

Missouri Department of dnr.mo.gov

NATURAL RESOURCES

Michael L. Parson, Governor

Carol S. Comer, Director

November 3, 2020

Peggy Grabau
Innovation and Compliance Manager
McCormick Distilling Co., Inc.
One McCormick Lane
Weston, MO 64098

RE: New Source Review Permit Correction - Permit Number: 112017-003A
Project Number: 2020-08-017; Installation Number: 165-0002

Dear Peggy Grabau:

On August 14, 2020 the Air Pollution Control Program became aware of an error in the calculation method used to determine VOC emissions from the bottling line in Permit # 112017-003 for McCormick Distilling Co., Inc. Additionally, an estimate of 40% alcohol by volume (ABV) for the ethanol used in the bottling line, instead of 50%, has since been proven to be a more accurate estimate due to testing.

In light of these new calculations, McCormick Distilling Co., Inc. requested a 40 tpy limit on VOC emissions. Because this limit would have been established in the original permit, it will now be added to the corrected version of the permit. Please replace the entire original Permit # 112017-003 with the following pages.

If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the administrative hearing commission, whose contact information is: Administrative Hearing Commission, United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.



Peggy Grabau
Page Two

If you have any questions regarding this correction, please do not hesitate to contact Dakota Fox at the department's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

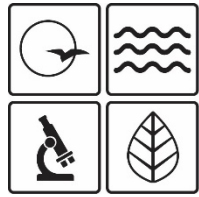
A handwritten signature in blue ink that reads "Kendall B. Hale". The signature is written in a cursive style.

Kendall B. Hale
Permits Section Chief

KBH:dfa

Enclosures

c: Kansas City Regional Office
PAMS File: 2020-08-017



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 112017-003A Project Number: 2017-07-031
Installation Number: 165-0002

Parent Company: McCormick Distilling Co., Inc.

Parent Company Address: One McCormick Lane, Weston, MO 64098

Installation Name: McCormick Distilling Co.

Installation Address: One McCormick Lane, Weston, MO 64098

Location Information: Platte County, S18, T53N, R35W

Application for Authority to Construct was made for:

The expansion of distilling and barrel aging operations. This review was conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

-
- Standard Conditions (on reverse) are applicable to this permit.
- Standard Conditions (on reverse) and Special Conditions are applicable to this permit.



Director or Designee
Department of Natural Resources

November 3, 2020
Effective Date

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Enforcement and Compliance Section of the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Enforcement and Compliance Section of the Department's Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available within 30 days of actual startup. Also, you must notify the Department's regional office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of the permit application and this permit and permit review shall be kept at the installation address and shall be made available to Department's personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit using the contact information below.

Contact Information:
Missouri Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102-0176
(573) 751-4817

The regional office information can be found at the following website:
<http://dnr.mo.gov/regions/>

Page No.	5
Permit No.	165-0002
Project No.	2020-08-017

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (3)(E). "Conditions required by permitting authority."

McCormick Distillation Co., Inc.
Platte County, S18, T53N, R35W

1. VOC Emission Limitations

- A. McCormick Distillation Co., Inc. shall emit less than 250.0 tons of VOCs in any consecutive 12-month period from the entire installation. All emission points that have the potential to emit VOC emissions are listed below.
 - 1) Grain Fermentation (EP-02)
 - 2) Distillation (EP-03)
 - 3) Natural Gas Boiler (EP-04)
 - 4) Barrel Aging (EP-05)
 - 5) Bottling (EP-06)
 - 6) Spirits Storage Tanks (EP-07)

- B. McCormick Distillation Co., Inc. shall emit less than 40.0 tons of VOCs in any consecutive 12-month period from the emission points that are listed below.
 - 1) Grain Fermentation (EP-02)
 - 2) Distillation (EP-03)
 - 3) Barrel Aging (EP-05)

- C. McCormick Distillation Co., Inc. shall develop and use forms to demonstrate compliance with Special Condition 1.A and 1.B using the Air Pollution Control Program approved efficiency factors of for VOC emissions as listed in Table 1 below and provided by the Air Pollution Control Program. The forms shall contain at a minimum the following information:
 - 1) Installation name
 - 2) Installation ID
 - 3) Permit number
 - 4) Current month
 - 5) Current 12-month date range
 - 6) Monthly throughput for each emission unit with the potential to emit VOC

Page No.	6
Permit No.	165-0002
Project No.	2020-08-017

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- 7) Monthly VOC emissions for each emission unit using the emission factors required by Special Condition 1.B.7.)
- 8) 12-month rolling total VOC emissions from all emission units, and the sum of all VOC emissions from startup, shutdown, and malfunction as reported to the Air Pollution Control Program's Compliance/Enforcement Section in accordance with the requirements of 10 CSR 10-6.050 *Start-Up, Shutdown, and Malfunction Conditions*
- 9) Indication of compliance with Special Condition 1.A.

Table 1: VOC Emission Factors

Emission Point Number	Emission Point Description	VOC Emission Factor
EP-01	Grain Handling and Unloading	N/A
EP-02	Grain Fermentation (three new 500 gallon fermenters, three existing 3500 gallon fermenters)	14.263 lb/1,000 bushels
EP-03	Distillation	0.158 tons/month ^a
EP-04	Natural Gas Boiler (5.02 MMBtu/hr)	5.5 lb/MMscf, 5.39 x 10 ⁻³ lb/MMBtu
EP-05	Barrel Aging (Adding 12,700 barrels; will have 18,500 total)	0.575 lb/barrel stored/month
EP-06	Bottling	4387.097 lb/Mgal
EP-07	Spirits Storage Tanks (Storage, Bottling, Regauge)	1.543 tons/month ^a
EP-08	Haul Roads	N/A

^aThis value represents the PTE for VOCs, and thus a throughput is not required for this emission point

2. Record Keeping and Reporting Requirements

- A. McCormick Distilling Co., Inc. shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include SDS for all materials used.
- B. McCormick Distilling Co., Inc. shall report to the Air Pollution Control Program's Compliance/Enforcement Section, by mail at P.O. Box 176, Jefferson City, MO 65102 and by e-mail at AirComplianceReporting@dnr.mo.gov, no later than 10 days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (6) REVIEW

Project Number: 2017-07-031
Installation ID Number: 165-0002
Permit Number: 112017-003A

Installation Address:
McCormick Distilling Co.
One McCormick Lane
Weston, MO 64098

Parent Company:
McCormick Distilling Co., Inc.
One McCormick Lane
Weston, MO 64098

Platte County, S18, T53N, R35W

REVIEW SUMMARY

- McCormick Distilling Co. has applied for authority to construct for the expansion of distilling and barrel aging operations.
- The application was deemed complete on July 18, 2017.
- HAPs emitted from this process result from the combustion of natural gas, fermentation, and distillation.
- None of the New Source Performance Standards (NSPS) apply to the installation.
- NSPS Subpart Kb, *Standards of Performance for Volatile Organic Liquid Storage Vessels*, does not apply because vessels at this facility are used either to store beverage alcohol or have volume less than 75 cubic meters.
- NSPS Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institution-Steam Generating Units* does not apply to the natural gas boiler because it is rated at less than 10 MMBtu/hr.
- NSPS Subpart NNN, *Standards of Performance for Volatile Organic Compound Emissions from SOCMI Distillation Operations* does not apply since the facility produces beverage alcohols.
- NSPS Subpart VV, *Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry* does not apply to the distillation process because only beverage alcohol is produced.
- None of the NESHAPs apply to this installation. None of the currently promulgated MACT regulations apply to the proposed equipment.

- No air pollution control equipment is being used in association with the new equipment.
- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential VOC emissions of the project are above de minimis levels.
- This installation is located in Platte County, an attainment area for all criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling was not performed for this review. No model is currently available which can accurately predict ambient ozone concentrations caused by this installation's VOC emissions.
- Emissions testing is not required for the equipment as a part of this permit.
- A Basic Operating Permit application is required for this installation within 30 days of commencement of operations.
- Approval of this permit is recommended without special conditions.

INSTALLATION DESCRIPTION

McCormick Distilling Co., Inc. has owned and operated a spirits distillation, storage, and bottling facility in Weston, Missouri since 1993. Prior to 1993, the installation has existed and operated under several different ownerships since 1856. The facility currently operates a grain fermentation and distillation process in order to produce whiskey. McCormick Distilling Co. distills only whiskey on site, though many other distilled spirits are bottled at the facility. An assortment of distilled spirits are transported to the facility via tanker truck and loaded into bulk exterior storage tanks. These tanks are then emptied into bottling tanks for bottling. There are currently 49 bottling tanks, 31 storage tanks, and 2 regauge tanks at the facility, many of differing capacities and locations. Certain spirits are aged in barrels typically between two to ten years. McCormick Distilling Co. initially calculated existing facility potential emissions to be less than de minimis. With the addition of extra fermentation, distillation, and barrel capacity, emissions were reevaluated over 8760 hours and VOC emissions were found to be greater than 40 tpy.

No permits have been issued to McCormick Distilling Co. from the Air Pollution Control Program.

PROJECT DESCRIPTION

McCormick Distilling Co., Inc. has applied for authority to construct distilling and barrel aging expansions. Since this is the first permit the facility has received, all other existing emission points have been incorporated into this permit as existing emission sources for informational purposes. This permitting action covers only those sources denoted as “Modified” in Table 2 below. (Note: modified sources will contain existing and new emissions and emission sources).

Table 2: Emission Points

Emission Point Number	Emission Point Description	Pollutants	Status ⁴
EP-01	Grain Handling and Unloading	PM/PM ₁₀ /PM _{2.5}	Modified
EP-02	Grain Fermentation (three new 500 gallon fermenters, three existing 3500 gallon fermenters)	VOC	Modified
EP-03	Distillation ¹	VOC	Modified
EP-04	Natural Gas Boiler (5.02 MMBtu/hr)	PM/PM ₁₀ /PM _{2.5} , SO ₂ , NO _x , VOC, CO, HAPs	Existing
EP-05	Barrel Aging (Adding 12,700 barrels; will have 18,500 total)	VOC	Modified
EP-06	Bottling	VOC	Existing
EP-07	Spirits Storage Tanks (Storage, Bottling, Regauge) ²	VOC	Existing
EP-08	Haul Roads ³	PM/PM ₁₀ /PM _{2.5}	Modified

¹Includes beer well, main distillation column, pot still, pre-barreling holding tank emissions, spent grain and solids residual VOC emissions, and all associated fugitive VOC piping/seal leaks. VOC losses from distillation were calculated by mass balance over all of the aforementioned distillation equipment.

²See Table 3 for a full list of spirit storage tanks.

³See Table 4 for a full summary of haul roads. As a part of this permit project, some haul road emission increases were estimated to increase proportionally due to small hauling vehicles which move supersacs.

⁴Modified emission points denote that emissions will increase. The emissions of this project constitute additional EP-01 supersac throughput; the addition of three new 500 gallon fermenters; additional distillation fugitive VOC emissions caused by the increased throughput from new fermenters; the addition of 12,700 new distilled spirit barrels for aging; the increased haul road emissions from additional supersac handling. Existing sources are not included in the project potential to emit. All new emissions associated with the modified sources were included in the project potential to emit.

Grains commonly used for distilling at the facility are corn, wheat and rye though they are not limited on the types of grains they may use. Bags of grain delivered to the facility in supersacs are unloaded to three foot square hopper which feeds an enclosed conveyor. The conveyor then empties into an enclosed roof cooker filled with water. The cooker will operate several cycles, cooking the grains (grain mashing). The cooker remains enclosed throughout the cooking process. Yeast is added to the cooked liquid (otherwise known as mash) and later pumped to a fermenter. The facility will operate a total of six separate fermenters of different sizes.

The final fermented grain alcohol mixture, known as “beer”, is pumped to a beer well vessel for holding. The beer well slowly pumps the beer to the top of a distillation column at around 9.5 gallons/minute. Beer will flow down the top of the distillation column while steam from a natural gas boiler is injected from the bottom. Product alcohol and water will migrate through a condenser connected to the top of the column. Solids and excess water will migrate to the bottom of the column. The solids and excess water are pumped to a thick stillage tank with a cylindrical screen. The screen captures spent grains and other solids while the excess water falls through the cylindrical screen to the thin stillage tank. The excess water is pumped back to the cooker for the next batch while the screened solids are picked up by farmers as livestock feed.

Alcohol and water that condense from the top of the distillation column are fed to a small pot still. The small pot still distills the alcohol further; alcohol and water are further evaporated from the top of the still while excess water remains in the bottoms of the pot still. Some excess water is left in the pot still and some is recycled to the beer well. The alcohol and water that evaporates from the small pot still are condensed and piped to a holding tank where water may be added to the alcohol via reverse osmosis. This lowers the alcohol proof significantly. The alcohol within the holding tank is emptied into barrels with closed tops for storage anywhere from 2 years to 10 years. After sitting for extended periods of time, the barrels are emptied into bottling tanks directly before pouring the alcohol into bottles. A boiler is located at the facility which has a HHV of 5.02 MMBtu/hr of natural gas. The natural gas boiler will be used to provide steam and heat for the distillation process.

McCormick is preparing to produce spirits with longer aging times – some aged 10 years compared to the current aging of 2-3 years. McCormick’s current maximum amount stored in barrel aging is 5,800 barrels (EP-04). In order to accommodate longer aging times, barrel aging capacity will need to be expanded over an extended time period. With the additional 10-year aging process, McCormick has estimated that a total of 18,500 barrels aging in inventory will be needed by the year 2027, with significant increases in inventory starting in 2018. The aging of distilled spirits accounts for most of the VOC emissions at the facility.

The facility currently houses 49 Bottling Tanks, 31 Storage Tanks, and two (2) Regauge Tanks. Tank volume, shell height/length, diameter, and roof radius vary with among tanks (see Table 3 below for full list of bottling, storage, and regauge tanks). Bottling tanks and regauge tanks will be held indoors while storage tanks will be outside. Regauge tanks are used for either blending distilled spirits or holding the resulting blended spirits. Blended spirits can then be introduced to other product lines for flavoring. Storage tanks will feed bottling tanks and regauge tanks before bottling.

Table 3: Bottling, Storage, and Regauge Tanks

Equipment ID	Tank Volume (gal)	Tank Height (ft)	Tank Diameter (ft)	Dome/Con roof Radius (ft)	Description (total capacity)
1,2,3,4	1,616	11.40	5.0	5.0	Bottling tanks: 361,674 gallons
7	1,269	6.04	6.0	---	
13	4,957	15.08	7.5	---	
15	3,008	8.04	8.0	---	
16	1,836	11.17	5.3	---	
17	1,955	11.50	5.5	---	
21,22,23	4,687	5.75	11.8	---	
24,25,26,27	3,523	8.38	8.5	8.5	
28,29	10,190	10.00	13.2	---	
30,31,32,33,35,36	10,877	15.33	11.0	---	
34	11,509	15.73	11.2	---	
37	5,039	11.16	8.8	---	
38,39	2,825	12.00	6.3	---	
40	2,933	7.83	8.0	---	
64,65	13,116	15.50	12.0	---	
66,67	18,096	16.91	13.5	13.5	
79,80,81,82,83,84	6,226	12.04	9.0	9.0	
85,86,87,88,89,90,91,92,93,94	10,348	11.96	11.5	11.5	
107,108,109,110,111,113	6,032	12.08	9.3	9.25	Storage Tanks: 513,976 gallons
112	6,032	12.1	9.3	9.25	
114,115,116,117,118,119,120,122,123	10,664	15.35	11.0	---	
121	10,765	17.95	10.2	---	
124,125	15,229	18.08	12.0	---	
126,127	20,305	24	12.0	---	
128,129	40,304	35.5	14.0	---	
130,131	40,304	35.63	14.0	---	
132,133	40,304	36	14.0	14	
141	11,000	15.25	11.0	---	
142	7,000	12.08	10.3	---	
143,144	17,062	24.42	11.0	---	
205,206	1,600	4.0	8.0	8.0	Regauge Tanks: 3,200 gallons

As summarized in Table 4 below, 88,340,566 gallons of distilled spirits could potentially be bottled each year. Because the storage tanks, bottling tanks, and regauge tanks at the facility directly feed the bottling process, the annual gallon throughput of each storage tank, bottling tank, and regauge tank is directly proportional to the annual bottling rate. Specifically, the total volume of all storage tanks at the facility sum to 513,976 gallons. To figure the average amount of liquid each tank will hold annually, take the tank volume as a percentage of 513,976 gallons and multiply that by the total facility bottling capacity of 88,340,566 gallons. So for tank No. 1 with a volume of 1,616.68 gallons, the potential annual throughput will be 277,869.83 gallons. This is of course an average rate and there may be some slight variances in VOC emissions among tanks. Since storage tanks feed bottling tanks, the process of dividing individual bottling tank capacity by total bottling tank capacity and multiplying by 88,340,566 gallons was repeated for bottling tanks. Regauge tanks are used primarily for blending spirits and will usually turn over no more than once per week (though calculations were performed with one turnover per day). Throughput of the regauge tanks are based upon total tank volume of the regauge tanks completely filling and emptying daily for 365 days per year. Table 4 below describes the facility's current maximum bottling rates.

Table 4: Bottling Rate and Storage Tank Throughputs

Line	Bottles per minute	Bottle size (ml)	Total (L/hr)	Total (gal/hr)	Reduced Hours ¹	Maximum Operation (hrs/year) ¹	Annual Potential Throughput (gal/yr)
1	230	750	10350	2,734.18	478	8,282	22,644,484
2	270	200	3240	855.92	316	8,444	7,227,367
3	155	1750	16275	4,299.40	476	8,284	35,616,229
4	225	750	10125	2,674.74	1,066	7,694	20,579,464
5	1.5	750	67.5	17.83	108	8,652	154,279
6	180	50	540	142.65	444	8,316	1,186,302
7	4	1750	420	110.95	356	8,404	932,443
Total							88,340,566

¹Annual maximum hours of operation reduced due to operational constraints. These constraints include bottle changeovers per year, label and item changes, PM (monthly preventative maintenance) hours, and washout (washing equipment between product changes) hours. Reduced hours are different for each line since each line will generally bottle different products.

EMISSIONS/CONTROLS EVALUATION

The emission factors used in this analysis were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition:

- Section 1.4-2 (July, 1998) "Natural Gas Combustion" (used to calculate natural gas combustion emissions for the 5.02 MMBtu boiler);
- Section 7.1-3 (November 2006) "Organic Liquid Storage Tanks" (calculations

performed using TANKS 4.09d for VOC – ethanol – emissions from storage tanks, bottling tanks, and regauge tanks);

- Section 9.9.1-1 (May, 2003) “Grain Elevators & Processes”;
- Section 9.12.1-2 (October 1996) “Malt Beverages”;
- Section 9.12.3-1 (April 1997) “Distilled Spirits”;
- Section 13.2.1-3 “Paved Roads”.

Pre-ground grain is delivered to the facility in 2,000 lb supersacs and 50 lb bags. When grain is needed, the supersac is lifted over a 3’ square covered hopper, which has an opening sized to accept the sac’s “outlet sock” and the “outlet sock” will be opened, releasing the ground grain into an enclosed auger, conveying it to the enclosed cooker. Emissions primarily will result from the 3’ square hopper loading. Therefore emissions for EP-01 Grain Handling and Loading were calculated using WebFIRE SCC 30200530 for grain handling. Since the conveyor and the cooker are enclosed, particulate emissions from conveying and dropping grain into the cooker were not calculated (the cooker will be mostly filled with liquid before grain is added, therefore there is some inherent capture from the solid-liquid mixing and grain drop distance will be small).

After cooking the grain-liquid mixture, the mixture from the cooker is moved to fermenter vats. The mixture will sit in the fermenters for a few days converting grain sugars to ethanol and carbon dioxide using yeast. VOC emissions from the fermenters were calculated using AP-42 Section 9.12.3-1 (Fermentation Vats). AP-42 lists emission factors for Ethanol, Ethyl Acetate, Isoamyl Alcohol, and Isobutyl Alcohol. Fermented grains will contain all of these compounds and therefore their emission factors were added together (though Ethanol typically constitutes greater than 99.0% of VOC). Therefore the combined emission factor used for this evaluation was 14.263 lb VOC/1,000 bushels where a bushel weighs 60 lbs for wheat (and many other common grains). The facility currently operates three open top 3500 gallon fermenters and three closed top 500 gallon fermenters.

The fermented liquid is then transported to the Still House and held within a beer well tank for distillation. The fermented liquid is distilled to remove water content and therefore increase ethanol content. However, some ethanol will evaporate and escape the distillation process. Excess water and solids from the column are filtered through a thin stillage tank where water and solids are separated by a filter. The solids are removed and sold to farmers as feed. The solids are not being dried so they will naturally have a high moisture content (i.e. no associated particulate emissions). Excess water is recycled to the cooker for additional fermentation. Alcohol product that exits the top of the distillation column is reboiled through a smaller pot still and then temporarily stored within a holding tank before barrel storage.

A mass balance was performed on the distillation process in order to determine how much ethanol evaporates by measuring the alcohol content (via specific gravity) and gallon throughput of a full batch of alcohol. The proof gallons from the large and small fermenters were measured to be 673.7 gallons whereas the final product exiting the distillation process was 671.7 proof gallons. (Note: A proof gallon is defined as one liquid gallon of spirits that is 50% alcohol at 60 °F – a spirit rated at 125 proof would be equivalent to 1.25 proof gallons.) Therefore the ethanol lost during distillation was 2.0

proof gallons (1.46 gallons). Using the density of ethanol defined in AP-42, Table 7.1-3 to be 6.610 lb/gallon, loss per batch was calculated to be 9.5 gallons of ethanol. Without additional fermenters, the facility is limited to producing 343 batches per year since fermenting takes more than a day. However, conservatively assuming a batch per day could be produced (365 batches), and multiplying by safety factor of 1.2 (20% above the ethanol losses measured), estimated annual VOC losses for ethanol were calculated to be 2.1 tons per year. Since the final proof gallons after distillation was measured from a barrel (a barrel for which will head to barrel storage), the distillation holding tank emissions are included in the measured distillation losses (i.e. holding tank losses were not evaluated with Tanks; distillation loss emissions that were measured account for all emissions from the beer well, distillation processes, holding tank, and screened solids residual VOC/HAPs). VOC emissions from barrel aging were calculated using an emission factor of 6.9 lb/bbl(barrels)/yr found in AP-42, Section 9.12.3-1 "Distilled Spirits" (April 1997).

Fermentation and distillation will produce VOC and HAPs. The primary HAPs of concern are Acetaldehyde (CAS 75-07-0), Formaldehyde (CAS 50-00-0), Methanol (CAS 67-56-1), and Acrolein (CAS 107-02-8). Stack test data provided to the Department of Natural Resources for an unrelated ethanol distillation facility were used to develop ratios of HAPs to VOC emissions. Since for McCormick was able to calculate VOC emissions from distillation via mass balance and VOC emissions from fermentation via AP-42, the stack test developed HAP ratios were then multiplied by VOC emissions to calculate distillation and fermentation HAP emissions.

Emissions from intermediate storage tanks, bottling tanks, and regauge tanks are based upon maximum hourly throughputs of distilled spirits described in the project description section. Tanks 4.09d were used to calculate tank emission losses for all tanks at the facility. While almost all distilled spirits arrive at the facility at 96% ethanol, testing shows McCormick Distilling Co., Inc.'s spirits are watered down to around 37.6% for bottling. For conservative emissions calculations, the storage tanks, bottling tanks, and regauge tanks were assumed to contain 100% ethanol. Bottling emissions were based upon the 17 lb/1000 bbl emission factor found in AP-42 Section 9.12-2. With a barrel containing 31 gallons, a final emission factor of 548.4 lb/Mgal was developed. However, this bottling emission factor is based upon emission rates from bottling beer. Assuming beer on average is approximately 5.0% ethanol, and considering McCormick typically bottles spirits at no more than 40.0% ethanol, emissions were scaled by a factor of eight (i.e. 4,387.1 lb/Mgal).

A variety of trucks are used to deliver, ship, and move distilled spirits and accompanying materials including semi-trucks, tanker trucks, and forklifts. A silt loading factor of 1.1 g/m² for corn wet mills, found in AP-42 table 13.2.1-3, was used since some milled corn is delivered to the facility and since all haul roads are paved. In 2016 McCormick bottled a wide variety of distilled spirits totaling 7,750,786.3 gallons. Rates for tanker trucks and semi-trucks arriving and leaving the facility each week were observed and recorded during a specific operating period in 2016. For that same period, gallons of distilled spirits produced at the facility were recorded. Since the facility's bottling capacity is 88,340,566 gallons/year, trucks per year totals were scaled by a corresponding factor of 11.4 (i.e. 88,340,566 gallons divided by 7,750,786.3 gallons). Average loaded and

unloaded truck weights observed at the facility, travel distances, and trucks per year haul rates are summarized in table 5 below.

Table 5: Haul Road Summary

Hauling Description (EP-07)	Average Load Weight (tons)	Unloaded Truck Weight (tons) ¹	Trucks per Year ²	One-Way Travel Distance (miles)
Receiving Goods/Raw Materials at Warehouse "I"	17.24	13	26,670.45	0.6
Receiving Tankers at Warehouse "E"	24.00	13	5,926.77	0.5
Raw Materials from Warehouse "I" to Warehouse "E"	17.24	13	26,670.45	0.2
finished Goods from Warehouse "E" to Warehouse "K"	17.24	13	92,336.90	0.3
Finished Goods from Warehouse "K"	22.39	13	71,121.19	0.3
Receiving Grain at Warehouse "I"	21.50	13	72.00	0.6
Supersacs from Warehouse "I" to Still House	1.07	5.4	1,095.00	0.1
Pallets from Warehouse "I" to Still House	1.00	5.4	365.00	0.1

¹Based on average truck weight for a tractor trailer (26,000 lbs) – See Other Relied Upon Documents references for details.

²Based upon scaling weekly trucks moving to and from the facility observed at the facility during 2016.

The following table provides an emissions summary for this project. Existing potential emissions were calculated as a part of this project. Existing actual emissions were not available since the facility has never had to submit an EIQ. Potential emissions of the application represent the potential of the new/modified equipment (see Table 2), assuming continuous operation (8760 hours per year). Conditioned Potential Emissions account for a voluntary 40 tpy limit on VOC emissions.

Table 6: Emissions Summary (tpy)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions	Potential Emissions of the Application ¹	New Installation Potential	New Installation Conditioned Potential
PM	25.0	19.85	N/A	7.66E-03	19.86	N/A
PM ₁₀	15.0	4.11	N/A	3.28E-03	4.12	N/A
PM _{2.5}	10.0	1.13	N/A	1.02E-03	1.13	N/A
SO ₂	40.0	0.01	N/A	N/A	0.01	N/A
NO _x	40.0	2.16	N/A	N/A	2.16	N/A
VOC	40.0	234.61	N/A	44.03	278.64	< 250.0
CO	100.0	1.81	N/A	N/A	1.81	N/A
HAPs	10.0/25.0	0.07	N/A	2.49E-03	0.07	N/A

N/A = Not Applicable; N/D = Not Determined

¹Includes only emissions from new (additional) fermentation and distillation processes as well as barrel aging emissions from the additional 12,700 barrels being added to storage – the existing 5,800 barrels were included in existing potential emissions.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential VOC emissions of the project is conditioned to below de minimis levels.

APPLICABLE REQUIREMENTS

McCormick Distilling Co. shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Operating Permits*, 10 CSR 10-6.065
- *Start-Up, Shutdown, and Malfunction Conditions*, 10 CSR 10-6.050
- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
 - Per 10 CSR 10-6.110(4)(B)2.B(II) and (4)(B)2.C(II) a full EIQ is required for the first full calendar year the equipment (or modifications) approved by this permit are in operation.
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-6.165

• SPECIFIC REQUIREMENTS

- *Restriction of Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating*, 10 CSR 10-6.405

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, it is recommended that this permit be granted without special conditions.

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated July 7, 2017, received July 11, 2017, designating McCormick Distilling Co., Inc. as the owner and operator of the installation.

OTHER RELIED UPON DOCUMENTS

- E-mail Communications between McCormick Distilling Co. and the Missouri Air Pollution Control Program. This includes supplemental data submitted along with the e-mails.
- University of Missouri Extension – Agriculture Tables for Weights and Measurement: Crops. (<http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4020>) This resource defines a bushel of wheat as 60 lbs/bushel.
- Vehicle (tractor trailer weight) provided by Energy.gov; <https://energy.gov/eere/vehicles/fact-621-may-3-2010-gross-vehicle-weight-vs-empty-vehicle-weight>
- Distillation and Fermentation HAPs to Ethanol ratios were obtained from uncontrolled distillation stack test data submitted to the Department of Natural Resources by Poet Biorefining (6/6/2014). Ratio of HAPs to VOC should be the same for fermentation and distillation.

APPENDIX A

Abbreviations and Acronyms

% percent	Mgal 1,000 gallons
°F degrees Fahrenheit	MWmegawatt
acfm actual cubic feet per minute	MHDRmaximum hourly design rate
BACT Best Available Control Technology	MMBtuMillion British thermal units
BMPs Best Management Practices	MMCFmillion cubic feet
Btu British thermal unit	MSDSMaterial Safety Data Sheet
CAM Compliance Assurance Monitoring	NAAQSNational Ambient Air Quality Standards
CAS Chemical Abstracts Service	NESHAPs National Emissions Standards for Hazardous Air Pollutants
CEMS Continuous Emission Monitor System	NO_xnitrogen oxides
CFR Code of Federal Regulations	NSPSNew Source Performance Standards
CO carbon monoxide	NSRNew Source Review
CO₂ carbon dioxide	PMparticulate matter
CO₂e carbon dioxide equivalent	PM_{2.5}particulate matter less than 2.5 microns in aerodynamic diameter
COMS Continuous Opacity Monitoring System	PM₁₀particulate matter less than 10 microns in aerodynamic diameter
CSR Code of State Regulations	ppmparts per million
dscf dry standard cubic feet	PSDPrevention of Significant Deterioration
EQ Emission Inventory Questionnaire	PTEpotential to emit
EP Emission Point	RACTReasonable Available Control Technology
EPA Environmental Protection Agency	RAL Risk Assessment Level
EU Emission Unit	SCCSource Classification Code
fps feet per second	scfmstandard cubic feet per minute
ft feet	SDS Safety Data Sheet
GACT Generally Available Control Technology	SICStandard Industrial Classification
GHG Greenhouse Gas	SIPState Implementation Plan
gpm gallons per minute	SMAL Screening Model Action Levels
gr grains	SO_xsulfur oxides
GWP Global Warming Potential	SO₂sulfur dioxide
HAP Hazardous Air Pollutant	tph tons per hour
hr hour	tpy tons per year
hp horsepower	VMT vehicle miles traveled
lb pound	VOC Volatile Organic Compound
lbs/hr pounds per hour	
MACT Maximum Achievable Control Technology	
µg/m³ micrograms per cubic meter	
m/s meters per second	