

DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION

ACTIVITY REPORT: Self Initiated Inspection

*FY 2015 Insp*

B736128569

FACILITY: Valentine Distilling Co., Inc.		SRN / ID: B7361
LOCATION: 161 VESTER, FERNDALE		DISTRICT: Southeast Michigan
CITY: FERNDALE		COUNTY: OAKLAND
CONTACT:		ACTIVITY DATE: 11/25/2014
STAFF: Iranna Konanahalli	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MINOR
SUBJECT: FY 2015 inspection of Valentine Distilling Co., Inc. ("Valentine")		
RESOLVED COMPLAINTS:		

*B7361-SAR-2014 11 25*

**Valentine Distilling Co., Inc. (B7361)**  
161 Vester St.  
Ferndale, Michigan 48220-1711

**SRN reassign (2010): Wolverine Wood Products (B7361) → Valentine Distilling Company (B7361).** Wolverine made upscale pool tables. Wolverine moved out of this building about July 2009; Wolverine may be out of business due to dire economic conditions of 2009. The current occupant is Valentine Distilling Co., which moved into this building on May 1, 2010, according to Mr. Rifino Valentine.

On November 25, 2014, I conducted a level-2 self-initiated inspection of Valentine Distilling Co., Inc. ("Valentine") located at 161 Vester St., Ferndale, Michigan 48220-1711. The inspection was conducted to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994, PA 451; and Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) administrative rules.

During the inspection, Mr. Rifino Valentine (Cell (NY): 646-286-2690); E-mail: rifino@ValentineDistilling.com, President and Owner, assisted me.

Valentine makes vodka under brand name "Valentine Vodka" using grains such as barley, wheat, corn, etc. Valentine also makes whiskey (aged in wooden barrels) and gin.

Two (2) fermentation tanks are present. Each tank (fermentation reactor) is of 2,000 liters capacity. Upon addition of yeast to the grain-based carbohydrates / starches / sugars (mashed grains in water at fermentation temperature), fermentation begins and lasts for four (4) days producing ethanol ( $C_2H_5OH$ ) and carbon dioxide ( $CO_2$ ). When completed, fermentation liquor in the reactor contains about 50 percent alcohol.

One 600-liter (= 158.5 ≈ 160 gallons) distillation still is present. Steam jacket is used to heat fermentation liquor (50% alcohol) to vaporize alcohol. Both water and alcohol are present in vapor phase based upon vapor-liquid equilibrium of two-component or binary (ethyl alcohol or ethanol and water) system. Ethanol boils at 174 °F forming azeotropic mixture at this temperature. Based upon boiling points (174 °F for alcohol and 212 °F for water), alcohol is more volatile component. Because of limitation of azeotrope, up to 95%v purity alcohol can be produced using fractional distillation. However, Valentine uses a single-stage distillation still. A condenser that uses tap water as heat transfer fluid is used to condense and recover alcohol. Condenser's inlet and outlet temperatures are 60 °F and 100 °F. Hence, condenser efficiency (product recovery) may be different in summer and winter. At about 60 °F, vapor

phase equilibrium concentration of alcohol is emitted as VOC. Condensed vodka contains 80 percent alcohol. Its concentration is reduced to 40% using water, bottled and distributed.

Volatile Organic Compounds (VOC) or alcohol emissions may be calculated based upon mass balance between fermentation liquor from the reactor and final product recovered knowing quantities (gallons or liters) and concentrations.

The process equipment may need a Rule 336.1201 permit. The process is not exempt per Rule 336.1285 (u) (160 gal >> 55 gal). This process may not be considered food, like cereal manufacturing. Besides, almost all alcohol (VOC) is distributed for sale (commercial production). The emissions are not particulate in nature but VOC (Rule 336.1285(dd)). This exemption is typically refers to a cereal manufacturing with particulate emissions. Rule 336.1285(dd) (iii) is instructive (particulate control system). Hence, Rule 336.1285(dd) exemption does not apply. As a permit by rule (conditional), Rule 336.1290 exemption is complicated and cumbersome for most companies and, consequently, they fail to comply. The product (alcohol) recovery condenser is part of the process (fermentation and separation) and not VOC control equipment. The purpose of this permit by rule (Rule 290) exemption is to reduce AQD's work-load and thereby eliminate or minimize permit backlog. At this time (FY2015), AQD's work-load is not substantial. Ms. Jenifer Dixon of Environmental Assistance Division of Michigan Department of Environmental Quality will assist Valentine with Rule 201 permit issues.

VOC emissions reduction equals better product recovery. Refrigerated condenser (instead of tap water) may help both recover more alcohol and reduce emissions.

In CY 2014, Valentine produced 480 gallons of vodka (12 batches), 660 gallons of whiskey (12 batches) and 0 gallon of gin (0 batch). All data based upon 100%v purity alcohol. Valentine experienced an exponential growth since its founding in 2010.

**Conclusion**

Ms.. Jenifer Dixon of Environmental Assistance Division will assist Valentine with Rule 201 permit issues.

NAME Jill Hannahall DATE 02/17/2015 SUPERVISOR CTE