

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
AIR QUALITY DIVISION

July 12, 2019

PERMIT TO INSTALL
105-19


ISSUED TO
Detroit Bulk Storage, Inc.

LOCATED AT
5851 West Jefferson
Detroit, Michigan

IN THE COUNTY OF
Wayne

STATE REGISTRATION NUMBER
P1038

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environment, Great Lakes, and Energy. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: June 20, 2019	
DATE PERMIT TO INSTALL APPROVED: July 12, 2019	SIGNATURE: 
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

PERMIT TO INSTALL

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COMMON ACRONYMS

AQD	Air Quality Division
BACT	Best Available Control Technology
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
COMS	Continuous Opacity Monitoring System
Department/department/EGLE	Michigan Department of Environment, Great Lakes, and Energy
EU	Emission Unit
FG	Flexible Group
GACS	Gallons of Applied Coating Solids
GC	General Condition
GHGs	Greenhouse Gases
HVLP	High Volume Low Pressure*
ID	Identification
IRSL	Initial Risk Screening Level
ITSL	Initial Threshold Screening Level
LAER	Lowest Achievable Emission Rate
MACT	Maximum Achievable Control Technology
MAERS	Michigan Air Emissions Reporting System
MAP	Malfunction Abatement Plan
MSDS	Material Safety Data Sheet
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standard for Hazardous Air Pollutants
NSPS	New Source Performance Standards
NSR	New Source Review
PS	Performance Specification
PSD	Prevention of Significant Deterioration
PTE	Permanent Total Enclosure
PTI	Permit to Install
RACT	Reasonable Available Control Technology
ROP	Renewable Operating Permit
SC	Special Condition
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SRN	State Registration Number
TBD	To Be Determined
TEQ	Toxicity Equivalence Quotient
USEPA/EPA	United States Environmental Protection Agency
VE	Visible Emissions

POLLUTANT / MEASUREMENT ABBREVIATIONS

acfm	Actual cubic feet per minute
BTU	British Thermal Unit
°C	Degrees Celsius
CO	Carbon Monoxide
CO ₂ e	Carbon Dioxide Equivalent
dscf	Dry standard cubic foot
dscm	Dry standard cubic meter
°F	Degrees Fahrenheit
gr	Grains
HAP	Hazardous Air Pollutant
Hg	Mercury
hr	Hour
HP	Horsepower
H ₂ S	Hydrogen Sulfide
kW	Kilowatt
lb	Pound
m	Meter
mg	Milligram
mm	Millimeter
MM	Million
MW	Megawatts
NMOC	Non-Methane Organic Compounds
NO _x	Oxides of Nitrogen
ng	Nanogram
PM	Particulate Matter
PM10	Particulate Matter equal to or less than 10 microns in diameter
PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
pph	Pounds per hour
ppm	Parts per million
ppmv	Parts per million by volume
ppmw	Parts per million by weight
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
scf	Standard cubic feet
sec	Seconds
SO ₂	Sulfur Dioxide
TAC	Toxic Air Contaminant
Temp	Temperature
THC	Total Hydrocarbons
tpy	Tons per year
µg	Microgram
µm	Micrometer or Micron
VOC	Volatile Organic Compounds
yr	Year

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**
2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**
3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to Rule 210 (R 336.1210), operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**
4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**
5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to Rule 219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of Rule 219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy. **(R 336.1219)**
6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**
7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**
8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.
9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.
10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of Rule 301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with Rule 303 (R 336.1303). **(R 336.1301)**
 - a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
 - b) A visible emission limit specified by an applicable federal new source performance standard.
 - c) A visible emission limit specified as a condition of this Permit to Install.

12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001. **(R 336.2001)**

FGFACILITY CONDITIONS

DESCRIPTION: The following conditions apply source-wide to all process equipment including equipment covered by other permits, grand-fathered equipment and exempt equipment.

POLLUTION CONTROL EQUIPMENT

NA

I. EMISSION LIMIT(S)

NA

II. MATERIAL LIMIT(S)

NA

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall not operate FGFACILITY unless the fugitive dust control plan specified in Appendix A, or an alternate approvable plan submitted to the AQD District Supervisor, for all plant roadways, the plant yard, all material storage piles, and all material handling operations has been implemented and is maintained. **(R 336.1371, R 336.1372, Act 451 324.5524)**

IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall keep, in a satisfactory manner, records showing the annual potential to emit calculations for PM, in tons per year, for FGFACILITY. The permittee shall up the potential to emit calculation whenever a new permitted or exempt emission unit is installed, or whenever a permitted, exempt, or grandfathered emission unit is modified or removed. Potential to emit calculations shall be based on the maximum operational capacity of the equipment operated for the entire year, except they may account for applicable permit requirements or applicable laws or rules limiting the potential to emit. The permittee shall keep all records on file at the facility and make them available to the Department upon request. **(Act 451 324.5524)**

VII. REPORTING

NA

VIII. STACK/VENT RESTRICTION(S)

NA

IX. OTHER REQUIREMENT(S)

NA

Footnotes:

¹ This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

APPENDIX A

MCL 324.5524 Operating Program

Detroit Bulk Storage Inc.

Revere Dock

5851 W. Jefferson St., Detroit, Michigan 48216

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Appendix A – Revere Dock Potential-to-Emit (PTE) Calculations

Introduction

This Operating Program has been developed and implemented for the Detroit Bulk Storage Revere Dock located at 5851 W. Jefferson St., Detroit, Michigan 48216 (Facility/Site). The purpose of this program is to describe the tools and methods used to control fugitive dust emissions in accordance Section 5524 of the Natural Resources and Environmental Protection Act, being MCL 324.5524, *Fugitive dust sources or emissions*.

The primary industrial activity at this Site is the importing and exporting of construction aggregates / dry bulk commodities. Aggregates are delivered to the Site by both ship and truck, and stockpiled utilizing conveyors and front-end loaders. Front-end loaders are also used to load construction aggregates into outbound trucks. Construction aggregates are loaded onto and off ships utilizing a conveyor system.

The Revere Dock typically operates 5 days/week in the winter months and 6 days/week in the summer months.

The facility is bordered by the Detroit River to the East, Waterfront Petroleum to the north, Fort Wayne to the south and Gordie Howe Bridge to the west. The Facility property, and all adjacent parcels are zoned M4 intensive industrial.

The following sections of this Operating Program are organized in order of the requirements of MCL 324.5524.

Applicability – MCL 324.5524(1)

The provisions of MCL 324.5524 apply to fugitive dust sources at the Revere Dock because the Facility meets the standard industrial classification (SIC) code and locational requirements established in MCL 324.5524. Facility operations are covered under SIC major group 42, *motor freight transportation and warehousing*. The Revere Dock specializes in the import and export of construction aggregates. The SIC code used to describe the Facility's primary industrial activities is 4214 – *Local Trucking with Storage*. The corresponding North American Industry Classification System (NAICS) code for the Facility is 484220 – *Specialized freight (except used good) trucking, local*.

Fugitive Dust Opacity Limits – MCL 324.5524(2)

In accordance with MCL 324.5524(2), best practices and operational controls are implemented at the Facility to limit fugitive dust emissions from paved and unpaved roads, lots, construction aggregate storage piles, and material handling activities to an opacity no greater than 5%. Emissions from any other source are limited to an opacity no greater than 20%. Specific controls used to control fugitive dust emissions are discussed in the following sections of this Operating Program.

Fugitive Dust Controls – MCL 324.5524(3)(a)

xxx

- Stockpile, Conveyor Loading, and Traffic Patterns – MCL 324.5524(3)(a)(i)–(iii)

MCL 324.5524(3)(a)(i) through 324.5524(3)(a)(iii) requires specific controls to limit fugitive dust emission from stockpiles, conveyor loading activities, and traffic pattern access areas surrounding stockpiles. As explained in MCL 324.5523(3)(a)(i), most of these controls are applicable to facilities where the total uncontrolled emissions of fugitive dust from material storage piles are greater than 50 tons per year and where potential particulate emissions from all sources, including fugitive dust sources, exceeds 100 tons per year. The Revere Dock total uncontrolled fugitive dust emissions do not exceed 50 tons per year. Therefore, the requirements of MCL 324.5524(3)(a)(i) – (iii) do not apply to this site, with the exception of the following in 324.5524(3)(iii) “All traffic pattern roads and parking facilities shall be paved or treated with water, oils, or chemical dust suppressants. All paved areas shall be cleaned in accordance with the operating program required by MCL 324.5524(4). All areas treated with water, oils, or chemical dust suppressants shall have the treatment applied in accordance with the operating program required by MCL 324.5524(4). Refer to Appendix A of this program for potential-to-emit (PTE) calculations for the Site.

- Material Handling with Pollution Control Equipment – MCL 324.5524(3)(a)(iv)

Revere Dock does not utilize pollution control equipment to collect particulate emission from material unloading and transport operations. Therefore, the requirements of MCL 324.5523(3)(a)(iv) do not apply to Revere Dock.

- Other Activity Controls – MCL 324.5524(3)(a)(v)

A potential for fugitive dust creation exists during stockpiling of construction aggregates from marine vessels or trucks and during loading of construction aggregates into marine vessels or trucks. To minimize fugitive dust emissions, water sprays are used as needed on conveyor transfer points and stockpiles, in accordance with MCL 324.5523(3)(a)(v).

- Particulate Collection Equipment – MCL 324.5524(3)(b)

The Facility does not use particulate collection equipment to control fugitive dust emissions; therefore, MCL 324.5524(3)(b) is not applicable to Revere Dock operations.

- Vehicle Transport of Materials with High Silt Content – MCL 324.5524(3)(c)

Revere Dock complies with the requirements of MCL 324.5524(3)(c) by requiring truck drivers to tarp all loads before leaving the Facility to control fugitive dust emissions during transport. A sign is posted on site to remind drivers of the requirement to tarp loads.

- Vehicle Transport of Materials – MCL 324.5524(3)(d)–(e)

Customer vehicles used to transport construction aggregate off site are not owned or operated by the Revere Dock. It is the vehicle owner/operator’s responsibility to ensure their vehicles are maintained in good operating condition and comply with Michigan law and regulations. However, if a Revere Dock employee observes a customer vehicle is not in a condition to transport materials without spillage or leakage (e.g., the truck does not have a tarp), then this is communicated to the driver, and the vehicle is not loaded.

If customers transport materials in vehicles with less than a 2-ton capacity, then those vehicles are not subject to tarping requirements in accordance with MCL 324.5524(3)(e).

- Vehicle Transport of Materials – MCL 324.5524(3)(f)

The Revere Dock typically handles construction aggregate materials. The Site does not store or handle fly ash; therefore, the requirements of MCL 324.5524(3)(f) do not apply to Revere Dock operations.

- Vehicle Transport of Materials – MCL 324.5524(3)(g)

The Revere Dock typically handles construction aggregate materials. If the Site stores and handles iron or steel slag, the slag material will be at ambient temperature, and transport vehicles follow the transport practices described in the above sections of this Operating Program.

Requirement to Prepare an Operating Program – MCL 324.5524(4)

This Operating Program has been prepared in accordance with MCL 324.5524, *Fugitive dust sources or emissions*, to document the methods and controls implemented at Revere Dock to control fugitive dust emissions from the Site's construction aggregate material storage and handling activities. This program has been designed to reduce fugitive dust emissions to the lowest level possible through the application of reasonably available and economically feasible controls.

Operating Program Contents – MCL 324.5524(5)

- Facility Contact Information – MCL 324.5524(5)(a)-(b)

Facility Name:	Revere Dock
Facility Address:	5851 W. Jefferson St. Detroit, Michigan 48216
Facility Manger:	Noel Frye, Plant Manager (313) 999-9015
Owner/Operator:	DBS P.O Box 600 Marine City, Michigan 48039
Environmental Contact:	L.M. Shink Engineering 4146 Pine Grove Ave. Fort Gratiot, Michigan, 48059 (810) 718-1965

The Revere Dock manager, Noel Frye, is responsible for implementation of the Operating Program with guidance and support from the L.M. Shink Engineering.

- Facility Maps and Diagrams – MCL 324.5524(5)(c)

In accordance with MCL 234.5524(5)(c), maps and diagrams of Revere Dock are provided as Figure 1 and Figure 2 to this Operating Program. **Figure 1** shows the general site location and its surroundings within 0.25-mile of the Facility. **Figure 2** depicts the general Facility layout, including the following details:

- Approximate storage pile locations
- Conveyor loading operations
- Traffic patterns within the Facility property

- Material Handling Pollution Control Equipment Locations – MCL 324.5524(5)(d)

As previously described, the Revere Dock does not maintain pollution control equipment for use during construction aggregate loading and transporting operations.

- Fugitive Dust Control Best Management Practices – MCL 324.5524(5)(e) •

- *Material Processing and Conveying*

Typically, construction aggregates are delivered to the Revere Dock by ship, and unloaded using the ship's conveyor(s). Material transfers by conveyor may occur anywhere within the Site boundary (see **Figure 2**) and additional portable conveyors may be used. Whenever materials are loaded or unloaded by conveyor, transfer points and drop heights are minimized to the maximum extent practicable to control fugitive dust emissions. Water may be used during conveyor transfer operations to wet the material to further control fugitive dust.

- *Traffic Management*

Equipment and truck speeds on site are normally restricted to 8 MPH, and communicated to employees and visitors by signage near the Facility entrance.

- *Dust Suppression*

Water, calcium chloride or another acceptable chemical dust suppressant may be applied to unpaved portions of the Revere Dock at the owner/operator's discretion to minimize fugitive dust generated from equipment and vehicles travelling on the facility property. A water spigot is located at the back of the scale house and may be used to supply water for watering unpaved portions of the facility. Additional information regarding dust suppression use and recordkeeping are discussed in the next two sections of this Program.

- Use of Waste or Recycled Oils for Fugitive Dust Control – MCL 324.5524(5)(f)

No waste or recycled oils are used for fugitive dust control at the Revere Dock. Therefore, the requirements of MCL 324.5524(5)(f) do not apply to the Facility.

- Dust Suppressant Recordkeeping – MCL 324.5524(5)(g)

Water, with no chemical additive is the primary material used for dust suppression on unpaved surfaces and stockpiles at Revere Dock. In the event of extremely dry weather conditions, the Facility may also have unpaved roads treated with a chloride solution by a third-party contractor. The Facility maintains records of chloride

applications for at least 5 years. These records are maintained electronically in the DBS main office.

- Paved Road and Parking Facility Cleaning – MCL 324.5524(5)(h)

In accordance with MCL 324.5524(5)(h), on site, paved traffic pattern roads, and Revere Dock, a paved public right-of-way, are cleaned by a wet sweeper truck at least twice per week, weather permitting. Records of paved road cleaning activities are maintained for at least 5 years as required by EGLE. These records are stored at the DBS main office.

- Other Information – MCL 324.5524(5)(i)

In accordance with MCL 324.5524(5)(i), Detroit Bulk Storage will provide EGLE with any additional information the department requests to facilitate its review of this operating program.

Operating Program Submittal – MCL 324.5524(6)

In accordance with MCL 324.5524(6), this Operating Program has been submitted to EGLE for approval as part of a Permit-to-Install (PTI) Application.

Operation Program Amendment – MCL 324.5524(7)

This Operating Program will be amended and resubmitted to EGLE for approval in the event of operational changes that may result in significant increases of fugitive dust emissions from the Site.

Alternate Provisions for Fugitive Dust Control – MCL 324.5524(8)

Detroit Bulk Storage is not requesting MDEQ approval of alternate fugitive dust controls to establish compliance with MCL 324.5524. Therefore, the requirements of MCL 324.5524(8) do not apply at the Revere Dock.

Alternate Provision Submittal to USEPA – MCL 324.5524(9)

We are not seeking MDEQ approval any alternate provisions for compliance with MCL 324.5524. Therefore, fugitive dust control at the Revere Dock does not require United States Environmental Protection Agency (USEPA) approval or incorporation in the state implementation plan.

Figures

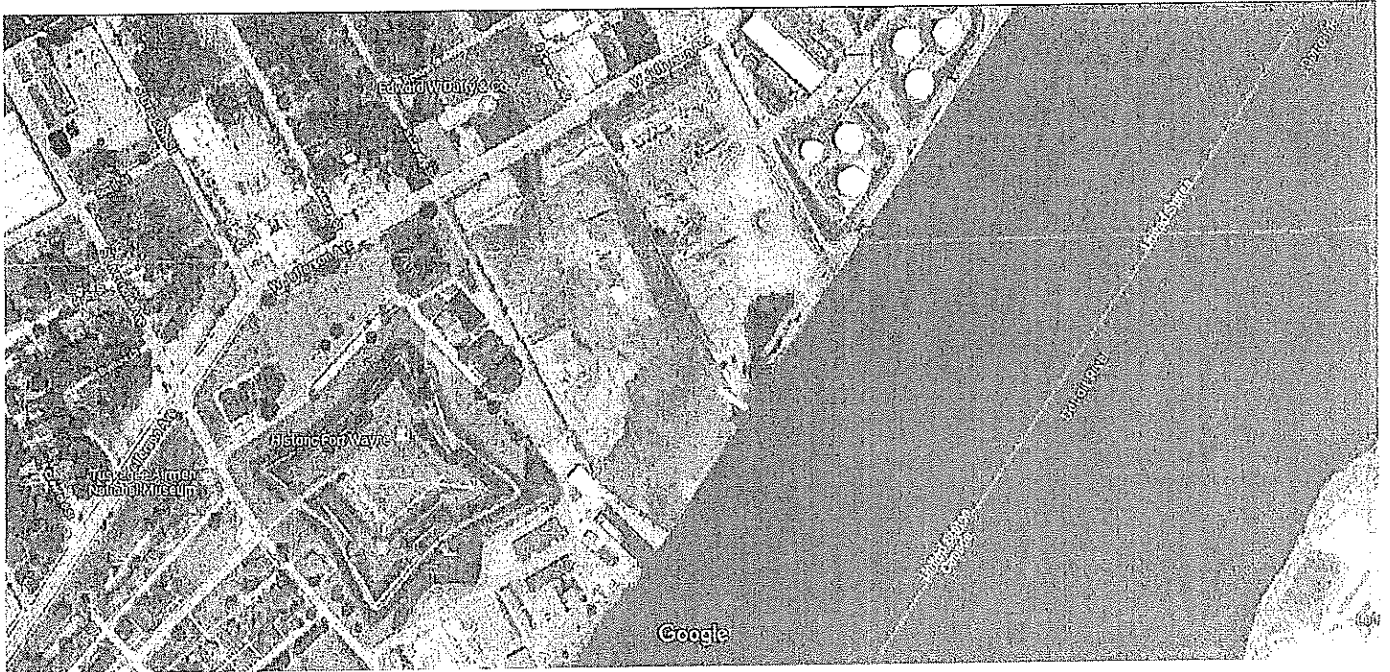


Figure 1: DBS Facility Map 1

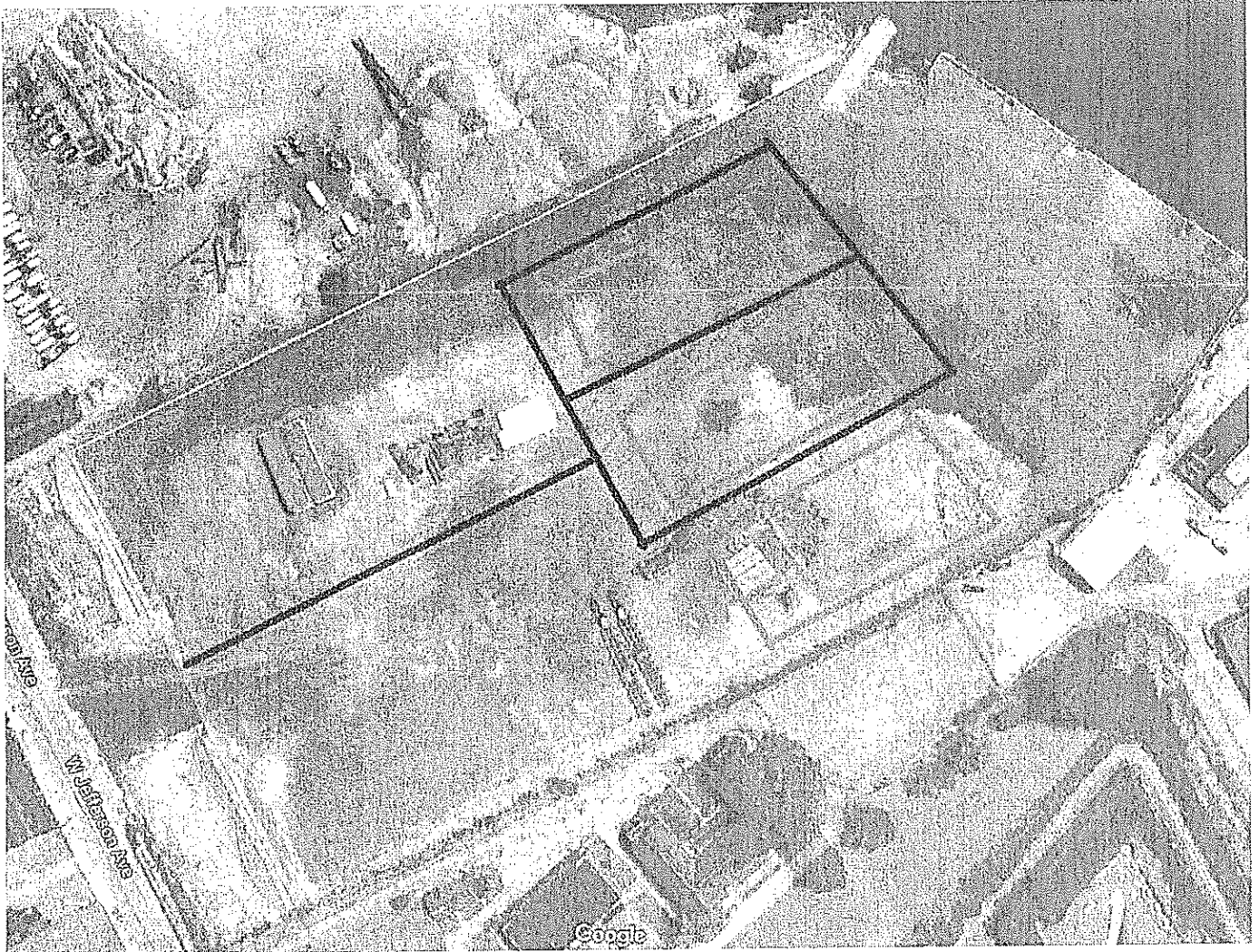


Figure 2: DBS Facility Map 2

Appendix A – Revere Dock Potential-to-Emit (PTE) Calculations

5851 W. Jefferson ST., Detroit, MI Potential-to-Emit Summary

Fugitive PM Potential Emissions (tons per year)		
Emission Source	Uncontrolled PM10	Controlled PM10
PAVED ROADS	1.11	0.22
UNPAVED ROADS	36.61	7.32
STOCKPILES - LOADING/UNLOADING	0.50	0.50
STOCKPILES - WIND	9.41	9.41
Total Potential Emissions	47.63	17.45

Emission Source: Loading Aggregate Materials into Stockpiles and Material Loadout

Air Contaminant: Total PM

Calculation Method: AP-42 13.2.4.3 Loading of Aggregate onto Storage Piles– Predictive Emission Factor Equations

Emission calculation for the quantity of particulate emissions generated by loading aggregate materials into stockpiles and material loadout from stockpiles:

$$E = k(0.0032) \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

Where:

E = particulate emission factor (lb/ton)

K = particle size multiplier

U = mean wind speed (mph)

M = material moisture content (%)

Assume:

k (See Note 1)	U (mph) (See Note 2)	M (%) (See Note 3)	E (lb/ton material handled)
0.35	9.7	2.1	0.002

Assume max annual throughput of 400,000 tons (See Note 4)

PTE = E x maximum annual throughput

PTE = 990 lbs/yr

PTE = 0.50 tpy

Notes:

- 1) PM-10 size range used for selecting Particle Size Multiplier, k for Aerodynamic Particle Size Multiplier Table in AP-42 13.2.4.3.
- 2) Mean Wind Speed source www.weatherbase.com (3/7/2018)
- 3) Moisture content, M, obtained from AP-42 Table 13.2.4-1 for Various Limestone Products material from the Stone Quarrying and Processing industry.
- 4) Throughput based on 4000 lbs/yd³ of concrete and maximum production of 200,000 yd³ of concrete/yr.

Emission Source: Fugitive Dust from Paved Roads
 Air Contaminant: Total PM
 Calculation Method: AP-42 13.2.1 Paved Roads - Predictive Emission Factor Equations

Emissions calculation for the quantity of particulate emissions from resuspension of loose material on the road surface due to vehicle travel on a dry paved road is estimated using the expression:

$$E = k (sL)^{0.91} \times (W)^{1.02}$$

where: E = particulate emission factor (having units matching the units of k),
 k = particle size multiplier for particle size range and units of interest,
 sL = road surface silt loading (grams per square meter) (g/m²), and
 W = average weight (tons) of the vehicles traveling the road.

If: k = 0.0022 lb/Vehicle Mile Travelled (VMT) See Note 1
 sL = 8.2 g/m² See Note 2
 W = 51 tons See Note 3

Then emission factor, E is calculated as follows:

$$E = k (sL)^{0.91} \times (W)^{1.02}$$

$$E = (0.0022 \frac{lb}{VMT}) \times (8.2 \frac{g}{m^2})^{0.91} \times (51 \text{ tons})^{1.02}$$

$$E = 0.824 \text{ lb/VMT}$$

Assume:

VMT per year = Total no. of trips per year x miles per trip
 No. of customer truck trips per year = total tons of aggregate / capacity of average customer truck

If maximum annual material throughput = 1,000,000 tons/year (See Note 5)

Then, annual PTE is:

Vehicle Type	Capacity per trip (tons)	Miles per trip	VMT	E (lbs / VMT)	Uncontrolled Emissions (lbs / yr)	Control Efficiency	Controlled Emissions (lbs/yr)
Gravel Truck	52	0.14	2692	0.824	2218	80%	444
<i>Total (tons/year)</i>					1.11		0.22

Notes:

- 1) PM-10 size range used for selecting Particle Size Multiplier, k in Table 13.2.1-1 of AP-42.
- 2) Average Quarry Silt Loading value, sL, selected from Table 13.2.1-3.
- 3) The average weight, W, of vehicles travelling paved road surfaces at the Site is based on the assumption that all site traffic consists of trucks pulling two gravel trailers. The approximate weight of an empty truck with trailers is 25 tons, and the maximum legal weight of a truck with full trailers is 77 tons.
 So W = (25 tons + 77 tons) / 2 = 51 tons.
- 4) Each gravel truck travels on approximately 0.14 mi of paved on site surfaces coming to and leaving the Site.
- 5) Average annual material throughput (as product sales) at the facility for the past 5 years is 323,160 tons. Estimated maximum throughput limited by size and configuration of the site. All trucks must weigh-in and weigh-out on one truck scale.

Emission Source: Fugitive Dust from Unpaved Roads
Air Contaminant: Total PM
Emission Calculation Method: AP-42 13.2.2 Unpaved Roads - Predictive Emission Factor Equations

Emissions calculation for the quantity of particulate emissions from resuspension of loose material on the road surface due to vehicle travel on a dry paved road is estimated using the expression:

$$E = k (s/12)^a \times (W/3)^b$$

where: E = site-specific emission factor (lb/Vehicle Mile Travelled (VMT)),
k = particle size multiplier constant,
s = surface material silt content (%),
a = empirical constant from AP-42 Table 13.2.2-2,
W = average weight (tons) of the vehicles traveling the road, and
b = empirical constant from AP-42 Table 13.2.2-2

Assume:	k (lb/VMT) (See Note 1)	s (%) (See Note 2)	a (See Note 1)	W (tons) (See Note 3)	b (See Note 1)	E (lb/VMT)
Front Endloader	1.5	8.3	0.9	66.5	0.45	4.34
Customer Trucks	1.5	8.3	0.9	51	0.45	3.85

VMT per year = Total no. of trips per year x miles per trip

No. of front end loader trips per year = total tons of aggregate / capacity of front loader bucket

No. of customer truck trips per year = total tons of aggregate / capacity of average customer truck

If maximum annual material throughput = 1,000,000 tons/year (See Note 6)

Then, annual PTE is:

Vehicle Type	Capacity per trip (tons)	Miles per trip	VMT	E (lbs / VMT)	Uncontrolled Emissions (lbs/yr)	Control Efficiency	Controlled Emissions (lbs/yr)
Front End Loader	12	0.1	8333	4.341	36173	80%	7235
Gravel Truck	52	0.5	9615	3.852	37040	80%	7408
Total (tons/year)					36.61		7.32

Notes:

- 1) PM-10 size range used for selecting k, a and b values in Table 13.2.2-2 of AP-42.
- 2) Estimated silt content for stone quarrying and processing haul roads from AP-42 Table 13.2.2-1.
- 3) The average weight, W, of customer vehicles travelling paved road surfaces at the Site is based on the assumption that all site traffic consists of trucks pulling two gravel trailers. The approximate weight of an empty truck with trailers is 25 tons, and the maximum legal weight of a truck with full trailers is 77 tons.
So $W = (25 \text{ tons} + 77 \text{ tons}) / 2 = 51 \text{ tons}$.
- 4) Assume each customer truck travels approximately 0.5-mi on unpaved on site surfaces.
- 5) Assume loader travels approximately 530 ft (0.1-mi) per truck loaded.
- 6) Average annual material throughput (as product sales) at the facility for the past 5 years is 323,160 tons.
Estimated maximum throughput limited by size and configuration of the site. All trucks must weigh-in and weigh-out on one truck scale.

Emission Source: Fugitive Dust from Stockpiles (Wind)
 Air Contaminant: Total PM
 Calculation Method: USEPA Control of Open Fugitive Dust Sources -
 4.1.3 Wind Emissions from Continuously Active Piles

Equation for total suspended particulate emissions from wind erosion on continuously active stockpiles:

$$E = 1.7 \left(\frac{s}{1.5} \right) \left(\frac{365 - p}{235} \right) \left(\frac{f}{15} \right)$$

where: E = particulate emission factor (in units of lb/d/acre),

s = silt content of aggregate, percent

p = number of days with ≥ 0.01 in. of precipitation per year

f = percentage of time that the unobstructed wind speed exceeds 12 mph at the mean pile height

Assume:	s	p	f	Then:	E
	(%)	(days)	(%)		(lb/day/acre)
	(See Note 1)	(See Note 2)	(See Note 3)		
	3.9	123	30		9.1

Facility stockpile areas = 11.9 acres

Annual PM Emissions = E x Stockpile Area x 365 days/year
 = 39540 lbs/day
 Annual PM Emissions = 19.8 tons/year
 Annual PM10 = 9.4 tons/year (See Note 4)

Notes:

- 1) Silt content from AP-42 Table 13.2.4-1 Stone quarrying, various limestone products
- 2) From NOAA NEIC Precipitation Data for Detroit City Airport and Detroit Metropolitan Airport weather stations. Precipitation data used from 1/1/2008 through 12/31/2017.
- 3) Default value
- 4) Assume total PM = 2.1 * PM10 content of emissions pursuant to AP-42 ratio for aggregate processing.