# Air Quality Permitting
# Statement of Basis

**May 16, 2005**

## Permit to Construct No. P-040425

## Gossner Foods, Inc., Magic Valley Division, Heyburn, Idaho

## Facility ID No. 067-00023

Prepared by:

Shawnee Chen, P.E., Senior Engineer
AIR QUALITY DIVISION

**FINAL**

# Table of Contents

# Acronyms, Units, and Chemical Nomenclatures

| | |
|---|---|
| acfm | actual cubic feet per minute |
| AFS | AIRS Facility Subsystem |
| AIRS | Aerometric Information Retrieval System |
| AP-42 | Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition |
| AQCR | Air Quality Control Region |
| ASTM | American Society for Testing and Materials |
| BACT | Best Available Control Technology |
| Btu | British thermal unit |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| DEQ | Department of Environmental Quality |
| EF | emissions factor |
| EI | emissions inventory |
| EPA | U.S. Environmental Protection Agency |
| gal | gallons |
| Gossner | Gossner Foods, Inc. Magic Valley Division |
| gr/dscf | grain (1 lb = 7,000 grains) per dry standard cubic feet |
| HAPs | Hazardous Air Pollutants |
| hp | horsepower |
| IDAPA | a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act |
| km | kilometer |
| lb | pound |
| lb/hr | pound per hour |
| MACT | Maximum Achievable Control Technology |
| MMBtu | million British thermal units |
| MMBtu/hr | million British thermal units per hour |
| 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 |
| PM | particulate matter |
| $PM_{10}$ | particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers |
| PSD | Prevention of Significant Deterioration |
| PTC | permit to construct |
| Rules | Rules for the Control of Air Pollution in Idaho |
| SIP | State Implementation Plan |
| $SO_2$ | sulfur dioxide |
| T/yr | tons per year |
| $\mu g/m^3$ | micrograms per cubic meter |
| UTM | Universal Transverse Mercator |
| VOC | volatile organic compound |

## 1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, Rules for the Control of Air Pollution in Idaho, for issuing permits to construct.

## 2. FACILITY DESCRIPTION

Gossner Foods Inc. Magic Valley Division (Gossner) is a cheese production plant. The plant will mainly produce Swiss cheese. The plant will also produce small amounts of other types of cheese, ice cream, and butter. The initial stage of production is 500,000 pounds of milk per day. The plant's design capacity is 1,000,000 pounds of milk per day.

## 3. FACILITY / AREA CLASSIFICATION

Gossner is classified as a true minor facility because its potential to emit is less than all major source thresholds. The Aerometric Information Retrieval System (AIRS) classification is "B." The Standard Industrial Classification defining the facility is 2022.

The facility is located within Air Quality Control Region (AQCR) 63 and Universal Transverse Mercator (UTM) zone 12. The facility is located in Minidoka/Cassia County which is designated as unclassifiable for all criteria pollutants. There are no Class I area within 10 kilometers of the facility.

The AIRS information provided in Section 9 of this statement of basis defines the classification for each regulated air pollutant at Gossner. This required information is entered into the EPA AIRs database.

## 4. APPLICATION SCOPE

The application is for the construction of a cheese production plant.

### *4.1 Application Chronology*

| | |
|---|---|
| December 23, 2004 | DEQ received a 15-day pre-permit construction application from Gossner |
| December 24, 2004 | DEQ approved Gossner's 15-day pre-permit construction |
| January 19, 2005 | DEQ declared the application complete |
| February 16, 2005 | DEQ received supplemental information to address DEQ's questions/statements from Gossner. |
| February 28, 2005 | DEQ received information that revised its application regarding the boiler. |
| April 4, 2005 | DEQ received comments on the draft permit. |

## 5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this PTC action.

## 5.1 Equipment Listing

1. Receiving bay
2. Receiving silos
3. Separator and pasteurizer
4. Horizontal cheese vats
5. Whey department
6. Whey department silos
7. Press room
8. Brine room
9. Brine conveyor
10. Make cooler
11. Warm room
12. Shipping cooler
13. Packaging room
14. Boiler room

    - Boiler 1 and Boiler 2:

      Boiler 1 and Boiler 2 are identical. Each boiler has a rated heat input rate of 25.106 million British thermal units per hour (MMBtu/hr). Each boiler is a steam boiler that can be fired by natural gas as a primary fuel and by propane as a secondary fuel. It is manufactured by Superior with model of Seminole 3-pass Wetback. The boiler use flue gas recirculation system to control the $NO_x$ emissions. Flue gas recirculation system is manufactured by Industrial Combustion with model number of LND30-300P and 80% control efficiency. Each boiler has a stack height of 35 feet, stack diameter of two feet, exit gas temperature of 400°F, and exit gas flow rate of 8,544 actual cubic feet per minute (acfm.)

15. Cleaning in place tanks (CIP)
16. Starter room
17. Starter freezer room
18. Master control center
19. Load-out docks
20. battery charging room
21. Refrigeration machinery room
22. Air compressor room
23. Main office reception area
24. Employee entrance/parking
25. Truck driver receiving
26. Butter room
27. Ice cream room
28. Emergency diesel generator (GEN 1)

    - Emergency diesel generator is Caterpillar, Standby DM6720, Open Generator Set – 1800 rpm/60 Hz/480 Volts/1000 eKW/1250kVA. The maximum fuel consumption is 71.2 gallon per hour. The generator has an exhaust stack gas temperature of 744 °F, an exhaust gas flow rate of 7,377.2 cubic feet per minute, and an exhaust internal diameter of 8.0 inch.

29. Three natural gas direct-fired roof-mounted heaters. Each contains two separate exhaust stacks.

    - Heater 1 combusts natural gas at a rate of 27 cubic feet natural gas per minute. The heater has two identical stacks each with stack height of 33 feet, exit diameter of three feet, exit gas volume of 8,952 acfm, and exit gas temperature of 480 °F.

- Heater 2 combusts natural gas at a rate of 41 cubic feet natural gas per minute. The heater has two identical stacks each with stack height of 34 feet, exit diameter of 3.4 ft, exit gas volume of 14,000 acfm, and exit gas temperature of 480 °F.
- Heater 3 combusts natural gas at a rate of 19.5 cubic feet natural gas per minute. The heater has two identical stacks each with stack height of 33 feet, exit diameter of three feet, exit gas volume of 6,966 acfm, and exit gas temperature of 480 °F.

30. 18,000 gal Propane storage tank.

## 5.2 Emissions Inventory

A revised emissions inventory (EI), including TAP emissions, was provided on February 16, 2005 and February 28, 2005. Emissions calculations were verified by DEQ and are presumed to accurately reflect emissions from this facility. A summary of the EI is provided as Appendix B. Table 5.1 provides a summary of the EI.

**Table 5.1 EMISSIONS ESTIMATES FOR CRITERIA POLLUTANTS[a]**

| Emissions units | $PM_{10}$ | | $SO_2$ | | VOC | | $NO_X$ | | CO | |
|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | T/yr | lb/hr | T/yr | lb/hr | T/yr | lb/hr | T/yr | lb/hr | T/yr |
| **Boiler 1** | 0.17 | 0.69 | 0.02 | 0.08 | 0.15 | 0.66 | 5.29 | 10.9 | 0.92 | 4.05 |
| **Boiler 2** | 0.17 | 0.69 | 0.02 | 0.08 | 0.15 | 0.66 | 5.29 | 10.9 | 0.92 | 4.05 |
| **Emergency Generator** | 0.27 | 0.07 | 5.42 | 1.36 | 0.65 | 0.16 | 23.86 | 5.96 | 1.51 | 0.38 |
| **Heater 1** | 0.01 | 0.05 | 0.00 | 0.00 | 0.01 | 0.04 | 0.16 | 0.71 | 0.14 | 0.60 |
| **Heater 2** | 0.02 | 0.08 | 0.00 | 0.01 | 0.01 | 0.06 | 0.25 | 1.08 | 0.21 | 0.91 |
| **Heater 3** | 0.01 | 0.04 | 0.00 | 0.00 | 0.01 | 0.03 | 0.12 | 0.51 | 0.10 | 0.43 |
| **Propane Storage Tank** | Neg. | | Neg. | | Neg. | | Neg. | | Neg. | |
| **Total** | | 1.61 | | 1.52 | | 1.61 | | 29.31 | | 10.41 |

a. Two operating scenarios are modeled and permitted. Scenario one: the boiler is fired by natural gas for the entire year. Scenario two: the boiler is fired by propane up to maximum 20 weeks per year or 932,112 gallons per calendar year, and by natural gas for the rest of the year. Between these two scenarios, the higher emissions rates are permitted as permit limits.

Boiler 1 and Boiler 2

- Natural gas fired

  Emissions factors for $PM_{10}$, CO, $SO_2$, VOC, and $NO_x$ were provided by the manufacturer. Emissions factors for lead and TAPs were obtained from AP-42 Section 1.4 (rev. 7/98). The hourly emissions rates were calculated by multiplying boiler's rated hourly heat input rate by the respective emissions factors (EF).

- Propane gas fired

  Emissions factors for $PM_{10}$, CO, $SO_2$, VOC, and $NO_x$ were taken from AP-42 Section 1.5 (rev. 10/96). The hourly emissions rates were calculated by multiplying boiler's rated hourly fuel usage by the respective EFs.

When fired by natural gas exclusively, the annual emissions rates are calculated by multiplying the maximum hourly natural gas combustion rate with the respective EFs. When propane is fired, annual emissions rates are calculated by summing the product of annual propane limit (932,112 gal/yr) and the respective EF, and the product of annual natural gas usage and the respective EF. Between these two scenarios, the higher emissions rates are permitted as permit limits.

Emergency generator

Emissions factors for $PM_{10}$, CO, VOC, and $NO_x$ were provided by the manufacturer. Emissions factors for $SO_2$ and TAPs were taken from AP-42 Section 3.4 (rev. 10/96). The hourly emissions rate for each criteria pollutant was calculated as follows: lb/hr emissions = EF (lb/hp-hr) x generator's power output (1,341 hp, manufacturer's data). The hourly emissions rate for each HAP was calculated: lb/hr TAP emissions = EF (lb/MMBtu, fuel input) x 72.1 gal/hr @100% load (manufacturer's data) x 0.14 MMBtu/gal (AP-42 Section 3.4, rev. 10/96).

The annual emissions rates were calculated by multiplying hourly emissions rates with 500 hours per year, which was requested by the applicant. The "500 hours" is a default operating hours for emergency generators set in EPA's guidance "*Calculating Potential to Emit (PTE) for Emergency Generators*" September 6, 1995.

Roof heaters 1, 2, and 3

The emissions factors for natural gas fired boilers (AP-42 Section 1.4, rev. 7/98) were used for the roof mounted heaters because these EF's are the most representative. The hourly emissions rate for each pollutant was calculated by multiplying each heater's natural gas consumption rate in million cubic feet per hour with the respective emissions factor. The annual emissions rates were calculated by multiplying maximum hourly emissions rates with 8,760 hours per year.

Propane storage tank

The propane storage tank at Gossner is 18,000 gallon. It is a pressure tank per the information submitted by the applicant's consultant on February 16, 2005. As discussed in AP-42, Section 7.1.3.4 (rev. 9/97), the emissions from the pressure tanks are considered negligible.

## 5.3 Modeling

The facility has demonstrated 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. CO emissions are below the modeling thresholds set forth in the *State of Idaho Air Quality Modeling Guideline.* Therefore, no modeling analysis was required for CO. The detailed modeling analysis is included in Appendix A. A summary of the modeling analysis is presented in Tables 5.2 and 5.3.

**Table 5.2 FULL IMPACT ANALYSIS RESULTS FOR $PM_{10}$ AND $NO_2$[a]**

| Pollutant | Averaging Period | Facility Ambient Impact ($\mu g/m^3$) | Background concentration ($\mu g/m^3$) | Total Ambient Concentration ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) | Percent of NAAQS |
|---|---|---|---|---|---|---|
| $PM_{10}$ | 24-hour | 7.3 | 73 | 80.3 | 150 | 53.5% |
| | Annual | 1.7 | 26 | 27.7 | 50 | 55.4% |
| $NO_2$ | Annual | 30.5 | 17 | 47.5 | 100 | 47.5% |
| $SO_2$ | 3-hr | | | 8.3 | | < 15% |
| | 24-hr | | | 50.6 | | < 15% |
| | Annual | | | 134.9 | | < 15% |

a. Two operating scenarios are modeled and permitted. Scenario one: the boiler is fired by natural gas only for the entire year. Scenario two: The boiler is fired by propane up to maximum 20 weeks per year or 932,112 gallons per calendar year and by natural gas for the rest of the year. Between these two scenarios, the higher ambient impacts are listed here.

Table 5.3 FULL IMPACT ANALYSIS RESULTS FOR TAPS

| Pollutant | Average period | Concentration ($\mu g/m^3$) | Regulatory Limit ($\mu g/m^3$) | Percent of Limit |
|---|---|---|---|---|
| Arsenic | Annual | 0.00006 | 2.3E-04 | 26.1% |
| Benzene | Annual | 0.026 | 1.20E-01 | 21.7% |
| Benzo(a)pyrene | Annual | 0.00001 | 3.00E-04 | 3.3% |
| Formaldehyde | Annual | 0.022 | 7.7E-02 | 28.6% |
| Cadmium | Annual | 0.00032 | 5.60E-04 | 57.1% |
| Nickel | Annual | 0.00061 | 4.20E-03 | 14.5% |

## 5.4 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this PTC.

IDAPA 58.01.01.201 ..... Permit to Construct Required

This facility is proposing to construct a new cheese production facility. The proposed project does not qualify for an exemption under Sections 220 through 223 of the Rules; therefore, a PTC is required.

IDAPA 58.01.01.203.02 ..... NAAQS

"*No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:....02. NAAQS....*"

The facility has demonstrated compliance, to DEQ's satisfaction, that this project will not cause or significantly contribute to a violation of any ambient air quality standards.

IDAPA 58.01.01.203.03 ..... Toxic Air Pollutants

"*No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:....03. Toxic Air Pollutants Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*"

The emissions for Arsenic, Benzene, Benzo(a)anthracene, cadmium, formaldehyde, and nickel exceeded their respective screen emissions levels. These six TAPs were modeled, and the modeled ambient concentrations were less than their respective TAP ambient increments (AACC), thus demonstrating compliance with IDAPA 58.01.01.203.03.

IDAPA 58.01.01.625 ..... Visible Emissions

This regulation states that any point of emission shall not have a discharge of any air pollutant for a period aggregating more than three minutes in any 60-minute period of greater than 20% opacity.

The emissions points at this facility are subject to this regulation.

IDAPA 58.01.01 675 ..... Fuel Burning Equipment

This regulation establishes particulate matter emission standards (grain loading standards) for fuel burning equipment. Fuel burning equipment is defined in IDAPA 58.01.01.006.41 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.*"

As indicated in the application, three space heaters are direct heat transfer processes. Therefore, it is not

fuel burning equipment as defined in IDAPA 58.01.01, and this regulation does not apply to the space heaters. The emergency generator is an internal combustion engine. The combustion of the fuel takes place in a confined space, producing expanding gases that are used directly to provide mechanical power. The engines do not produce heat or power through indirect heat transfer. Therefore, it is not fuel burning equipment as defined in IDAPA 58.01.01, and this regulation does not apply to the emergency generator.

This regulation is applicable to the natural gas-fired boilers. The calculated results in Appendix B of this statement of basis demonstrate that the boilers are incompliance with the grain loading standard.

IDAPA 58.01.01 728..... Distillate Fuel Oil

*"No person shall sell, distribute, use or make available for use, any distillate fuel oil containing more than the following percentages of sulfur: (5-1-94)*

***01. ASTM Grade 1.*** *ASTM Grade 1 fuel oil - 0.3 percent by weight. (5-1-94)*

***02. ASTM Grade 2.*** *ASTM Grade 2 fuel oil - 0.5 percent by weight. (5-1-94)"*

The diesel used in the emergency generator is subject to the fuel sulfur content requirements.

40 CFR 60, Subpart Dc ..... New Source Performance Standards

Boiler 1 and Boiler 2 are defined as affected facilities in accordance with 40 CFR 60, Subpart Dc because each has a rated heat rate between 10 and 100 MMBtu/hr. Because the boilers are fired on gas fuel, no standard of performance applies. However, Gossner is required to submit notification of the date of construction or reconstruction and actual startup (40 CFR 60.7). Additionally, the facility is required to record and maintain records of the amounts of each fuel combusted in each boiler during each day.

40 CFR 61 and 63..... National Emission Standards for Hazardous Air Pollutants & MACT

This facility is not subject to NESHAP or MACT.

## 5.5 Fee Review

DEQ received Gossner's $1,000 PTC application fee on November 14, 2004, which was required in accordance with IDAPA 58.01.01.224. Gossner's emissions increase is between 10 to 100 tons range. In accordance with IDAPA 58.01.01.225, the PTC processing fee is $5,000. Gossner paid the PTC processing fee on May 9, 2005.

**Table 5.4 PTC PROCESSING FEE TABLE**

| Emissions Inventory | | | |
|---|---|---|---|
| **Pollutant** | **Annual Emissions Increase (T/yr)** | **Annual Emissions Reduction (T/yr)** | **Annual Emissions Change (T/yr)** |
| $NO_X$ | 30.07 | 0 | 30.07 |
| $SO_2$ | 1.48 | 0 | 1.48 |
| CO | 10.27 | 0 | 10.27 |
| $PM_{10}$ | 1.61 | 0 | 1.61 |
| VOC | 1.38 | 0 | 1.38 |
| TAPS/HAPS | 0.40 | 0 | 0.40 |
| Total: | **45.22** | 0 | **45.22** |
| | | | |
| Fee Due | **$ 5 ,000.00** | | |

## 5.6 *Regional Review of Draft Permit*

The draft permit was made available for Twin Falls Regional Office review on March 14, 2005. The comments were received on March 16, 2005. They were addressed in this final permit.

## 5.7 *Facility Review of Draft Permit*

The draft permit was provided for facility review on March 18, 2005. The comments were received on April 4, 2005. They were addressed in this final permit.

# 6. PERMIT CONDITIONS

The following permit conditions describe the requirements of a new PTC.

## 6.1 *Emissions Unit – Natural Gas Fired Boiler 1 and Boiler 2*

6.1.1 Two operating scenarios were modeled. Scenario one is that the boilers are fired by natural gas only for the entire year. Scenario two is that the boilers are fired by propane up to the maximum allowable combustion limit of 932,112 gal/yr and by natural gas for the rest of the year. Between these two scenarios, the higher emissions rates were permitted as permit limits. $PM_{10}$ 24-hour emissions limits are established in Permit Condition 2.3 for each boiler because the facility-wide $PM_{10}$ ambient impact is 54% of $PM_{10}$ 24-hour NAAQS.

6.1.2 The annual propane usage is limited to 932,112 gallons per any consecutive 12-month period for each boiler as proposed by the applicant (Permit Condition 2.7). This operating requirement assures that the facility will not exceed the NAAQS for $NO_x$ (annual averaging period).

6.1.3 The visible emissions limit of 20% opacity is included as Permit Condition 2.4. Opacity exceedances are not typically observed with gas fuel combustion sources. Thus, there is no specific monitoring requirement for opacity. However, the permit requires that only gas fuel is to be combusted (Permit Condition 2.6).

6.1.4 The PM grain loading standard is included in Permit Condition 2.5. The calculation in Appendix B indicates that each boiler will comply so long as gas fuel is combusted.

6.1.5 The boilers are subject to NSPS 40 CFR 60, Subpart Dc. Permit Conditions 2.8 and 2.9 provide the means (gas flow meter requirement) and methods (reporting and monitoring requirements) to demonstrate compliance with Subpart Dc.

6.1.6 Emissions rates of other criteria air pollutants are inherently limited by the 24-hour $PM_{10}$ emissions limits. Therefore, it is not necessary to list them in the permit.

## 6.2 *Emissions Unit – Diesel-fired Emergency Generator*

6.2.1 $PM_{10}$ 24-hour emissions limit is established in Permit Condition 3.3 because the facility-wide $PM_{10}$ ambient impact is 54% of $PM_{10}$ 24-hour NAAQS. The emergency generator was modeled at its maximum fuel consumption rate for 24-hour NAAQS. Therefore, there is no specific monitoring requirement for this limit.

6.2.2 20% opacity limit is included in Permit Condition 3.4. The permittee shall at all times (except as

provided in the Rules for the Control of Air Pollution in Idaho) maintain in good working order and operate as efficiently as practicable, as in General Provisions No.2, to ensure compliance with the opacity limit.

6.2.3 The emergency generator is fired by diesel. The fuel oil is subject to sulfur content requirement specified in IDAPA 58.01.01.728 and Permit Condition 3.6. The permittee shall maintain documentation of supplier verification of distillate fuel oil sulfur content on an as-received basis to demonstrate compliance with fuel sulfur content requirement (Permit Condition 3.7).

6.2.4 The emergency generator was modeled at its maximum fuel consumption rate, and 500 operation hours per year requested by the applicant. The "500 hours" is a default operating hours for emergency generators set in EPA's guidance "*Calculating Potential to Emit (PTE) for Emergency Generators*" September 6, 1995. Therefore the operation hours for emergency generator are not required to monitor in this permit.

6.2.5 Emissions rates of other criteria air pollutants are inherently limited by the 24-hour $PM_{10}$ emissions limits. Therefore, it is not necessary to list them in the permit.

### *6.3 Emissions Unit – Three Roof Mounted Natural Gas Fired Heaters*

6.3.1 $PM_{10}$ 24-hour emissions limits are established in the Permit Condition 4.3 for each heater stack because the facility-wide $PM_{10}$ ambient impact is 54% of $PM_{10}$ 24-hour NAAQS. The heaters were modeled at their maximum rates and were assumed to operate 8,760 hours per year. Therefore, there is no specific monitoring requirement for this permit condition.

6.3.2 20% opacity limit is included in Permit Condition 4.4. Opacity exceedances are not typically observed with gas fuel combustion sources. Thus, there is no specific monitoring requirement for opacity. However, the permit requires that only gas fuel is to be combusted (Permit Condition 4.5).

6.3.3 Emissions rates of other criteria air pollutants are inherently limited by the 24-hour $PM_{10}$ emissions limits. Therefore, it is not necessary to list them in the permit.

## 7. PUBLIC COMMENT

An opportunity for public comment period on the PTC application was provided in accordance with IDAPA 58.01.01.209.01.c. During this time, there were not comments on the application and no requests for a public comment period on DEQ's proposed action.

## 8. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommends that Gossner be issued a final PTC No. 067-00023 for the construction of a cheese production facility. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

## 9. AIRS

**Table 9.1 AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM**

| AIR PROGRAM / POLLUTANT | SIP | PSD | NSPS (Part 60) | NESHAP (Part 61) | MACT (Part 63) | TITLE V | AREA CLASSIFICATION A – Attainment U – Unclassifiable N – Nonattainment |
|---|---|---|---|---|---|---|---|
| $SO_2$ | B | | | | | | U |
| $NO_x$ | B | | | | | | U |
| CO | B | | | | | | U |
| $PM_{10}$ | B | | Dc | | | | U |
| PT (Particulate) | B | | | | | | |
| VOC | B | | | | | | U |
| THAP (Total HAPs) | B | | | | | | |
| | | | APPLICABLE SUBPART | | | | |
| | | | | | | | |

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For NESHAP only, class "A" is applied to each pollutant which is below the 10 T/yr threshold, but which contributes to a plant total in excess of 25 T/yr of all NESHAP pollutants.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

SYC/sd Permit No. P-040425

G:\Air Quality\Stationary Source\SS Ltd\PTC\Gossner Swiss Cheese\P-040425\final\P-040425 Final SB.doc

# APPENDIX A

## Modeling Review

Permit to Construct No. P-040425

Gossner Food, Inc., Magic Valley Division Heyburn

Facility ID No. 067-00023

**MEMORANDUM**

**DATE:** March 11, 2005

**TO:** Shawnee Chen, Air Quality Division

**THROUGH:** Kevin Schilling, Stationary Source Modeling Coordinator, Air Quality Division

**FROM:** Dustin Holloway, Modeling Analyst, Air Quality Division

**PROJECT NUMBER:** P-040425

**SUBJECT:** Addendum to Gossner Foods, Inc. modeling analysis Facility ID No. 067-00023

---

## 1. SUMMARY

Gossner Foods, Inc. submitted supplemental information in support of a permit to construct (PTC) application for their proposed facility in Heyburn, Idaho. The supplemental information contained revised annual emissions estimates various equipment at the facility. DEQ reviewed these changes and determined that additional analysis is not necessary.

## 2. CHANGES IN MODELED RESULTS

The annual $PM_{10}$ concentration estimated by the applicant in the initial application was 0.93 $\mu g/m^3$. The updated application estimated that the concentration would be 1.6 $\mu g/m^3$. This a very small percentage of the standard of 50 $\mu g/m^3$. The initial application did not contain an estimate for $SO_2$. The updated application contained an estimate for $SO_2$. The resulting concentrations, including background concentrations, are 8.3, 50.6, and 134.9 $\mu g/m^3$ for the annual, 24-hour, and 3-hour concentrations respectively. These are all less than 15% of the applicable national ambient air quality standards for each averaging period. The initial application contained a toxic pollutant analysis. The emissions rates of toxic pollutants were not affected by the changes made in the supplemental application.

Based on the low impacts for both $PM_{10}$ and $SO_2$, DEQ has determined that a full review of the updated materials is not necessary.

DH/sd G:\Air Quality\Stationary Source\SS Ltr\Modeling\modeling memos\Gossner P-040425\P-040425 Modeling Memo Addendum.doc

# MEMORANDUM

**DATE:** February 7, 2005

**TO:** Shawnee Chen, Air Quality Program

**THROUGH:** Kevin Schilling, Stationary Source Modeling Coordinator, Air Quality Program

**FROM:** Dustin Holloway, Modeling Analyst, Air Quality Program

**PROJECT NUMBER:** P-040425

**SUBJECT:** Modeling review for the Gossner Foods, Inc. facility in Heyburn Idaho

---

## 1. SUMMARY

CH2MHILL conducted a dispersion modeling analysis in support of a permit to construct (PTC) application for the Gossner Foods, Inc. (Gossner) facility in Heyburn. The analysis includes a full impact analysis for $PM_{10}$, and a toxic pollutant analysis for the pollutants which exceeded the screening emissions limits in IDAPA 58.01.01.585-586.

Based on the results of the analyses, DEQ has determined that the modeling analysis: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) appropriately adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that predicted pollutant concentrations at all receptor locations, when appropriately combined with background concentrations, were below stated air quality standards.

## 2. BACKGROUND INFORMATION

### *2.1 Applicable Air Quality Impact Limits*

Gossner is located in Heyburn, in Minidoka County. Minidoka County is designated unclassifiable for all criteria air pollutants. The following table summarizes the applicable air quality standards for this area.

| Table 2.1 APPLICABLE REGULATORY LIMITS | | | | |
|---|---|---|---|---|
| **Pollutant** | **Averaging Period** | **Significant Contribution Levels (µg/m³)[a, b]** | **Regulatory Limit (µg/m³)[c]** | **Modeled Value Used[d]** |
| $PM_{10}$[e] | Annual | 1 | 50[f] | Maximum 1st highest[g] |
| | 24-hour | 5 | 150[h] | Maximum 6th highest[i] Highest 2nd highest[j] |
| $NO_2$ | Annual | 1 | 100[f] | Maximum 1st highest[g] |
| Arsenic | Annual | N/A | 2.3E-04[f] | Maximum 1st highest[g] |
| Benzene | Annual | N/A | 1.2E-01[f] | Maximum 1st highest[g] |
| Benzo(a)pyrene | Annual | N/A | 3.0E-04[f] | Maximum 1st highest[g] |
| Cadmium | Annual | N/A | 5.6E-04[f] | Maximum 1st highest[g] |
| Chromium | Annual | N/A | 8.3E-05[f] | Maximum 1st highest[g] |
| Formaldehyde | Annual | N/A | 7.7E-02[f] | Maximum 1st highest[g] |
| Nickel | Annual | N/A | 4.2E-03[f] | Maximum 1st highest[g] |
| PAH | Annual | N/A | 3.0E-04[f] | Maximum 1st highest[g] |

[a] IDAPA 58.01.01.006.93
[b] Micrograms per cubic meter.
[c] IDAPA 58.01.01.577 for criteria pollutants, IDAPA 58.01.01.585 for non-carcinogenic toxic air pollutants IDAPA 58.01.01.586 for carcinogenic toxic air pollutants.
[d] The maximum 1st highest modeled value is always used for significant impact analysis and for all toxic air pollutants.
[e] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers.
[f] Never expected to be exceeded in any calendar year.
[g] Concentration at any modeled receptor.
[h] Never expected to be exceeded more than once in any calendar year.
[i] Concentration at any modeled receptor when using five years of meteorological data.
[j] The highest 2nd high is considered to be conservative for five years of meteorological data.
[k] Not to be exceeded more than once per year.

## 2.2 *Background Concentrations*

The default background concentrations for rural agricultural areas in DEQ's background concentration data[1] for $PM_{10}$ and $NO_x$ were used in this analysis.

| Table 2.2 BACKGROUND CONCENTRATIONS. | | |
|---|---|---|
| **Pollutant** | **Averaging Period** | **Background concentrations (µg/m³)[a]** |
| $PM_{10}$ | 24-hour | 73 |
| | Annual | 26 |
| $NO_2$ | Annual | 17 |

[a]. Micrograms per cubic meter

[1] Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

## 3. ASSESSMENT OF SUBMITTED, CERTIFIED MODELING ANALYSIS

### 3.1 Modeling Methodology

**Table 3.1 MODELING PARAMETERS.**

| Parameter | What Facility Submitted | DEQ's Review/Determination |
|---|---|---|
| Modeling protocol | Gossner submitted a modeling protocol which was reviewed and approved by DEQ. | The modeling analysis was conducted in accordance with the modeling protocol. |
| Model Selection | ISCST3 | ISCST3 is an EPA recommended model; however it cannot calculate concentrations in building cavities. DEQ reran the modeling analysis with ISCPRIME. The PRIME algorithm calculates the concentrations in building cavities. This is appropriate for this facility because the buildings are located near the fenceline and cavity regions could extend into ambient air. |
| Meteorological Data | 2000 Heyburn data | This is the most representative data available for this area. |
| Model Options | Regulatory defaults except that missing meteorological data was allowed. | The Heyburn meteorological data has some missing data points. However, the data conforms to the quality assurance standard of 90% completeness per quarter. |
| Land Use | Rural | The area surrounding this facility is primarily rural or agricultural |
| Complex Terrain | Complex terrain was analyzed in this analysis | This is appropriate for this area |
| Building Downwash | Building downwash was accounted for | The analysis uses the PRIME algorithm to calculate the concentrations caused by building downwash |
| Receptor Network | 25 meter spacing along the fenceline; 100 meter spacing out to 1,000 meters; 500 meter spacing out to 5,000 meters | This grid is sufficient to demonstrate compliance with the applicable ambient air quality standards |
| Facility Layout | N/A | The facility layout in the model was compared the facility plot plans provided by the applicant |

### 3.2 Emission Rates

**Table 3.2 $PM_{10}$ AND $NO_x$ EMISSION RATES**

| Stack ID | Description | $PM_{10}$ (lb/hr)[a] | $PM_{10}$ (lb/hr)[b] | $NO_x$ |
|---|---|---|---|---|
| EF1 | Exhaust Fan 1 | 6.16E-03 | 6.16E-03 | 8.11E-02 |
| EF2 | Exhaust Fan 2 | 6.16E-03 | 6.16E-03 | 8.11E-02 |
| EF3 | Exhaust Fan 3 | 9.35E-03 | 9.34E-03 | 1.23E-01 |
| EF4 | Exhaust Fan 4 | 9.35E-03 | 9.34E-03 | 1.23E-01 |
| BOILER1 | Boiler No. 1 | 1.66E-01 | 1.39E-01 | 2.40 |
| BOILER2 | Boiler No. 2 | 1.66E-01 | 1.39E-01 | 2.40 |
| EF5 | Exhaust Fan 5 | 4.45E-03 | 4.45E-03 | 5.84E-02 |
| EF6 | Exhaust Fan 6 | 4.45E-03 | 4.45E-03 | 5.84E-02 |
| GEN1 | Generator | 2.69E-01 | 1.53E-02 | 1.36 |

[a] The short term $PM_{10}$ emission rates are the maximum hourly estimated emission rates
[b] The annual $PM_{10}$ emission rates are the hourly emission rates averaged over an entire year

| Table 3.3 TOXIC POLLUTANT EMISSION RATES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Stack ID | Arsenic | Benzene | Benzo(a)-anthracene | Cadmium | Chromium | Formaldehyde | Nickel | Total PAH |
| EF1 | 1.62E-07 | 1.70E-06 | 9.70E-10 | 8.90E-07 | 1.14E-06 | 6.10E-05 | 1.70E-06 | NA |
| EF2 | 1.62E-07 | 1.70E-06 | 9.70E-10 | 8.90E-07 | 1.14E-06 | 6.10E-05 | 1.70E-06 | NA |
| EF3 | 2.46E-07 | 2.59E-06 | 1.48E-09 | 1.36E-06 | 1.72E-06 | 9.25E-05 | 2.59E-06 | NA |
| EF4 | 2.46E-07 | 2.59E-06 | 1.48E-09 | 1.36E-06 | 1.72E-06 | 9.25E-05 | 2.59E-06 | NA |
| BOILER1 | 4.86E-06 | 5.10E-05 | 2.92E-08 | 2.67E-05 | 3.40E-05 | 1.82E-03 | 5.10E-05 | NA |
| BOILER2 | 4.86E-06 | 5.10E-05 | 2.92E-08 | 2.67E-05 | 3.40E-05 | 1.82E-03 | 5.10E-05 | NA |
| EF5 | 1.17E-07 | 1.23E-06 | 7.00E-10 | 6.45E-07 | 8.20E-07 | 4.39E-05 | 1.23E-06 | NA |
| EF6 | 1.17E-07 | 1.23E-06 | 7.00E-10 | 6.45E-07 | 8.20E-07 | 4.39E-05 | 1.23E-06 | NA |
| GEN1 | NA | 7.74E-03 | 2.56E-06 | NA | NA | 7.86E-04 | NA | 5.04E-05 |

## 3.3 *Emission Release Parameters*

| Table 3.4 STACK RELEASE PARAMETERS | | | | | | | |
|---|---|---|---|---|---|---|---|
| Stack ID | Easting (m) | Northing (m) | Elevation (m) | Stack Height (ft) | Stack Temperature (°F) | Exit Velocity (m/s) | Stack Diameter (ft) |
| EF1 | 273,409.9 | 4,714,281.5 | 1,265.5 | 33.0 | 479.93 | 6.22 | 3.05 |
| EF2 | 273,413.0 | 4,714,288.0 | 1,265.5 | 33.0 | 479.93 | 6.22 | 3.05 |
| EF3 | 273,380.4 | 4,714,190.5 | 1,265.4 | 34.0 | 479.93 | 4.98 | 4.27 |
| EF4 | 273,389.8 | 4,714,184.5 | 1,265.4 | 34.0 | 479.93 | 4.98 | 4.27 |
| EF5 | 273,382.4 | 4,714,174.0 | 1,265.3 | 33.0 | 479.93 | 4.84 | 3.05 |
| EF6 | 273,378.8 | 4,714,169.0 | 1,265.2 | 33.0 | 479.93 | 4.84 | 3.05 |
| BOILER1 | 273,405.0 | 4,714,214.0 | 1,265.4 | 35.0 | 400.73 | 8.86 | 2.00 |
| BOILER2 | 273,400.5 | 4,714,205.0 | 1,265.4 | 35.0 | 400.73 | 8.86 | 2.00 |
| GEN1[a] | 273,364.4 | 4,714,317.0 | 1,265.8 | 10.0 | 744.53 | 107.4 | 0.67 |
| [a] The generator's temperature and exit velocity were reduced by DEQ to 300°F and 50 m/s, respectively. | | | | | | | |

DEQ reviewed the emission release parameters for all of the stacks identified in the modeling analysis. DEQ staff believe that the emission release parameters provided by the generator manufacturer represent conditions at the generator exhaust manifold, rather than the stack tip.

## 3.4 *Results*

### 3.4.1 *Full Impact Analysis Results*

| Table 3.5 FULL IMPACT ANALYSIS RESULTS | | | | | | |
|---|---|---|---|---|---|---|
| Pollutant | Averaging Period | Facility Ambient Impact ($\mu g/m^3$) | Background Concentration ($\mu g/m^3$) | Total Ambient concentration ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) | Percent of NAAQS |
| $PM_{10}$ | 24-hour | 7.3 | 73 | 80.3 | 150 | 53.5% |
| | Annual | 1.7 | 26 | 27.7 | 50 | 55.4% |
| $NO_2$ | Annual | 30.5 | 17 | 47.5 | 100 | 47.5% |

### 3.4.2 *Toxic Air Pollutants Results*

| Table 3.6 TOXIC POLLUTANT RESULTS | | | | |
|---|---|---|---|---|
| **Pollutant** | **Averaging Period** | **Concentration ($\mu g/m^3$)** | **Toxic Standard[4] ($\mu g/m^3$)** | **Percent of Standard** |
| Arsenic | Annual | 0.00006 | 2.30E-04 | 26.1% |
| Benzene | Annual | 0.026 | 1.20E-01 | 21.7% |
| Benzo(a)anthracene | Annual | 0.00001 | 3.00E-04 | 3.3% |
| Cadmium | Annual | 0.00032 | 5.60E-04 | 57.1% |
| Chromium | 24-hour | 0.00173 | 2.50E+01 | 0.007% |
| Formaldehyde | Annual | 0.022 | 7.70E-02 | 28.6% |
| Nickel | Annual | 0.00061 | 4.20E-03 | 14.5% |
| PAH | Annual | 0.00017 | 3.00E-04 | 56.7% |

[4] The applicable standards are listed in IDAPA 58.01.01.585-586. Carcinogens are listed in section 586

The results of the dispersion modeling analysis demonstrate, to DEQ's satisfaction, that the Gossner Foods facility will not cause or contribute to a violation of any ambient air quality standards.

DH/sd G:\Air Quality\Stationary Source\SS Ltd\Modeling\modeling memos\Gossner P-040425\P-040425 Modeling Memo.doc

# APPENDIX B

## Emissions Inventory and Grain Loading Calculation

Permit to Construct No. P-040425

Gossner Food, Inc., Magic Valley Division Heyburn

Facility ID No. 067-00023

## Emission Estimate Summary

Preliminary Annual Emissions Estimates
Criteria Pollutants

| | | Emission Rate (ton/year) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Stack Name | Stack ID | PM | PM10 | NOx | SO2 | CO | VOC | Lead |
| Boiler 1* | BOILER1 | 6.60E-01 | 6.60E-01 | 3.32E+00 | 7.70E-02 | 4.04E+00 | 6.60E-01 | 5.32E-05 |
| Boiler 2* | BOILER2 | 6.60E-01 | 6.60E-01 | 3.32E+00 | 7.70E-02 | 4.04E+00 | 6.60E-01 | 5.32E-05 |
| Emergency Diesel Generator | GEN1 | 6.72E-02 | 6.72E-02 | 6.96E+00 | 1.36E+00 | 3.77E-01 | 1.62E-01 | 0.00E+00 |
| Exhaust Fan 1 | EF1 | 2.70E-02 | 2.70E-02 | 3.55E-01 | 2.13E-03 | 2.98E-01 | 1.95E-02 | 1.77E-06 |
| Exhaust Fan 2 | EF2 | 2.70E-02 | 2.70E-02 | 3.55E-01 | 2.13E-03 | 2.98E-01 | 1.95E-02 | 1.77E-06 |
| Exhaust Fan 3 | EF3 | 4.09E-02 | 4.09E-02 | 5.39E-01 | 3.23E-03 | 4.53E-01 | 2.96E-02 | 2.69E-06 |
| Exhaust Fan 4 | EF4 | 4.09E-02 | 4.09E-02 | 5.39E-01 | 3.23E-03 | 4.53E-01 | 2.96E-02 | 2.69E-06 |
| Exhaust Fan 5 | EF5 | 1.95E-02 | 1.95E-02 | 2.56E-01 | 1.54E-03 | 2.15E-01 | 1.41E-02 | 1.28E-06 |
| Exhaust Fan 6 | EF6 | 1.95E-02 | 1.95E-02 | 2.56E-01 | 1.54E-03 | 2.15E-01 | 1.41E-02 | 1.28E-06 |
| Total | | 1.56E+00 | 1.56E+00 | 1.49E+01 | 1.52E+00 | 1.04E+01 | 1.61E+00 | 1.16E-04 |
| Modeling Threshold | | | 1.00E+00 | 1.00E+00 | 1.00E+00 | | | 6.00E-01 |
| Required to Model? | | | YES | YES | YES | | | no |

Preliminary Maximum Hourly Emissions Estimates
Criteria Pollutants

| | | Emission Rate (lb/hr) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Stack Name | Stack ID | PM | PM10 | NOx | SO2 | CO | VOC | Lead |
| Boiler 1* | BOILER1 | 1.51E-01 | 1.51E-01 | 7.58E-01 | 1.76E-02 | 9.21E-01 | 1.51E-01 | 1.22E-05 |
| Boiler 2* | BOILER2 | 1.51E-01 | 1.51E-01 | 7.58E-01 | 1.76E-02 | 9.21E-01 | 1.51E-01 | 1.22E-05 |
| Emergency Diesel Generator | GEN1 | 2.69E-01 | 2.69E-01 | 2.38E+01 | 5.42E+00 | 1.51E+00 | 6.50E-01 | 0.00E+00 |
| Exhaust Fan 1 | EF1 | 6.16E-03 | 6.16E-03 | 8.10E-02 | 4.86E-04 | 6.80E-02 | 4.46E-03 | 4.05E-07 |
| Exhaust Fan 2 | EF2 | 6.16E-03 | 6.16E-03 | 8.10E-02 | 4.86E-04 | 6.80E-02 | 4.46E-03 | 4.05E-07 |
| Exhaust Fan 3 | EF3 | 9.35E-03 | 9.35E-03 | 1.23E-01 | 7.38E-04 | 1.03E-01 | 6.77E-03 | 6.15E-07 |
| Exhaust Fan 4 | EF4 | 9.35E-03 | 9.35E-03 | 1.23E-01 | 7.38E-04 | 1.03E-01 | 6.77E-03 | 6.15E-07 |
| Exhaust Fan 5 | EF5 | 4.45E-03 | 4.45E-03 | 5.85E-02 | 3.51E-04 | 4.91E-02 | 3.22E-03 | 2.93E-07 |
| Exhaust Fan 6 | EF6 | 4.45E-03 | 4.45E-03 | 5.85E-02 | 3.51E-04 | 4.91E-02 | 3.22E-03 | 2.93E-07 |
| Total | | 6.10E-01 | 6.10E-01 | 2.59E+01 | 5.46E+00 | 3.79E+00 | 9.60E-01 | 2.69E-05 |
| Modeling Threshold | | | 2.00E-01 | | 2.00E-01 | 1.40E+01 | | |
| Required to Model? | | | YES | | YES | no | | |

Toxics

| | Heater1 | Heater2 | Heater3 | Boiler1* | Boiler2* | Generator | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| Toxic Air Pollutants[1] | Emission Rate (lb/yr) | Emission Rate (lb/hr) | Emission Rate (lb/hr) | Emission Rate (lb/hr) | Emission Rate (lb/hr) | | | IDAPA 58.01.01. 585/586 - EL (lb/hr) | Compare to EL |
| 3-Methylchloranthrene | 2.92E-09 | 4.42BE-09 | 2.10BE-09 | 4.37472E-05 | 4.37E-06 | | 9.69E-08 | 2.50E-06 | Below |
| Benzene | 3.40E-06 | 0.000005166 | 0.000002457 | 5.10384E-05 | 5.1E-05 | 7.74E-03 | 7.85E-03 | 8.00E-04 | Exceeds |
| Benzo(a)pyrene | 1.94E-09 | 2.952E-09 | 1.404E-09 | 2.91648E-08 | 2.92E-08 | 2.58E-06 | 2.63E-06 | 2.00E-06 | Exceeds |
| Formaldehyde | 1.22E-04 | 0.0001845 | 0.00008775 | 0.0018228 | 0.001823 | 7.88E-04 | 4.83E-03 | 5.10E-04 | Exceeds |
| Hexane | 2.92E-03 | 0.004428 | 0.002106 | 0.0437472 | 0.043747 | | 9.69E-02 | 1.20E+01 | Below |
| Naphthalene | 9.88E-07 | 1.5006E-06 | 7.137E-07 | 1.48254E-05 | 1.48E-05 | 1.30E-03 | 1.33E-03 | 3.33E+00 | Below |
| Pentane | 4.21E-03 | 0.006396 | 0.003042 | 0.0631904 | 0.06319 | | 1.40E-01 | 1.18E+02 | Below |
| Toluene | 5.51E-06 | 0.000008364 | 0.000003978 | 8.26336E-05 | 8.28E-05 | 2.80E-03 | 2.98E-03 | 2.50E+01 | Below |
| o-Xylenes | | | | | | 1.92E-03 | 1.92E-03 | 2.90E+01 | Below |
| Total PAH | | | | | | 5.04E-05 | 5.04E-05 | 9.10E-05 | Below |
| Acetaldehyde | | | | | | 2.51E-04 | 2.51E-04 | 3.00E-03 | Below |
| Acrolein | | | | | | 7.85E-05 | 7.85E-05 | 1.70E-02 | Below |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Toxic Air Pollutants-Metals[1] | Emission Rate (lb/hr) | Emission Rate (lb/hr) | Emission Rate (lb/hr) | Emission Rate (lb/hr) | Emission Rate (lb/hr) | | IDAPA 58.01.01. 585/586 - EL (lb/hr) | Compare to EL |
| Arsenic | 0.000000324 | 0.000000492 | 0.000000234 | 4.8608E-06 | 4.86E-06 | 1.08E-05 | 1.50E-06 | Exceeds |
| Barium | 0.000007128 | 0.000010824 | 0.000005148 | 0.000106938 | 0.000107 | 2.37E-04 | 3.30E-02 | Below |
| Beryllium | 1.944E-06 | 2.952E-06 | 1.404E-06 | 2.91648E-07 | 2.92E-07 | 6.48E-07 | 2.80E-05 | Below |
| Cadmium | 0.000001782 | 0.000002706 | 0.000001287 | 2.67344E-05 | 2.67E-05 | 5.92E-05 | 3.70E-06 | Exceeds |
| Chromium | 0.000002268 | 0.000003444 | 0.000001638 | 3.40258E-05 | 3.4E-05 | 7.54E-05 | 3.30E-02 | Below |
| Cobalt | 1.3608E-07 | 2.0664E-07 | 9.828E-08 | 2.04154E-06 | 2.04E-06 | 4.52E-06 | 3.30E-03 | Below |
| Copper | 0.000001377 | 0.000002091 | 9.945E-07 | 2.06584E-05 | 2.07E-05 | 4.58E-05 | 1.30E-02 | Below |
| Manganese | 6.156E-07 | 9.346E-07 | 4.446E-07 | 9.23552E-06 | 9.24E-06 | 2.05E-05 | 6.70E-02 | Below |
| Mercury | 4.212E-07 | 6.396E-07 | 3.042E-07 | 6.31904E-06 | 6.32E-06 | 1.40E-05 | 1.00E-03 | Below |
| Molybdenum | 0.000001782 | 0.000002706 | 0.000001287 | 2.67344E-05 | 2.67E-05 | 5.92E-05 | 3.33E-01 | Below |
| Nickel | 0.000003402 | 0.000005166 | 0.000002457 | 5.10384E-05 | 5.1E-05 | 1.13E-04 | 2.75E-05 | Exceeds |
| Selenium | 3.888E-06 | 5.904E-06 | 2.808E-06 | 5.83296E-07 | 5.83E-07 | 1.29E-06 | 1.30E-02 | Below |
| Vanadium | 0.000003726 | 0.000005658 | 0.000002691 | 5.58992E-05 | 5.59E-05 | 1.24E-04 | 3.00E-03 | Below |
| Zinc | 0.00004698 | 0.00007134 | 0.00003393 | 0.000704816 | 0.000705 | 1.56E-03 | 3.33E-01 | Below |

## Grain Loading Calculations from a Natural Gas Fired Boiler

Emissions Unit: A boiler fired with natural gas only
Purpose: To calculate PM emissions concentration to determine compliance with grain loading standard (IDAPA 58.01.01.675)

**Source Information**

**Facility:** Gossner Swiss Cheese Plant
**Permit No.:** p-040425
**Facility ID No.:** Boiler No.1

| | | |
|---|---|---|
| Rated Heat Input Rate: [a] | 25.1 | MMBtu/hr |
| PM Emissions:[b] | 0.151 | lb/hr |
| Grain Loading Calculated:[c] | 0.004 | gr/dscf @ 3% $O_2$ |
| Grain Loading Standard: | 0.015 | gr/dscf @ 3% $O_2$ |
| **Does the boiler meet the standard?** [d] | Y | |

**Exit/Flue Gas Flowrate Calculation**

| | | |
|---|---|---|
| $F_d$:[e] | 8,710.0 | dscf/MMBtu |
| Exit Gas flowrate @ 0% $O_2$: [f] | 3,644.6 | dscfm @ 0% $O_2$ |
| Exit gas flowrate @ 3% $O_2$: [g] | 4,255.4 | dscfm @ 3% $O_2$ |

[a] Input rated heat input rate in MMBtu/hr. You can convert $10^6$ scf/hr to MMBtu/hr by multiplying 1020 But/scf, natural gas average gross heating value.

[b] The value automatically taken from the linked emissions calculation spreadsheet for this natural gas fired boiler.

[c] grain loading(gr/dscf @3% O2) = PM emissions (lb/hr) x 7,000 grain/lb /60 (min/hr) / exit gas flowrate @ 3% $O_2$ (dscfm).

[d] When the calculated grain loading is less than the standard, the result will show "meet the grain loading standard" otherwise it will show "Not meet the grain loading standard".

[e] Taken from 40 CFR 60 Appendix A, Method 19, Table 19-1. Fd: dry exit gas volumetric flow rate (under complete combustion, at standard condition, 68 $F^0$, 1 atm) per MMBtu heat input of a fuel (dscf/MMBtu)

[f] Exit gas flowrate @ 0% of $O_2$ (dscfm) = $F_d$ (dscf/MMBtu) x rated heat input rate (MMBtu/hr)/ 60 (min/hr)

[g] Exit gas flowrate @ 3% $O_2$ of (dscfm) = Exit gas flowrate @ 0% of $O_2$ (dscfm) x 20.9/(20.9-3)

dscfm: dry standard cubic feed per minute
MMBtu/hr: million British thermal unit per hour
gr: grain