Statement of Basis

Permit to Construct No. P-2007.0197
Project ID 61375

B & D Foods
Boise, Idaho

Facility ID 001-00162

Final

May 20, 2015
Darrin Pampaian, P.E.
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.

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
CAS No.	Chemical Abstracts Service registry number
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CMS	continuous monitoring systems
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
COMS	continuous opacity monitoring systems
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gases
gph	gallons per hour
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
HAP	hazardous air pollutants
hp	horsepower
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
iwg	inches of water gauge
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
PCB	polychlorinated biphenyl
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
PTE	potential to emit
PW	process weight rate
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
TEQ	toxicity equivalent
ULSD	ultra-low sulfur diesel
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

B & D Foods is a food processing plant. The plant produces frozen battered meat and poultry. The process consists of applying batter to meat or poultry, frying the battered food, recoating the food with batter, refrying the food, and freezing the product for subsequent distribution.

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).

April 18, 2008	P-2007.0197, Replacement of Hot oil heater 1 and Fryer 1, Permit status (A, but will become S upon issuance of this permit)
June 9, 2006	PTC No. P-050006, Permit for a n existing facility with two oil heaters, two hot oil fryers, a mist eliminator and an incinerator, Permit status (S)
November 4, 2004	DEQ issued a Consent Order, (Terminated May 13, 2009)

Application Scope

This PTC is for a permit modification at an existing minor facility.

The B & D Foods plant currently processes 60,000 pounds per day of meat and poultry.

The applicant has proposed to:

- Increase the meat and poultry throughput from 60,000 pounds per day to 90,000 pounds per day.
- Increase daily incinerator and fryer operation from 16 hours per day to 18 hours per day.
- Increase daily oil heater operation from 21 hours to 22 hours per day.
- Increase annual incinerator and fryer operation from 250 days per year to 317 days per year.

Application Chronology

May 22, 2014	DEQ received an application and an application fee.
June 2 – June 17, 2014	DEQ provided an opportunity to request a public comment period on the application and proposed permitting action.
June 16, 2014	DEQ determined that the application was incomplete.
July 16, 2014	DEQ received supplemental information from the applicant.
November 11, 2014	DEQ determined that the application was incomplete.
December 8, 2014	DEQ received supplemental information from the applicant.
December 12, 2014	DEQ determined that the application was incomplete.
December 17, 2014	DEQ received supplemental information from the applicant.
January 15, 2015	DEQ determined that the application was complete.
March 4, 2015	DEQ made available the draft permit and statement of basis for peer and regional office review.
March 10, 2015	DEQ made available the draft permit and statement of basis for applicant review.
March 24, 2015	DEQ received the permit processing fee.

April 6 – May 6, 2015	DEQ provided a public comment period on the proposed action.
May 20, 2015	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
HEATER1	Oil heater 1: Manufacturer: Eclipse Model: 4IJ. Version 2 Heat input rating: 1.8 MMBtu/hr Fuel: Natural gas only	None	HEATER1: Exit height: 36.15 ft (11.02 m) Exit diameter: 0.66 ft (0.20 m) Exit flow rate: 424.87 acfm Exit temperature: 465.0 °F (513.71 K)
HEATER2	Oil heater 2: Manufacturer: Maxon Model: #422M Heat input rating: 1.44 MMBtu/hr Fuel: Natural gas only	None	HEATER2: Exit height: 48.0 ft (14.63 m) Exit diameter: 0.98 ft (0.30 m) Exit flow rate: 485.50 acfm Exit temperature: 435.0 °F (497.04 K)
INCINERATOR	Fryer 1: Manufacturer: Immerso-Cook, Maxon Model: 2395.01.900 Heat input rating: 1.5 MMBtu/hr Fuel: Natural gas only Fryer 2: Manufacturer: Immerso-Cook, Maxon Model: 2395.01.900 Heat input rating: 1.5 MMBtu/hr Fuel: Natural gas only	Mist eliminator (in line before the incinerator): Manufacturer: Amistco Model: TM-1109 Control efficiency: 99.9% for PM_{10}, 60% for $PM_{2.5}$ Incinerator: Manufacturer: Maxon Model: NP II Heat input rating: 1.5 MMBtu/hr Control efficiency: 85.0% for PM_{10} Fuel: Natural gas only	INCINERATOR: Exit height: 40.58 ft (12.37 m) Exit diameter: 1.84 ft (0.56 m) Exit flow rate: 5,509.40 acfm Exit temperature: 535.0 °F (552.59 K)

Emissions Inventories

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 oil heaters, fryers, and incinerator associated with the meat and poultry processing operations at the facility (see Appendix A) for this proposed modification.

Uncontrolled Potential to Emit

Using the definition of Potential to Emit, uncontrolled Potential to Emit is then defined 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 **not** be treated as part of its design **since** the limitation or the effect it would have on emissions **is not** state or federally enforceable.

The uncontrolled Potential to Emit is used to determine if a facility is a "Synthetic Minor" source of emissions. Synthetic Minor sources are facilities that have an uncontrolled Potential to Emit for regulated air pollutants or HAP above the applicable Major Source threshold without permit limits.

It was previously determined for this facility that uncontrolled emissions were less than 100 T/yr for all pollutants and the facility classification is not changing as a result of this project.

Pre-Project Potential to Emit

Pre-project Potential to Emit is used to establish the change in emissions at a facility as a result of this project.

The following table presents the pre-project potential to emit for all criteria pollutants from all emissions units at the facility as was previously determined for permit P-2007.0197. Note: CO_2e emissions were not required to be calculated at the time for the previous permitting project thus they are not presented in the following table.

Table 2 PRE-PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM_{10}		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]
Oil heater 1	0.014	0.036	0.001	0.003	0.18	0.473	0.15	0.397	0.01	0.026
Oil heater 2	0.011	0.029	0.001	0.002	0.14	0.378	0.12	0.318	0.008	0.021
Fryer 1 and 2	0.28	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incinerator	0.012	0.023	0.001	0.002	0.15	0.300	0.13	0.252	0.008	0.017
Pre-Project Totals	**0.32**	**0.65**	**0.003**	**0.007**	**0.47**	**1.15**	**0.40**	**0.97**	**0.03**	**0.06**

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 and GHG pollutants from all emissions units at the facility as determined 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 3 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM_{10}		$PM_{2.5}$		SO_2		NO_X		CO		VOC		CO_2e	
	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]	lb/hr[a]	T/yr[b]	lb/hr[a]	T/yr[b]
Oil heater 1	0.013	0.047	0.013	0.047	0.001	0.004	0.176	0.615	0.148	0.517	0.010	0.034	213.02	846.57
Oil heater 2	0.011	0.037	0.011	0.037	0.001	0.003	0.141	0.492	0.119	0.414	0.008	0.027	170.42	677.26
Fryer 1 and 2	0.299	0.854	0.18	0.513	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Incinerator	0.011	0.032	0.011	0.032	0.001	0.003	0.147	0.420	0.124	0.352	0.008	0.023	177.52	705.48
Post Project Totals	**0.33**	**0.97**	**0.22**	**0.63**	**0.003**	**0.010**	**0.46**	**1.53**	**0.39**	**1.28**	**0.03**	**0.08**	**561**	**2,229**

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 4 CHANGES IN POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM_{10}		$PM_{2.5}$[a]		SO_2		NO_X		CO		VOC		CO_2e[a]	
	lb/hr	T/yr	lb/hr	T/yr	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	0.32	0.65	0.0	0.0	0.003	0.007	0.47	1.15	0.40	0.97	0.03	0.06	0.00	0.00
Post Project Potential to Emit	0.33	0.97	0.22	0.63	0.003	0.010	0.46	1.53	0.39	1.28	0.03	0.08	561	2,229
Changes in Potential to Emit	**0.01**	**0.32**	**0.22**	**0.63**	**0.00**	**0.00**	**-0.01**	**0.38**	**-0.01**	**0.31**	**0.00**	**0.02**	**561**	**2,229**

a) Note: $PM_{2.5}$ and CO_2e emissions were not required to be calculated during the previous permitting action. Therefore, the pre-project potential to emit for both pollutants are presented zero for calculation purposes only.

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.

All daily emissions of non-carcinogenic TAPs were assumed to be the increase for the project. Therefore, only post-project non-carcinogenic TAPs emissions are presented in the following table:

Table 5 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)
Barium	0.00E-03	2.04E-05	0.000020	0.033	No
Chromium	0.00E-03	6.51E-06	0.000007	0.033	No
Cobalt metal, dust, and fume	0.00E-03	3.90E-07	0.00000039	0.0033	No
Copper dusts & mists, as Cu	0.00E-03	3.95E-06	0.000004	0.067	No
Hexane	0.00E-03	8.36E-03	0.0084	12	No
Manganese, fume	0.00E-03	1.77E-06	0.000002	0.067	No
Molybdenum, soluble compounds	0.00E-03	5.11E-06	0.000005	0.333	No
Napthalene	0.00E-03	2.83E-06	0.000003	3.33	No
Pentane	0.00E-03	1.21E-02	0.0121	118	No
Selenium	0.00E-03	1.12E-07	0.00000011	0.013	No
Toluene	0.00E-03	1.58E-05	0.000016	25	No
Vanadium	0.00E-03	1.07E-05	0.000011	0.003	No
Zinc, metal	0.00E-03	1.35E-04	0.00014	0.667	No

None of the screening emission levels for non-carcinogenic TAP were exceeded as a result of this project. Therefore, modeling is not required for any non-carcinogenic TAP because none of the 24-hour average 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.

All hourly annualized emissions of carcinogenic TAPs were assumed to be the increase for the project (see discussion for cadmium below). Therefore, only post-project carcinogenic TAPs emissions are presented in the following table:

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)
Acenaphthene[a]	0.00E-03	8.36E-09	0.000000008	9.10E-05	No
Acenaphthylene[a]	0.00E-03	8.36E-09	0.0000000084	9.10E-05	No
Anthracene[a]	0.00E-03	1.12E-08	0.000000011	9.10E-05	No
Arsenic	0.00E-03	9.29E-07	0.00000093	1.5E-06	No
Benzene	0.00E-03	9.76E-06	0.0000098	8.0E-04	No
Benzo(g,h,i)perylene[a]	0.00E-03	5.58E-09	0.0000000056	9.10E-05	No
Beryllium	0.00E-03	5.58E-08	0.0000000558	2.8E-05	No
Cadmium	0.00E-03	5.11E-06	0.00000511	3.7E-06	Yes*
Dichlorobenzene[a]	0.00E-03	5.58E-06	0.0000056	9.10E-05	No
Fluoranthene[a]	0.00E-03	1.39E-08	0.0000000139	9.10E-05	No
Fluorene[a]	0.00E-03	1.30E-08	0.000000013	9.10E-05	No
Formaldehyde	0.00E-03	3.49E-04	0.0003	5.1E-04	No
2-Methylnapthalene[a]	0.00E-03	1.12E-07	0.00000011	9.10E-05	No
3-Methylchloranthrene[a]	0.00E-03	8.36E-09	0.0000000084	9.10E-05	No
Nickel	0.00E-03	9.76E-06	0.00000976	2.70E-05	No
POM[b]	0.00E-03	5.30E-08	0.00000005	2.0E-06	No
Phenanathrene[a]	0.00E-03	7.90E-08	0.000000079	9.10E-05	No
Pyrene[a]	0.00E-03	2.32E-08	0.000000023	9.10E-05	No

a) Polyaromatic hydrocarbon (except PAH group), as defined in IDAPA 58.01.01.586.
b) Polycyclic Organic Matter (POM) or 7-PAH group: For emissions of the 7-PAH group, the following PAHs shall be considered together as one TAP, equivalent in potency to benzo(a)pyrene: benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, indenol(1,2,3,-cd)pyrene, benzo(a)pyrene.. The total is compared to benzo(a)pyrene.

Except for cadmium, none of the PTEs for carcinogenic TAP were exceeded as a result of this project. The cadmium emissions level exceeds the EL for 8,760 hours per year of operation starting from zero. However, the net change in hourly annualized cadmium emissions from the previous permitting action is 8 hr per day and 115 more days per year (16 hr to 24 hr and 250 to 365 days). The EL allows for a full increment for this modification. For this permitting action the actual incremental increase in cadmium emissions is 5.37E-07 lb/hr which is less than the EL of 3.7E-06. Therefore, modeling is not required for any carcinogenic TAPs because none of the annual average carcinogenic screening ELs identified in IDAPA 58.01.01.586 were exceeded.

Post Project HAP Emissions

The following table presents the post project potential to emit for HAP pollutants from all emissions units at the facility 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 7 HAZARDOUS AIR POLLUTANTS EMISSIONS POTENTIAL TO EMIT SUMMARY

IDAPA Listing	Hazardous Air Pollutants	PTE (lb/hr)	PTE (T/yr)
585	Chromium	6.51E-06	0.0000285
	Cobalt metal, dust, and fume	3.90E-07	0.000002
	Hexane	8.36E-03	0.036617
	Manganese, fume	1.77E-06	0.000008
	Molybdenum, soluble compounds	5.11E-06	0.000022
	Napthalene	2.83E-06	0.000012
	Selenium	1.12E-07	0.000000
	Toluene	1.58E-05	0.000069
586	Acenaphthene[a]	8.36E-09	0.000000
	Acenaphthylene[b]	8.36E-09	0.000000
	Anthracene[a]	1.12E-08	0.000000
	Arsenic	9.29E-07	0.000004
	Benzene	9.76E-06	0.000043
	Benzo(g,h,i)perylene	5.58E-09	0.000000
	Beryllium	5.58E-08	0.000000
	Cadmium	5.11E-06	0.000022
	Dichlorobenzene[a]	5.58E-06	0.000024
	Fluoranthene[a]	1.39E-08	0.000000
	Fluorene[a]	1.30E-08	0.000000
	Formaldehyde	3.49E-04	0.001529
	2-Methylnapthalene[a]	1.12E-07	0.000000
	3-Methylchloranthrene[a]	8.36E-09	0.000000
	Nickel	9.76E-06	0.000043
	Phenanathrene[a]	7.90E-08	0.000000
	Pyrene[b]	2.32E-08	0.000000
Not Listed	Benz(a)anthracene	8.36E-09	0.000000
	Benzo(a)pyrene	5.58E-09	0.000000
	Benzo(b)fluoranthene	8.36E-09	0.000000
	Chrysene	8.36E-09	0.000000
	Dibenzo(a,h)anthracene	5.58E-09	0.000000
	7,12-Dimethylbenz(a)anthracene	7.44E-08	0.000000
	Lead	2.32E-06	0.000010
	Mercury	1.21E-06	0.000005
	Totals	**0.00878**	**0.0384**

Ambient Air Quality Impact Analyses

As presented in the Modeling Memo in Appendix B, the estimated emission rates of PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO, VOC, HAP, and TAP from this project were below 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 B.

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 Ada 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.

Facility Classification

"Synthetic Minor" classification for criteria pollutants is defined as the uncontrolled Potential to Emit for criteria pollutants are above the applicable major source thresholds and the Potential to Emit for criteria pollutants fall below the applicable major source thresholds. Therefore, the following table compares the uncontrolled Potential to Emit and the Potential to Emit for criteria pollutants to the Major Source thresholds to determine if the facility will be "Synthetic Minor."

Table 8 UNCONTROLLED PTE AND PTE FOR REGULATED AIR POLLUTANTS COMPARED TO THE MAJOR SOURCE THRESHOLDS

Pollutant	Uncontrolled PTE (T/yr)	PTE (T/yr)	Major Source Thresholds (T/yr)	Uncontrolled PTE Exceeds the Major Source Threshold and PTE Exceeds the Major Source Threshold?
$PM_{10}/PM_{2.5}$	<100	0.97	100	No
SO_2	<100	0.010	100	No
NO_X	<100	1.53	100	No
CO	<100	1.28	100	No
VOC	<100	0.08	100	No
CO_2e	<100,000	2,229	100,000	No

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

"Synthetic Minor" classification for HAP pollutants is defined as the uncontrolled Potential to Emit for HAP pollutants are above the applicable major source thresholds and the Potential to Emit for HAP pollutants fall below the applicable major source thresholds. Therefore, the following table compares the uncontrolled Potential to Emit and the Potential to Emit for HAP pollutants to the Major Source thresholds to determine if the facility will be "Synthetic Minor."

Table 9 UNCONTROLLED PTE AND PTE FOR HAZARDOUS AIR POLLUTANTS COMPARED TO THE MAJOR SOURCE THRESHOLDS

HAP Pollutant	Uncontrolled PTE (T/yr)	PTE (T/yr)	Major Source Thresholds (T/yr)	Uncontrolled PTE Exceeds the Major Source Threshold and PTE Exceeds the Major Source Threshold?
Total HAPs	<10	0.0384	10	No
Total	**<10**	**0.04**	**25**	No

As demonstrated in Table 8, the facility has an uncontrolled potential to emit for $PM_{10}/PM_{2.5}$, SO_2, NO_X, CO, and VOC emissions are less than the Major Source thresholds of 100 T/yr for each pollutant. In addition, as demonstrated in Table 9the facility has uncontrolled potential HAP emissions of less than the Major Source threshold of 10 T/yr and for all HAP combined less than the Major Source threshold of 25 T/yr. Therefore, this facility is not designated as a Synthetic Minor facility.

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_{10} emissions at this facility are subject to the State of Idaho visible emissions standard of 20% opacity. This requirement is assured by Permit Conditions 2.3 and 3.4.

Standards for New Sources (IDAPA 58.01.01.676)

IDAPA 58.01.01.676 Standards for New Sources

The fuel burning equipment located at this facility, with a maximum rated input of ten (10) million BTU per hour or more, are subject to a particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. However, as discussed previously there is no fuel burning equipment at this facility rated at 10 MMBtu/hr or greater. Therefore, the fuel burning equipment at this facility is not subject to this requirement and no further discussion is required.

Standards for New Sources (IDAPA 58.01.01.677)

IDAPA 58.01.01.677 Standards for Minor and Existing Sources

The fuel burning equipment located at this facility, with a maximum rated input of less than ten (10) million BTU per hour and in operation prior to October 1, 1979, are subject to a particulate matter limitation of 0.015 gr/dscf of effluent gas corrected to 3% oxygen by volume when combusting gaseous fuels. Fuel-Burning Equipment is defined as any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer. However, the fuel burning equipment at this facility rated at 10 MMBtu/hr or less was installed after October 1, 1979. Therefore, the fuel burning equipment at this facility is not subject to this requirement and no further discussion is required.

Particulate Matter – New Equipment Process Weight Limitations (IDAPA 58.01.01.701)

IDAPA 58.01.01.701 Particulate Matter – New Equipment Process Weight Limitations

IDAPA 58.01.01.700 through 703 set PM emission limits for process equipment based on when the piece of equipment commenced operation and the piece of equipment's process weight (PW) in pounds per hour (lb/hr). IDAPA 58.01.01.701 and IDAPA 58.01.01.702 establish PM emission limits for equipment that commenced operation on or after October 1, 1979 and for equipment operating prior to October 1, 1979, respectively.

For equipment that commenced operation on or after October 1, 1979, the PM allowable emission rate (E) is based on one of the following four equations:

IDAPA 58.01.01.701.01.a: If PW is $< 9{,}250$ lb/hr; $E = 0.045\ (PW)^{0.60}$

IDAPA 58.01.01.701.01.b: If PW is $\geq 9{,}250$ lb/hr; $E = 1.10\ (PW)^{0.25}$

For equipment that commenced prior to October 1, 1979, the PM allowable emission rate is based on one of the following equations:

IDAPA 58.01.01.702.01.a: If PW is $< 17{,}000$ lb/hr; $E = 0.045\ (PW)^{0.60}$

IDAPA 58.01.01.702.01.b: If PW is $\geq 17{,}000$ lb/hr; $E = 1.12\ (PW)^{0.27}$

For the modified Fryers 1 and 2 emissions unit proposed to be installed as a result of this project with a proposed throughput of 5,000 lb/hr (90,000 pounds per day hr ÷ 18 hours of operation per day), E is calculated as follows:

Proposed throughput = 5,000 lb/hr

Therefore, E is calculated as:

$E = 0.045 \times PW^{0.60} = 0.045 \times (5{,}000)^{0.60} = 7.46$ lb-PM/hr

As presented previously in the Emissions Inventories Section of this evaluation the post project PTE for this emissions unit is 0.31 lb-PM_{10}/hr (0.299 lb-PM_{10}/hr + 0.011 lb-PM_{10}/hr). Assuming PM is 50% PM_{10} means that PM emissions will be 0.62 lb-PM/hr (0.31 lb-PM_{10}/hr ÷ 0.5 lb-PM_{10}/lb-PM). Therefore, compliance with this requirement has been demonstrated.

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 do not have a potential to emit greater than 100 tons per year for all criteria pollutants or 10 tons per year for any one HAP or 25 tons per year for all HAPs combined as demonstrated previously in the Emissions Inventories Section of this analysis. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006 and the requirements of IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is/is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

The facility is not subject to any NSPS requirements 40 CFR Part 60.

NESHAP Applicability (40 CFR 61)

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

MACT Applicability (40 CFR 63)

The facility is not subject to any MACT standards in 40 CFR Part 63.

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.

Permit condition 1.1 establishes the permit to construct scope.

Permit condition 1.3 explains which previous permit for the facility is being replaced as a result of this project.

Permit condition, Table 1.1, provides a description of the purpose of the permit and the regulated sources, the process, and the control devices used at the facility.

OIL HEATERS 1 AND 2

Permit condition 2.1 provides a process description of the oil heater process at this facility.

Permit condition 2.2 provides a description of the control devices used on the oil heater equipment at this facility.

As discussed previously, Permit Condition 2.3 establishes a 20% opacity limit for the oil heaters 1 and 2 stack(s), or functionally equivalent openings associated with the oil heaters 1 and 2 operations. This requirement was carried over from the previous permit.

Permit condition 2.4 establishes that the oil heaters shall combust natural gas exclusively. This requirement was carried over from the previous permit.

FRYERS 1 AND 2

Permit condition 3.1 provides a process description of the fryer process at this facility.

Permit condition 3.2 provides a description of the control devices used on the oil heater equipment at this facility.

Permit condition 3.3 establishes the PM_{10} and $PM_{2.5}$ emissions limits as proposed by the Applicant. These emissions limits were also used for the modeling demonstration.

As discussed previously, Permit Condition 3.4 limits a maximum 20% opacity limit for the fryers 1 and 2 incinerator stack, or functionally equivalent openings associated with the fryers 1 and 2 incinerator operations. This requirement was carried over from the previous permit.

Permit condition 3.5 establishes the new finished meat and poultry product fried throughput limit on a daily and annual basis as proposed by the Applicant. These limits are also used to demonstrate compliance with the PM_{10} and $PM_{2.5}$ emissions limits that were used for NAAQS compliance demonstration. This requirement was revised from the previous permit.

Permit condition 3.6 requires that the fryers 1 and 2 and the incinerator shall combust natural gas exclusively. This requirement was carried over from the previous permit with a modification to include the fryers that have always been operated on natural gas.

Permit condition 3.7 requires an operating range, in inches of water gauge, for the mist eliminator. This requirement was modified from the previous permit requirement that the mist eliminator be operated per the manufacturer's specifications (previous permit condition 3.6). As the mist eliminator has been in operation for several years the operating range was obtained from the Applicant and included in the permit to insure compliance.

Permit condition 3.8 requires the incinerator be operated per the manufacturer's specifications. This requirement was modified to include an operating temperature that is to be established during the performance test. Thermal incinerators typically require a minimum operating temperature to insure complete combustion.

Permit condition 3.9 requires visible emissions monitoring of the incinerator exhaust stack. This requirement was carried over from the previous permit.

Permit condition 3.10 requires that the Applicant monitor and record the combined weight of meat and poultry product fried on a calendar day and rolling 12-calendar month basis. This requirement was carried over from the previous permit.

Permit condition 3.11 requires that the Applicant monitor and record the pressure drop across the mist eliminator once per day while the mist eliminator is operating. This requirement was revised from weekly to daily in the previous permit.

Permit condition 3.12 requires that the Applicant monitor and record the operating temperature the incinerator once per day while the incinerator is operating. This is a new requirement as a result of the modification to the Incinerator Operation permit condition to include operating temperature.

Permit condition 3.13 requires that the Applicant shall have developed an O&M manual for the mist eliminator. This requirement was carried over from the previous permit.

Permit condition 3.14 requires that the Applicant shall have developed an O&M manual for the incinerator. This requirement was carried over from the previous permit with a modification to include incinerator combustion temperature instead of the incoming air stream temperature (pervious permit condition 3.11).

Permit condition 3.15 requires that the Applicant perform a one-time source test to demonstrate compliance with the proposed PM_{10} or $PM_{2.5}$ emissions rates proposed by the Applicant. These source testing requirements were included so that DEQ staff would have better confidence in the PM_{10} and $PM_{2.5}$ emissions factors proposed by the Applicant. This is a new permit requirement.

Permit condition 3.16 specifies the test methods to be used during the source test. This is a new permit requirement as a result of the required one-time source test.

Permit condition 3.17 specifies the parameters to monitored and recorded during the source test. . This is a new permit requirement as a result of the required one-time source test.

PUBLIC REVIEW

Public Comment Opportunity

An opportunity for public comment period on the application was provided in accordance with IDAPA 58.01.01.209.01.c. During this time, there were comments on the application and there was a request for a public comment period on DEQ's proposed action. Refer to the chronology for public comment opportunity dates.

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 submitted in response to DEQ's proposed action. Refer to the chronology for public comment period dates.

A response to public comments document has been crafted by DEQ based on comments submitted during the public comment period. That document is part of the final permit package for this permitting action.

APPENDIX A – EMISSIONS INVENTORIES

AIR PERMITTING DATA NEEDS
Prepared by: T. Graening
Date: 1-2

#	ITEM	CURRENT PERMIT BASIS	NEW PERMIT BASIS	COMMENTS
1	Daliy Production Limit	60,000 lbs/day	90,000 lb/day	
2	Annual Production Days	250	317	317 actual production days in 2013
3	Daily Production Hours	16	18	
4	Daily Incinerator Hours	16	18	same as production hours
5	Daily Total Fryer Hours (including cleanup)	21	22	
6	Average Daily Oil Use	8640 lbs	11,250 lbs	
7	Production lbs for above daily oil use	60,000	90,000	
8	Oil retention in batter by weight	10 to 14%	10 to 14%	% relates to finished product wt, not batter wt
9	Batter pickup by weight	45 to 50%	45 to 50%	% relates to finished product wt
10	Mist eliminator efficiency for < 5 micron PM	60%	assume 60%	no change to equipment
11	Mist eliminator efficiency for > 5 micron PM	99.9%	assume 99.9%	no change to equipment
12	% of < 5 micron PM in total PM	1%	assume 1%	no change to process
13	Incinerator efficiency	85%	assume 85%	no change to equipment
14	Theoretical daily maximum capacity of current process		90,000 lbs/day	

NOTES

1. There is one Mist Eliminator(Amistco TM-1109) on the common duct to which the fryers and oil filters are connected
2. There is one Incinerator on the common duct downstream of the Mist Eliminator
3. Source of 60% Mist Eliminator efficiency for < 5 microm PM is unknown
4. Source of 1% <5 micron PM in total PM is unknown
5. Source of 85% incinerator efficiency is unknown
6. There is one Mist Eliminator(Koch Glitsch Style 338) mounted on the #1 Fryer(Food Design) that was not figured into the current permit calculations

Average Daily Oil Usage	11250	lb/day	
Production Hours	18	hr/day	
Oil to Exhaust	7200	lb/day	Assuming 90,000 production lb/day and 10% of oil stays within finished product and 45% stays in batter
Oil to Exhaust by hour	400	lb/hr	
% of < 5 micron PM in total PM	1%		
Mist eliminator efficiency for < 5 micron PM	60%		
Amount of < 5 micron	4	lb/hr	
Controlled amount of < 5 micron	1.6	lb/hr	
Mist eliminator efficiency for > 5 micron PM	99.90%		
Controlled amount of > 5 micron	0.396	lb/hr	
Total PM Emissions to Incinerator	1.996	lb/hr	
Incinerator efficiency	85%		
Total PM Emissions to atmosphere (Fryer oil)	0.2994	lb/hr	
Incinerator/Fryer operating hours	18	hr/day	4 hours of cleanup for fryer during day for 22 total work hours/day
PM Emissions (Fryer oil)	5.3892	lb/day	
Annual operating hours	317	day/yr	
Annual PM Emissions in tons (Fryer oil)	0.854	T/yr	

	Size	Hrs/yr	lb/MMscf	PM10	PM2.5*	NOx	CO	SOx	VOC
	MMBtu/hr			7.6	7.6	100	84	0.6	5.5
				T/yr	T/yr	T/yr	T/yr	T/yr	T/yr
Hot Oil Heater #1	1.8	6974		0.047	0.047	0.615	0.517	0.004	0.034
Hot Oil Heater #2	1.44	6974		0.037	0.037	0.492	0.414	0.003	0.027
Incinerator	1.5	5706		0.032	0.032	0.420	0.352	0.003	0.023
Fryers (Oil)		5706		0.854	0.513				
				0.970	**0.629**	**1.527**	**1.283**	**0.009**	**0.084**
			BRC Threshold	1.5	1	4	10	4	4
			Percentage	64.68%	62.86%	38.18%	12.83%	0.23%	2.10%

* South Coast Air Management District states that a fraction of 60% of PM2.5/PM10 is appropriate for deep fryers

	Size	lb/MMscf	PM10	PM2.5*	NOx	CO	SOx	VOC
	MMBtu/hr		7.6	7.6	100	84	0.6	5.5
			lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
Hot Oil Heater #1	1.8		0.013	0.013	0.176	0.148	0.001	0.010
Hot Oil Heater #2	1.44		0.011	0.011	0.141	0.119	0.001	0.008
Incinerator	1.5		0.011	0.011	0.147	0.124	0.001	0.008
Fryers (Oil)			0.299	0.180				
			0.335	**0.215**	**0.465**	**0.390**	**0.003**	**0.026**

* South Coast Air Management District states that a fraction of 60% of PM2.5/PM10 is appropriate for deep fryers

Natural Gas Combustion

NG heating value 1020 btu/scf

Max hours per day 24
Max hours per year 8760

Emission Unit	Rating (MMBtu/hr)
Hot Oil Heater #1	1.8
Hot Oil Heater #2	1.44
Incinerator	1.5
Total	

Non Metal HAP[2]	CAS	EF (lb/MMscf)	lb/hr	T/yr
Benzene	71-43-2	2.10E-03	9.76E-06	4.27E-05
Dichlorobenzene	25321-22-6	1.20E-03	5.58E-06	2.44E-05
Formaldehyde	50-00-0	7.50E-02	3.49E-04	1.53E-03
Hexane	110-54-3	1.80E+00	8.36E-03	3.66E-02
Naphthalene	91-20-3	6.10E-04	2.83E-06	1.24E-05
Toluene	108-88-3	3.40E-03	1.58E-05	6.92E-05
2-Methylnapthalene[1]	91-57-6	2.40E-05	1.12E-07	4.88E-07
3-Methylchloranthrene[1]	56-49-5	1.80E-06	8.36E-09	3.66E-08
7,12-Dimethylbenz(a)anthracene[1]		1.60E-05	7.44E-08	3.26E-07
Acenaphthene[1]	83-32-9	1.80E-06	8.36E-09	3.66E-08
Acenaphthylene[1]	203-96-8	1.80E-06	8.36E-09	3.66E-08
Anthracene[1]	120-12-7	2.40E-06	1.12E-08	4.88E-08
Benz(a)anthracene[1]	56-55-3	1.80E-06	8.36E-09	3.66E-08
Benzo(a)pyrene[1]	50-32-8	1.20E-06	5.58E-09	2.44E-08
Benzo(b)fluoranthene[1]	205-99-2	1.80E-06	8.36E-09	3.66E-08
Benzo(g,h,i)perylene[1]	191-24-2	1.20E-06	5.58E-09	2.44E-08
Benzo(k)fluoranthene[1]	205-82-3	1.80E-06	8.36E-09	3.66E-08
Chrysene[1]	218-01-9	1.80E-06	8.36E-09	3.66E-08
Dibenzo(a,h)anthracene[1]	53-70-3	1.20E-06	5.58E-09	2.44E-08
Dichlorobenzene[1]	25321-22-6	1.20E-03	5.58E-06	2.44E-05
Fluoranthene[1]	206-44-0	3.00E-06	1.39E-08	6.11E-08
Fluorene[1]	86-73-7	2.80E-06	1.30E-08	5.70E-08
Indeno(1,2,3-cd)pyrene[1]	193-39-5	1.80E-06	8.36E-09	3.66E-08
Phenanathrene[1]	85-01-8	1.70E-05	7.90E-08	3.46E-07
Pyrene[1]	129-00-0	5.00E-06	2.32E-08	1.02E-07

1. The pollutant is a HAP because it is considered a polycyclic organic matter (POM).
2. Emission factors are based on AP-42 (1998), Section 1.4, Natural Gas Combustion, Table 1.4-3.

Metal HAP[1]	CAS	EF (lb/MMscf)	lb/hr	T/yr
Arsenic	7440-38-2	2.00E-04	9.29E-07	4.07E-06
Beryllium	7440-41-7	1.20E-05	5.58E-08	2.44E-07
Cadmium	7440-43-9	1.10E-03	5.11E-06	2.24E-05
Chromium	7440-47-3	1.40E-03	6.51E-06	2.85E-05
Cobalt	7440-48-4	8.40E-05	3.90E-07	1.71E-06
Lead	7439-92-1	5.00E-04	2.32E-06	1.02E-05
Manganese	7439-96-5	3.80E-04	1.77E-06	7.73E-06
Mercury	7439-97-6	2.60E-04	1.21E-06	5.29E-06
Molybdenum	7439-98-7	1.10E-03	5.11E-06	2.24E-05
Nickel	7440-02-0	2.10E-03	9.76E-06	4.27E-05
Selenium	7782-49-2	2.40E-05	1.12E-07	4.88E-07

1. Emission factors are based on AP-42 (1998), Section 1.4, Natural Gas Combustion, Table 1.4-4.

Total HAP **3.85E-02**

Idaho State TAP	CAS	585/586	EF (lb/MMscf)	Max lb/hr	Max (T/yr)	24-hr or Annual Average (lb/hr)[3]	EL 24-hr or Annual (lb/hr)	Modeling Required (Y/N)
Benzene	71-43-2	586	2.10E-03	9.76E-06	4.27E-05	9.76E-06	8.00E-04	N
POM[1]		586	1.14E-05	5.30E-08	2.32E-07	5.30E-08	2.00E-06	N
2-Methylnapthalene[2]	91-57-6	586	2.40E-05	1.12E-07	4.88E-07	1.12E-07	9.10E-05	N
3-Methylchloranthrene[2]	56-49-5	586	1.80E-06	8.36E-09	3.66E-08	8.36E-09	9.10E-05	N
Acenaphthene[2]	83-32-9	586	1.80E-06	8.36E-09	3.66E-08	8.36E-09	9.10E-05	N
Acenaphthylene[2]	203-96-8	586	1.80E-06	8.36E-09	3.66E-08	8.36E-09	9.10E-05	N
Anthracene[2]	120-12-7	586	2.40E-06	1.12E-08	4.88E-08	1.12E-08	9.10E-05	N
Benzo(g,h,i)perylene[2]	191-24-2	586	1.20E-06	5.58E-09	2.44E-08	5.58E-09	9.10E-05	N
Dichlorobenzene[2]	25321-22-6	586	1.20E-03	5.58E-06	2.44E-05	5.58E-06	9.10E-05	N
Fluoranthene[2]	206-44-0	586	3.00E-06	1.39E-08	6.11E-08	1.39E-08	9.10E-05	N
Fluorene[2]	86-73-7	586	2.80E-06	1.30E-08	5.70E-08	1.30E-08	9.10E-05	N
Phenanathrene[2]	85-01-8	586	1.70E-05	7.90E-08	3.46E-07	7.90E-08	9.10E-05	N
Pyrene[2]	129-00-0	586	5.00E-06	2.32E-08	1.02E-07	2.32E-08	9.10E-05	N
Formaldehyde	50-00-0	586	7.50E-02	3.49E-04	1.53E-03	3.49E-04	5.10E-04	N
Napthalene	91-20-3	586	6.10E-04	2.83E-06	1.24E-05	2.83E-06	9.10E-05	N
Arsenic	7440-38-2	586	2.00E-04	9.29E-07	4.07E-06	9.29E-07	1.50E-06	N
Beryllium	7440-41-7	586	1.20E-05	5.58E-08	2.44E-07	5.58E-08	2.80E-05	N
Cadmium[4]	7440-43-9	586	1.10E-03	5.11E-06	2.24E-05	5.11E-06	3.70E-06	Y
Nickel	7440-02-0	586	2.10E-03	9.76E-06	4.27E-05	9.76E-06	2.70E-05	N
Barium	7440-39-3	585	4.40E-03	2.04E-05	8.96E-05	2.04E-05	0.033	N
Chromium	7440-47-3	585	1.40E-03	6.51E-06	2.85E-05	6.51E-06	0.033	N
Cobalt	7440-48-4	585	8.40E-05	3.90E-07	1.71E-06	3.90E-07	0.0033	N
Copper	7440-50-8	585	8.50E-04	3.95E-06	1.73E-05	3.95E-06	0.067	N
Manganese	7439-96-5	585	3.80E-04	1.77E-06	7.73E-06	1.77E-06	0.067	N
Molybdenum	7439-98-7	585	1.10E-03	5.11E-06	2.24E-05	5.11E-06	0.333	N
Selenium	7782-49-2	585	2.40E-05	1.12E-07	4.88E-07	1.12E-07	0.013	N
Vanadium	7440-62-2	585	2.30E-03	1.07E-05	4.68E-05	1.07E-05	0.003	N
Zinc	7440-66-6	585	2.90E-02	1.35E-04	5.90E-04	1.35E-04	0.667	N
Hexane	110-54-3	585	1.80E+00	8.36E-03	3.66E-02	8.36E-03	12	N
Pentane	109-66-0	585	2.60E+00	1.21E-02	5.29E-02	1.21E-02	118	N
Toluene	108-88-3	585	3.40E-03	1.58E-05	6.92E-05	1.58E-05	25	N
Napthalene	91-20-3	585	6.10E-04	2.83E-06	1.24E-05	2.83E-06	3.33	N

1. POM is the combination of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene. and are compared against the emission level of benzo(a)pyrene.

2. These pollutants are evaluated individually against the PAH emission level.

3. 585 is based on 24-hr average and 586 pollutants are annual averages

4. The cadmium exceeds the EL at 8760 starting from zero. However, the net change in cadmium from the previous permitting action is 8 hr per day and 115 more days (16 hr to 24 hr and 250 to 365 days). The EL allows for a full increment for this modification. Threfore, the actual incremental increase is 5.37E-07 lb/hr

Greenhouse Gas Emissions

Emission Unit	Rating (MMBtu/hr)	CO_2	N_2O	CH_4	CO_2e[1]
	pounds per hour				
Oil Heater #1	1.80	211.76	3.88E-03	4.06E-03	213.02
Oil Heater #2	1.44	169.41	3.11E-03	3.25E-03	170.42
Incinerator	1.50	176.47	3.24E-03	3.38E-03	177.52
Total		**557.65**	**1.02E-02**	**1.07E-02**	**560.96**
	metric tons per year				
	Rating (MMBtu/hr)	CO_2	N_2O	CH_4	CO_2e[1,2]
Oil Heater #1	1.80	841.45	1.54E-02	1.61E-02	846.57
Oil Heater #2	1.44	673.16	1.23E-02	1.29E-02	677.26
Incinerator	1.50	701.21	1.29E-02	1.34E-02	705.48
Total		**2,215.82**	**4.06E-02**	**4.25E-02**	**2,229.30**

1. The total CO_2e was calculated using global warming potentials from 40 CFR Part 98, Subpart A, Table A-1

2. The conversion from pounds to metric tons is 2204.6 lb to each metric ton.

APPENDIX B – AMBIENT AIR QUALITY IMPACT ANALYSES

MEMORANDUM

DATE: February 4, 2015

TO: Darrin Pampaian, P.E., Permit Writer, Air Program

FROM: Darrin Mehr, Air Quality Analyst, Air Program

PROJECT: P-2007.0197 PROJ 61375 PTC Modification – Production Increase from 60,000 lbs per day to 90,000 lbs per day at B&D Foods' Boise Facility

SUBJECT: Demonstration of Compliance with IDAPA 58.01.01.203.02 (NAAQS) and 203.03 (TAPs)

1.0 Summary

LJD Holdings, doing business as B&D Foods submitted a Permit to Construct (PTC) application for modifications to B&D Foods existing PTC, for the facility located in Boise, Idaho. Project-specific air quality impact analyses involving atmospheric dispersion modeling of estimated emissions associated with the proposed modification were submitted to DEQ and performed by DEQ to demonstrate that the proposed modification would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02 and 203.03 [Idaho Air Rules Section 203.02 and 203.03]). Stantec (formerly JBR Environmental), B&D Foods' permitting consultant, submitted the analyses and applicable information and data enabling DEQ to evaluate potential impacts to ambient air.

Stantec performed project-specific air quality impact analyses on behalf of B&D Foods, to demonstrate compliance of the proposed project with air quality standards. The project consisted of a PTC modification for an increase in daily throughput of fried meat and poultry products from the current allowable rate of 60,000 pounds per day (lbs/day) to a rate of 90,000 lbs/day.

The DEQ review summarized by this memorandum addressed only the rules, policies, methods, and data pertaining to the pollutant dispersion modeling analyses used to demonstrate that the estimated emissions associated with operation of the proposed facility or modification will not cause or significantly contribute to a violation of any applicable air quality standard. This review did not evaluate compliance with other rules or analyses that do not pertain to the air impact analyses. This review also did not evaluate the accuracy of emissions estimates. Evaluation of emissions estimates is the responsibility of the permit writer.

This memorandum is based on several documents:

- the final modeling report and electronic modeling files obtained by DEQ from Stantec's file transfer protocol (ftp) site on December 17, 2014;
- the modeling protocol submitted by Stantec, then JBR Environmental, which was received by DEQ on March 26, 2014; and,
- the DEQ modeling protocol approval, issued May 1, 2014.

The submitted modeling information and air quality impact analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data

(review of emissions estimates was not within the scope of this DEQ modeling review); 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that predicted pollutant concentrations from emissions associated with the modification as modeled were below Significant Impact Levels (SILs) or other applicable regulatory thresholds; or b) that predicted pollutant concentrations from emissions associated with the modification as modeled, when appropriately combined with co-contributing sources and background concentrations, were below applicable National Ambient Air Quality Standards (NAAQS) at ambient air locations where and when the modification has a significant impact; 5) showed that Toxic Air Pollutant (TAP) emissions increases associated with the modification do not result in increased ambient air impacts exceeding allowable TAP increments. Table 1 presents key assumptions and results to be considered in the development of the permit.

Table 1. KEY CONDITIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
B&D Foods modeled total NO_x emission rates to demonstrate compliance with the 1-hour average NO_2 NAAQS. Emissions rates used in the modeling analyses, as listed in this memorandum, represent maximum potential emissions as given by design capacity or as limited by the issued permit for the specific pollutant and averaging period.	Compliance has not been demonstrated for emissions rates greater than those used in the modeling applicability evaluation or modeling analyses. B&D Foods demonstrated that facility-wide NO_x emissions from the facility will not exceed the applicable 1-hour NO_2 NAAQS when the facility's maximum hourly NO_x emissions rates were modeled for continuous operation over 24 hours per day and 8,760 hours per year and the design impact was added to DEQ-approved ambient NO_2 backgrounds. No scaling—or reduction—of emission rates to reflect limitations on operations was applied to the hourly NO_x emission rates.
Criteria pollutant emissions increases for this project were below Level I de minimis modeling applicability thresholds, except for 1-hour NO_2.	Modeling applicability is based on this project's emission increases. In accordance with DEQ policy, no modeling is required provided the project's requested emission increase is below the Level I thresholds.
Increases of all carcinogenic and non-carcinogenic toxic air pollutants (TAPs) were below the screening emission rate limits (ELs), based on the incremental change in potential emissions.	No modeling is required for TAPs with a project increase in potential to emit less than an EL.
NOx emissions rates for several sources were reduced by 50% using an emission factor for low NOx burners for natural gas combustion sources.	Hot water heaters #1, #2, and #3 (HWEAT1, HWEAT2, and HWEAT3) and hot oil heater #1 (HEATER1) are equipped with low NOx burners.

Air impact analyses are required by Idaho Air Rules to be conducted according to methods outlined in 40 CFR 51, Appendix W (Guideline on Air Quality Models). Appendix W requires that facilities be modeled using emissions and operations representative of design capacity or as limited by a federally enforceable permit condition. The submitted information and analyses demonstrated to the satisfaction of the Department that operation of the proposed facility or modification will not cause or significantly contribute to a violation of any ambient air quality standard, provided the key conditions in Table 1 are representative of facility design capacity or operations as limited by a federally enforceable permit condition.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality standards and analyses used to demonstrate compliance with air quality standards.

2.1.1 Area Classification

The B&D Foods facility is located in Boise, within northern Ada County, Idaho. The area is designated as an attainment or unclassifiable area for lead (Pb), nitrogen dioxide (NO_2), ozone, particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$), and sulfur dioxide (SO_2). The area is in attainment but is being managed under a maintenance plan for carbon monoxide (CO) and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}). There are no Class I areas within 10 kilometers of this location.

2.1.2 Modeling Applicability for Criteria Pollutants

Idaho Air Rules Section 203.02 state that a PTC cannot be issued unless the application demonstrates to the satisfaction of DEQ that the new source or modification will not cause or significantly contribute to a NAAQS violation. Atmospheric dispersion modeling is used to evaluate the potential impact of a proposed project to ambient air and demonstrate NAAQS compliance. However, if the emissions associated with a project are very small, project-specific modeling analyses may not be necessary.

If the emissions increase associated with a project are below modeling applicability thresholds established in the *Idaho Air Quality Modeling Guideline* (State of Idaho Guideline for Performing Air Quality Impact Analyses. Doc. ID AQ-011 {September 2013} http://www.deq.idaho.gov/media/1029/modeling-guideline.pdf), then a project-specific analysis is not required. Modeling applicability emissions thresholds were developed by DEQ based on modeling of a hypothetical source designed to reasonably assure that impacts are below the applicable Significant Impact Level (SIL). DEQ has established two threshold levels: Level 1 thresholds are unconditional thresholds, requiring no approval for use by DEQ; Level 2 thresholds are conditional upon DEQ approval, depending on evaluation of the project and the site, including emissions quantities, stack parameters, number of sources emissions are distributed amongst, distance between the sources and the ambient air boundary, and the presence of sensitive receptors near the ambient air boundary.

2.1.3 Significant and Cumulative NAAQS Impact Analyses

If modeled maximum pollutant impacts to ambient air from the emissions sources associated with a new facility or the emissions increase associated with a modification exceed the significant impact levels (SILs) of 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, 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 may also be required for permit revisions driven by compliance/enforcement actions, any correction of emissions limits or other operational parameters that may affect pollutant impacts to ambient air, or other cases where DEQ believes NAAQS may be threatened by the emissions associated with the proposed project.

The SIL analyses for a facility modification involves modeling the increase in allowable or potential emissions that results from the proposed modification. Any decreases in emissions are modeled as negative values to account for the reduction in impacts to ambient air.

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 facility-wide emissions, and emissions from any nearby co-contributing sources, and then adding a DEQ-approved background concentration value to the modeled result that is appropriate for the criteria pollutant/averaging-time 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 lists SILs and 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 a violation of the standard, the permit may not be issued if the permitted facility or modification has a significant contribution (exceeding the SIL) to the modeled violation. This evaluation is made specific to both time and space. If the SIL analysis indicates the facility/modification has an impact exceeding the SIL, the facility/modification might not have a significant contribution to a violation if impacts are below the SIL at the specific receptor showing the violation during the time periods when a modeled violation occurred.

Compliance with Idaho Air Rules Section 203.02 is demonstrated if : a) all modeled impacts of the SIL analysis are below the applicable SIL or other level determined to be inconsequential to NAAQS compliance; or b) 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 c) 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.

Table 2. APPLICABLE REGULATORY LIMITS				
Pollutant	**Averaging Period**	**Significant Impact Levels[a] ($\mu g/m^3$)[b]**	**Regulatory Limit[c] ($\mu g/m^3$)**	**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	0.3	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 $\mu g/m^3$)	75 ppb[p] (196 $\mu g/m^3$)	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 $\mu g/m^3$)	100 ppb[s] (188 $\mu g/m^3$)	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]	75 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. The NAAQS was revised from 15 $\mu g/m^3$ to12 $\mu g/m^3$ on December 14, 2012.
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.

2.1.4 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 emissions 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 emissions 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.

2.2 Background Concentrations

Background concentrations are used in the cumulative NAAQS impact analyses to account for impacts from sources not explicitly modeled. Background concentrations were needed for 1-hour NO_2. Project-specific modeling analyses were not needed for other criteria pollutants because emissions increases associated with the proposed project were below established DEQ modeling applicability thresholds. Lead emissions were not listed in the emission estimate tables or electronic spreadsheet. This air impact analyses review assumed that potential lead emissions from the facility are negligible and do not exceed the modeling threshold of 14 pounds per month.

Table 3 provides ambient background NO_2 concentrations used in the full impact analyses.

Background concentrations for 1-hour NO_2 were based on monitoring data collected at the St. Luke's Meridian site. DEQ generated the values based on data spanning July 2012 through June 2014, forming two complete years of data with equal representation of seasons. A separate NO_2 background value was used for each hour of the day, using the 98^{th} percentile value of monitoring data for each hour of the day. DEQ scaled each hour-of-day value by a factor based on the Northwest Airquest ambient background lookup tool website's annual average NO_2 background for the B&D Foods facility site and the St. Luke's Meridian monitoring site, obtained from the following website: http://lar.wsu.edu/nw-airquest/lookup.html.

The Northwest Airquest 1-hour NO_2 background values for the B&D Foods and St. Luke's Meridian monitoring site were 44 parts per billion (ppb) (82.7 $\mu g/m^3$) and 39 ppb (73.2 $\mu g/m^3$), respectively, providing a scaling factor of 1.13 to determine NO_2 background concentrations at the B&D Foods site.

Table 3. BACKGROUND 1-HOUR NO_2 CONCENTRATIONS					
Hour Ending	Concentration ($\mu g/m^3$)[a]	Hour Ending	Concentration ($\mu g/m^3$)[a]	Hour Ending	Concentration ($\mu g/m^3$)[a]
1	56.2	9	50.4	17	57.8
2	56.7	10	47.0	18	68.6
3	59.3	11	38.1	19	80.2
4	57.8	12	36.3	20	85.1
5	58.6	13	33.6	21	82.7
6	60.6	14	40.1	22	75.1
7	64.1	15	44.2	23	66.3
8	57.7	16	48.3	24	59.3

a. micrograms per cubic meter.

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

This section describes the modeling methods used by the applicant's consultant, Stantec, to demonstrate pre-construction compliance with applicable air quality impact requirements.

3.1.1 Overview of Analyses

Stantec performed project-specific air impact analyses that were determined by DEQ to be reasonably representative of the facility-wide potential operations scenario for the 1-hour NO_2 NAAQS. Results of the submitted analyses demonstrated 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 4 provides a brief description of parameters used in the modeling analyses.

Table 4. MODELING PARAMETERS		
Parameter	Description/Values	Documentation/Addition Description
General Facility Location	Boise, in Northern Ada County	The area is an attainment or unclassified area for all criteria pollutants.
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 14134.
Meteorological Data	Boise	2008-2012. See Section 3.1.6 of this memorandum.
Terrain	Considered	Receptor, building, and emissions source elevations were determined using a USGS 1/3 arc second National Elevation Dataset (NED) file.
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.
Receptor Grid	Grid 1	Varies from 1-meter to a maximum of 15-meter spacing along the property boundary.
	Grid 2	25-meter spacing outward to at least 100 meters centered on the facility. This is a 350-meter (x) by 350-meter (y) grid.
	Grid 3	50-meter spacing in a 550-meter (x) by 600-meter (y) grid centered on Grid 2.
	Grid 4	100-meter spacing in a 1,200-meter (x) by 1,300-meter (y) grid centered on Grids 1, 2, and 3.
	Grid 5	250-meter spacing in a 2,250-meter (x) by 2,500-meter (y) grid centered on Grid 4.
	Grid 6	500-meter spacing in a 4,500-meter (x) by 5,000-meter (y) grid centered on Grid 5.
	Grid 7	1,000-meter spacing in an 11,000-meter (x) by 11,000-meter (y) grid centered on Grid 6.

3.1.2 Modeling Protocol and Methodology

A modeling protocol was submitted to DEQ on March 26, 2014, prior to submittal of the application. The protocol was submitted by Stantec on behalf of LJD Holdings, "doing business as" B & D Foods. DEQ provided a protocol approval letter on May 1, 2014.

DEQ approved the use of the non-regulatory guideline Beta algorithms for modeling stacks equipped with rain caps or exhausting horizontally.

Project-specific modeling in the final December 17, 2014, submittal was generally conducted using data and methods described in the protocol and in the *Idaho Air Quality Modeling Guideline*.

3.1.3 Evaluation of Ozone Impacts

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.

The following is a simplified summary of the atmospheric chemistry in a VOC rich atmosphere:

$$NO_2 + h\upsilon \rightarrow NO + O$$
$$O + O_2 \rightarrow O_3$$
$$O_3 + NO \rightarrow NO_2 + O_2$$
$$HO_2 + NO \rightarrow NO_2 + OH$$

Atmospheric dispersion models used in stationary source air permitting analyses (see Section 3.1.4) cannot be used to accurately 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. DEQ has used CMAQ to estimate O_3 concentrations for the Treasure Valley and evaluate potential O_3 control strategies. Use of the CMAQ model is very resource intensive and DEQ asserts that routinely performing a CMAQ analysis for a particular permit application is not a reasonable requirement for air quality permitting, especially for minor source permitting.

DEQ has not typically required minor sources to evaluate potential O_3 impacts as a part of the stationary source air permitting process. This is consistent with 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."*

Emissions of VOCs and NOx from the proposed modification were evaluated for their potential to cause a

violation of the 8-hour O_3 NAAQS. DEQ reviewed facility-wide VOC and NOx emissions, expressed as tons per year (T/yr) based on the post-project controlled potential to emit values were 0.084 T/yr for VOCs and 1.53 T/yr for NOx, per Table 4-1 of the May 21, 2014, permit application. The VOC and NO_x emissions from the B&D Foods facility are well below the suggested 100 ton/year threshold to trigger a more extensive O_3 analysis.

3.1.4 Model Selection

Idaho Air Rules Section 202.02 requires that estimates of ambient concentrations be based on air quality models specified in 40 CFR 51, Appendix W (Guideline on Air Quality Models). 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 includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

AERMOD was used for the modeling analyses to evaluate impacts of the facility.

NO_2 1-hour impacts can be assessed using a tiered approach to account for $NO/NO_2/O_3$ chemistry. Tier 1 assumes full conversion of NO to NO_2. Tier 2 assumes a 0.80 default ambient ratio of NO_2/NOx. Tier 3 accounts for more refined assessment of the NO to NO_2 conversion, and a supplemental modeling program can be used with AERMOD to better account for $NO/NO_2/O_3$ atmospheric chemistry. Either the Plume Volume Molar Ratio Method (PVMRM) or the Ozone Limiting Method (OLM) can be specified within the AERMOD input file. EPA guidance (Memorandum: from Tyler Fox, Leader, Air Quality Modeling Group, C439-01, Office of Air Quality Planning and Standards, USEPA; to Regional Air Division Directors. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard.* March 01, 2011) has not indicated a preference for one option over the other (PVMRM vs OLM) for particular applications. Stantec elected to use PVMRM for the B&D Foods analyses, but presented the results using both methods to document in the modeling report that a conservative impact was used for the design concentration. Section 3.1.5 provides a description of parameters and data used for PVMRM and OLM.

3.1.5 Data and Parameters Used for Modeling 1-Hour NO_2 with PVMRM and OLM

PVMRM and OLM were used with AERMOD to provide a more refined estimate of 1-hour NO_2 concentrations at specific receptors. Table 5 lists the data and parameters used for these Tier III compliance methods.

Hourly O_3 data were used in PVMRM (and OLM) to estimate the conversion of NO to NO_2. Table 6 lists hourly O_3 concentrations used in the PVMRM and OLM model setups for the 1-hour NO_2 impact analyses. Stantec developed these hour-of-day values by selecting the maximum monitored value for each of the 24 hours in a day for one year of DEQ data obtained from the St. Luke's Meridian monitoring site. DEQ determined these data were appropriate and/or conservative for use at the B&D Foods site.

Stantec used an in-stack NO_2/NOx ratio of 0.20 for all natural gas-fired emissions units and provided support documentation for the non-default in-stack NO_2/NO_x ratio. DEQ determined this value was appropriate for the analysis, based on in-stack ratio database documentation. For comparison considerations, the recommended default value for the NO_2/NOx ratio listed in *Modeling Compliance of the Federal 1-Hour NO_2 NAAQS, CAPCOA Guidance Document*, Appendix C-In-Stack NO_2/NOx Ratios, California Air Pollution Control Officers Association, October 27, 2011, for natural gas-fired boilers is 0.10.

Stantec modeled the INCINERATOR (the only other NOx source) using the EPA default ratio of 0.5. Justification and DEQ approval of the default value was not required.

Table 5. PARAMETERS AND DATA FOR PVMRM		
Parameter	**Value**	**Source/Comments**
NO_2/NOx ratio for In-Stack Emissions	0.5 for the INCINERATOR. 0.2 for all other sources.	0.5 is an EPA suggested default when source-specific data are not available. The incinerator is an emission control device that is operated with a natural gas combustion source. Hot oil and frying process by-product materials are routed to the incinerator where they are combusted in an 85% efficient incinerator unit. Stantec chose the default value for the in-stack NO_2 to NO_x ratio for this source. All other sources are fired on natural gas and do not have process emissions or combustion by-products other than natural gas combustion products. Stantec applied a 0.2 in-stack NO_2/NOx ratio that DEQ accepts as a valid or conservative in-stack ratio for these emissions units.
Ambient Equilibrium for NO_2/NOx	0.90	Default value.
O_3 Concentrations	Value specified for each hour modeled.	Stantec developed background values that were based on data from the St. Luke's site in Meridian, Idaho.

Table 6. BACKGROUND OZONE CONCENTRATIONS					
Hour	**Concentration (ppb)[a]**	**Hour**	**Concentration (ppb)[a]**	**Hour**	**Concentration (ppb)[a]**
1	49	9	41	17	67
2	48	10	54	18	65
3	49	11	68	19	64
4	50	12	74	20	58
5	45	13	77	21	58
6	40	14	80	22	50
7	35	15	77	23	50
8	37	16	70	24	49

a. parts per billion by volume

3.1.6 Meteorological Data

DEQ provided Stantec with model-ready meteorological data processed from Boise surface and Boise upper air meteorological data for a consecutive five-year period covering 2008-2012. These data were collected by the National Weather Service at the Boise airport. They were process into AERMOD-ready files using the EPA preprocessing program AERMINUTE Version 11325 and AERMET Version 12345 using Oris Solutions' BEEST graphical user interface. A 0.5 meter per second lower wind speed threshold was used. DEQ determined these data were reasonably representative for the B&D Foods site. More representative data of sufficient quality for use in dispersion models were not available for the area.

3.1.7 Terrain Effects

Stantec used a 1/3 arc second National Elevation Dataset (NED) file, in the NAD83 datum, to calculate elevations of receptors. The modeling domain was fully encompassed by the extents of coverage of the NED terrain file. The terrain preprocessor, AERMAP Version 11103, was used 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. The AERMOD dispersion model 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.

AERMAP was run to calculate the base elevations of emission sources, building, and tanks, in addition to the receptors.

3.1.8 Building Downwash

Potential downwash effects on the emissions plumes were accounted for in the submitted modeling analyses by using building dimensions and locations (locations of building corners, base elevation, and building height). Dimensions and orientation of existing buildings were used as input to the Building Profile Input Program for the Plume Rise Model Enhancements downwash algorithm (BPIP-PRIME) to calculate direction-specific dimensions and Good Engineering Practice (GEP) stack height information for input to AERMOD. DEQ requested that Stantec and B&D Foods include the neighboring WPC Solutions building in the BPIP-PRIME setup for evaluation of the effects of building-induced downwash on one or more of the exhaust plumes or demonstrate that the building did not cause building-induced downwash. Stantec included the WPC Solutions building, using the same base elevation and building height as was used for the B&D Foods structure (854 meters above sea level for the building base elevation and 10.06 meters above grade for the structure height), stating that the adjacent WPC building appeared to have the same base elevation and height as the adjacent B&D Foods building.

Figure 1 below shows the 3-dimensional outline of the building setup exported by the Providence/Oris Solutions BEEST graphic user interface to Google earth. Figure 2 below shows the footprints of the B&D Foods and the closest neighboring structure.

Figure 1. B&D FOODS AND THE AREA IMMEDIATELY SURROUNDING THE FACILITY

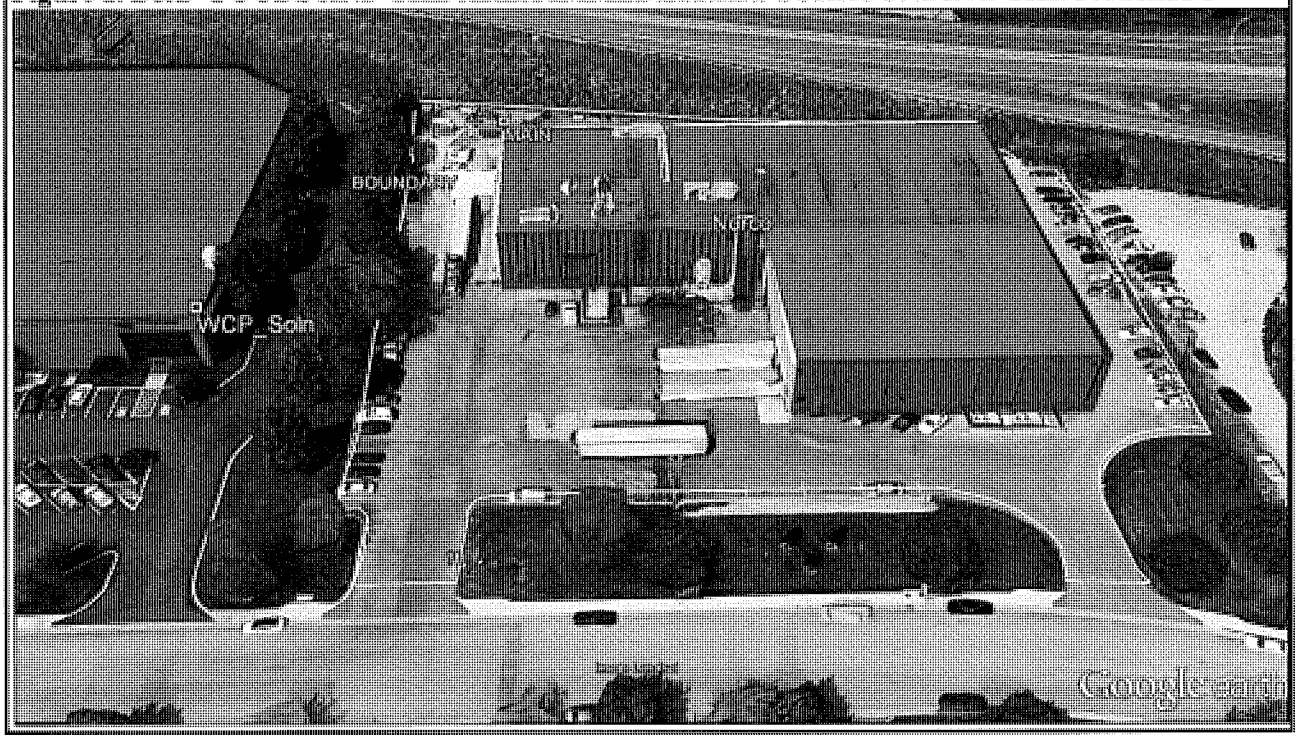
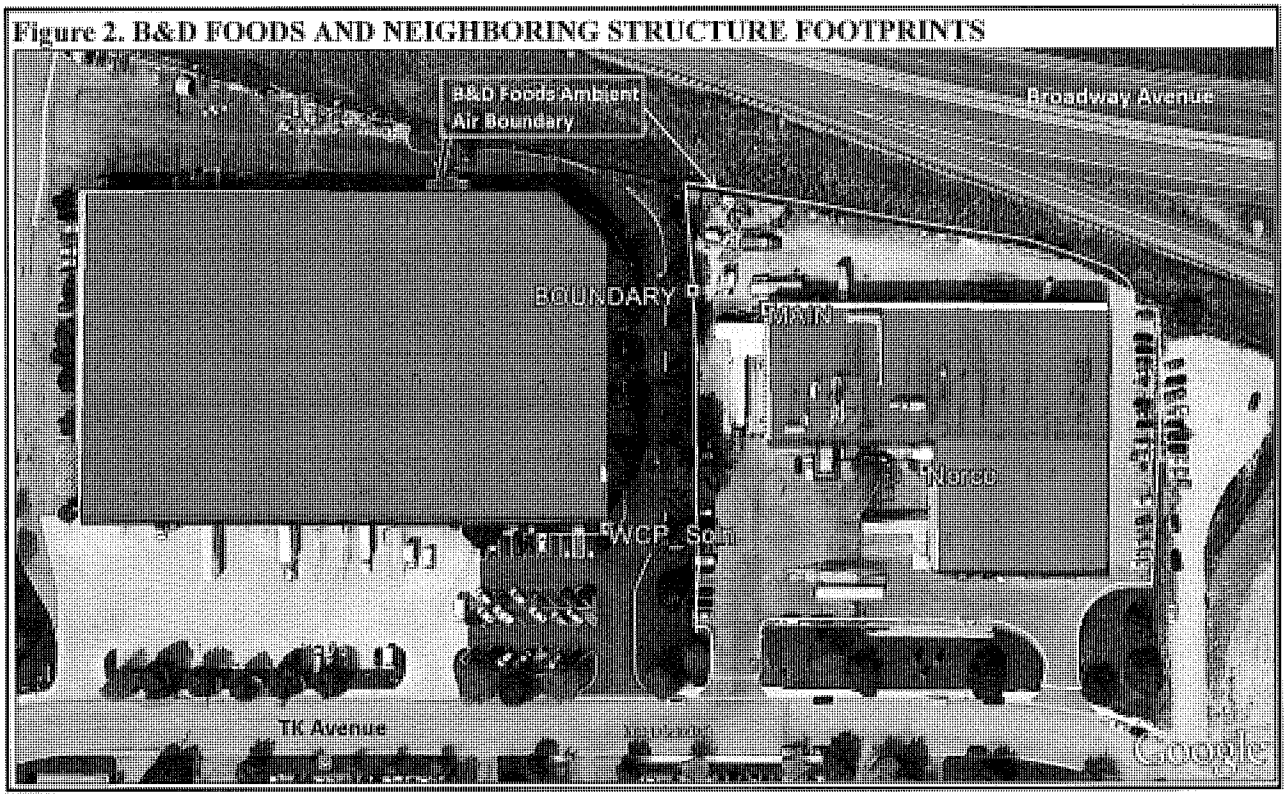


Figure 2. B&D FOODS AND NEIGHBORING STRUCTURE FOOTPRINTS



3.1.9 Ambient Air Boundary

B&D Foods' ambient air boundary was established along the facility's property boundary. As depicted in the figure above, the public access sidewalk and the area covered in trees and grass adjacent to the sidewalk along TK Avenue were also treated as ambient air. The December 8, 2014, modeling report states that "B&D will control access to the property through posting of signage and training facility personnel to patrol and prevent public access." The modeling report's description does not describe fencing along boundaries, but the report's plot plan depicts fencing along the southern boundary shared with the WPC Solutions building and along the western property boundary between the facility and Broadway Boulevard. The stated methods to control public access to areas excluded from ambient air are consistent with those described in DEQ's Modeling Guideline, and DEQ determined that such methods will reasonably preclude public access to areas excluded from ambient air in the impact analyses.

3.1.10 Receptor Network

Table 5 describes the receptor network used in the submitted modeling analyses. DEQ determined that the receptor network was adequate to reasonably assure compliance with applicable air quality standards at all ambient air locations. The design value concentration impact for this project was predicted to occur along the ambient air boundary, where a maximum of 15-meter receptor spacing was used. The ambient air boundary receptors bordering the vehicle access paths were very densely spaced, down to as little as one meter, which provides very good receptor coverage. The highest impacts for the project occurred within these receptors. Beyond the ambient air boundary, a grid set on 25-meter spacing out to 100 meters from the ambient air boundary was used in the analyses.

Additional nested receptor grids with receptor spacing of 50 meters, 100 meters, 250 meters, 500 meters, and 1,000 meters were used in the analyses. Stantec assessed impacts out to at least 5.5 kilometers in all directions from the facility.

3.2 Emission Rates

Emissions rates of criteria pollutants and TAPs for the project were provided by B & D Foods and Stantec for the applicable averaging periods. Review and approval of estimated emissions was the responsibility of the DEQ permit writer, and is not addressed in this modeling memorandum. DEQ modeling review included verification that the application's potential emissions rates were properly used in the model. The rates listed represent the maximum allowable rate as averaged over the specified period.

3.2.1 Criteria Pollutant Emissions Rate

Table 7 lists criteria pollutant emissions rates used in the project-specific modeling analyses for averaging periods of 24 hours or less. The rates listed represent the maximum allowable rate as averaged over the specified period. Total NO_x emissions (NO and NO_2) were input to the model used to demonstrate compliance with the 1-hour NO_2 NAAQS.

Emission rates were below level I modeling thresholds for all criteria air pollutants with an annual averaging period.

Table 7. MODELED SHORT-TERM AVERAGE CRITERIA POLLUTANT EMISSIONS		
Source ID	Description	NOx[b] Emission Rates (lb/hr[a])
INCINERATOR	Incinerator	0.147
HEATER1	Oil Heater 1	0.088
HEATER2	Oil Heater #2	0.141
UNITHEAT1	Unit Heater #1	0.020
UNITHEAT2	Unit Heater #2	0.020
UNITHEAT3	Unit Heater #3	0.015
UNITHEAT5	Unit Heater #5	0.015
UNITHEAT6	Unit Heater #6	0.015
HWHEAT1	Hot water Heater#1	0.020
HWHEAT2	Hot water Heater#2	0.020
HWHEAT3	Hot water Heater#3	0.020
HWHEAT4	Hot water Heater#4	0.020
PRESSH2O	Pressure Water Heater	0.092
HWHEAT5	Hot water Heater #5	0.027
HWHEAT6	Hot water Heater #6	0.0064
FURNACE1	Furnace #1	0.012
FURNACE2	Furnace #2	0.0039
FURNACE3	Furnace #3	0.0039

[a] Pounds per hour.
[b] Oxides of nitrogen, 1-hour averaging period.

3.2.2 TAP Emissions Rates

TAP emissions increases associated with the proposed modification were below the emissions screening levels (ELs) of Idaho Air Rules Section 585 and 586. Therefore, no TAP emissions were modeled to demonstrate compliance with carcinogenic or noncarcinogenic TAPs increments.

The emissions presented in Appendix C – Emission Inventory—identified cadmium as a carcinogenic TAP with an emission rate of 5.11E-06 lb/hr, average hourly emissions based on future requested operations without regarding current-allowable emissions. As noted in footnote 4 of the natural gas combustion portion of this inventory, only the increase in TAP emissions attributed to this modification project are subject to evaluation against the allowable increment. Stantec's identified the increase in cadmium emissions subject to this project's modification at 5.37E-07 lb/hr. This emission rate is below the 3.70E-06 lb/hr EL. Modeling was not required for cadmium or any other TAP.

3.3 Emission Release Parameters

Tables 8 and 9 list emissions release parameters for sources modeled. All emissions units were modeled as point sources with vertical and uninterrupted releases of the exhaust plumes to atmosphere.

DEQ issued a modeling protocol approval letter to B&D Foods on May 1, 2014, requesting that the application contain documentation and justification for all stack parameters used in the modeling analyses, clearly showing how stack gas temperatures and flow rates were estimated. Generally, adequate documentation/justification was provided and the final modeled release parameters were within normally expected ranges for the source types modeled.

Release conditions of the stacks were revisited by B&D Foods at DEQ's request, and several stacks that were originally modeled as an uninterrupted vertical release were found to be equipped with rain caps. Rain caps impede the vertical release of the exhaust plume with the loss of momentum of the exhaust

stream. These capped points included Oil Heater #1, Unit Heaters #1, #2, #3, #5, and #6, Hot Water Heater #4, and the High Pressure Washer Water Heater stacks. Stantec and B&D Foods verified that the incinerator stack is not capped, and although there is a horizontal plenum section on the rooftop, the exit point for the incinerator stack has a 90 degree bend and exhausts vertically and uninterrupted as shown in the photograph included in Appendix D—Supporting Documentation—of the final modeling report, dated December 16, 2014.

The capped stack exhaust parameters and those of the other sources were documented/justified using a test report titled "B & D Foods Stack Measurements Boise, Idaho," dated March 20, 2014, by Building Systems Technologies, PLLC. The monitored parameters included stack release height above the roofline, exit diameter, exit temperature, and flow rate. These values were used for all sources except the 170° Fahrenheit (°F) exit temperature for the incinerator stack, which was determined by Stantec and B&D Foods to be non-representative of normal operations because the incinerator was nonoperational while Building Systems Technologies performed the on—site exhaust parameter collection. The 170°F temperature was replaced with a value of 527°F. Supporting documentation for this temperature is located in Appendix D of the final modeling report. The 527°F value is based on the lowest monthly temperature reading for January 2014 through June 2014 for the incinerator. Stantec described the location within the stack where the temperature is observed as being 35 to 40 inches from the exit point. DEQ determined this measurement is an adequate representation of the exhaust temperature at the point of release to the atmosphere.

Stantec calculated the volumetric flow rate of the exhaust produced by natural gas combustion in the #2 Oil Heater because the flow rate could not be monitored during the on-site stack exhaust parameter monitoring due to access limitations.

DEQ determined the permit application provides adequate documentation and that the modeled parameters are appropriate for all emission units represented in the modeling demonstration.

Table 8. EMISSIONS RELEASE PARAMETERS – S.I. Units								
Release Point	Source Description	Point Source Release Type	Source Location UTM[a] Coordinates, Zone 11, NAD83		Stack Height (m)	Modeled Diameter (m)	Stack Gas Temperature (K)[c]	Stack Gas Flow Velocity (m/sec)[d]
			X- coordinate or Easting (m)[b]	Y-coordinate or Northing (m)				
INCINERATOR	Incinerator	DEFAULT	565,165.87	4,824,532.31	12.4	0.561	548.2	10.5
HEATER1	Oil Heater 1	RAINCAP	565,174.38	4,824,531.64	11.0	0.204	513.7	6.1
HEATER2	Oil Heater #2	DEFAULT	565,170.25	4,824,555.07	14.6	0.305	497.0	3.1
UNITHEAT1	Unit Heater #1	RAINCAP	565,179	4,824,584	11.6	0.102	385.9	4.1
UNITHEAT2	Unit Heater #2	RAINCAP	565,189	4,824,558	11.6	0.102	380.4	4.4
UNITHEAT3	Unit Heater #3	RAINCAP	565,148	4,824,518	10.9	0.127	324.8	1.7
UNITHEAT5	Unit Heater #5	RAINCAP	565,147	4,824,569	10.8	0.203	380.4	1.8
UNITHEAT6	Unit Heater #6	RAINCAP	565,170	4,824,591	10.8	0.203	354.3	1.6
HWHEAT1	Hot water Heater#1	DEFAULT	565,177	4,824,564	10.5	0.064	327.0	16.4
HWHEAT2	Hot water Heater#2	DEFAULT	565,175	4,824,564	10.5	0.064	325.4	17.9
HWHEAT3	Hot water Heater#3	DEFAULT	565,174	4,824,564	10.5	0.064	323.7	17.1
HWHEAT4	Hot water Heater#4	RAINCAP	565,172	4,824,564	10.7	0.152	319.8	2.8
PRESSH2O	Pressure Water Heater	RAINCAP	565,172	4,824,555	11.3	0.305	602.6	1.2
HWHEAT5	Hot water Heater #5	DEFAULT	565,158	4,824,525	11.0	0.203	306.5	0.6
HWHEAT6	Hot water Heater #6	DEFAULT	565,180	4,824,593	10.9	0.076	309.8	3.6
FURNACE1	Furnace #1	DEFAULT	565,165	4,824,523	11.0	0.102	302.6	2.6
FURNACE2	Furnace #2	DEFAULT	565,178	4,824,590	10.6	0.051	292.0	7.0
FURNACE3	Furnace #3	DEFAULT	565,178	4,824,593	10.6	0.051	292.0	7.0

a. Universal Transverse Mercator.
b. Meters.
c. Kelvin.
d. Meters per second.

Table 9. EMISSIONS RELEASE PARAMETERS – English Units								
Release Point	Source Description	Point Source Release Type	Source Location UTM[e] Coordinates, Zone 11, NAD83		Stack Height (ft)[b]	Modeled Diameter (ft)	Stack Gas Temperature (°F)[c]	Stack Gas Flow Velocity (ft/sec)[d]
			X- coordinate or Easting (m)[a]	Y-coordinate or Northing (m)				
INCINERATOR	Incinerator	DEFAULT	565,165.87	4,824,532.31	40.6	1.84	527	34.5
HEATER1	Oil Heater #1	RAINCAP	565,174.38	4,824,531.64	36.2	0.67	465	20.1
HEATER2	Oil Heater #2	DEFAULT	565,170.25	4,824,555.07	48.0	1.00	435	10.3
UNITHEAT1	Unit Heater #1	RAINCAP	565,179	4,824,584	37.9	0.33	235	13.4
UNITHEAT2	Unit Heater #2	RAINCAP	565,189	4,824,558	37.9	0.33	225	14.3
UNITHEAT3	Unit Heater #3	RAINCAP	565,148	4,824,518	35.7	0.42	125	5.5
UNITHEAT5	Unit Heater #5	RAINCAP	565,147	4,824,569	35.3	0.67	225	6.0
UNITHEAT6	Unit Heater #6	RAINCAP	565,170	4,824,591	35.5	0.67	178	5.3
HWHEAT1	Hot water Heater#1	DEFAULT	565,177	4,824,564	34.6	0.21	129	53.8
HWHEAT2	Hot water Heater#2	DEFAULT	565,175	4,824,564	34.6	0.21	126	58.7
HWHEAT3	Hot water Heater#3	DEFAULT	565,174	4,824,564	34.6	0.21	123	56.2
HWHEAT4	Hot water Heater#4	RAINCAP	565,172	4,824,564	35.0	0.50	116	9.3
PRESSH2O	Pressure Water Heater	RAINCAP	565,172	4,824,555	37.0	1.00	625	4.1
HWHEAT5	Hot water Heater #5	DEFAULT	565,158	4,824,525	36.2	0.67	92	1.9
HWHEAT6	Hot water Heater #6	DEFAULT	565,180	4,824,593	35.7	0.25	98	11.9
FURNACE1	Furnace #1	DEFAULT	565,165	4,824,523	36.2	0.33	85	8.6
FURNACE2	Furnace #2	DEFAULT	565,178	4,824,590	34.7	0.17	66	22.9
FURNACE3	Furnace #3	DEFAULT	565,178	4,824,593	34.7	0.17	66	22.9

a. Meters.
b. Feet.
c. Degrees Fahrenheit.
d. Feet per second.
e. Universal Transverse Mercator.

3.4 Results for Significant Impact Level Analyses

A SIL analysis was not submitted for the project. The applicant conservatively used a cumulative NAAQS impact analysis to demonstrate compliance with the 1-hour NO_2 NAAQS.

3.5 Results for Cumulative Impact Analyses

Table 10 provides results for the cumulative NAAQS impact analyses performed for 1-hour NO_2. Modeling was not required for any other NAAQS because the project emission inventory demonstrated that the project's emission increases were below the Level I de minimis modeling applicability thresholds.

The submitted modeling analyses indicated that Tier III NOx chemistry algorithms OLM and PVMRM produced nearly identical results.

Table 10. RESULTS FOR CUMULATIVE IMPACT ANALYSES							
Pollutant	Averaging Period	Modeled Design Value Concentration ($\mu g/m^3$)[a]		Background Concentration ($\mu g/m^3$)	Total Ambient Impact for NAAQS Compliance ($\mu g/m^3$)	NAAQS[b] ($\mu g/m^3$)	Percent of NAAQS
		Tier III Method PVMRM[c]	Tier III Method OLM[d]				
NO_2[e]	1-hour	161.1[f]	161.1[f]	Included in model[g]	161.1[h]	188	86%

a. Micrograms per cubic meter.
b. National ambient air quality standards.
c. Plume Volume Molar Ratio Method
d. Ozone Limiting Method
e. Nitrogen dioxide.
f. Modeled design value is the maximum 5-year mean of 8th highest daily 1-hour maximum impacts for each year of a 5-year meteorological dataset.
g. Background NO_2 concentrations are included with the modeled output value. The individual hour background NO_2 values listed in Table 4 of this memorandum for a 24-hour period were used for the NAAQS analysis.
h. Both PVMRM and OLM design impacts were predicted to occur at the ambient air boundary receptor at Universal Transverse Mercator (UTM) coordinates 565,153.7 meters Easting and 4,824,611 meters Northing, Zone 11, NAD83 datum.

4.0 Conclusions

The ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the proposed project will not cause or significantly contribute to a violation of any ambient air quality standard.

APPENDIX C – FACILITY DRAFT COMMENTS

The following comments were received from the facility on March 18, 2015:

Facility Comment: Permit Condition 3.5 (previous Permit Condition 3.4), Throughput Limit – This previous Permit Condition states the combined weight of meat and poultry product produced shall not exceed the limit of 60,000 pounds per calendar day. The draft permit PC 3.5 states the combined weight of meat and poultry product to the fryers shall not exceed 90,000 pounds per calendar day. The process and emissions calculation methodology has not changed since 2008. For consistency, B&D Foods requests that the proposed condition reflect the previous language. The calculations assume 90,000 pounds produced. Additionally, it is much easier for record keeping purposes to weigh the end product rather than the entry point.

DEQ Response: After discussing the wording with the facility it was decided that "…weight of finished meat and poultry product…" would be used and the permit condition was changed to reflect this decision.

Facility Comment: Permit Condition 3.8 indicates that a minimum operating temperature associated with the incinerator shall be established following the required performance test. The accompanying recordkeeping requirement (permit condition 3.12) states that records shall be kept once per day while the incinerator is operational. Does that mean that records shall be maintained once the permit is finalized or following the performance test? If it is the former, what are the ramifications if there are temperature readings less than the values used during the test?

DEQ Response: Permit Condition 3.12 was modified to included "…established during the performance test…" to clarify the permit condition.

APPENDIX D – PROCESSING FEE

PTC Fee Calculation

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: B & D Foods
Address: 3491 South T.K. Ave.
City: Boise
State: ID
Zip Code: 83705
Facility Contact: Tim Andersen
Title:
AIRS No.: 001-00162

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	0.4	0	0.4
SO_2	0.0	0	0.0
CO	0.3	0	0.3
PM10	0.3	0	0.3
VOC	0.0	0	0.0
TAPS/HAPS	0.0	0	0.0
Total:	0.0	0	**1.0**
Fee Due	**$ 2,500.00**		

Comments: