Fugitive Dust Control Methods
MDEQ – Air Quality Division
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Steve Weis
Michigan Department of Environmental Quality (DEQ)
Aqd - Detroit Field Office
313-456-4688
weiss@michigan.gov
Reasons to Manage Fugitive Dust

• Regulatory requirements
• Equipment maintenance
• Conserve material
• Potential health impacts
• The State Farm principle
Managing Fugitive Dust

• Assess facility/site for areas with potential sources of fugitive dust
• Implement a fugitive dust management plan
  - Select control measure to use
  - Implement the plan
• Keep records of dust management measures
Assess facility/site

- Identify potential sources of dust on property
- Analyze traffic patterns
- Decide on dust control measures
- Determine frequency of dust control
Assess facility/site
Common Dust Management Measures

Start with preventative measures

- Minimize size of disturbed/exposed area
- Adjust work schedule (limit dusty work on windy days)
- Clean up dusty spills
- Eliminate trackout
- Apply dust suppressants
- Get everyone at the site involved
Dust Control Measures for Occasional Use Areas

- Vegetative ground cover
- Wind erosion controls (e.g. bushes, fence, wind breaks)
- Apply dust suppressant
Common Fugitive Dust sources

- Material storage piles
- Material handling operations
- Material processing
- Construction/demolition activities
- Roadways and unpaved areas
Fugitive Dust Management
Storage Piles
Fugitive Dust Management
Storage Piles
Fugitive Dust Management
Storage Piles

• Limit pile size
• Enclose storage and handling areas
• Cover piles when not in use, or dust suppressant
• Use pneumatic conveying/telescopic chutes, minimize drop distance
• Keep ground at base of pile clear of spills
...the company will use sprayed water to reduce dust during loading and conveyor belt use...

...Loading would be suspended when winds exceed 30 mph...

...piles stored for more than 45 days would be sealed with an epoxy solution...

...piles stored longer than 150 days would be covered with a tarp...
Storage Pile Management
Incorporating Storage Piles Into Your Plan

1.0 Storage Piles

As a limestone crushing operation, the facility will have storage piles of limestone of various sizes. There will be an average of six storage piles at the facility. The stone will be loaded into the piles from conveyors. The stone discharged to the piles will have been wetted in the process by the water mist sprays. Storage piles will be wetted when weather conditions are such that fugitive emissions are likely to occur, at a minimum of once per week. Wetting of the storage piles will take place through the use of a hose attached to the water tank truck. Water will be sprayed for approximately 10 to 15 minutes per pile. A log sheet will be kept that will record the pile wetting schedule. The actual moisture content of the piles is not known, but must be maintained at a level so that the product will meet the customer’s specifications. Free fall from front end loaders will be minimized to 2 feet, where possible. Watering schedules will be adjusted if, after a site visit and written notification, the Michigan Department of Environmental Quality’s (MDEQ) Air Quality Inspector determines that fugitive dust regulations are not being met utilizing the current schedule.
Dust Control Measures for Conveyors
Dust Management Measures for Conveyors

- Utilize spray system
- Telescopic chutes
- Limit drop heights
- Erect enclosures
- Screw conveyors
Truck Loading

- Empty bucket slowly
- Ensure drop height is minimized
- Install water spray bars on bucket
- Maintain vehicles to prevent leakage or spillage
- Do not overload!
Fugitive Dust Control
Earth Moving

• Conduct activity on less windy days
• Reduce wind effects with windbreaks where practicable
• Require tarpaulins for all haul vehicles
Dust Control Measures for Roadways
Fugitive Dust Control
On-site Roadways

• Train workers - accountability
• Reduce vehicle speed on unpaved roads and lots to 10mph
• Water/sweep surfaces often
• Rinse vehicles leaving facility
• Apply dust suppressants
Fugitive Dust Control
At the Entrance/Exit

- Establish a truck and wheel wash
- Provide an area of crushed gravel/stone to assist in dislodging PM
- Sweep street regularly
Driveways
Driveways
Driveways
Truck and Wheel Wash
Control Speed Limit
Trackout
Trackout
Fugitive Dust Control
Street Sweeping
There’s a sweeper here somewhere
Operate Sweeper to Capture Dust
Addressing Traffic, Roads and Trackout in Your Plan

2.0 ROADS AND TRUCK TRAFFIC

All limestone transport trucks will be tarped prior to leaving the facility and a 10 mile per hour speed limit will be posed at several locations along the plant road.

All limestone transport trucks will pass through a wheel wash system prior to leaving the facility.

A street sweeper will be operated as necessary to control the carry out that may be deposited by trucks leaving the quarry. The sweepings will occur a minimum of two times per month and records will be kept on file.

Appropriate measures will be taken when necessary to minimize the emission of water onto Two Stone Road from the trailers of trucks leaving the facility. This water may be present in the bottom of trailers and results from the stone processing and particulate emission control activities.
Dust Suppressants

**Purpose:** Attract moisture, bind dust particles, seal surface
Common dust suppressants

- Water
- Chloride salts
- Lignin (pulp/paper by-product)
- Vegetable-based products (e.g. SBF)
- Polymer solutions
- Emulsified asphalt or resin solutions
Watering

- Typically cheapest dust control method
- Only provides temporary control
- Weather conditions dictate reapplication frequency
Figure 1—Instantaneous dust concentrations from haul trucks on test section of road as it is initially wetted and allowed to dry.
Effective Watering
Watering – less effective method
Watering controlling dust, but not runoff
Watering controlling dust, but not runoff (cont.)
Dust Suppressants

• Chloride solutions
  - attract moisture, reduce evaporation
  - corrosive, negative impacts on aquatic/plant life

• Vegetable-based products
  - non-corrosive, typ. non-toxic, less trackout
  - can be odorous, sticky
Dust Suppressants (cont.)

- Polymer solutions, resins and emulsified asphalt, lignin
  - binds surface dust, less trackout, long lasting
  - potentially toxic effects on surface water
Don’t apply to paved surfaces
Avoid Contaminating Other Media
Use Approved Dust Suppressants

DEQ Guidance on Dust Suppressants

Dust suppressants are used to minimize fugitive dust emissions and control erosion and maintenance costs on unpaved roads and lots. The mechanisms by which suppressants abate dust vary with product type, some form crusts or protective surfaces on the soil, others act as binding agents causing particles to agglomerate together, and some attract moisture to the soil particles.

Potential environmental impacts of dust suppressants include: surface and groundwater quality deterioration; soil contamination; toxicity to soil and water biota; toxicity to humans during and after application; air pollution from volatile dust suppressant components; accumulation in soils; changes in hydrologic characteristics of the soils; and impacts on native flora and fauna populations.

Potential Environmental Consequences of Dust Suppressants

Example Uses:
1. Unpaved roads and parking areas.
2. Harvester and windrow fields.
3. Temporarily disturbed areas undergoing vegetation establishment.
4. Earth-moving activities (landfills, mining).

Exposure Pathways:
A. Atmospheric transport and transformation.
B. Erosion of sprayed, suppressant-soaked soils and solids.
C. Uptake of dust suppressants by plants.
D. Ingestion of dust suppressant/contributions by animals.
E. Ingestion of exposed animals by humans.
F. Ingestion of exposed humans by animals.
G. Ingestion of contaminated groundwater.
H. Ingestion of dust suppressants by humans.
I. Potential impacts on soil microflora and microfauna.

Figure 21: Conceptual model of the various uses of dust suppressants and the potential environmental consequences.

Source: Potential Environmental Impacts of Dust Suppressants: Avoiding Another Times Beach, An Expert
Addressing accountability in your plan

**Everyone**

1. Opacity levels cannot exceed 20%. If you can see it than it is over 20%.
2. Roads must be inspected 5 days a week and documented.
3. Roads must be swept 3 times a week, weather permitting.
4. City streets are swept twice a month.
5. Do not track mud onto the city roads.
6. Crane tracks should be cleaned regularly.
7. Keep the magnet as close to the load as possible when it is dropped into the pile or the trailer.
8. When handling or loading material, dust suppressant must be used.
9. Finished product must be sprayed when handled. Must keep the hose on it if the spraying is not enough.
What about temporary sources?
Construction and Demolition activities
Road Construction and Repair
Temporary Sources

Employ dust management methods for:

• Storage piles
• Active work areas
• Material transfer operations
• Concrete, asphalt batch plants
• Roadways, trackout
Fugitive Dust Control Methods

• Assess facility/site for areas with potential fugitive dust
• Implement a fugitive dust control plan
Select control measure to use
Implement the plan
• Keep records of control measures
Incorporating Dust Suppressant Application in Your Plan With a Fugitive Dust Control Log

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Control Method</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/2</td>
<td>2pm</td>
<td>Watered road ways</td>
<td>Last rainfall on 6/29</td>
</tr>
</tbody>
</table>

**Self-Inspection Checklist: Fugitive Dust Control Method Log**

- **Fugitive Dust Source:** ________________________________

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**DEQ**
Fugitive Dust Control Log (cont.)

### Self-Inspection Checklist: Weather Log

<table>
<thead>
<tr>
<th>Date</th>
<th>Temperature</th>
<th>Wind Speed/Direction</th>
<th>Amt. of Rainfall</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/2</td>
<td>81°F at 2pm</td>
<td>5-10 mph, NW</td>
<td>0</td>
<td>Last rainfall on 6/29 - water applied</td>
</tr>
</tbody>
</table>

...
Self-Inspection Checklist

Using a Self-Inspection Checklist helps you incorporate the routine tasks of fugitive dust control into your daily schedule. It serves as a job reminder on a daily basis, and as a record of your efforts to keep dust problems to a minimum. You can identify problem areas before they get out of hand, and anticipate making adjustments for seasonal changes or for any unforeseen circumstances. Your personal involvement in reducing fugitive dust will help us all breathe a little easier!

Prevention
- Limit Surface Area Disturbed
- Limit Work in Wind
- Apply Suppressives as Needed
- Clean up Spills Immediately

Occasional Use Areas
- Grow Groundcover
- Erect Windbreaks
- Apply Crust Chemicals

Frequent Use Areas
- Pave Roads
- Enclose Storage Areas
- Cover Storage Piles
- Water/Sweep Often
- Reduce Speed Limits
- Minimize Trips
- Limit Area Access
- Prevent Carryout Offsite

Use Your Checklist Daily!
SUMMARY

• Conduct evaluation of site
• Be sure to address:
  – Traffic and Trackout
  – Conveyors
  – Storage Piles
  – Any activity that could generate dust
• Choose site specific control measures
• Document all activities for accountability