DEQ
Montana Department of Environmental Quality

Air, Energy & Mining Division

April 17, 2020

Parrish Andrews
Malteurop North America, Inc. – Great Falls Malting Plant
2800 Great Bear Ave.
Great Falls, MT 59404

Dear Mr. Andrews:

Montana Air Quality Permit #3238-08 is deemed final as of April 17, 2020, by the Department of Environmental Quality (Department). This permit is for a barley malt manufacturing plant. All conditions of the Department's Decision remain the same. Enclosed is a copy of your permit with the final date indicated.

For the Department,

Julie A. Merkel
Permitting Services Section Supervisor
Air Quality Bureau
(406) 444-3626

Ed Warner
Lead Engineer – Permitting Services Section
Air Quality Bureau
(406) 444-2467

JM:EW
Enclosures:

Montana Department of Environmental Quality
Air, Energy & Mining Division

Montana Air Quality Permit #3238-08

Malteurop North America, Inc. – Great Falls Malting Plant
2800 Great Bear Avenue
Great Falls, Montana 59404

April 17, 2020

MONTANA AIR QUALITY PERMIT

Issued To:
Malteurop North America, Inc.
2800 Great Bear Avenue
Great Falls, Montana 59404

MAQP: #3238-08
Application Complete: 01/29/2020
Preliminary Determination Issued: 03/09/2020
Department's Decision Issued: 04/01/2020
Permit Final: 04/17/2020

A Montana Air Quality Permit (MAQP), with conditions, is hereby granted to Malteurop North America Incorporated (Malteurop), pursuant to Sections 75-2-204 and 211 of the Montana Code annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq*., as amended, for the following:

SECTION I: Permitted Facilities

A. Plant Location

The Malteurop facility is located approximately 2 miles north of the City of Great Falls, Montana, and approximately ½ mile west of Black Eagle Road. The legal description of the facility site is the NE ¼ of the SE ¼ of Section 30, Township 21 North, Range 4 East, in Cascade County, Montana. The coordinates for this location are 47.544 latitude, -111.264 longitude.

B. Current Permit Action

On January 29, 2020, the Department of Environmental Quality – Air Quality Bureau (Department) received an application from Bison Engineering, Inc., on behalf of Malteurop, for modification of their current MAQP. Malteurop plans to decommission the MOCO Heater #1 and install in its place a new natural gas-fired heater firing up to 57.7 million British thermal units per hour (MMBtu/hr).

SECTION II: Conditions and Limitations

A. Operational Requirements

1. Malt and salable malt by-product production shall be limited to 16,000,000 bushels during any rolling 12-month time period (ARM 17.8.749).

2. Malteurop shall not receive more than 456,000 tons of barley during any rolling 12-month time period (ARM 17.8.749).

3. Malteurop shall install, operate, and maintain three fabric filter baghouses, including BF01 – Main Process Baghouse, BF02 – Grain Receiving Baghouse, and BF04 – Product Load-Out and Grain Processing Baghouse, for the control of particulate matter (PM) and particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) from affected operations (ARM 17.8.752).

4. Malteurop shall install, operate, and maintain the Product Load-Out and Grain Processing Baghouse for the control of filterable Particulate Matter with an

aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$) emissions from affected operations (ARM 17.8.752).

5. Malteurop shall house all barley preparation processes within the workhouse and shall utilize fabric filter baghouse control for emissions from the barley preparation processes (ARM 17.8.752).

6. Malteurop shall unload all barley shipments to underground hoppers. Malteurop shall utilize fabric filter baghouse emission control on the hoppers (ARM 17.8.752).

7. Malteurop shall load all malt and salable malt by-product for shipment via covered conveyors. Malteurop shall utilize fabric filter baghouse emission control on the conveyors (ARM 17.8.752).

8. Each material transfer point for grain receiving and off-loading shall incorporate an enclosure (at least three-sided) for fugitive emission control (ARM 17.8.752).

9. Malteurop shall not cause or authorize the production, handling, storage, or transportation of any material without taking reasonable precautions to control emissions of particulate matter (ARM 17.8.308).

10. Malteurop shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

11. Malteurop shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.9 and II.A.10 (ARM 17.8.752).

12. Elemental sulfur burning for kiln operations shall be limited to 200 pounds of sulfur per kiln batch (ARM 17.8.749).

13. Total elemental sulfur burning for kiln operations (cumulative for all three kilns) shall be limited to 146,000 pounds during any rolling 12-month time period (ARM 17.8.749).

14. Total elemental sulfur burning for kiln operations (cumulative for all three kilns) shall not exceed 2,190 hours during any rolling 12-month time period (ARM 17.8.749).

15. Malteurop shall burn only pipeline-quality natural gas for the kiln operations process heaters (ARM 17.8.752).

16. Malteurop shall utilize dry low oxides of nitrogen (NO_x) combustion technology to control emissions from the HEATEC Heater #1 (25 million British thermal units per hour (MMBtu/hr)), the HEATEC Heater #2 (42 MMBtu/hr), and HEATEC Heater #3 (48 MMBtu/hr) (ARM 17.8.752).

17. The HEATEC Heater #4 shall not exceed 57.7 MMBtu/hr rated input capacity (ARM 17.8.749).

18. Malteurop shall install and operate the HEATEC Heater #4 with low NO_x burners and flue gas recirculation (ARM 17.8.752).

19. Malteurop shall install and operate the HEATEC Heater #5 with low NO_x burners and flue gas recirculation (ARM 17.8.752).

20. The design of each kiln shall include a screw auger for movement of malt product/by-product out of the kiln and the kiln heat exchanger shall be located at the top of each kiln (ARM 17.8.749).

B. Emission Limitations

1. PM_{10} emissions from the main fabric filter baghouse (BF01) shall be limited to the following (ARM 17.8.749):

    i. 0.010 grains per dry standard cubic foot (gr/dscf) of air-flow
    ii. 5.73 pounds per hour (lb/hr)

2. PM_{10} emissions from the grain receiving fabric filter baghouse (BF02) shall be limited to the following (ARM 17.8.749):

    i. 0.010 gr/dscf of air-flow
    ii. 0.62 lb/hr

3. PM_{10} emissions from the product load-out and grain processing baghouse (BF04) shall be limited to the following (ARM 17.8.752):

    i. 0.010 gr/dscf of air-flow
    ii. 1.37 lb/hr

4. Emissions from the Johnston process Heater #1 (25 MMBtu/hr capacity) shall not exceed the following (ARM 17.8.749):

    NO_x 2.39 lb/hr calculated on a 1-hour averaging period
    CO 2.01 lb/hr calculated on a 1-hour averaging period

5. Emissions from the Johnston process Heater #2 (42 MMBtu/hr capacity) shall not exceed the following (ARM 17.8.749):

    NO_x 2.39 lb/hr calculated on a 1-hour averaging period
    CO 2.01 lb/hr calculated on a 1-hour averaging period

6. Emissions from the HEATEC process Heater #1 (25 MMBtu/hr capacity) shall not exceed the following (ARM 17.8.749):

NO_x	1.32 lb/hr calculated on a 1-hour averaging period
CO	2.22 lb/hr calculated on a 1-hour averaging period

7. Emissions from the HEATEC process Heater #2 (42 MMBtu/hr capacity) shall not exceed the following (ARM 17.8.749):

NO_x	1.69 lb/hr calculated on a 1-hour averaging period
CO	2.83 lb/hr calculated on a 1-hour averaging period

8. Emissions from the HEATEC process Heater #3 (48 MMBtu/hr capacity) shall not exceed the following (ARM 17.8.749):

NO_x	2.83 lb/hr calculated on a 1-hour averaging period
CO	4.75 lb/hr calculated on a 1-hour averaging period

9. Emissions from the HEATEC process Heater #4 (57.7 MMBtu/hr capacity) shall not exceed the following (ARM 17.8.752):

NO_x	2.11 lb/hr calculated on a 1-hour averaging period
CO	2.83 lb/hr calculated on a 1-hour averaging period

10. Emissions from the HEATEC process Heater #5 (57.7 MMBtu/hr capacity) shall not exceed the following (ARM 17.8.752):

NO_x	2.11 lb/hr calculated on a 1-hour averaging period
CO	2.83 lb/hr calculated on a 1-hour averaging period

11. Sulfur dioxide (SO_2) emissions from each kiln shall be limited to 33.33 lb/hr during elemental sulfur burning (ARM 17.8.749).

12. Malteurop shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).

13. Malteurop shall not cause or authorize the production, handling, transportation, or storage of any material unless reasonable precautions to control emissions of airborne particulate matter are taken. Such emissions (including fugitive emissions) of airborne particulate matter from any stationary source shall not exhibit an opacity of 20% or greater averaged over six consecutive minutes (ARM 17.8.308).

C. Testing Requirements

1. Malteurop shall conduct Method 5 and Method 9 performance source testing, or another Method as may be approved by the Department, on the main process baghouse (BF01) and monitor compliance with the particulate and opacity

limitations in Section II.B.1 and Section II.B.12, respectively. After the initial source tests, additional source testing shall be conducted on an annual basis, or according to another source testing/monitoring schedule as may be approved by the Department in writing (ARM 17.8.105 and ARM 17.8.749).

2. Malteurop shall conduct Method 5 and Method 9 performance source testing, or another Method as may be approved by the Department, on the grain receiving baghouse (BF02) and the Product Load-Out and Grain Processing Baghouse (BF04) to monitor compliance with the particulate limitations of Section II.B.2 and II.B.3 and opacity limitations in Section II.B.12. After the initial source tests, additional source testing shall be conducted on an every 2-year basis, or according to another source testing/monitoring schedule as may be approved by the Department in writing (ARM 17.8.105 and ARM 17.8.749).

3. Malteurop shall conduct performance source testing for NO_x and CO, concurrently, on the Johnston process Heater #1 to monitor compliance with the emission limitations in Section II.B.4. After the initial source tests, additional source testing shall be conducted as required by the Department (ARM 17.8.105 and ARM 17.8.749).

4. Malteurop shall conduct performance source testing for NO_x and CO, concurrently, on the Johnston process Heater #2 to monitor compliance with the emission limitations in Section II.B.5. After the initial source tests, additional source testing shall be conducted as required by the Department (ARM 17.8.105 and ARM 17.8.749).

5. Malteurop shall conduct performance source testing for NO_x and CO, concurrently, on the HEATEC process Heater #1 to monitor compliance with the emission limitations in Section II.B.6. After the initial source tests, additional source testing shall be conducted as required by the Department (ARM 17.8.105 and ARM 17.8.749).

6. Malteurop shall conduct performance source testing for NO_x and CO, concurrently, on the HEATEC process Heater #2 and to monitor compliance with the emission limitations in Section II.B.7. After the initial source tests, additional source testing shall be conducted as required by the Department (ARM 17.8.105 and ARM 17.8.749).

7. Malteurop shall conduct performance source testing for NO_x and CO, concurrently, on the HEATEC process Heater #3 to monitor compliance with the emission limitations in Section II.B.8. After the initial source tests, additional source testing shall be conducted as required by the Department (ARM 17.8.105 and ARM 17.8.749).

8. Malteurop shall conduct performance source testing for NO_x and CO, concurrently, on the HEATEC process Heater #4 to monitor compliance with the emission limitations in Section II.B.9. After the initial source tests, additional source testing shall be conducted as required by the Department (ARM 17.8.105 and ARM 17.8.749).

9. Within 60 days after startup, but no later than 180 days after initial startup of the Heater #5, Malteurop shall conduct performance source testing for NO_x and CO, concurrently, on the HEATEC process Heater #5 to monitor compliance with the emission limitations in Section II.B.10. After the initial source tests, additional source testing shall be conducted as required by the Department (ARM 17.8.105 and ARM 17.8.749).

10. Malteurop shall conduct performance source testing on the kiln stacks to monitor compliance with the SO_2 emission limit in Section II.B.11. The source test shall be conducted while sulfur is being burned in the batch process. After the initial source test, additional source testing shall be conducted as required by the Department (ARM 17.8.105 and ARM 17.8.749).

11. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

12. The Department may require further testing (ARM 17.8.105).

D. Notification Requirements

Malteurop shall notify the Department, in writing, of the startup of HEATEC process Heater #5 permitted in MAQP #3238-08. The notice shall be submitted to the Department within 15 days of the actual startup date (postmark and/or email date).

E. Operational Reporting Requirements

1. Malteurop shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis.

   Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. Information shall be in the units required by the Department. This information may be used to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505).

2. Malteurop shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.745(1), that would include *the addition of a new emissions unit,* change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.745(l)(d) (ARM 17.8.745).

3. All records compiled in accordance with this permit must be maintained by Malteurop as a permanent business record for at least 5 years following the date

of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.749).

4. Malteurop shall document, by month, the total amount (in tons) of malt and salable malt by-product produced annually at the facility. By the 25th day of each month, Malteurop shall total the malt and salable malt by-product produced for the previous month. The monthly information will be used to monitor compliance with the rolling 12-month limitation in Section II.A.1. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

5. Malteurop shall document, by month, the total amount (in tons) of barley received annually by the facility. By the 25th day of each month, Malteurop shall total the amount (in tons) of barley received during the previous month. The monthly information will be used to monitor compliance with the rolling 12-month limitation in Section II.A.2. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

6. Malteurop shall document, per kiln batch, the total amount (in pounds) of elemental sulfur burned. Malteurop shall maintain on-site records of the amount of sulfur burned per kiln batch to monitor compliance with the limitation in Section II.A.12. A written report of the compliance verification shall be submitted with the annual emission inventory (ARM 17.8.749).

7. Malteurop shall document, by month, the total amount (in pounds) of elemental sulfur burned for kiln operations. By the 25th day of each month, Malteurop shall total the amount (in pounds) of elemental sulfur burned during the previous month. The monthly information will be used to monitor compliance with the rolling 12-month limitation in Section II.A.13. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

8. Malteurop shall document, by month, the total hours of elemental sulfur burning for kiln operations. By the 25th day of each month, Malteurop shall total the hours of elemental sulfur burning during the previous month. The monthly information will be used to monitor compliance with the rolling 12-month limitation in Section II.A.14. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).

SECTION III: General Conditions

A. Inspection – Malteurop shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver – The permit and the terms, conditions, and matters stated herein shall be deemed accepted if Malteurop fails to appeal as indicated below.

C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving Malteurop of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*. (ARM 17.8.756).

D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties, or other enforcement action as specified in Section 75-2-401, *et seq*., MCA.

E. Appeals – Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefore, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department's decision, unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department's decision on the application is final 16 days after the Department's decision is made.

F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by the Department at the location of the source.

G. Permit Fee – Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by Malteurop may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.

H. Duration of Permit – Construction or installation must begin or contractual obligations entered into that would constitute substantial loss within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall expire (ARM 17.8.762).

Montana Air Quality Permit (MAQP) Analysis
Malteurop North America Incorporated
MAQP #3238-08

I. Introduction/Process Description

A. Permitted Equipment

Malteurop North America Incorporated (Malteurop) owns and operates a barley malt manufacturing plant with a malt and salable malt by-product production capacity of 16 million bushels per year. The Malteurop plant incorporates the following equipment:

- Four steeping vessels, each 20-meters in diameter
- 8 germinating vessels, each 31-meters in diameter
- Three natural gas fired kilns incorporating the 7 permitted process heaters with a maximum rated heat input of 280.64 million British thermal units per hour (MMBtu/hr) heat input capacity
- A barley washer
- 80 silos for storing barley and malt products
- Three process fabric filter baghouses including a main process fabric filter baghouse (BF01) with an air-flow capacity of 66,800 dry standard cubic feet per minute (dscfm), a grain (barley) receiving fabric filter baghouse (BF02) with an air-flow capacity of 7,250 dscfm, and a product load-out and grain processing fabric filter baghouse (BF04) with an air-flow capacity of 16,000 dscfm
- Associated equipment

B. Source Description

The Malteurop facility is located approximately 2 miles north of the City of Great Falls, Montana, and approximately ½ mile west of Black Eagle Road. The legal description of the facility site is the NE ¼ of the SE ¼ of Section 30, Township 21 North, Range 4 East, in Cascade County, Montana.

Malt is the processed form of barley grain and a basic ingredient in the production of beer. Malting is the process by which barley is transformed into malt. The process begins with "steeping" or soaking of clean barley kernels in large tanks of water called "steeping vessels." After steeping, the barley is then removed from the steeping vessels and placed in a germinating vessel. After a period of germination, the barley is dried and roasted in a kiln to stop the germination process and reduce the moisture content of the product, now considered malt. At this stage of the process, the malt product can be easily stored and/or shipped to various locations for further processing.

Construction and operation of the proposed malting plant occurred in two phases. After construction of Phase I, the malting plant had capacity to produce from 8 to 10 million bushels of malt per year. After construction of Phase II, the malting plant capacity increased to a maximum of 16 million bushels of malt per year. The entire malting plant encompasses approximately 10 acres of land.

C. Permit History

On May 17, 2003, International Malting Company, LLC (IMC) was issued final **Montana Air Quality Permit (MAQP) #3238-00** for the operation of a barley malt manufacturing plant with an initial Phase I malt and salable malt by-product production capacity of 10 million bushels per year and a final plant (after Phase II) capacity of 16 million bushels per year. The initially permitted IMC plant incorporated the following equipment:

- Four steeping vessels, each 20-meters in diameter
- 8 germinating vessels, each 31-meters in diameter
- Three natural gas fired kilns incorporating 12 primary process heaters rated at 19.1 million British thermal units per hour (MMBtu/hr) heat input capacity per process heater and two natural gas fired booster process heaters rated at 21 MMBtu/hr and 38 MMBtu/hr heat input capacity, respectively
- A barley washer
- 80 silos for storing barley and malt products
- 8 process fabric filter baghouses (Baghouse #1 through Baghouse #8)
- Associated equipment

In addition, potential emissions from the initially proposed and permitted plant exceeded the applicable major source Title V permitting thresholds; therefore, on February 26, 2005, IMC was issued final and effective Title V Operating Permit **#OP3238-00**.

On April 12, 2005, the Department of Environmental Quality – Air Resources Management Bureau (Department) received a complete application for the modification of IMC's MAQP #3238-00. Specifically, the modification included the replacement of 8 fabric filter baghouses (total air-flow capacity of 215,000 dscfm) with a single fabric filter baghouse (air-flow capacity of 66,800 dscfm); replacement of the 14 previously permitted process and booster heaters (total heat input capacity 288.2 MMBtu/hr) with 6 proposed process heaters (total heat input capacity of 218.64 MMBtu/hr); modification of the heating system from air-to-air heat exchangers to air-to-glycol heat exchangers; change in plant layout and configuration; increase in the allowable fabric filter baghouse grain loading limit from 0.005 grains per dry standard cubic feet (gr/dscf) to 0.010 gr/dscf; and a reduction in the allowable amount of elemental sulfur (S) combusted per batch of malt from 500 pounds of S per batch (lb/batch) to 200 lb S/batch.

Prior to this permit action, potential oxides of nitrogen (NO_x), carbon monoxide (CO), and particulate matter/particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM/PM_{10}) emissions from IMC facility operations exceeded applicable Title V major source permitting thresholds. The changes resulted in a reduction in total facility potential emissions of all regulated pollutants to a level less than Title V major source permitting thresholds. Therefore, the permit action resulted in IMC being permitted as a minor source of emissions, as defined under the Title V permitting program. On June 21, 2005, the Department revoked IMC's Title V operating permit.

Finally, IMC requested that the Department remove the kilns from the emission inventory as potential PM/PM_{10} emitters. The kilns were re-designed from what was originally analyzed and permitted and according to IMC, no particulate emissions would result from the newly designed kiln operations. Because IMC was unable to provide technical

information supporting this claim and because published information contained in the Environmental Protection Agency's (EPA), AP-42, Compilation of Air Pollutant Emissions Factors, indicated that the kiln operations do in fact emit PM/PM_{10}, the Department denied this request and maintained kiln PM/PM_{10} emissions in the emission inventory under the permit action. **MAQP #3238-01** replaced MAQP #3238-00.

On July 6, 2005, the Department received a complete permit application from IMC for the modification of MAQP #3238-01. Specifically, IMC proposed the installation and operation of two new fabric filter baghouse control units for grain receiving and product load-out operations, respectively. The baghouse controlling grain receiving operations has a maximum nominal flow rate of 7,250 dscfm and a PM_{10} emission limit of 0.01 grains per dry standard cubic feet (gr/dscf) resulting in the Potential to Emit (PTE) 2.72 tons per year (TPY) of PM_{10}. The product load-out baghouse will have a maximum nominal flow rate of 3,480 dscfm and a PM_{10} emission limit of 0.01 gr/dscf, resulting in the PTE 1.31 TPY of PM_{10}.

In addition, the main process baghouse (BF01) flow rate used in the ambient air quality impact analysis conducted for MAQP #3238-01 was incorrectly reported as 59,335 actual cubic feet per minute (acfm). The correct flow rate for the affected unit is 77,404 acfm (66,800 dscfm). The modeling analysis submitted for the affected permit action addressed this correction.

Further, on August 22, 2005, the Department received comments from IMC on the Department's Preliminary Determination (PD). Specifically, IMC requested the removal of the 1-hour averaging time period requirement for the applicable baghouse pound per hour (lb/hr) emission rate limits and the removal of the applicable baghouse flow-rate limitations included in the PD.

Based on the information contained in the comment letter, the Department recognized that the 1-hr averaging times for the lb/hr applicable baghouse emission limits have the effect of creating an overly stringent compliance demonstration for the affected units, in this case. Further, because the permit imposes grain loading and lb/hr emission limits on the baghouse(s) and because these limits together ensure that compliant actual emissions will not exceed emissions analyzed under the ambient air quality impact analysis conducted for the permit modification, the Department determined that the baghouse flow-rate limitations represented redundant permit requirements, in this case. Therefore, the Department modified the compliance source test requirement for the affected units to specify that the testing, including averaging times, be conducted pursuant to Method 5 and removed the subject baghouse flow-rate conditions under the Date of Decision (DD). **MAQP #3238-02** replaced MAQP #3238-01.

On November 16, 2006, the Department received notification of proposed changes in operations at the IMC facility in accordance with the provisions contained in the Administrative Rules of Montana (ARM) 17.8.745 (de minimis rule). Specifically, IMC proposed a change in the actual location of the facility fabric filter baghouses and kiln vents, updates to the kiln building dimensions, a change in the type of emission source for baghouse BF03 from a point source to a volume source, and a change in the type of emission source for the kiln vents from volume sources to point sources. The Department determined that all proposed changes can be accomplished in accordance with the de minimis rule.

However, in accordance with ARM 17.8.745(1)(a)(iii) because the current permit action would result in changed conditions of operation at the IMC facility that would affect the plume rise or dispersion characteristics of IMC emissions, IMC was required to submit an ambient air impact analysis (modeling) to demonstrate compliance with the applicable standards. A detailed discussion of ambient impacts associated with the changed conditions of operation at the IMC facility is contained in Section VI, Ambient Air Impact Analysis, of the Permit Analysis to this permit. Further, in accordance with ARM 17.8.745(1)(a)(i) and ARM 17.8.745(2), because the proposed permit action would change the stack on BF02 and BF03 from a vertical to horizontal or downward exhaust and thereby violate an existing condition in the IMC permit (Section II.A.17, MAQP #3238-02), an Administrative Amendment in accordance with ARM 17.8.764 is required for the current permit action. Because modeling conducted for the current permit action shows compliance with all applicable standards without relying on unobstructed vertical stacks for BF02 and BF03, Section II.A.17 of MAQP #3238-02, which required unobstructed vertical stacks on the affected units, was removed under the current permit action. **MAQP #3238-03** replaced MAQP #3238-02.

On February 14, 2008, the Department received a request for an administrative amendment to MAQP #3238-03 to change the corporate name from IMC to Archer Daniels Midland Company – Malting. This permit action changed the name on MAQP #3238-03. **MAQP #3238-04** replaced MAQP #3238-03.

On February 9, 2009, the Department received a request for an administrative amendment to MAQP #3238-04 to change the corporate name from Archer Daniels Midland Company – Malting to Malteurop. This permit action changed the name on MAQP #3238-04 and updated the permit to reflect the current permit language and rule references used by the Department. **MAQP #3238-05** replaced MAQP #3238-04.

On January 26, 2009, the Department received a de minimis request regarding the relocation of the product load-out baghouse (BF03). This request was reviewed and approved via letter dated March 18, 2009. There were no changes in emissions associated with the change. The request was made to improve worker safety and allow easier access for maintenance. The de minimis request and approval was inadvertently not added to MAQP #3238-05 but was incorporated into the MAQP #3238-06 permit action.

On October 12, 2011, the Department received a permit modification request to add a new natural gas fired heater to the facility. Additionally, Malteurop requested to update the description of an existing boiler from "Future Plant Heater" to "HEATEC Heater #3". The newest heater is identical to the HEATEC Heater #3 and minor description edits for HEATEC Heater #3 were incorporated to reflect the "input" heater ratings rather than the "output" rating. Each of HEATEC Heaters #3 and #4 have an input rating of 57.7 MMBtu/hr. The potential emissions associated with HEATEC Heater #3 were increased to match HEATEC Heater #4 and updated in the emission inventory within the permit analysis. Additionally, the heater input ratings for the other existing heaters were revised slightly based on information provided by Malteurop and the CO and NO_x limits adjusted accordingly based on AP 42 emission factors. **MAQP #3238-06** replaced MAQP #3238-05.

On July 17, 2013, the Department received an application from Bison Engineering, Inc., on behalf of Malteurop, for modification of their MAQP and associated Title V Operating Permit. Malteurop revised its grain handling system to improve efficiency and enhance dust control within the grain processing workhouse. The baghouse replacement resulted in a net increase of 12,160 dry standard cubic feet per minute (dscfm) of baghouse air flow capacity. Malteurop removed Product Load-Out Baghouse BF03 and added a new fabric filer baghouse (BF04) which complements existing baghouse BF01 and also controls product load-out of particulate emissions (previously controlled by BF03). **MAQP #3238-07** replaced MAQP #3238-06.

D. Current Permit Action

On January 29, 2020, the Department received an application from Bison Engineering, Inc., on behalf of Malteurop, for modification of their current MAQP. Malteurop plans to decommission the MOCO Heater #1 and install in its place a new natural gas-fired heater firing up to 57.7 million British thermal units per hour (MMBtu/hr). Emissions from the new heater (HEATEC Heater #5) are limited to not exceed 2.11 pounds per hour (lb/hr) of oxides of nitrogen (NO_x) and 2.83 lb/hr of carbon monoxide (CO). **MAQP #3238-08** replaces MAQP #3238-07.

E. Response to Public Comments

Person/Group Commenting	Permit Reference	Comment	Department Response
No comments received			

F. Additional Information

Additional information, such as applicable rules and regulations, Best Available Control Technology (BACT)/Reasonably Available Control Technology (RACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the ARM and are available, upon request, from the Department. Upon request, the Department will provide references for location of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 – General Provisions, including but not limited to:

1. ARM 17.8.101 Definitions. This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices), and shall conduct test, emission or ambient, for such periods of time as may be necessary using methods approved by the Department.

3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source, or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq*., Montana Code Annotated (MCA).

   Malteurop shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation or to continue for a period greater than four hours.

5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction of the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner as to create a public nuisance.

B. ARM 17.8, Subchapter 2 – Ambient Air Quality, including, but not limited to the following:

1. ARM 17.8.204 Ambient Air Monitoring
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
6. ARM 17.8.221 Ambient Air Quality Standard for Visibility
7. ARM 17.8.223 Ambient Air Quality Standard for PM_{10}

Malteurop must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3 – Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

2. ARM 17.8.308 Particulate Matter, Airborne. (1) This rule requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, Malteurop shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter, Fuel Burning Equipment. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.

4. ARM 17.8.310 Particulate Matter, Industrial Process. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule.

5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. This rule requires that no person shall burn liquid, solid, or gaseous fuel in excess of the amount set forth in this rule.

6. ARM 17.8.324 Hydrocarbon Emissions--Petroleum Products. (3) No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule.

7. ARM 17.8.340 Standard of Performance for New Stationary Sources and Emission Guidelines for Existing Sources. This rule incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). This facility is not an NSPS affected source because it does not meet the applicability definition of any NSPS subpart in 40 CFR Part 60.

   40 CFR 60, Subpart DD, Standard of Performance for Grain Elevators. This subpart does not apply to the proposed facility because the facility does not meet or exceed the grain storage capacity of an affected source as defined in this subpart.

D. ARM 17.8, Subchapter 5 – Air Quality Permit Application, Operation, and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. Malteurop submitted the appropriate permit application fee for the current permit action.

2. ARM 17.8.505 When Permit Required--Exclusions. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit (excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

   An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as

may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that prorate the required fee amount.

E. ARM 17.8, Subchapter 7 – Permit, Construction and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a facility to obtain an air quality permit or permit modification if they construct, modify or use any air contaminant sources that have the PTE greater than 25 tons per year of any pollutant. Malteurop has the PTE more than 25 tons per year of total PM, PM_{10}, sulfur dioxide (SO_2), NO_x, and CO; therefore, an air quality permit is required.

3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit program.

4. ARM 17.8.745 Montana Air Quality Permits—Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that are not subject to the Montana Air Quality Permit Program.

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. Malteurop submitted the required permit application for the current permit action. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. Malteurop submitted an affidavit of publication of public notice for the January 28, 2020, issue of the *Great Falls Tribune*, a newspaper of general circulation in the Town of Great Falls, MT in Cascade County, as proof of compliance with the public notice requirements.

6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.

7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The required BACT analysis is included in Section III of this permit analysis.

8. ARM 17.8.755 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.

9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving Malteurop of the responsibility for

complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*.

10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.

11. ARM 17.8.762 Duration of Permit. An air quality permit shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or modified source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than one year after the permit is issued.

12. ARM 17.8.763 Revocation of Permit. An air quality permit may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).

13. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

14. ARM 17.8.765 Transfer of Permit. This rule states that an air quality permit may be transferred from one person to another if written notice of Intent to Transfer, including the names of the transferor and the transferee, is sent to the Department.

F. ARM 17.8, Subchapter 8 – Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the FCAA that it would emit, except as this subchapter would otherwise allow.

This facility has emissions greater than major source thresholds for greenhouse gas emissions. The source is otherwise a minor source of all other emissions with respect to PSD. Therefore, the source is not a major stationary source since this facility is not

a listed source and the facility's potential to emit is below 250 tons per year of any criteria pollutant. No review from a PSD standpoint was required for this action.

G. ARM 17.8, Subchapter 12 – Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:

   a. PTE > 100 tons/year of any pollutant;

   b. PTE > 10 tons/year of any one Hazardous Air Pollutant (HAP), PTE > 25 tons/year of a combination of all HAPs, or a lesser quantity as the Department may establish by rule; or

   c. PTE > 70 tons/year of PM_{10} in a serious PM_{10} nonattainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing MAQP #3238-08 for Malteurop, the following conclusions were made:

   a. The facility's PTE is less than 100 tons/year for all regulated pollutants.

   b. The facility's PTE is less than 10 tons/year for any one HAP and less than 25 tons/year for all HAPs.

   c. This source is not located in a serious PM_{10} nonattainment area.

   d. This facility is not subject to any current NSPS.

   e. This facility is not subject to any current National Emission Standards for Hazardous Air Pollutants (NESHAP) except 40 CFR 61, Subpart M, National Emission Standard for Asbestos.

   f. This source is not a Title IV affected source, nor a solid waste combustion unit.

   g. This source is an EPA designated Title V source for Greenhouse Gases.

   Prior to MAQP #3238-01, facility operations resulted in emissions of NO_x and CO which exceeded the applicable Title V major source permitting threshold(s); therefore, the facility was a Title V major source and received final and effective Title V Operating Permit #OP3238-00 on February 26, 2005. However, MAQP #3238-01 modified operations to the extent that potential emissions of all regulated pollutants fell below the applicable Title V threshold(s) making the facility a minor source of emissions as defined under the Title V permit program. Based on that permit action, the Department revoked Title V Operating Permit #OP3238-00 on June 21, 2005.

   After July 1, 2011, Malteurop was again subject to Title V because it met the definition of a major source of regulated pollutants based on greenhouse gas (GHG) emissions

as required by the United States Environmental Protection Agency (EPA) "Light Duty Vehicle Rule" and "Tailoring Rule." Malteurop applied for Title V Operating Permit #OP3238-01 which was issued on May 31, 2013.

The Supreme Court of the United States (SCOTUS), in its *Utility Air Regulatory Group v. EPA* decision on June 23, 2014, ruled that the Clean Air Act neither compels nor permits EPA to require a source to obtain a PSD or Title V permit on the sole basis of its potential emissions of GHG. SCOTUS also ruled that EPA lacked the authority to tailor the Clean Air Act's unambiguous numerical thresholds of 100 or 250 TPY to accommodate a CO_2e threshold of 100,000 TPY. SCOTUS upheld that EPA reasonably interpreted the Clean Air Act to require sources that would need PSD permits based on their emission of conventional pollutants to comply with BACT for GHG. As such, the Tailoring Rule has been rendered invalid and sources cannot become subject to PSD or Title V regulations based on GHG emissions alone. As an outcome of this ruling, Malteurop requested the revocation of their Title V operating permit which occurred on August 13, 2014.

III. BACT Determination

A BACT determination is required for each new or modified source. Malteurop shall install on the new or modified source the maximum air pollution control capability which is technically practicable and economically feasible, except that BACT shall be utilized.

A BACT analysis was submitted by Malteurop in Permit Application #3238-08, addressing some available methods of controlling PM/PM_{10}/$PM_{2.5}$, NO_x, CO, SO_2, and VOC emissions from the heater. The Department reviewed the proposed control methods, as well as previous BACT determinations for similar sources. The following control options have been analyzed by the Department through the BACT process.

A. NO_x BACT Analysis

NO_x will be formed during the combustion of natural gas in the process heater. NO_x formation occurs by three fundamentally different mechanisms. The principal mechanism of NO_x in natural gas combustion is thermal NO_x. The thermal NO_x mechanism occurs through the thermal dissociation and the subsequent reaction of nitrogen (N_2) and oxygen (O_2) molecules in the combustion air. Most NO_x formed through the thermal NO_x mechanism occurs in the high temperature flame zone near the burners. The formation of thermal NO_x is affected by three factors: (1) oxygen concentration, (2) peak temperature, and (3) time of exposure at peak temperature. As these factors increase, NO_x emission levels increase.

The second mechanism of NO_x formation, called prompt NO_x, occurs through early reaction of nitrogen molecules in the combustion air and hydrocarbon radicals from the fuel. Prompt NO_x reactions occur within the flame and are usually negligible when compared to the amount of NO_x formed through the thermal NO_x mechanism. However, prompt NO_x levels may become significant with the use of ultra-low-NO_x burners.

The third mechanism of NO_x formation, called fuel NO_x, stems from the evolution and reaction of fuel-bound nitrogen compounds with oxygen. Due to the characteristically low

fuel nitrogen content of natural gas, NO_x formation through the fuel NO_x mechanism for boilers fired with natural gas is insignificant.

1. NOx Control Technology Identification

   NO_x emissions from the process heater can be reduced by several different methods. The following NO_x control technologies were analyzed for application to the process heater. These control technologies can be applied individually or in combination:

   - Selective Catalytic Reduction (SCR)
   - Selective Non-Catalytic Reduction (SNCR)
   - Combustion Controls – Low NO_x Burners with Flue Gas Recirculation

   The following text provides an explanation and analysis of each selected control technology/strategy listed above.

   a. SCR

      SCR is a post combustion gas treatment technique that uses a catalyst to reduce NO and NO_2 to molecular Nitrogen (N), water (H_2O), and oxygen (O_2). Ammonia (NH_3) is commonly used as the reducing agent. The United States Environmental Protection Agency (EPA) Air Pollution Control Technology Fact Sheet for SCR (EPA-452/F-03-032) states that the control efficiency for an SCR system is between 70% and 90%.

      Ammonia vaporized and injected into the flue gas upstream of the catalyst bed combines with NO_x at the catalyst surface to form an ammonium salt intermediate. The ammonium salt intermediate then decomposes to produce elemental nitrogen and water. Another alternative is to inject an aqueous ammonia solution. Through this process the ratio of NH_3 to NO_x can be varied to achieve the desired level of NO_x reduction; however, increasing the ratio to greater than 1 results in increased un-reacted ammonia passing through the catalyst and into the atmosphere ("ammonia slip").

      The catalyst lowers the temperature required for the chemical reaction between NO_x and NH_3. Catalysts used for the NO_x reduction include base metals, precious metals, and zeolites. Commonly, the catalyst of choice for the reaction is a mixture of titanium and vanadium oxides.

      An attribute common to all catalysts is the narrow "window" of acceptable system temperatures. For SCR, this temperature window is approximately 480°F to 800°F (EPA-452/F-03-032). At temperatures below this window, the NO_x reduction reaction will not proceed. Operation at temperatures exceeding this window will shorten catalyst life and can lead to the oxidation of NH_3 to either nitrogen oxides (thereby increasing NO_x emissions) or possibly generating explosive levels of ammonium nitrate in the exhaust gas stream. The exhaust gas may need to be either heated or cooled in order to fall within this window of acceptable system temperatures.

Other factors impacting the effectiveness of SCR include catalyst reactor design, operating temperature, the type of fuel fired, sulfur content of the fuel, design of the NH_3 injection system, and the potential for catalyst poisoning. Also, the disposal of spent catalyst must be considered. Unlike zeolite and precious metal catalysts, base metal catalysts constitute a hazardous waste.

b. SNCR

SNCR involves the non-catalytic decomposition of NO_x to nitrogen and water. A nitrogenous reducing agent, typically ammonia or urea, is injected into the exhaust gas stream. Because a catalyst is not used to drive the reaction, temperatures of 1600°F to 2100°F are required according to the EPA Air Pollution Control Technology Fact Sheet for SNCR (EPA-452/F-03-031).

NO_x removal efficiency varies considerably for this technology, depending on inlet NO_x concentrations, fluctuating flue gas temperatures, residence time, amount and type of nitrogenous reducing agent, mixing effectiveness, and the presence of interfering chemical substances in the gas stream. Reductions of 30% to 50% can be expected (EPA-452/F-03-031).

As with SCR, technical difficulties exist for SNCR application. Since SNCR requires a flue gas temperature of 1600°F to 2100°F and the stack temperature for the process heater is cooler than this, additional burners would be required to raise the flue gas temperature. Additional burners would produce additional emissions and consume additional energy resources.

c. Combustion Controls – Low NO_x Burners with Flue Gas Recirculation

Combustion controls are features of the heater that reduce the formation of NOx at the source.

Low NO_x Burners and Ultra Low NO_x Burners – Low NO_x Burners (LNB) integrate staged combustion into the burner creating a fuel-rich primary combustion zone. Fuel NO_x formation is decreased by the reducing conditions in the primary combustion zone. Thermal NO_x is limited due to the lower flame temperature caused by the lower oxygen concentration. The secondary combustion zone is a fuel-lean zone where combustion is completed. LNB may result in increased CO and hydrocarbon emissions, decreased heater efficiency, and increased fuel costs. Ultra Low NO_x Burners (ULNB) further reduce NO_x emissions at the expense of efficiency with the addition of internal recirculation of combustion gases.

Flue Gas Recirculation – Flue Gas Recirculation (FGR) is a flame-quenching technique that involves recirculation a portion of the flue gas from the economizers or the air heater outlet and returning it to the furnace through the burner or windbox. The primary effect of FGR is to reduce the peak flame temperature through absorption of the combustion heat by relatively cooler flue gas. FGR also services to reduce the O_2 concentration in the combustion zone.

2. Eliminate Technically Infeasible NO_x Control Options

   All of the identified control alternatives are considered technically feasible; therefore, none have been eliminated based on this criterion.

3. Rank Control Technologies by NO_x Control Effectiveness

   The heater that Malteurop will install has LNB and FGR as standard equipment and built into the base price of the heater package. Therefore, combustion controls of LNB and FGR are considered the baseline case for NO_x reductions.

   The application provided a ranked table which also offered a corresponding NO_x emission rate based on the estimated achievable control efficiencies of the pollution control technologies.

Control Technology	NO_x Reduction (% control)	NO_x Reduction from Baseline (% control)	NO_x Emission Rate (lb/MMBtu)
SCR	Additional 70 to 90% (max used for evaluation)	90%	0.0036
SNCR	Additional 30 to 50% (max used for evaluation)	50%	0.018
ULNB	Up to 80%	44%	0.02
Baseline: Combustion Controls, LNB with FGR	67%	0	0.036
Uncontrolled[1]	0%	NA	0.098

4. Evaluate Controls and Document Results

   SCR – SCR offers the highest level of potential reduction of NO_x emissions over the baseline case at up to 90%. Although there are no prohibitive environmental issues that would preclude the use of SCR, there are potential adverse impacts to the environment. Unreacted ammonia in the flue gas (ammonia slip) and the products of secondary reactions between ammonia and other species present in the flue gas will be emitted to the atmosphere. Ammonia slip can be corrosive to downstream exhaust handling equipment as well as causing in increase in opacity of the exhaust plume. Consideration must be made for addressing the onsite storage of large volumes of ammonia. MAQP application #3238-08 provided an economic impact analysis for SCR which addressed capital costs as well as annual costs from operating labor and materials, maintenance, utilities, overhead, administrative charges, property taxes, and insurance. This economic impact of SCR results in a cost-effectiveness of $23,033 per ton of NO_x removed from the exhaust stream. At maximum potential effectives, application of SCR could remove 8 tons of NO_x per year.

   SNCR – SNCR offers the next highest level of potential reduction of NO_x emissions over the baseline case at up to 50%. Like SCR, there are no prohibitive environmental issues that would preclude the use of SNCR. Ammonia slip and secondary reactions between ammonia and other species in the flue gas are also impacts of SNCR, as well as

consideration of the onsite storage of large volumes of ammonia. The economic impact analysis provided in MAQP application #3238-08 provided a figure of $21,416 per ton of NO_x removed from the exhaust stream from the application of SNCR, removing 4 tons per year when operated at maximum potential effectiveness.

Combustion Controls – The third highest level of control identified is LNB with FGR. The use of combustion controls to minimize NO_x formation can have a slight but acceptable adverse effect on CO formation. In addition, there is a small energy penalty from LNB because they are slightly less efficient than a standard burner, increasing the fuel required for achieving the equivalent heat output. Increased electrical power is also needed to power the fans to operate the FGR system. These impacts are typically deemed acceptable and are in common practice today. The energy impacts from ULNB are higher than for LNB. As LNB and FGR are part of the base heater package, economic impact from their operation has not been calculated. MAQP application #3238-08 provided a cost-effectiveness of $37,515 per ton of NO_x formation prevented through the use of ULNB, corresponding to 4 tons per year of NO_x when operated at maximum potential effectiveness.

5. NO_x BACT Selection

The Department analyzed the use of SCR, SNCR, and LNB/ULNB with FGR combustion controls as possible NO_x control technologies/strategies for the heater. SCR, SNCR, and ULNB resulted in economic impacts which are unacceptable for the environmental benefit they offer. Therefore, they are removed from consideration as BACT for the heater. The Department determined that LNB with FGR will constitute the appropriate level of NO_x emissions control to achieve BACT for the heater. Malteurop proposed a BACT emission limit based on an emission factor of 0.0365 pounds per million British thermal units (lb/MMBtu) of heat input capacity. The summary of EPA RACT/BACT/LAER Clearinghouse (RBLC) results for NO_x control of similarly sized boilers and heaters indicates that this emission factor is consistent with other recently permitted units employing similar pollution control strategies at major sources. Therefore, the Department accepts the proposed NO_x emission limit of 2.11 pounds per hour (lb/hr) on a 1-hour clock average, with concentrations referenced to 3% dry stack oxygen as BACT. This limit is based on the emission factor of 0.0365 lb/MMBtu while operating at the maximum firing rate of 57.7 MMBtu/hr. The proposed BACT would be expected to present control costs comparable to other recently permitted similar sources, and is capable of achieving the appropriate emissions standards.

B. CO and VOC BACT Analysis

CO and VOC are formed from incomplete combustion of organic constituents within natural gas in the heater. Because CO and VOC are generated and controlled by the same mechanisms, they are analyzed together for purposes of this BACT. In an ideal process, complete combustion of organics results in the emission of water vapor carbon dioxide. When organic compounds do not oxidize completely, the result is CO and various VOCs.

CO and VOC emissions from the process heater can be reduced by implementing the following techniques:

- Complete oxidation of the exhaust stream after it leaves the heater burner, and
- Improving combustion conditions to facilitate complete combustion in the heater burner.

Post-combustion CO and VOC control is accomplished via add-on equipment that creates an environment of high temperature and oxygen concentration to promote complete oxidation of the CO and VOC remaining in the exhaust. The use of certain catalyst materials can facilitate this process at relatively lower temperatures.

1. CO and VOC Control Technology Identification

   CO and VOC emissions from the process heater can be reduced by the following control technologies:

   - Thermal oxidation
   - Catalytic oxidation
   - Proper system design and operation

   The following text provides an explanation and analysis of each selected control technology/strategy listed above.

   a. Oxidation of Post-Combustion Gases: Thermal and Catalytic Oxidation

      Thermal Oxidation – Fundamentally, oxidizers, or incinerators, use heat to complete the complete the conversion of CO and VOC to carbon dioxide and water in the gas stream. The thermal oxidizer acts as a supplementary combustion chamber to facilitate this conversion. Temperature, residence time, and turbulence of the system affect the control efficiency. A thermal oxidizer/incinerator generally operates at temperatures greater than 1400°F according to the EPA Air Pollution Control Technology Fact Sheet for Regenerative Incinerators (EPA-452/F-03-021). This high-temperature environment is produced by the combustion of supplemental fuel, generally natural gas. Several design variations address different inlet concentrations, air flow rates, fuel efficiency requirements and other operational variables. All of them function using the same basic principles. One commonly used design is called a regenerative thermal oxidizer (RTO), which is evaluated for this BACT analysis. This type of thermal oxidizer typically uses a bed of ceramic packing material to capture heat from the incineration process and preheat the incoming exhaust gas with it. This design improves thermal efficiency and reduces the amount of supplemental fuel that must be combusted. RTOs can reduce VOC emissions by up to 99%; however, they are less effective at reducing CO (EPA-452/F-03-021). MAQP application #3238-08 provided a CO control efficiency range of 70-90% for RTO.

      Catalytic Oxidation – Catalytic oxidizers employ the same principles as thermal oxidizers, but they use catalysts to lower the temperature required to effect complete oxidation. The optimum temperature range for catalytic oxidizers is generally about

800ºF (EPA-452/F-03-021). The lower temperature requirement reduces the amount of natural gas needed to fuel the ABC abatement system and the overall size of the incinerator. Catalytic oxidizers achieve up to 99% VOC control efficiency and more than 98% of CO (EPA-452/F-03-021).

b. Proper System Design and Operation

In an ideal combustion process, all of the carbon and hydrogen contained within the fuel are oxidized to carbon dioxide (CO_2) and water (H_2O). The emission of CO and VOC in a combustion process is the result of incomplete organic fuel combustion.

Some fuels inherently reduce CO emissions due to physical characteristics. For example, pipeline quality natural gas generally results in much lower CO emissions as compared to various liquid or solid fuels in wide use. The proposed heater will be fired on natural gas.

Also, reduction of CO and VOC can be accomplished by controlling the combustion temperature, residence time, and available oxygen. Normal combustion practice involves maximizing the heating efficiency of the fuel in order to minimize fuel usage. This efficiency of fuel combustion will also minimize CO and VOC emissions. Maximizing fuel efficiency generally also increases the formation of NO_x emissions. Proper system design and control is considered the baseline case for this BACT analysis.

2. Eliminate Technically Infeasible CO and VOC Control Options

All of the identified control alternatives are considered technically feasible; therefore, none have been eliminated based on this criterion.

3. Rank Control Technologies by CO and VOC Control Effectiveness

Thermal and catalytic oxidizers have identical control efficiencies for VOC emissions with a range of 90-99%. MAQP application #3238-08 indicated that catalytic oxidizers have the same range of control efficiency for CO as for VOC, while thermal oxidizer CO control efficiency is generally less at 70-90%.

4. Evaluate Controls and Document Results

Catalytic Oxidizer – A catalytic oxidizer can reach the highest level of control that can be realized for CO and VOC. There are potential environmental impacts from the handling of spent catalyst. Many of the catalyst formulations are potentially toxic and subject to hazardous waste disposal regulations. A catalytic oxidizer would require the exhaust gas stream to be heated to acceptable levels to facilitate the oxidation reaction. The combustion of the additional natural gas to raise the exhaust temperature will cause an increase in additional criteria pollutant emissions. There are also additional energy requirements in fuel and electricity in order to heat the exhaust gas. These additional energy costs, as well as annualized capital, operating, and maintenance costs, were included in the economic impact analysis for a catalytic oxidizer in MAQP application #3238-08. Accounting for the increased emissions from the combustion of the additional natural gas to raise the exhaust temperature to necessary operating

temperature, the catalytic oxidizer was presented as having a cost effectiveness of $40,021 per ton of CO removed and $372,514 per ton of VOC removed. The respective potential tons of pollutant removed are 11 tons of CO and 1 ton of VOC.

Thermal Oxidizer – An RTO can reach high levels of control like the catalytic oxidizer. The RTO would require heating of the exhaust stream to acceptable levels to facilitate the oxidation reaction. The combustion of the additional natural gas to raise the exhaust temperature will cause an increase in additional criteria pollutant emissions. There are also additional energy requirements in fuel and electricity in order to heat the exhaust gas. These additional energy costs, as well as annualized capital, operating, and maintenance costs, were included in the economic impact analysis for an RTO in MAQP application #3238-08. Accounting for the increased emissions from the combustion of the additional natural gas to raise the exhaust temperature to necessary operating temperature, the RTO was presented as having a cost effectiveness of $139,207 per ton of CO removed and $1,012,785 per ton of VOC removed. The respective potential tons of pollutant removed are 7 tons of CO and 1 ton of VOC.

Proper Design and Operation – No significant environmental and energy impacts are expected from the proper design and operation of the proposed heater. Operating at maximum efficiency will increase the NO_x emissions while reducing CO and VOC emissions. Economic impacts are not expected.

5. CO and VOC BACT Selection

The Department analyzed the use of catalytic oxidation and thermal oxidation as possible CO and VOC control technologies/strategies for the heater. Catalytic and thermal oxidation resulted in economic impacts which are unacceptable for the environmental benefit they offer. Therefore, they are removed from consideration as BACT for the heater. The Department determined that the baseline case proper design and operation will constitute the appropriate level of CO and VOC emissions control to achieve BACT for the heater. Malteurop proposed a CO BACT emission limit based on an emission factor of 0.049 lb/MMBtu of heat input capacity. The summary of EPA RBLC results for CO control of similarly sized boilers and heaters indicates that this emission factor is consistent with other recently permitted units employing similar pollution control strategies at major sources. Therefore, the Department accepts the proposed CO emission limit of 2.83 lb/hr on a 1-hour clock average, with concentrations referenced to 3% dry stack oxygen as BACT. This limit is based on the emission factor of 0.049 lb/MMBtu while operating at the maximum firing rate of 57.7 MMBtu/hr.

For VOC emissions, Malteurop proposed a work practice standard in lieu of an emission limit as BACT due to compliance with CO emissions serving as a better indicator of proper combustion. The proposed a work practice standard is the sole use of natural gas as fuel in the heater as BACT. The Department accepts this as BACT for VOC emissions from the heater. The proposed BACT would be expected to present control costs comparable to other recently permitted similar sources, and is capable of achieving the appropriate emissions standards.

C. $PM/PM_{10}/PM_{2.5}$ and SO_2 BACT Analysis

Particulate and SO_2 controls are rarely applied to natural gas-fired boilers and heaters. Since natural gas has negligible ash content, filterable particulate emissions are predicted to be very low. While condensable PM are known to result from natural gas combustion, their predicted levels are also very low. Natural gas has negligible sulfur content; therefore, very little SO_2 is emitted from its combustion. Therefore, the application of any add-on controls for particulate or SO_2 emissions would be cost-prohibitive and provide little environmental benefit. Malteurop proposed a work practice standard of the sole use of natural gas as fuel in the heater as BACT. The Department accepts this as BACT for particulate and SO_2 emissions from the heater. The proposed BACT would be expected to present control costs comparable to other recently permitted similar sources, and is capable of achieving the appropriate emissions standards.

IV. Emission Inventory

	Potential to Emit in Tons/Year							
Emissions Source	**PM**	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**CO**	**VOC**	**SO_2**	**CO_2e**
Main Process Baghouse	50.16	25.08	25.08					
Grain Receiving Baghouse	5.44	2.72	2.72					
Product Load Out and Grain Processing Baghouse	12.00	6.01	1.02					
Johnston Heater #1	0.80	0.80	0.80	10.48	8.80	0.58	0.06	13,023
Johnston Heater #2	0.80	0.80	0.80	10.48	8.80	0.58	0.06	13,023
Heatec #1	0.88	0.88	0.88	5.80	9.74	0.64	0.07	12,909
Heatec #2	1.12	1.12	1.12	7.39	12.41	0.81	0.09	21,687
Heatec #3	1.88	1.88	1.88	12.39	20.81	1.36	0.15	24,785
Heatec #4	1.88	1.88	1.88	9.22	12.38	1.36	0.15	29,817
Heatec #5	1.88	1.88	1.88	9.24	12.40	1.36	0.15	29,794
SO_2 Emissions - Kilns							36.50	
Fugitive Emissions: Grain Receiving Pits	0.80	0.18	0.18					
Fugitive Emissions: Malt Kilns (3)	25.84	23.12	23.12					
Fugitive Emissions: Malt Load-Out	1.17	0.39	0.39					
Fugitive Emissions: Vehicle Traffic - Paved Roads	0.75	0.43	0.43					
TOTAL --->	**105.40**	**67.17**	**62.10**	**65.27**	**85.34**	**6.69**	**37.23**	**145,038**
TITLE V Applicability (Fugitives Excluded) --->	*76.84*	*43.05*	*37.98*	*65.27*	*85.34*	*6.69*	*37.23*	*145,038*

NOTE: PM, PM_{10}, and $PM_{2.5}$ emission values for natural gas-burning sources in this table include the condensable fractions.

Malteurop Emission Inventory Calculation Details

Main Process Baghouse
Calculations

Air Flow Capacity: 66800 dscfm
Operating Hours 8760 hours/year

PM Emissions:

Emission Factor 0.02 gr/dscf (EPA Baghouse Emission Factor)
Calculations (0.02 gr/dscf) * (66,800.00 dscfm) * 60 min/hr * 1 lb/7000 gr) = 11.45 lbs/hr
(11.45 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) = 50.16 TPY

PM_{10} Emissions:

Emission Factor 0.01 gr/dscf (Permit Limit)
Calculations (0.01 gr/dscf) * (66,800.00 dscfm) * 60 min/hr * 1 lb/7000 gr) = 5.73 lbs/hr
(5.73 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) = 25.08 TPY

$PM_{2.5}$ Emissions:

Emission Factor 0.01 gr/dscf (Permit Limit)

Calculations	(0.01 gr/dscf) * (66,800.00 dscfm) * 60 min/hr * 1 lb/7000 gr) =			5.73	lbs/hr
	(5.73 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =			25.08	TPY

Grain Receiving Baghouse Calculations			
Air Flow Capacity:	7250	dscfm	
Operating Hours	8760	hours/year	

PM Emissions:

Emission Factor	0.02	gr/dscf	(EPA Baghouse Emission Factor)		
Calculations	(0.02 gr/dscf) * (7,250.00 dscfm) * 60 min/hr * 1 lb/7000 gr) =			1.24	lbs/hr
	(1.24 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =			5.44	TPY

PM_{10} Emissions:

Emission Factor	0.01	gr/dscf	(Permit Limit)		
Calculations	(0.01 gr/dscf) * (7,250.00 dscfm) * 60 min/hr * 1 lb/7000 gr) =			0.62	lbs/hr
	(0.62 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =			2.72	TPY

$PM_{2.5}$ Emissions:

Emission Factor	0.01	gr/dscf	(Permit Limit)		
Calculations	(0.01 gr/dscf) * (8,760.00 dscfm) * 60 min/hr * 1 lb/7000 gr) =			0.62	lbs/hr
	(0.62 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =			2.72	TPY

Product Load-Out and Grain Processing Baghouse Calculations			
Air Flow Capacity:	16,000	dscfm	
Operating Hours	8760	hours/year	

PM Emissions:

Emission Factor	0.02	gr/dscf	(EPA Baghouse Emission Factor)		
Calculations	(0.02 gr/dscf) * (16,000 dscfm) * 60 min/hr * 1 lb/7000 gr) =			2.74	lbs/hr
	(2.74 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =			12.0	TPY

PM_{10} Emissions:

Emission Factor	0.01	gr/dscf	(BACT Permit Limit)		
Calculations	(0.01 gr/dscf) * (16,000 dscfm) * 60 min/hr * 1 lb/7000 gr) =			1.37	lbs/hr
	(1.37 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =			6.01	TPY

$PM_{2.5}$ Emissions:

Emission Factor	0.002	gr/dscf	(Estimate based on BACT Permit Limit)		
Calculations	(0.002 gr/dscf) * (16,000 dscfm) * 60 min/hr * 1 lb/7000 gr) =			0.23	lbs/hr
	(0.27 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =			1.02	TPY

Johnston Heater #1 (Up to 24.4 MMBTU/hr)			
Heater Input Capacity	24.4	MMBtu/hr	
Operating Hours	8760	hours/year	

Natural Gas Heating Value	1020	MMBtu/MM scf (AP-42-Table 1.4-2)		

PM Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.18	lbs/hr
	(0.18 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.80	TPY

PM_{10} Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.18	lbs/hr
	(0.18 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.80	TPY

$PM_{2.5}$ Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.18	lbs/hr
	(0.18 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.80	TPY

NO_x Emissions

Emission Factor	100	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(100 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		2.39	lbs/hr
	(2.39 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		10.48	TPY

CO Emissions

Emission Factor	84	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(84 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		2.01	lbs/hr
	(2.01 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		8.80	TPY

VOC Emissions

Emission Factor	5.5	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(5.5 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.13	lbs/hr
	(0.13 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.58	TPY

SO_2 Emissions

Emission Factor	0.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(0.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.01	lbs/hr
	(0.01 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.06	TPY

Johnston Heater #2 (Up to 24.4 MMBTU/hr)

Heater Input Capacity	24.4	MMBtu/hr
Operating Hours	8760	hours/year
Natural Gas Heating Value	1020	MMBtu/MM scf (AP-42-Table 1.4-2)

PM Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.18	lbs/hr
	(0.18 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.80	TPY

PM_{10} Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.18	lbs/hr
	(0.18 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.80	TPY

$PM_{2.5}$ Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.18	lbs/hr
	(0.18 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.80	TPY

NO_x Emissions

Emission Factor	100	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(100 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		2.39	lbs/hr
	(2.39 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		10.48	TPY

CO Emissions

Emission Factor	84	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(84 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		2.01	lbs/hr
	(2.01 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		8.80	TPY

VOC Emissions

Emission Factor	5.5	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(5.5 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.13	lbs/hr
	(0.13 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.58	TPY

SO_2 Emissions

Emission Factor	0.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(0.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(24.40 MMBtu/hour) =		0.01	lbs/hr
	(0.01 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.06	TPY

Heatec #1 (Up to 27.0 MMBTU/hr)

Heater Input Capacity	27.0	MMBtu/hr
Operating Hours	8760	hours/year
Natural Gas Heating Value	1020	MMBtu/MM scf (AP-42-Table 1.4-2)

PM Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(27.00 MMBtu/hour) =		0.20	lbs/hr
	(0.20 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.88	TPY

PM_{10} Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(27.00 MMBtu/hour) =		0.20	lbs/hr
	(0.20 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.88	TPY

$PM_{2.5}$ Emissions:

Emission Factor	7.6 lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(27.00 MMBtu/hour) =	0.20	lbs/hr
	(0.20 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	0.88	TPY

NO_x Emissions

Emission Factor	50 lb/MM scf (AP-42, Table 1.4-1) (Controlled Low NO_x burner)		
Calculations	(50 lb/MMscf) * (1 MM scf/1020 MMBTU) *(27.00 MMBtu/hour) =	1.32	lbs/hr
	(1.32 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	5.80	TPY

CO Emissions

Emission Factor	84 lb/MM scf (AP-42, Table 1.4-1)		
Calculations	(84 lb/MMscf) * (1 MM scf/8760 MMBTU) *(27.00 MMBtu/hour) =	2.22	lbs/hr
	(2.22 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	9.74	TPY

VOC Emissions

Emission Factor	5.5 lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(5.5 lb/MMscf) * (1 MM scf/1020 MMBTU) *(27.00 MMBtu/hour) =	0.15	lbs/hr
	(0.15 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	0.64	TPY

SO_2 Emissions

Emission Factor	0.6 lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(0.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(27.00 MMBtu/hour) =	0.02	lbs/hr
	(0.02 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	0.07	TPY

Heatec #2 (Up to 34.41 MMBTU/hr)

Heater Input Capacity	34.4	MMBtu/hr
Operating Hours	8760	hours/year
Natural Gas Heating Value	1020	MMBtu/MM scf (AP-42-Table 1.4-2)

PM Emissions:

Emission Factor	7.6 lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(34.41 MMBtu/hour) =	0.26	lbs/hr
	(0.26 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	1.12	TPY

PM_{10} Emissions:

Emission Factor	7.6 lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(34.41 MMBtu/hour) =	0.26	lbs/hr
	(0.26 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	1.12	TPY

$PM_{2.5}$ Emissions:

Emission Factor	7.6 lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(34.41 MMBtu/hour) =	0.26	lbs/hr
	(0.26 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	1.12	TPY

NO_x Emissions

Emission Factor	50	lb/MM scf (AP-42, Table 1.4-1) (Controlled Low NO_x burner)		
Calculations	(50 lb/MMscf) * (1 MM scf/1020 MMBTU) *(34.41 MMBtu/hour) =		1.69	lbs/hr
	(1.69 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		7.39	TPY

CO Emissions

Emission Factor	84	lb/MM scf (AP-42, Table 1.4-1)		
Calculations	(84 lb/MMscf) * (1 MM scf/8760 MMBTU) *(34.41 MMBtu/hour) =		2.83	lbs/hr
	(2.83 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		12.41	TPY

VOC Emissions

Emission Factor	5.5	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(5.5 lb/MMscf) * (1 MM scf/1020 MMBTU) *(34.41 MMBtu/hour) =		0.19	lbs/hr
	(0.19 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.81	TPY

SO_2 Emissions

Emission Factor	0.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(0.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(34.41 MMBtu/hour) =		0.02	lbs/hr
	(0.02 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.09	TPY

Heatec #3 (Up to 57.7 MMBTU/hr)

Heater Input Capacity	57.7	MMBtu/hr
Operating Hours	8760	hours/year
Natural Gas Heating Value	1020	MMBtu/MM scf (AP-42-Table 1.4-2)

PM Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		0.43	lbs/hr
	(0.43 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		1.88	TPY

PM_{10} Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		0.43	lbs/hr
	(0.43 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		1.88	TPY

$PM_{2.5}$ Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		0.43	lbs/hr
	(0.43 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		1.88	TPY

NO_x Emissions

Emission Factor	50	lb/MM scf (AP-42, Table 1.4-1) (Controlled Low NO_x burner)		
Calculations	(50 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		2.83	lbs/hr
	(2.83 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		12.39	TPY

CO Emissions

Emission Factor	84	lb/MM scf (AP-42, Table 1.4-1)		
Calculations	(84 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		4.75	lbs/hr
	(4.75 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		20.81	TPY

VOC Emissions

Emission Factor	5.5	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(5.5 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		0.31	lbs/hr
	(0.31 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		1.36	TPY

SO_2 Emissions

Emission Factor	0.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(0.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		0.03	lbs/hr
	(0.03 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		0.15	TPY

Heatec #4 (Up to 57.7 MMBTU/hr)

Heater Input Capacity	57.7	MMBtu/hr
Operating Hours	8760	hours/year
Natural Gas Heating Value	1020	MMBtu/MM scf (AP-42-Table 1.4-2)

PM Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		0.43	lbs/hr
	(0.43 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		1.88	TPY

PM_{10} Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		0.43	lbs/hr
	(0.43 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		1.88	TPY

$PM_{2.5}$ Emissions:

Emission Factor	7.6	lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(7.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		0.43	lbs/hr
	(0.43 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		1.88	TPY

NO_x Emissions

Emission Factor	37.23	lb/MM scf (Vendor BACT Proposal) (Controlled Low NO_x burner with FGR)		
Calculations	(37.23 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		2.11	lbs/hr
	(2.11 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		9.22	TPY

CO Emissions

Emission Factor	49.98	lb/MM scf (Vendor BACT Proposal) (Controlled Low NOx burner with FGR)		
Calculations	(49.98 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =		2.83	lbs/hr
	(2.83 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =		12.38	TPY

VOC Emissions

Emission Factor	5.5	lb/MM scf (AP-42, Table 1.4-2)

Calculations	(5.5 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =	0.31	lbs/hr
	(0.31 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	1.36	TPY

SO2 Emissions

Emission Factor	0.6 lb/MM scf (AP-42, Table 1.4-2)		
Calculations	(0.6 lb/MMscf) * (1 MM scf/1020 MMBTU) *(57.70 MMBtu/hour) =	0.03	lbs/hr
	(0.03 lbs/hr) * (8760 hrs/yr) *(0.0005 tons/lb) =	0.15	TPY

Heatec #5 Natural gas-fired heater (57.7 MMBtu/hr) – MAQP #3238-08

Maximum Process Rate = 0.05657 10^6 cf/hr (Supplied information, 57.7 MMBtu/hr capacity, 1020 Btu/scf)
Maximum Hours of Operation = 8,760 hrs/yr

Filterable PM Emissions:
Emission Factor = 1.9 lb/10^6 cf (AP 42, Table 1.4-2, all PM<1um, 7/98)
Calculation: (0.05657 10^6 cf/hr) * (8760 hrs/yr) * (1.9 lb/10^6 cf) * (ton/2000 lb) = 0.4708 ton/yr

Filterable PM_{10} Emissions:
Emission Factor = 1.9 lb/10^6 cf (AP 42, Table 1.4-2, all PM<1um, 7/98)
Calculation: (0.05657 10^6 cf/hr) * (8760 hrs/yr) * (1.9 lb/10^6 cf) * (ton/2000 lb) = 0.47076 ton/yr

Filterable $PM_{2.5}$ Emissions:
Emission Factor = 1.9 lb/10^6 cf (AP 42, Table 1.4-2, all PM<1um, 7/98)
Calculation: (0.05657 10^6 cf/hr) * (8760 hrs/yr) * (1.9 lb/10^6 cf) * (ton/2000 lb) = 0.47076 ton/yr

Condensable $PM_{2.5}$ Emissions:
Emission Factor = 5.7 lb/10^6 cf (AP 42, Table 1.4-2, 7/98)
Calculation: (0.05657 10^6 cf/hr) * (8760 hrs/yr) * (5.7 lb/10^6 cf) * (ton/2000 lb) = 1.41229 ton/yr

CO Emissions:
Emission Factor = 2.83 lb/hr (BACT emission limit, MAQP #3238-08)
Calculation: (8760 hrs/yr) * (2.83 lb/hr) * (ton/2000 lb) = 12.39540 ton/yr

NO_x Emissions:
Emission Factor = 2.11 lb/hr (BACT emission limit, MAQP #3238-08)
Control Efficiency = 0% (Built into emission factor)
Calculation: (8760 hrs/yr) * (2.11 lb/hr) * (ton/2000 lb) = 9.24180 ton/yr

SO_2 Emissions:
Emission Factor = 0.6 lb/10^6 cf (AP 42, Table 1.4-2, 7/98)
Calculation: (0.05657 10^6 cf/hr) * (8760 hrs/yr) * (0.6 lb/10^6 cf) * (ton/2000 lb) = 0.14866 ton/yr

VOC Emissions:
Emission Factor = 5.5 lb/10^6 cf (AP 42, Table 1.4-2, 7/98)
Calculation: (0.05657 10^6 cf/hr) * (8760 hrs/yr) * (5.5 lb/10^6 cf) * (ton/2000 lb) = 1.36274 ton/yr

CH_4 Emissions:
Emission Factor = 2.3 lb/10^6 cf (AP 42, Table 1.4-2, 7/98)
Calculation: (0.05657 10^6 cf/hr) * (8760 hrs/yr) * (2.3 lb/10^6 cf) * (ton/2000 lb) = 0.56987 ton/yr
CO2e = 0.56987 * 21 = 11.96732 ton/yr (CH4 GWP = 21, 40 CFR 98, Subpart A, Table A-1)

N_2O Emissions:

Emission Factor = 0.64 lb/10^6 cf (AP 42, Table 1.4-2, LNB, 7/98)
Calculation: (0.05657 10^6 cf/hr) * (8760 hrs/yr) * (0.64 lb/10^6 cf) * (ton/2000 lb) = 0.15857 ton/yr
CO2e = 0.15857 * 310 = 49.15768 ton/yr

CO_2 Emissions:
Emission Factor = 120000 lb/10^6 cf (AP 42, Table 1.4-2, 7/98)
Calculation: (0.05657 10^6 cf/hr) * (8760 hrs/yr) * (120000 lb/10^6 cf) * (ton/2000 lb) = 29,732.47 ton/yr

CO_2e Emissions:
$CO_2e(Total) = CO_2 + CO_2e(CH_4) + CO_2e(N_2O)$
CO2e(Total) = 29,732 + 12 + 49 = 29,794 ton/yr

Elemental Sulfur Burning

Molecular Weight (Sulfur)	32 lb/mol		
Molecular Weight (SO_2)	64 lb/mol		
Batch Process Duration	36 hrs/batch (Company Information)		
Sulfur Burning Duration_ Batch Process	3hr/kiln batch (Company Information)		
Maximum Sulfur Burned/Batch	200 lb/kiln batch (Permit Limit)		
Barley Sulfur Absoprtion	75% (Company Conservative Estimate) (Translates to 25% Sulfur Remaining)		
Kiln Throughput Capacity	380 ton/batch/kiln (Company Information)		
Number of kilns	3 kilns		
Operating Hours	8760 hr/yr		
Combined Total Barley throughput Capacity	(For 3 kilns)		
Calculations: 380 ton/batch/Kiln**1 batch/36 hr/kiln*8760 hr/yr*3 kilns =		277400	ton/yr
Total Number of Batches Processed/Year (Combined 3 Kilns) 277,400 tons/yr*1 batch/380 tons =		730	batches

Sulfur Burning Duration

Calculations: 730 batches/yr*3 hr S burning/batch =	2190	hr S burning/yr

SO_2 Emissions - Kilns

Calculations: 200 lbs/kiln batch * 1 kiln batch/3 hrs*64 lbs SO_2/32 lb S*(1-.75) =	33.33	lbs/hr
Calculations: 33.33 lb/hr* 3 hr/batch* 730 batches/yr * 0.0005 ton/lb =	36.50	tons/yr

Fugitive Emissions: Grain Receiving Pits

Barley Density	48 lb/bushel		
Process Rate	19,000,000 bushels/yr (Limit based on equipment Capacity)		
Calculations	48 lb/bushel*19,000,000 bushels/yr*0.0005 ton/lb =	456000	tons/yr

PM Emissions

Emission Factor	0.035 lb/ton (AP-42, Table 9.9.1-1, SCC03-02-005, Hopper Truck)		
Emission Control	90% (3-sided enclosure)		
Calculations	0.035 lb/ton*456,000 ton/yr * (1-0.9)*0.0005 tons/lb=	0.80	tons/yr

PM_{10} Emissions

Emission Factor	0.0078 lb/ton (AP-42, Table 9.9.1-1, SCC03-02-005, Hopper Truck)		
Emission Control	90% (3-sided enclosure)		
Calculations	0.0078 lb/ton*456,000 ton/yr * (1-0.9)*0.0005 tons/lb=	0.18	tons/yr

$PM_{2.5}$ Emissions

Emission Factor	0.0078 lb/ton (AP-42, Table 9.9.1-1, SCC03-02-005, Hopper Truck)		
Emission Control	90% (3-sided enclosure)		
Calculations	0.0078 lb/ton*456,000 ton/yr * (1-0.9)*0.0005 tons/lb=	0.18	tons/yr

Fugitive Emissions: Malt Kilns (3)

Malt Density	34 lb/bushel		
Process Rate	16,000,000 bushels/yr (Company Information)		
Calculations	34 lb/bushel*16,000,000 bushels/yr*0.0005 tons/lb = 272,000 ton/yr		

PM Emissions

Emission Factor	0.19 lb/ton (AP-42, Table 9.9.1-2)		
Calculations	0.19 lb/ton*272,000 ton/yr *0.0005 tons/lb	25.84	tons/yr

PM_{10} Emissions

Emission Factor	0.17 lb/ton (AP-42, Table 9.9.1-2)		
Calculations	0.17 lb/ton*272,000 ton/yr *0.0005 tons/lb=	23.12	tons/yr

$PM_{2.5}$ Emissions

Emission Factor	0.19 lb/ton (AP-42, Table 9.9.1-2)		
Calculations	0.19 lb/ton*272,000 ton/yr *0.0005 tons/lb=	23.12	tons/yr

Fugitive Emissions: Malt Load-Out (2 spouts @190 tph and 2 spouts at 100 tph)

Process Rate	272,000 ton/yr (Malt Production Capacity)		

PM Emissions

Emission Factor	0.086 lb/ton (AP-42, Table 9.9.1-1, SCC03-02-005-52, Truck)		
Emission Control	90% (3-sided enclosure)		
Calculations	0.086 lb/ton*272,000 ton/yr * (1-0.9)*0.0005 tons/lb=	1.17	tons/yr

PM_{10} Emissions

Emission Factor	0.029 lb/ton (AP-42, Table 9.9.1-1, SCC03-02-005-52, Truck)		
Emission Control	90% (3-sided enclosure)		
Calculations	0.029 lb/ton*272,000 ton/yr * (1-0.9)*0.0005 tons/lb=	0.39	tons/yr

$PM_{2.5}$ Emissions

Emission Factor	0.029 lb/ton (AP-42, Table 9.9.1-1, SCC03-02-005-52, Truck)		
Emission Control	90% (3-sided enclosure)		
Calculations	0.029 lb/ton*272,000 ton/yr * (1-0.9)*0.0005 tons/lb=	0.39	tons/yr

Fugitive Emissions: Vehicle Traffic - Paved Roads

Assumptions:

E = k (sL/2)0.65 * (AP-42, Section 13.2.1.3, 10/02)

(W/3)1.5

Where:

k = 0.028	Particle size multiplier for PM and units of interest, lb/VMT (AP-42, Section 13.2.1.3, 10/02)
k = 0.016	Particle size multiplier for PM10 and units of interest, lb/VMT (AP-42, Section 13.2.1.3, 10/02)
sL = 0.5	Road surface silt loading, g/m2 (worst case default; AP-42, Section 13.2.1.3, 10/02)
W = 20	Average vehicle weight, tons (assumed)
E = 0.196	PM emission factor, lb/VMT (calculated)
E = 0.112	PM_{10} emission factor, lb/VMT (calculated)
E = 0.112	$PM_{2.5}$ emission factor, lb/VMT (assumed equal to PM_{10})
n = 2	Number of trucks per hour (Company Information)
VMT = 0.44	Vehicle miles traveled (calculated from site plan, MAQP #3238-00)

PM Emissions

Emission Factor:	0.172 lb/hr	(calculated PM emission rate)		
Calculations:	0.172 lb/hr * 8760 hr/yr * 0.0005 ton/lb =		0.75	ton/yr

PM_{10} Emissions

Emission Factor:	0.098 lb/hr	(calculated PM_{10} emission rate)		
Calculations:	0.098 lb/hr * 8760 hr/yr * 0.0005 ton/lb =		0.43	ton/yr

$PM_{2.5}$ Emissions

Emission Factor:	0.098 lb/hr	(assumed equal to PM_{10})		
Calculations:	0.098 lb/hr * 8760 hr/yr * 0.0005 ton/lb =		0.43	ton/yr

V. Existing Air Quality

The air quality of the proposed area of operation is considered attainment/unclassified for all pollutants. A narrow area along 10th Avenue South (bounded by 9th Avenue South on the north, 11th Avenue South on the south, 54th Street South on the east and 2nd Street South on the west) was formerly classified as a non-attainment area for CO but has been re-designated to attainment area status under a limited maintenance plan (LMP) effective on July 8, 2002.

VI. Ambient Air Impact Analysis

The proposed project results in a very small net increase in maximum potential emissions from some pollutants and a net decrease in others; therefore, the Department determined that only minor impacts to air quality would be expected.

VII. Taking or Damaging Implication Analysis

As required by 2-10-105, MCA, the Department conducted the following private property taking and damaging assessment.

YES	NO	
X		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
	X	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	X	3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property)
	X	4. Does the action deprive the owner of all economically viable uses of the property?
	X	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)].
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
	X	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	X	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
	X	7a. Is the impact of government action direct, peculiar, and significant?
	X	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	X	7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
	X	Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas)

Based on this analysis, the Department determined there are no taking or damaging implications associated with this permit action.

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Air, Energy & Mining Division
Air Quality Bureau
P.O. Box 200901, Helena, Montana 59620
(406) 444-3490

ENVIRONMENTAL ASSESSMENT (EA)

Issued To: Malteurop North America, Inc. – Great Falls Malting Plant
2800 Great Bear Avenue
Great Falls, Montana 59404

Montana Air Quality Permit number (MAQP): 3238-08

EA Draft: March 9, 2020
EA Final: April 1, 2020
Permit Final: April 17, 2020

1. *Legal Description of Site:* NE ¼ of the SE ¼ of Section 30, Township 21 North, Range 4 East, in Cascade County, Montana. The coordinates for this location are 47.544 latitude, -111.264 longitude.

2. *Description of Project:* Malteurop North America, Inc. (Malteurop) intends to decommission the MOCO Heater #1 and install in its place a new natural gas-fired heater firing up to 57.7 million British thermal units per hour (MMBtu/hr).

3. *Objectives of Project:* Malteurop proposes to add a new process heater to its operations to be used as the primary baseload heater for the facility.

4. *Alternatives Considered:* In addition to the proposed action, the Department also considered the "no-action" alternative. The no-action alternative would deny Malteurop the air quality permit authorizing the installation and operation of the new heater. However, Malteurop has complied with the regulatory obligations related to air quality to authorize the installation and operation of the new heater. Therefore, the "no-action" alternative was eliminated from further consideration. Other alternatives considered were discussed in the BACT analysis, Section III, in the Permit Analysis.

5. *A Listing of Mitigation, Stipulations, and Other Controls:* A list of enforceable conditions, including a BACT analysis, would be included in MAQP #3238-08.

6. *Regulatory Effects on Private Property:* The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

7. *SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS*: The following comments have been prepared by the Department.

A. *Terrestrial and Aquatic Life and Habitats*

The proposed project results in a very small net increase in maximum potential emissions from some pollutants and a net decrease in others. The nature of operations would remain unchanged at the Malteurop facility. The project is expected to have only minor impacts.

B. *Water Quality, Quantity and Distribution*

The proposed project would have no impact on the water quality, quantity, and distribution.

C. *Geology and Soil Quality, Stability and Moisture*

The proposed project would occur entirely within the existing facility and the new heater would be installed in the same location as the heater which is being decommissioned. No new land disturbance is associated with the project. There are no expected impacts to geology and soil quality, stability, and moisture.

D. *Vegetation Cover, Quantity, and Quality*

The proposed project would occur entirely within the existing facility and the new heater would be installed in the same location as the heater which is being decommissioned. No new land disturbance is associated with the project. There are no expected impacts to vegetation cover, quantity, and quality.

E. *Aesthetics*

The proposed project would occur entirely within the existing facility and the new heater would be installed in the same location as the heater which is being decommissioned. No new land disturbance is associated with the project. Normal construction activities would occur which would have a minor impact on aesthetics. No change in aesthetics is expected during normal operation of the proposed new heater.

F. *Air Quality*

The proposed project results in a very small net increase in maximum potential emissions from some pollutants and a net decrease in others. The nature of operations would remain unchanged at the Malteurop facility. MAQP #3238-08 would contain conditions and limitations related to the proposed heater which would protect air quality. The project is expected to have only minor impacts.

G. *Unique Endangered, Fragile, or Limited Environmental Resources*

The proposed project results in a very small net increase in maximum potential emissions from some pollutants and a net decrease in others. The nature of operations would remain unchanged at the Malteurop facility. Changes would occur entirely within the existing facility and the new heater would be installed in the same location as the heater which is being decommissioned. No new land disturbance is associated with the project. Because the net change in potential emissions is small, there are no expected impacts to unique endangered, fragile, or limited environmental resources associated with this project.

H. *Sage Grouse Executive Order*

The Department recognizes that the site location is not within a Greater Sage Grouse General Habitat Area as defined by Executive Order No. 12-2015.

I. *Demands on Environmental Resource of Water, Air and Energy*

This proposed project would not have any expected impact on environmental resources of water, air, and energy. The proposed heater is of similar capacity as the unit which will be decommissioned and would use the same type of fuel. Malteurop would provide for power and fuel demands from its normal power and fuel supply sources. No other utilities upgrading would be required for the project.

J. *Historical and Archaeological Sites*

The proposed project would occur entirely within the existing facility and the new heater would be installed in the same location as the heater which is being decommissioned. No new land disturbance is associated with the project. No impacts to any historical and archaeological sites are expected.

K. *Cumulative and Secondary Impacts*

This proposed project is not expected to result in any cumulative or secondary physical and biological impacts. The proposed heater is of similar capacity as the unit which will be decommissioned and would use the same type of fuel. There is no new ground disturbance associated with the project and the nature of operations at Malteurop would not change.

8. *SUMMARY OF COMMENTS ON POTENTIAL ECONOMIC AND SOCIAL EFFECTS:* The following comments have been prepared by the Department.

A. *Social Structures and Mores*

There are no planned changes to the number of employees associated with the proposed project and the nature of operations at Malteurop would remain unchanged. There are no expected impacts to social structures and mores due to the proposed project.

B. *Cultural Uniqueness and Diversity*

There are no planned changes to the number of employees associated with the proposed project and the nature of operations at Malteurop would remain unchanged. There are no expected impacts to cultural uniqueness and diversity.

C. *Local and State Tax Base and Tax Revenue*

There are no planned changes to the number of employees associated with the proposed project and the nature of operations at Malteurop would remain unchanged. There are no expected impacts to local and state tax base and tax revenue.

D. *Agricultural or Industrial Production*

The proposed project would not impact the production capacity of the Malteurop facility. No changes to facility throughput or operation are associated with the project. There are no anticipated changes to agricultural or industrial production.

E. *Human Health*

The proposed project results in a very small net increase in maximum potential emissions from some pollutants and a net decrease in others. The Department determined that only minor impacts to air quality would be expected from this action and that impacts to human health would be negligible.

F. *Access to and Quality of Recreational and Wilderness Activities*

According to MAQP #3238-08, no recreational opportunities exist on or near the site. The proposed project would have no impact on access to and quality of recreational and wilderness activities.

G. *Quantity and Distribution of Employment*

Malteurop does not intend to hire any additional employees as a result of this project. There are no anticipated impacts to quantity and distribution of employment associated with the proposed project.

H. *Distribution of Population*

Malteurop does not intend to hire any additional employees as a result of this project. There are no anticipated impacts to distribution of population associated with the proposed project.

I. *Demands for Government Services*

Government services are required for the review and issuance of the air quality permit, as well as for compliance verification with applicable conditions within MAQP #3238-08. However, these demands on government services are minor and consistent with current practices.

J. *Industrial and Commercial Activity*

There may be some minor impacts to industrial and commercial activity associated with construction activities during the installation of the proposed heater. However, ongoing operation of the heater would not have an impact on industrial and commercial activity.

K. *Locally Adopted Environmental Plans and Goals*

The Department is not aware of any locally adopted plans and goals that would be impacted by the issuance of MAQP #3238-08.

L. *Cumulative and Secondary Impacts*

There are no anticipated cumulative or secondary economic or social effects due to the issuance of MAQP #3238-08. The project would not result in any changes to facility capacity or production and Malteurop would not hire any new employees as a result of it.

Recommendation: No Environmental Impact Statement (EIS) is required.

If an EIS is not required, explain why the EA is an appropriate level of analysis: The current permitting action is for the construction and operation of new natural gas-fired heater. MAQP #3238-08 includes conditions and limitations to ensure the facility will operate in compliance with all applicable rules and regulations. In addition, there are no significant impacts associated with this proposal.

Other groups or agencies contacted or which may have overlapping jurisdiction: Montana Historical Society – State Historic Preservation Office, Natural Resource Information System – Montana Natural Heritage Program – Montana Sage Grouse Conservation Program

Individuals or groups contributing to this EA: Department of Environmental Quality – Air Quality Bureau

EA prepared by: Ed Warner
Date: February 28, 2020