated in this modeling review memorandum.

Table 1 presents key assumptions and results to be considered in the development of the permit. Idaho Air Rules require air impact analyses be conducted in accordance with methods outlined in 40 CFR 51, Appendix W *Guideline on Air Quality Models* (Appendix W). Appendix W requires that air quality impacts be assessed using atmospheric dispersion models with emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

The submitted information and analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data (review of emission estimates was addressed by the DEQ permit writer); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that estimated potential/allowable emissions are at a level defined as below regulatory concern (BRC) and do not require a NAAQS compliance demonstration; b) that predicted pollutant concentrations from emissions associated with the project as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or c) that predicted pollutant concentrations from emissions associated with the project, when appropriately combined with co-contributing sources and background concentrations, were below applicable NAAQS at ambient air locations where and when the project has a significant impact; 5) showed that TAP emission increases associated with the project will not result in increased ambient air impacts exceeding allowable TAP increments. This conclusion assumes that conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition. The DEQ permit writer should use Table 1 and other information presented in this memorandum to generate appropriate permit provisions/restrictions to assure emissions do not exceed applicable regulatory thresholds requiring further analyses and to assure the requirements of Appendix W are met regarding emissions representative of design capacity or permit allowable rates.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES.	
Criteria/Assumption/Result	**Explanation/Consideration**
General Emission Rates. Emission rates used in the air impact analyses must represent maximum potential emissions as given by design capacity, inherently limited by the nature of the process or configuration of the facility, or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emission rates greater than those used in the air impact analyses.
Air Impact Analyses for Criteria Pollutant Emissions. Short-term and long-term project emission increase of $PM_{2.5}$[a] and NO_2[b] are greater than DEQ Level I modeling thresholds. Therefore, $PM_{2.5}$ (24-hour and annual) and NO_2 (1-hour and annual) were subject to NAAQS Compliance Demonstration requirements.	Project-specific air impact analyses demonstrating compliance with NAAQS, as required by Idaho Air Rules Section 203.02, are required for pollutant increases above BRC thresholds, or for pollutants having an emission increase that is greater than Level I modeling applicability thresholds (where the BRC exclusion cannot be used).
Air Impact Analyses for TAP Emissions. Allowable emissions of arsenic, benzene, cadmium, and nickel exceed screening emission levels (ELs). Analyses demonstrating compliance with arsenic, benzene, cadmium, and nickel TAP increments were performed.	A TAP increment compliance demonstration, as required by Idaho Air Rules Section 203.03, would be required for any TAPs with emission increases above ELs.
The Use of a Daily Limit for Lime Rock Throughput Instead of a Five-day Rolling Average. The current permit represents the lime rock throughput as a five-day rolling average. However, DEQ's modeling team determined that a five-day rolling average limit does not assure compliance with a 24-hour standard. A daily throughput limit must be used for pollutants with a 24-hour ambient air standard.	Modeling the increase in the five-day average rather than the maximum increase in what will be emitted during any day does not demonstrate compliance with a 24-hour standard. DEQ determined that a daily throughput limit is more appropriate than a five-day rolling average limit. The existing five-day lime rock rolling average (770 tons per day) was considered a "realizable" existing allowable rate and was used as baseline. Compliance with 24-hour standards has not been demonstrated for a daily lime rock throughput increase greater than 40 tons per day.
Release Parameters for Emission Points. Stack heights are no shorter than what is indicated in this memorandum. Stack diameters are no larger than what is indicated in this memorandum. Typical exhaust flow rates and temperatures at the point of release are not less than the values indicated in this memorandum.	Compliance with applicable air quality standards is not assured if release parameters vary substantially from what was used in impact analyses.

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
b. Nitrogen dioxide.

Summary of Submittals and Actions

September 23, 2020 Application received by DEQ.

September 25, 2020 Regulatory start date.

October 20, 2020 Application determined incomplete by DEQ.

October 28, 2020 Revised application received by DEQ.

November 27, 2020 Application determined incomplete by DEQ.

December 17, 2020 Revised application received by DEQ.

January 15, 2021 Application determined complete by DEQ.

2.0 Background Information

This section provides background information applicable to the project and the site proposed for the facility. It also provides a brief description of the applicable air impact analyses requirements for the project.

2.1 Project Description

TASCO's Mini-Cassi facility processes sugar beets and intermediate products into refined granulated sugar and feed products for commercial and retail markets. The annual beet crop is harvested and processed during fall and winter, while granulated sugar is produced year-round.

The focus of the project is to increase permitted production limits for the Eberhardt lime kiln, which provides calcined lime and carbon dioxide gas for the juice purification process. TASCO requested to increase the lime rock throughput limits by 40 tons per day (T/day) and 31,900 tons per year (tpy) and to increase the coal and/or coke daily limit by 4 T/day.

Permit Condition 23 of the current permit (PTC No. P-2010.0043 issued on 9/22/2010) states, "*The lime rock input to the kiln shall not exceed 770 tons per day, based on a five-day rolling average*." The applicant proposed to increase the lime rock production limit by 40 T/day on a five-day rolling average basis. The air impact analysis initially modeled the increase in the five-day average rather than the maximum increase in what will be emitted during any day. However, DEQ's modeling team contends that this method does not demonstrate compliance with a 24-hour standard. DEQ determined that a daily throughput limit is more appropriate than a five-day rolling average limit. The existing five-day rolling average (770 T/day) was considered a "realizable" existing allowable rate and was used as baseline. A daily throughput instead of a five-day rolling average limit must be applied moving forward.

The PTC addresses all air pollutant-emitting activities associated with the project.

2.2 Facility Location and Area Classification

The TASCO Mini-Cassia facility is located east of the town of Paul, Minidoka County, Idaho. The TASCO property covers approximately 1,100 acres. The surrounding land is mostly agricultural. The topography of the area is flat. The Mini-Cassia facility is in Idaho Air Quality Control Region 63 and is designated as an attainment or unclassifiable area for particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$), carbon monoxide (CO), ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb). The area is not classified as non-attainment for any criteria pollutant.

2.3 Air Impact Analyses Required for All Permits to Construct

Idaho Air Rules Sections 203.02 and 203.03 state:

> *No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:*
>
> ***02. NAAQS**. The stationary source or modification would not cause or significantly contribute to a violation of any ambient air quality standard.*

03. Toxic Air Pollutants. *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Atmospheric dispersion modeling, using computerized simulations, is used to demonstrate compliance with both NAAQS and TAPs. Idaho Air Rules Section 202.02 states:

02. Estimates of Ambient Concentrations*. All estimates of ambient concentrations shall be based on the applicable air quality models, data bases, and other requirements specified in 40 CFR 51 Appendix W (Guideline on Air Quality Models).*

2.4 Significant Impact Level and Cumulative NAAQS Impact Analyses

If specific criteria pollutant emission increases associated with the proposed permitting project cannot qualify for a BRC exemption as per Idaho Air Rules Section 221, then the permit cannot be issued unless the application demonstrates that applicable emission increases will not cause or significantly contribute to a violation of NAAQS, as required by Idaho Air Rules Section 203.02.

The first phase of a NAAQS compliance demonstration is to evaluate whether the proposed facility/project could have a significant impact to ambient air. Section 3.1.1 of this memorandum describes the applicability evaluation of Idaho Air Rules Section 203.02. The Significant Impact Level (SIL) analysis for a new facility or proposed modification to a facility involves modeling estimated criteria air pollutant emissions from the facility or modification to determine the potential impacts to ambient air. Air impact analyses are required by Idaho Air Rules to be conducted in accordance with methods outlined in Appendix W. Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition.

A facility or modification is considered to have a significant impact on air quality if maximum modeled impacts to ambient air exceed the established SIL listed in Idaho Air Rules Section 006 (referred to as a "significant contribution" in Idaho Air Rules) or as incorporated by reference as per Idaho Air Rules Section 107.03.b. Table 2 lists the applicable SILs.

Table 2. APPLICABLE REGULATORY LIMITS.

Pollutant	Averaging Period	Significant Impact Levels[a] (µg/m^3)[b]	Regulatory Limit[c] (µg/m^3)	Modeled Design Value Used[d]
PM_{10}[e]	24-hour	5.0	150[f]	Maximum 6th highest[g]
$PM_{2.5}$[h]	24-hour	1.2	35[i]	Mean of maximum 8th highest[j]
	Annual	0.2	12[k]	Mean of maximum 1st highest[l]
Carbon Monoxide (CO)	1-hour	2,000	40,000[m]	Maximum 2nd highest[n]
	8-hour	500	10,000[m]	Maximum 2nd highest[n]
Sulfur Dioxide (SO_2)	1-hour	3 ppb[o] (7.8 µg/m^3)	75 ppb[p] (196 µg/m^3)	Mean of maximum 4th highest[q]
	3-hour	25	1,300[m]	Maximum 2nd highest[n]
Nitrogen Dioxide (NO_2)	1-hour	4 ppb (7.5 µg/m^3)	100 ppb[s] (188 µg/m^3)	Mean of maximum 8th highest[t]
	Annual	1.0	100[r]	Maximum 1st highest[n]
Lead (Pb)	3-month[u]	NA	0.15[r]	Maximum 1st highest[n]
	Quarterly	NA	1.5[r]	Maximum 1st highest[n]
Ozone (O_3)	8-hour	40 TPY VOC[v]	70 ppb[w]	Not typically modeled

a. Idaho Air Rules Section 006 (definition for significant contribution) or as incorporated by reference as per Idaho Air Rules Section 107.03.b.
b. Micrograms per cubic meter.
c. Incorporated into Idaho Air Rules by reference, as per Idaho Air Rules Section 107.
d. The maximum 1st highest modeled value is always used for the significant impact analysis unless indicated otherwise. Modeled design values are calculated for each ambient air receptor.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
f. Not to be exceeded more than once per year on average over 3 years.
g. Concentration at any modeled receptor when using five years of meteorological data.
h. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
i. 3-year mean of the upper 98th percentile of the annual distribution of 24-hour concentrations.
j. 5-year mean of the 8th highest modeled 24-hour concentrations at the modeled receptor for each year of meteorological data modeled. For the SIL analysis, the 5-year mean of the 1st highest modeled 24-hour impacts at the modeled receptor for each year.
k. 3-year mean of annual concentration.
l. 5-year mean of annual averages at the modeled receptor.
m. Not to be exceeded more than once per year.
n. Concentration at any modeled receptor.
o. Interim SIL established by EPA policy memorandum.
p. 3-year mean of the upper 99th percentile of the annual distribution of maximum daily 1-hour concentrations.
q. 5-year mean of the 4th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of 1st highest modeled 1-hour impacts for each year is used.
r. Not to be exceeded in any calendar year.
s. 3-year mean of the upper 98th percentile of the annual distribution of maximum daily 1-hour concentrations.
t. 5-year mean of the 8th highest daily 1-hour maximum modeled concentrations for each year of meteorological data modeled. For the significant impact analysis, the 5-year mean of maximum modeled 1-hour impacts for each year is used.
u. 3-month rolling average.
v. An annual emissions rate of 40 ton/year of VOCs is considered significant for O_3.
w. Annual 4th highest daily maximum 8-hour concentration averaged over three years.

If modeled maximum pollutant impacts to ambient air from the emission sources associated with a new facility or modification exceed the SILs, then a cumulative NAAQS impact analysis is necessary to demonstrate compliance with NAAQS and Idaho Air Rules Section 203.02.

A cumulative NAAQS impact analysis for attainment area pollutants involves assessing ambient impacts (typically the design values consistent with the form of the standard) from potential/allowable emissions resulting from the project and emissions from any nearby co-contributing sources (including existing emissions from the facility that are unrelated to the project), and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-period at the facility location and the area of significant impact. The resulting pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also specifies the modeled design value that must be used for comparison to the NAAQS. NAAQS compliance is evaluated on a receptor-by-receptor basis for the modeling domain.

If the cumulative NAAQS impact analysis indicates an exceedance of NAAQS, a culpability analysis can determine if this exceedance is due to emissions from the proposed project. The permit may not be issued if the proposed project has a significant contribution (exceeding the SIL) to the modeled violation. If project-specific impacts are below the SIL, then the project does not have a significant contribution to the specific violations.

Compliance with Idaho Air Rules Section 203.02 is generally demonstrated if: a) applicable specific criteria pollutant emission increases are at a level defined as BRC, using the criteria established by DEQ regulatory interpretation[1]; or b) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or c) modeled design values of the

cumulative NAAQS impact analysis (modeling all emissions from the facility and co-contributing sources, and adding a background concentration) are less than applicable NAAQS at receptors where impacts from the proposed facility/modification exceeded the SIL or other identified level of consequence; or d) if the cumulative NAAQS analysis showed NAAQS violations, the impact of proposed facility/modification to any modeled violation was inconsequential (typically assumed to be less than the established SIL) for that specific receptor and for the specific modeled time when the violation occurred.

2.5 Toxic Air Pollutant Analyses

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.*

Permitting requirements for toxic air pollutants (TAPs) from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Per Section 210, if the total project-wide emission increase of any TAP associated with a new source or modification exceeds screening emission levels (ELs) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emission increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated.

Idaho Air Rules Section 210.20 states that if TAP emissions from a specific source are regulated by the Department or EPA under 40 CFR 60, 61, or 63, then a TAP impact analysis under Section 210 is not required for that TAP. The DEQ permit writer evaluates the applicability of specific TAPs to the Section 210.20 exclusion.

3.0 Analytical Methods and Data

This section describes the methods and data used in the analyses to demonstrate compliance with applicable air quality impact requirements. The DEQ Statement of Basis provides a discussion of the methods and data used to estimate criteria and TAP emission rates.

3.1 Emission Source Data

Emissions of criteria pollutants and TAPs resulting from operation of the TASCO Mini-Cassia facility were estimated by the applicant for various applicable averaging periods. The calculation of potential

emissions is the responsibility of the DEQ permit writer, and the representativeness and accuracy of emission estimates is not addressed in this modeling memorandum. DEQ air impact analysts are responsible for assuring that potential emission rates provided in the emission inventory are properly used in the model. The rates listed must represent the maximum allowable rate as averaged over the specified period.

Emission rates used in the impact modeling applicability analyses and any modeling analyses, as listed in this memorandum, should be reviewed by the DEQ permit writer and compared with those in the final emission inventory. All modeled criteria air pollutant and TAP emission rates must be equal to or greater than the facility's potential emissions calculated in the PTC emission inventory or proposed permit allowable emission rates.

3.1.1 Criteria Pollutant Modeling Applicability and Modeled Emission Rates

If project-specific emission increases for criteria pollutants would qualify for a BRC permit exemption as per Idaho Air Rules Section 221 if it were not for potential emissions of one or more pollutants exceeding the BRC threshold of 10 percent of emissions defined by Idaho Air Rules as significant, then a NAAQS compliance demonstration may not be required for those pollutants with emissions below BRC levels. DEQ's regulatory interpretation policy of exemption provisions of Idaho Air Rules is that: "A DEQ NAAQS compliance assertion will not be made by the DEQ modeling group for specific criteria pollutants having a project emissions increase below BRC levels, provided the proposed project would have qualified for a Category I Exemption for BRC emissions quantities except for the emissions of another criteria pollutant.[1]" The interpretation policy also states that the exemption criteria of uncontrolled potential to emit (PTE) not to exceed 100 ton/year (Idaho Air Rules Section 220.01.a.i) is not applicable when evaluating whether a NAAQS impact analyses is required. A permit will be issued limiting PTE below 100 ton/year, thereby negating the need to maintain calculated uncontrolled PTE under 100 ton/year. The BRC exemption cannot be used to exempt a project from a pollutant-specific NAAQS compliance demonstration in most cases where a PTC is required for the action regardless of emission quantities, such as the modification of an existing emission or throughput limit.

A NAAQS compliance demonstration must be performed for pollutant increases that would not qualify for the BRC exemption from the requirement to demonstrate compliance with NAAQS.

Site-specific air impact modeling analyses may not be necessary for some pollutants, even where such emissions do not qualify for the BRC exemption. DEQ has developed modeling applicability thresholds, below which a site-specific modeling analysis is not required. DEQ generic air impact modeling analyses that were used to develop the modeling thresholds provide a conservative SIL analysis for projects with emissions below identified threshold levels. Project-specific modeling applicability thresholds are provided in the *Idaho Air Modeling Guideline*[2]. These thresholds were based on assuring an ambient impact of less than the established SIL for specific pollutants and averaging periods.

If total project-specific emission rate increases of a pollutant are below Level I Modeling Applicability Thresholds, then project-specific air impact analyses are not necessary for permitting. Use of Level II Modeling Applicability Thresholds is conditional, requiring DEQ approval. DEQ approval is based on dispersion-affecting characteristics of the emission sources such as stack height, stack gas exit velocity, stack gas temperature, distance from sources to ambient air, presence of elevated terrain, and potential exposure to sensitive public receptors.

Table 3 provides a comparison between project-specific emission increases and modeling applicability thresholds.

Table 3. SITE-SPECIFIC CRITERIA POLLUTANT MODELING APPLICABILITY.					
Pollutant	**Averaging Period**	**Emission Increase**	**Level I Modeling Thresholds**	**Level II Modeling Thresholds[a]**	**Site-Specific Modeling Required?**
PM_{10}[b]	24-hour	0.10 lb/hr[c]	0.22	2.6	No
$PM_{2.5}$[d]	24-hour	0.10 lb/hr	0.054	0.63	Yes
	Annual	0.96 tpy[e]	0.35	4.1	Yes
Carbon Monoxide (CO)	1-hour, 8-hour	14.18 lb/hr	15	175	No
Sulfur Dioxide (SO_2)	1-hour, 3-hour	0.07 lb/hr	0.21	2.5	No
Nitrogen Oxides (NOx)	1-hour	0.60 lb/hr	0.20	2.4	Yes
	Annual	5.74 tpy	1.2	14	Yes

a. The application did not evaluate the appropriateness of using Level II thresholds for the project.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers.
c. Pounds per hour.
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
e. Tons per year.

As shown in Table 3, the increase in emissions of PM_{10}, CO, and SO_2 on a short-term averaging basis is less than DEQ's Level I modeling thresholds. Therefore, dispersion modeling was not required for PM_{10}, CO, and SO_2. Dispersion modeling was required for $PM_{2.5}$ (on a 24-hour and annual basis) and NO_2 (on a 1-hour and annual basis) since the emission increase exceeded Level I thresholds. The application did not evaluate the appropriateness of using Level II thresholds for the project.

Table 4 lists criteria pollutant emission rates used in the SIL analyses. The first carbonation tank represents 90% of the total emissions while the second carbonation tank is the remaining 10%. This proportion was based on a November 15, 2018 stack test. Note that total modeled emission rates for 1-hour and annual NO_2 (Table 4) were slightly larger than the calculated emission increase (Table 3). A cumulative NAAQS impact analysis was not required for this project because results from the SIL analyses were below applicable SILs.

Table 4. MODELED EMISSION RATES FOR SIL ANALYSES.					
Source ID	**Description**	**24-hour $PM_{2.5}$[a] (lb/hr)[b]**	**Annual $PM_{2.5}$ (tpy)[c]**	**1-hour NO_2[d] (lb/hr)**	**Annual NO_2 (tpy)**
PK1/2A	First Carbonation Vent	0.09	0.86	0.57	5.45
PK1/2B	Second Carbonation Vent	0.01	0.10	0.06	0.61
Total Modeled Emission Rates:		*0.10*	*0.96*	*0.63*	*6.06*

a. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
b. Pounds per hour.
c. Tons per year.
d. Nitrogen dioxide.

Ozone (O_3) differs from other criteria pollutants in that it is not typically emitted directly into the atmosphere. O_3 is formed in the atmosphere through reactions of VOCs, NOx, and sunlight. Atmospheric dispersion models used in stationary source air permitting analyses cannot be used to estimate O_3 impacts resulting from VOC and NOx emissions from an industrial facility. O_3 concentrations resulting from area-wide emissions are predicted by using more complex airshed models such as the Community Multi-Scale Air Quality (CMAQ) modeling system. Use of the CMAQ model is very resource-intensive and DEQ asserts that performing a CMAQ analysis for a particular permit application is not typically a reasonable or necessary requirement for air quality permitting.

Addressing secondary formation of O_3 within the context of permitting a new stationary source has been somewhat addressed in EPA regulation and policy. As stated in a letter from Gina McCarthy of EPA to Robert Ukeiley, acting on behalf of the Sierra Club (letter from Gina McCarthy, Assistant Administrator, United States Environmental Protection Agency, to Robert Ukeiley, January 4, 2012):

> *. . . footnote 1 to sections 51.166(I)(5)(I) of the EPA's regulations says the following: "No de minimis air quality level is provided for ozone. However, any net emission increase of 100 tons per year or more of volatile organic compounds or nitrogen oxides subject to PSD would be required to perform an ambient impact analysis, including the gathering of air quality data."*
>
> *The EPA believes it unlikely a source emitting below these levels would contribute to such a violation of the 8-hour ozone NAAQS, but consultation with an EPA Regional Office should still be conducted in accordance with section 5.2.1.c. of Appendix W when reviewing an application for sources with emissions of these ozone precursors below 100 TPY."*

DEQ determined it was not appropriate or necessary to require a quantitative source-specific O_3 impact analysis because allowable emission estimates of VOCs and NOx are below the 100 tons/year threshold.

3.1.2 TAPs Modeling Applicability and Modeled Emission Rates

Facility-wide emissions of arsenic, benzene, cadmium, and nickel exceed the applicable emission screening levels (ELs) of Idaho Air Rules Section 585 and 586. Air impact modeling analyses were then required to demonstrate that maximum impacts of arsenic, benzene, cadmium, and nickel are below applicable ambient increment standards expressed in Idaho Air Rules Section 585 and 586 as AACs and AACCs.

Arsenic, benzene, cadmium, and nickel are carcinogenic TAPs that are regulated on a long-term averaging basis. Therefore, the appropriate emission rates for impact analyses are maximum annual emissions, expressed as an average pound/hour value over an 8,760-hour period.

Table 5 provides a summary of TAP emission increases for the four TAPs that had an increase exceeding the ELs of Idaho Air Rules Section 585 or 586.

Table 5. TAP EMISSION INCREASES THAT TRIGGER MODELING.

Toxic Air Pollutant	Emissions (lb/hr)[a]	Screening Emissions Level (lb/hr)
Arsenic[b]	1.68E-04	1.50E-06
Benzene[b]	1.01E-03	8.00E-04
Cadmium[b]	5.72E-05	3.70E-06
Nickel[b]	7.44E-05	2.70E-05

a. Pounds per hour.
b. Carcinogenic TAP. ELs are annual maximum emissions expressed as pounds/hour. The emission rate is the annual emissions divided by 8,760 hours/year.

Table 6 lists the emission rates used in the TAPs impact analyses. The total modeled emission rate for each TAP is equal to the emission increase for that TAP listed in Table 5.

Table 6. MODELED EMISSION RATES FOR TAPS IMPACT ANALYSES.

Source ID	Description	Arsenic[a] (lb/hr)[b]	Benzene[a] (lb/hr)	Cadmium[a] (lb/hr)	Nickel[a] (lb/hr)
PK1/2A	First Carbonation Vent	1.51E-04	9.07E-04	5.15E-05	6.70E-05

PK1/2B	Second Carbonation Vent	1.67E-05	1.01E-04	5.73E-06	7.44E-06
Total Modeled Emission Rates:		1.68E-04	1.01E-03	5.72E-05	7.44E-05

[a] Carcinogenic TAP. The emission rate is the annual emissions divided by 8,760 hours/year.
[b] Pounds per hour.

3.1.3 Emission Release Parameters

Table 7 lists the emission release parameters, including stack height, exhaust temperature, exhaust velocity, and stack diameter for the first and second carbonation vents (English units are in parentheses). Emission point release parameters were based on information provided in the application. Justification for emission release parameters is summarized in the next section.

Table 7. POINT SOURCE EMISSION RELEASE PARAMETERS IN METRIC UNITS (ENGLISH UNITS IN PARENTHESES).

Release Point	Description	UTM[a] Coordinates		Stack Height in m (ft)[c]	Stack Exhaust Temp. in K (°F)[d]	Stack Exhaust Velocity in m/sec (fps)[e]	Stack Diameter in m (ft)	Orient. Of Release[f]
		Easting-X in m[b]	Northing-Y in m					
PK1/2A	First Carbonation Vent	273,748.14	4,721,536.25	24.1 (79.0)	353.7 (177.0)	10.8 (35.3)	1.07 (3.50)	D
PK1/2B	Second Carbonation Vent	273,736.29	4,721,501.62	20.1 (66.0)	363.2 (194.0)	2.1 (6.9)	1.07 (3.50)	D

[a] Universal Transverse Mercator.
[b] m: meters.
[c] ft: feet.
[d] K: Kelvin; °F: degrees Fahrenheit.
[e] m/sec: meters per second; fps: feet per second.
[f] Orientation of release: D (default, vertical, uninterrupted release); H (horizontal release); R (rain-capped release).

3.1.4 Emission Release Parameter Justification

Carbonation Vents

Model IDs: PK1/2A and PK1/2B

The first (PK1/2A) and second (PK1/2B) carbonation vents were modeled with an exit temperature of 177°F and 194°F, respectively, based on a November 15, 2018 stack test. Actual flow rates from the 2018 stack test were 20,367 actual cubic feet per minute (acfm) and 3,973 acfm for the first and second carbonation tanks, respectively. Modeled exit diameter for both vents (42 inches or 3.50 feet) was based on compliance test program results dated January 9, 2019. Therefore, the corresponding modeled exit velocities are 10.8 meter/second and 2.1 meter/second.

$$PK1/2A\ exit\ velocity = 20{,}367 \frac{\cancel{feet^3}}{\cancel{minute}} \times \frac{4}{\pi(3.50\ \cancel{feet})^2} \times \frac{1\ \cancel{minute}}{60\ seconds} \times \frac{1\ meter}{3.28\ \cancel{feet}} = 10.8 \frac{meter}{second}$$

$$PK1/2B\ exit\ velocity = 3{,}973 \frac{\cancel{feet^3}}{\cancel{minute}} \times \frac{4}{\pi(3.50\ \cancel{feet})^2} \times \frac{1\ \cancel{minute}}{60\ seconds} \times \frac{1\ meter}{3.28\ \cancel{feet}} = 2.1 \frac{meter}{second}$$

Modeled stack heights (24.1 feet and 20.1 feet) were verified by field measurements. Both stacks were modeled with vertical, uninterrupted release.

Release parameters for both carbonation vents were appropriately documented and justified.

3.2 Background Concentrations

Cumulative NAAQS impact analyses were not required for this project. Therefore, background concentrations were not needed.

3.3 Impact Modeling Methodology

This section describes the modeling methods used by the applicant to demonstrate preconstruction compliance with applicable air quality standards.

3.3.1 General Overview of Impact Analyses

The applicant and Stantec performed the project-specific air pollutant emission inventory and air impact analyses that were submitted with the application. The submitted information/analyses, in combination with results from DEQ's air impact analyses, demonstrate compliance with applicable air quality standards to DEQ's satisfaction, provided the facility is operated as described in the submitted application and in this memorandum.

Table 8 provides a brief description of parameters used in the modeling analyses.

Table 8. MODELING PARAMETERS.

Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Paul, Idaho	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 19191.
Meteorological Data	Burley surface station; Boise upper air station	The meteorological model input files for this project were developed by DEQ. The data were processed using the latest version of AERMET (version 19191) and the "ADJ_U*" option. See Section 3.3.5 of this memorandum for additional details of the meteorological data.
Terrain	Considered	1 arc second National Elevation Dataset (NED) was acquired from the USGS for the surrounding area. AERMAP version 18081 was used to process terrain elevation data for all buildings and receptors. See Section 3.3.6 for more details.
Building Downwash	Considered	Plume downwash was considered for the structures associated with the facility. BPIP-PRIME was used to evaluate building dimensions for consideration of downwash effects in AERMOD. See Section 3.3.7 for more details.
NOx Chemistry	ARM2	The ARM2 method is a Tier 2 analysis method which assumes an ambient equilibrium between NO and NO_2, in which the conversion of NO to NO_2 is predicted using hourly ambient NOx monitoring data. ARM2 has been adopted by the EPA as a default regulatory Tier 2 option. See Section 3.3.8 for more details.
Receptor Grid	**SIL Analysis** The selection of receptors for use in the SIL analysis is as follows (see Section 3.3.10 for more details):	
	Boundary Receptors	50-meter spacing between boundary point receptors.
	Discrete Receptors	50-meter spacing along areas of public access that run through TASCO property.
	Grid 2	200-meter spacing in a 10,800-meter (easting) by 7,800-meter (northing) grid centered on the facility.
	Grid 3	50-meter spacing in a 3,300-meter (easting) by 2,000-meter (northing) grid centered on the facility.
	Refined Grid 3	25-meter spacing as requested by DEQ. This grid is 1,650 meters by

	1,000 meters centered on the facility.
Cumulative NAAQS Impact Analysis A cumulative NAAQS impact analysis was not required for this project.	
TAPs Analysis The same receptor grid was used for the TAPs analysis as for the SIL analysis.	

3.3.2 Modeling Protocol

A modeling protocol was not submitted for this project.

3.3.3 Modeling Methodology

Project-specific modeling and other required impact analyses were generally conducted using data and methods described in the *Idaho Air Quality Modeling Guideline*.[2]

3.3.4 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in Appendix W. The refined, steady-state, multiple-source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. AERMOD retains the single straight-line trajectory of ISCST3, but it includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

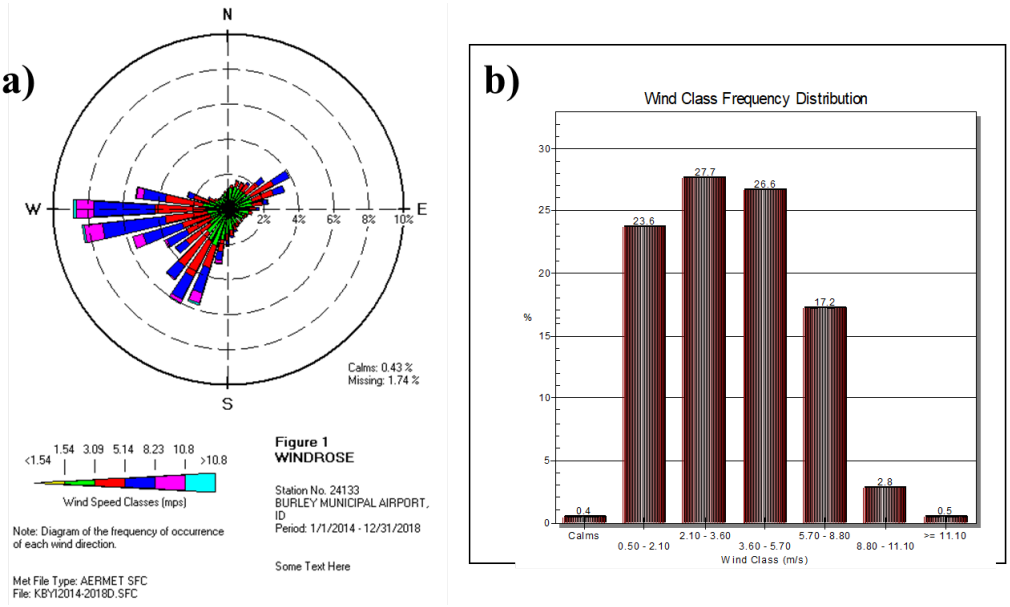
AERMOD version 19191 was used by Stantec for the modeling analyses to evaluate impacts of the facility. This version was the current version at the time the application was received by DEQ.

3.3.5 Meteorological Data

DEQ processed a meteorological dataset from Burley, Idaho (KBYI; station ID 725867-24133) covering the years 2014-2018. The upper air soundings required by AERMET were obtained from the Boise airport station (site ID 24131). Surface characteristics were determined by DEQ staff using AERSURFACE version 13016. DEQ modeling staff evaluated annual moisture conditions for the AERSURFACE runs based on thirty years of Burley airport precipitation data. Conditions were determined to be "wet" for 2014, 2016, and 2017, and "average" for 2015 and 2018. Average moisture content is defined as within a 30 percentile of the 30-year mean of 9.94 inches. Calms were relatively low, and less than 1 percent of the data were missing from the 5-year record.

Figure 1 shows a wind rose and wind speed histogram at Burley Airport. AERMINUTE version 15272 was used to process Automated Surface Observing Systems (ASOS) wind data for use in AERMET. AERMET version 19191 was used to process surface and upper air data and to generate a model-ready meteorological data input file. The "adjust u star" (ADJ_U*) option was applied in AERMET to enhance model performance during low wind speeds under stable conditions. DEQ provided meteorological data to the applicant, with and without the ADJ_U* option enabled. In the submitted modeling files, Stantec used the meteorological data with the ADJ_U* option enabled. DEQ determined that these data are adequately representative of the meteorology at the TASCO Mini-Cassia site for minor source permitting.

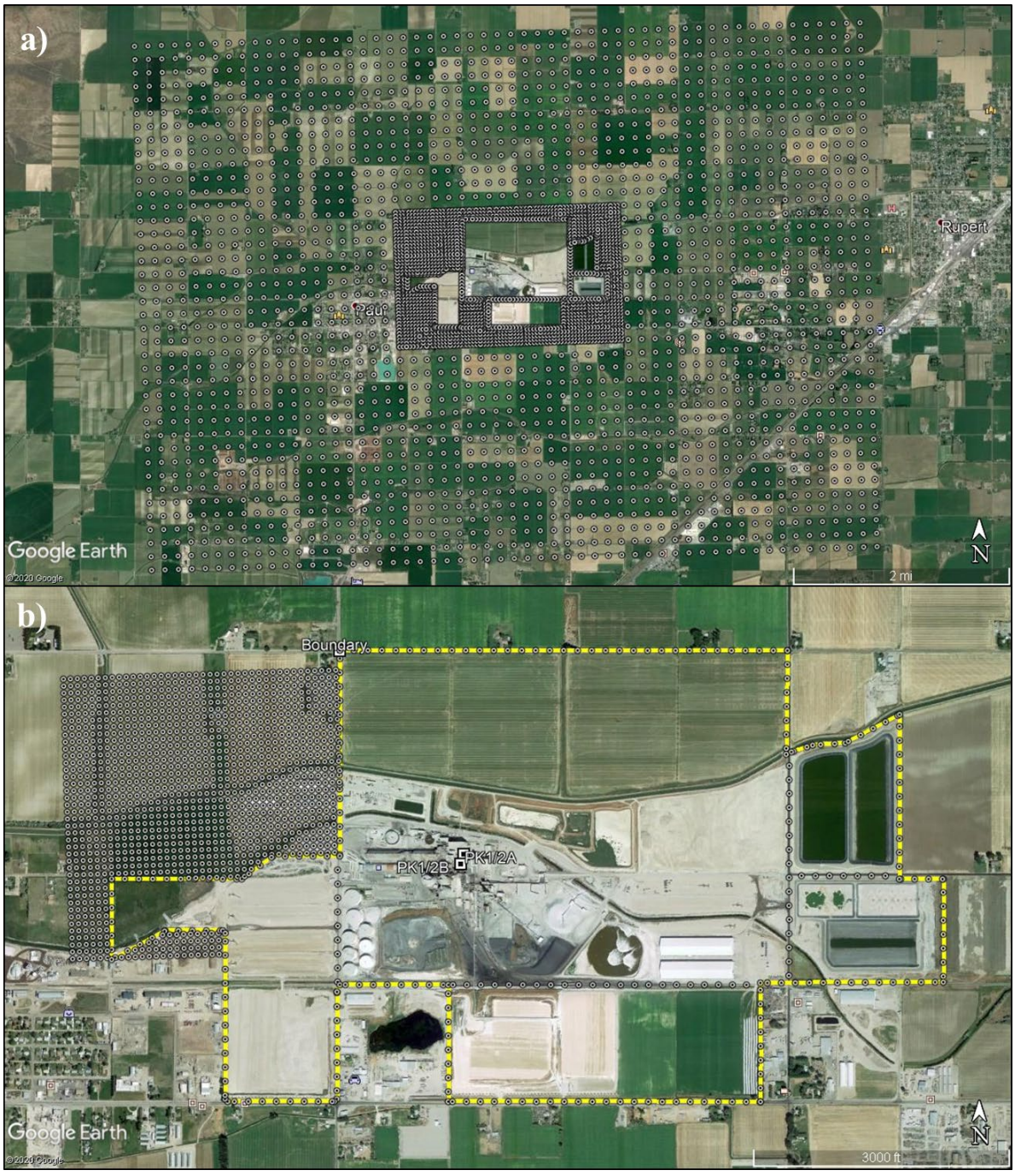
Figure 1. (a) WIND ROSE AND (b) WIND SPEED HISTOGRAM AT BURLEY AIRPORT IN IDAHO (2014-2018).



3.3.6 Effects of Terrain on Modeled Impacts

Submitted ambient air impact analyses used terrain data extracted from United States Geological Survey (USGS) National Elevation Dataset (NED) 1-arc second TIFF files. The terrain preprocessor AERMAP version 18081 was used by the applicant and by Stantec to extract the elevations from the NED files and assign them to receptors in the modeling domain in a format usable by AERMOD. AERMAP also determined the hill-height scale for each receptor. The hill-height scale is an elevation value based on the surrounding terrain which has the greatest effect on that individual receptor. AERMOD uses those heights to evaluate whether the emissions plume has sufficient energy to travel up and over the terrain or if the plume will travel around the terrain. Figures 2a and 2b depict the coarse and the fine receptor grids, respectively, used in the analyses, overlaid on a terrain image from Google Earth.

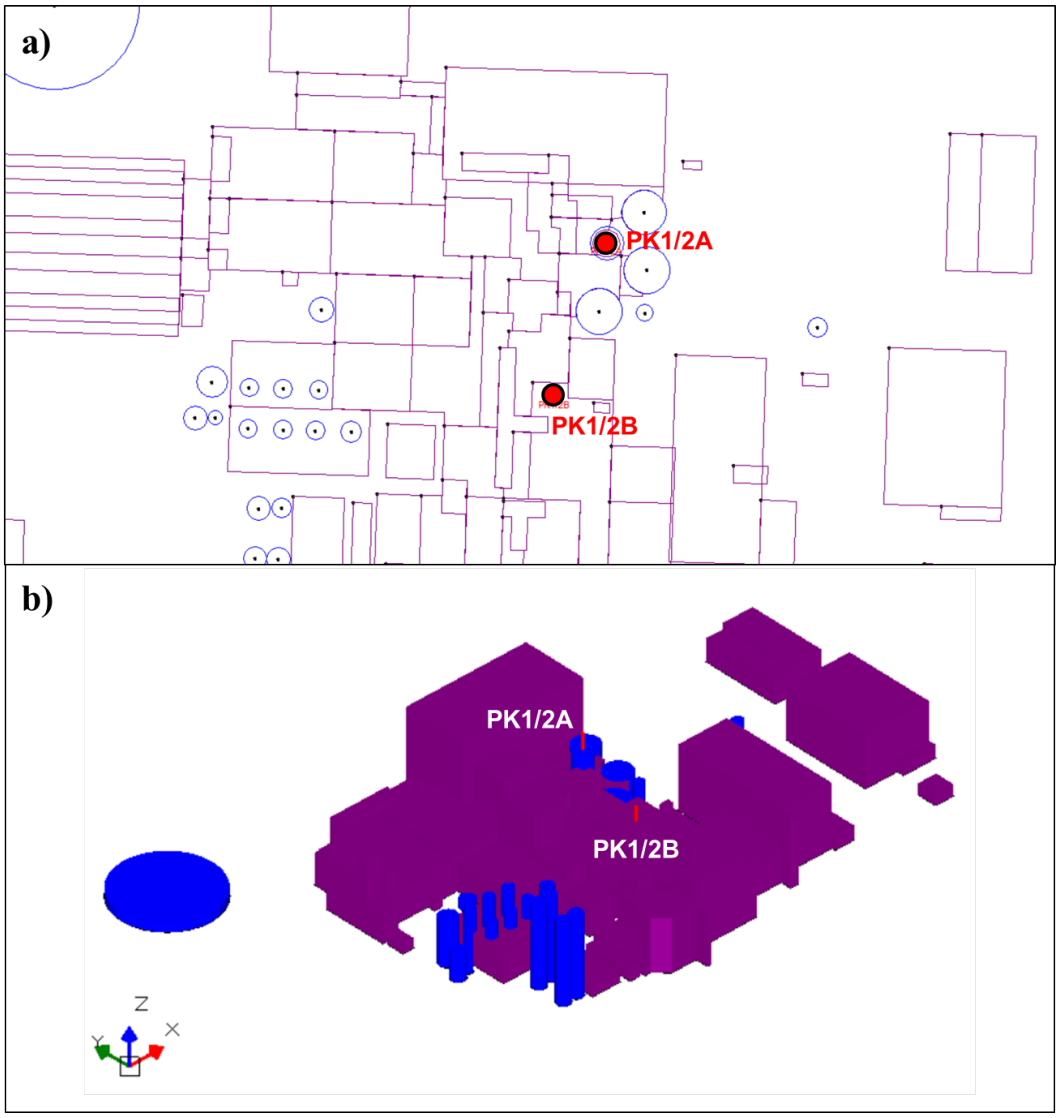
Figure 2. (a) THE COARSE AND (b) THE FINE RECEPTOR GRIDS CENTERED AT THE TASCO MINI-CASSIA FACILITY IN PAUL, IDAHO.



3.3.7 Facility Layout and Downwash

Figure 3a shows a close-up of the facility's model setup showing locations of the first (stack ID: PK1/2A) and second (PK1/2B) carbonation vents. Figure 3b illustrates a three-dimensional view of Figure 3a as viewed from the southwest.

Figure 3. (a) CLOSE-UP OF TASCO MINI-CASSIA FACILITY'S MODEL SETUP SHOWING EMISSION SOURCES, AND (b) THREE-DIMENSIONAL VIEW OF THE MODEL SETUP AS VIEWED FROM THE SOUTHWEST.



DEQ verified proper identification of the site location, equipment locations, and the ambient air boundary by comparing a graphical representation of the modeling input file to aerial photographs on Google Earth (available at https://www.google.com/earth).

Potential downwash effects on emission plumes were accounted for in the model by using building dimensions and locations (locations of building corners, base elevation, and building heights). Dimensions and orientation of buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME version 04274) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD.

3.3.8 NOx Chemistry

The atmospheric chemistry of NO, NO_2, and O_3 complicates accurate prediction of NO_2 impacts resulting from NOx emissions. The conversion of NO to NO_2 can be conservatively addressed through the use of several methods as outlined in a *2014 EPA NO_2 Modeling Clarification Memorandum*.[3] The guidance outlines a three-tiered approach:

- Tier 1 – assume full conversion of NO to NO_2 where total NOx emissions are modeled and modeled impacts are assumed to be 100 percent NO_2.
- Tier 2 – use an ambient ratio to adjust impacts from the Tier 1 analysis.
- Tier 3 – use a detailed screening method to account for $NO/NO_2/O_3$ chemistry such as the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM).

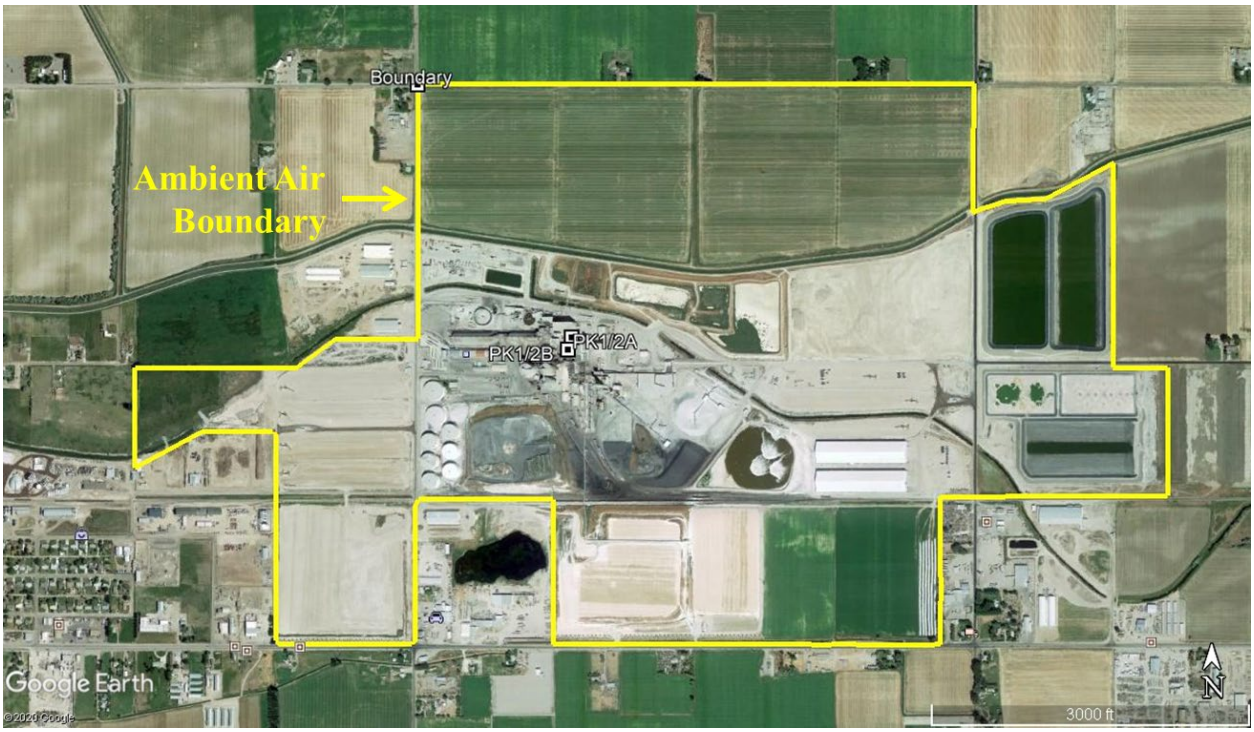
Stantec used the ARM2 method, a Tier 2 analysis method which assumes an ambient equilibrium between NO and NO_2, in which the conversion of NO to NO_2 is predicted using hourly ambient NOx monitoring data. ARM2 has been adopted by the EPA as a default regulatory Tier 2 option. A minimum and maximum NO_2/NOx ratio of 0.5 and 0.9, respectively, were specified in the model.

3.3.9 Ambient Air Boundary

Ambient air is defined in Section 006 of the Idaho Air Rules as "that portion of the atmosphere, external to buildings, to which the general public has access." Ambient air for the Mini-Cassia facility was considered as the limits of the property boundary. Public access to the property is precluded through management and physical barriers. The area around the treatment lagoons east of the production facility is enclosed with chain link fencing. The production area is fenced and roads within the production area and along the perimeter of the boundary are patrolled by security personnel. Where there are no fences, public access is restricted by security patrols. Because roads and a rail line transect the property in several locations, discrete modeling receptors have been placed along the center line of these access ways.

The ambient air boundary for this project is identical to the ambient air boundary that was used by the applicant in its 2018 air impact modeling analyses. DEQ has determined that measures described in the application to preclude public access to areas of the site excluded from ambient air are adequate. Figure 4 shows the ambient air boundary. The inner grid receptors are illustrated in Figure 2b.

Figure 4. TASCO MINI-CASSIA FACILITY'S AMBIENT AIR BOUNDARY.



3.3.10 Receptor Network

Table 8 describes the receptor network used in the submitted modeling analyses. The receptor grids used in the model provided good resolution of the maximum design concentrations for the project and provided extensive coverage. TASCO used both coarse and fine receptor grids, depicted in Figures 2a and 2b, respectively. The coarse and the fine receptors grids are composed of 3,861 and 1,541 receptors, respectively. DEQ determined that the receptor grid used in the submitted modeling analyses was adequate to resolve maximum modeled impacts.

The receptor grid used in the submitted modeling analyses met the minimum recommendations specified in the *Idaho Air Quality Modeling Guideline*[2], and DEQ determined that the receptor network was effective in reasonably assuring compliance with applicable air quality standards at all ambient air locations.

3.3.11 Good Engineering Practice Stack Height

An allowable good engineering practice (GEP) stack height may be established using the following equation in accordance with Idaho Air Rules Section 512.03.b:

H = S + 1.5L, where:

H = good engineering practice stack height measured from the ground-level elevation at the base of the stack.

S = height of the nearby structure(s) measured from the ground-level elevation at the base of the stack.

L = lesser dimension, height or projected width, of the nearby structure.

Sources from the TASCO Mini-Cassia facility are below GEP stack height. Therefore, consideration of downwash caused by nearby buildings was required.

4.0 NAAQS and TAPs Impact Modeling Results

4.1 Results for NAAQS Analyses

4.1.1 Significant Impact Level Analysis

A SIL analysis was conducted for the increase in emissions of $PM_{2.5}$ and NO_2 from the first and second carbonation vents. As shown in Table 9 below, maximum ambient impacts are below SILs for 24-hour and annual $PM_{2.5}$, and for 1-hour and annual NO_2. Therefore, a cumulative NAAQS impact analysis was not required for the project.

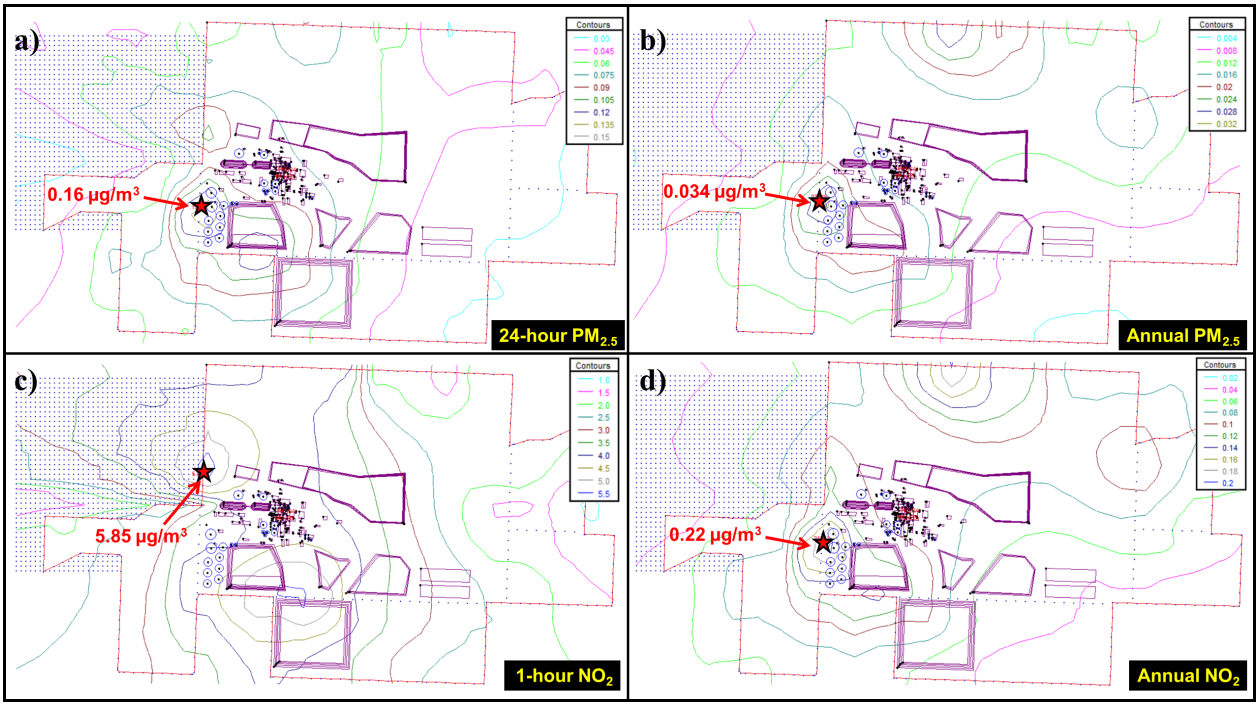
Table 9. RESULTS FOR SIGNIFICANT IMPACT LEVEL ANALYSIS.

Pollutant	Averaging Period	Maximum Modeled Impact ($\mu g/m^3$)[a]	Significant Impact Level (SIL) ($\mu g/m^3$)	Percent of SIL	Cumulative NAAQS Impact Analysis Required?
$PM_{2.5}$[b]	24-hour	0.16	1.2	13.3%	No
	Annual	0.034	0.2	17.0%	No
NO_2[c]	1-hour	5.85	7.5	78.0%	No
	Annual	0.22	1.0	22.0%	No

a. Micrograms per cubic meter.
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.
c. Nitrogen dioxide.

Figure 5 illustrates the maximum modeled impacts for 24-hour and annual $PM_{2.5}$, and for 1-hour and annual NO_2. Locations of maximum impacts are indicated by the red star. High concentrations occur either along one of the public roads that runs through the facility or on the property boundary. DEQ determined that maximum concentrations are adequately resolved by the refined receptor network.

Figure 5. MAXIMUM MODELED IMPACTS IN µg/m³ FOR SIGNIFICANT IMPACT LEVEL ANALYSIS.



4.1.2 Cumulative NAAQS Impact Analysis

A cumulative NAAQS impact analysis was not required for this project.

4.2 Results for TAPs Impact Analyses

Dispersion modeling was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 and 586 for those TAPs with emission increases exceeding screening emission levels (ELs). Table 10 lists the maximum modeled impacts for the four TAPs that required modeling. All modeled impacts are below applicable AACCs.

Table 10. TAPS AIR IMPACT ANALYSIS RESULTS.

TAP	Maximum Modeled Impact (µg/m³)[a]	AAC or AACC (µg/m³)	Percent of AAC/AACC
Arsenic[b]	3.0E-05	2.30E-04	13.0%
Benzene[b]	1.6E-04	1.20E-01	0.13%
Cadmium[b]	1.0E-05	5.60E-04	1.8%
Nickel[b]	1.0E-05	4.20E-03	0.24%

a. Micrograms per cubic meter.
b. Carcinogenic TAP. Modeled impact and AACC represent annual or period-average concentration.

5.0 Conclusions

The information submitted with the PTC application, combined with DEQ's air impact analyses,

demonstrated to DEQ's satisfaction that emissions from the TASCO Mini-Cassia modification project in Paul, Idaho will not cause or significantly contribute to a violation of any applicable ambient air quality standard or TAP increment.

References

1. *Policy on NAAQS Compliance Demonstration Requirements.* Idaho Department of Environmental Quality Policy Memorandum. July 11, 2014.

2. *State of Idaho Guideline for Performing Air Quality Impact Analyses*. Idaho Department of Environmental Quality. September 2013. State of Idaho DEQ Air Doc. ID AQ-011. Available at http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf.

3. *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO_2 National Ambient Air Quality Standard*. Office of Air Quality Planning and Standards. Air Quality Modeling Group. Research Triangle Park, NC. Guidance memorandum from R. Chris Owen and Roger Brode to Regional Dispersion Modeling Contacts. September 30, 2014.

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on March 16, 2021:

Facility Comment: Page 3, Section 1 – Permit scope regulated sources: In Table 1.1, TASCO requests deleting the process slaker (S-K2) information including the daily and annual CaO production capacities. As per Section 9 of the Tier I Operating Permit (No. T1-2019.0020), the process slaker and all other slakers are categorized as insignificant sources. Supporting documentation is included in the PTC minor modification issued by IDEQ on March 18, 2014 (No. P-2010.0043, Project No. 61325). The draft Statement of Basis should also be updated to reflect this revision to the draft PTC.

DEQ Response: The requested change to remove the process slaker (S-K2) has been granted. The process slaker was effectively removed from the PTC in 2014 as no permit requirements exist in the current PTC. Also, because the slaker has been moved to the insignificant sources in the existing Tier I Operating permit, it will be removed from the PTC regulated sources table.

APPENDIX D – PROCESSING FEE

PTC Processing Fee Calculation Worksheet

Instructions:
Fill in the following information and answer the following questions with a Y or N. Enter the emissions increases and decreases for each pollutant in the table.

Company:	**The Amalgamated Sugar Company**
Address:	**50 South 500 West**
City:	**Paul**
State:	**Idaho**
Zip Code:	**83347**
Facility Contact:	**Stan Case**
Title:	**Plant Manager**
AIRS No.:	**067-00001**

N	Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N
Y	Did this permit require engineering analysis? Y/N
N	Is this a PSD permit Y/N (IDAPA 58.01.01.205.04)

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X	0.0	12.2	-12.2
SO_2	0.5	0	0.5
CO	0.0	1220	-1220.0
PM10	0.0	1.24	-1.2
VOC	0.6	0	0.6
Total:	0.0	1233.44	**-1232.4**
Fee Due	**$ 1,000.00**		

Comments: