Board of Adjustment CUP Application Addendum:

Silica Sand Processing and Transportation Operations

This packet provides the information needed to submit a Conditional Use Permit application for a silica sand processing and/or transportation operation to the City of Winona Board of Adjustment. Because of the amount of information needed for the application, at least one pre-application meeting with City staff is required. Contact the City Planning Division at 507-457-8250 to schedule a meeting.

After the pre-application meeting, the following information must be provided for a CUP application. Provide attachments as needed. Note that all proposed silica sand processing and/or transportation operations require a complete Transportation Impact Analysis (see Attachment A) to be submitted with a CUP application.

A letter will be provided to you within 15 business days if more information is required to declare the CUP application complete.

Project Narrative

Describe the proposed construction or development, including a description of the proposed machinery, processes, products of the operation, and a conceptual site plan for reference. Also provide a dust control plan per number (7) below. In addition, please provide the following specific information:

A) Proposed hours of operation:

B) Days of the week:

C) Months of the year:

D) Average number of trucks per day:

E) Maximum number of trucks per day:

F) Source of trucks/product:

G) Destination of outbound trucks:

Dangerous and Objectionable Elements

Describe the mechanisms and techniques to be used in restricting the emission of dangerous and objectionable elements as set forth below. Indicate if an element does not apply to the project:

(1) Fire and explosion hazard. All activities involving and all storage of inflammable and explosive materials shall be provided at any point with adequate safety

devices against the hazard of fire and explosion and adequate firefighting and fire suppression equipment and devices standards in the industry. Burning of waste materials in open fire shall be prohibited at any point. The relevant provisions of state and local laws and regulations shall also apply.

(2) Radioactivity or electric disturbance. No activities shall be permitted which emit dangerous radioactivity at any point or electrical disturbance adversely affecting the operation at any point.

(3) Noise. Maximum decibel levels in accordance with City Code Chapter 39 and as measured in the MPCA document "A Guide to Noise Control in Minnesota":

	Day (7 a.m. - 10 p.m.)		Night (10 p.m. - 7 a.m.)	
Zoning District	L_{50}	L_{10}	L_{50}	L_{10}
RMHP, R-S, R-R, R-1.5	60	65	50	55
R-1, R-2, R-3, C-1	60	65	50	55
B-1, B-2, B-3	65	70	65	70
B-2.5, M-1, M-2, A-G	75	80	75	80

(4) Vibration. No vibration shall be permitted which is discernible without instruments at the boundary of the M-2 district or in the nearest R district.

(5) Smoke. No emission shall be permitted at any point, from any chimney or otherwise, of visible gray smoke of a shade equal to or darker than No. 2 of the Power's Micro-Ringlemann Chart, published by McGraw-Hill Publishing Company, Inc., and copyright 1954 (being a direct facsimile reduction of the standard Ringlemann Chart as issued by the United States Bureau of Mines), except that visible gray smoke of a shade equal to No. 2 on said Chart may be emitted for 4 minutes in any 30 minutes. These provisions applicable to visible gray smoke shall also apply to visible smoke of different color but with an apparently equivalent capacity.

(6) Odors. No emission shall be permitted of odorous gases or other odorous matter in such quantities as to be offensive at the boundary of the M-2 district or in the nearest R district. Any process which may involve the creation or emission of any odors shall be provided with a secondary safeguard system, so that control will be maintained if the primary safeguard system should fail. There is hereby established as a guide in determining such quantities of offensive odors Table III, "Odor Thresholds," in Chapter 5 "Air Pollution Abatement Manual," copyright 1951 by Manufacturing Chemists' Assn., Inc., Washington, D.C.

(7) Fly ash, dust, fumes, vapors, gases, and other forms of air pollution. No emission shall be permitted which can cause any damage to health, to animals, vegetation or other forms of property, or which can cause any excessive soiling, at any point; and in no event any emission, from any chimney or otherwise, of any solid or liquid particles in concentrations exceeding 3/10 grains per cubic foot of the conveying gas at any point. For measurement of the amount of particles in gases resulting from combustion, standard corrections shall be applied to a stack temperature of 500 degrees Fahrenheit and 50 percent excess air. All activities shall comply with applicable state law, rules and local ordinances for dust and Particulate Matter generation, and any stockpiles (including sand and dirt) which produce windblown dust shall be covered. Moisture testing of uncovered sand or air quality monitoring is required. Testing of sand shall ensure that moisture levels are above 2.5%. See Attachment C for the moisture testing procedure. A fugitive dust control plan is required detailing dust control measures both on-site and off-site. See Attachment D for dust control plan requirements.

(8) Glare. No direct or sky-reflected glare, whether from floodlights or from high-temperature processes, such as combustion, welding or otherwise, so as to be visible at the boundary of the M-2 district or in the nearest R district. This restriction shall not apply to signs otherwise permitted by the provisions of this chapter.

(9) Liquid or solid wastes. No discharge at any point into any public sewer, private sewage disposal system or stream or into the ground, except in accord with standards approved by the department of health of the state or standards equivalent to those approved by such department for similar uses of any materials of such nature or temperature as can contaminate any water supply or otherwise cause the emission of dangerous or offensive elements.

Specific Conditions

Respond to the following specific CUP conditions for sand processing and transportation operations. Indicate if a condition does not apply to the project:

(1) Hard Surfacing – Asphalt or concrete surfacing shall be required in any truck or equipment maneuvering area.

(2) Truck Washing Equipment and/or Tracking Pads – Truck washing equipment or tracking pads, or a combination of both, shall be required at each facility.

(3) Truck Route Designation – All trucks entering and leaving such facilities shall enter and exit Winona on designated truck routes. Such routes shall avoid residentially zoned property to the greatest extent possible.

(4) Transportation Impact Analysis – All silica sand facilities shall complete a Transportation Impact Analysis (See Attachment A).

(5) Enclosure and Covering of Processing Equipment and Stockpiles - Processing equipment (including dryers, washers, and screeners) and stockpiles within 500 feet of any R or B district shall be enclosed by a structure. Stockpiles greater than 500 feet from an R or B district and undisturbed for more than one week shall be covered.

(5) Setback – All structures housing processing equipment and stockpiles shall be located a minimum of 500’ from a residential property.

(6) Stockpile Watering – Uncovered stockpiles shall be watered regularly to prevent surface areas from drying out and becoming susceptible to wind erosion.

(7) Hours of Operation – Hours of operation for truck traffic and equipment/ machinery with back-up alarms shall be limited to 7 a.m. – 7 p.m.

(8) Landscaping and Screening – Sufficient landscaping and screening, including but not limited to fences, walls and/or vegetative screens, as approved by the City of Winona, shall be provided to mitigate visual impacts of operations on adjacent properties.

(9) Contact Information – Facility operators shall provide current contact information to the City of Winona to facilitate prompt response to concerns.

(10) Permits and Reports Obtained and Placed on File – Any applicable state or federal permits shall be obtained and placed on file at the City of Winona. Any reports generated to fulfill permit requirements shall be submitted to the City of Winona. An informational sheet on state permits which may apply to the project is attached to this application (Attachment B). Applicant must document discussion with the all applicable agencies by providing staff names and initial date contacted.

Attachments

A) Transportation Impact Analysis Requirements
B) State Environmental Regulations Summary
C) Moisture Testing Procedure
D) Fugitive Dust Control Plan Requirements

A

ARTICLE IX. TRANSPORTATION IMPACT ANALYSES AND ROAD USE AGREEMENTS

43.88 PURPOSE.

(a) Purpose and Intent: The intent of this article is to provide the information necessary to allow decision-makers to assess the transportation implications of traffic associated with a proposed development in relation to safety, the existing and proposed capacity and condition of the street system, congestion, and the quality of life of neighboring residents. This article establishes requirements for the analysis and evaluation of transportation impacts associated with proposed developments. Traffic studies should identify what improvements, if any, are needed to:

(1) Ensure safe ingress to and egress from a site;
(2) Maintain adequate street capacity on public streets serving the development;
(3) Ensure safe and reasonable traffic operating conditions on streets and at intersections;
(4) Avoid creation of or mitigate existing hazardous traffic conditions;
(5) Minimize the impact of non-residential traffic on residential uses in the vicinity; and
(6) Protect the public investment in the existing street system.

43.89 GENERAL PROVISIONS

(a) When Required: (*Note: All silica sand and mining/extraction land uses require a TIA*) A Transportation Impact Analysis and Road Use Agreement shall be required for any development subject to a site plan or CUP after 1/1/2013 which will generate 200 or more heavy commercial vehicle trips per day at maximum daily operating capacity. An analysis shall be required for projects where heavy commercial vehicles from the operation would contribute more than 20% of the traffic on any local street. These provisions shall not prevent the City from requesting a Transportation Impact Analysis be complete for projects outside the City of Winona which will have any of the aforementioned impacts on non-truck route roads in the City of Winona.

(b) Jurisdiction: The City Engineer shall have the final authority for determining the need and adequacy of Transportation Impact Analyses and Road Use Agreements. The City Engineer may waive the requirement for a Transportation Impact Analysis and/or Road Use Agreement.

(c) Applicability: A Transportation Impact Analysis shall apply to roads used for transporting materials in heavy commercial vehicles, extending from the site access to a truck route unless waived by the City Engineer.

(d) Application: No development application subject to a Transportation Impact Analysis or Road Use Agreement shall be considered complete unless accompanied by an appropriate traffic study except if a waiver has been granted.

(e) Findings: A Transportation Impact Analysis shall find the following:

(1) The traffic generated by the proposed use can be safely accommodated on proposed haul routes and will not need to be upgraded or improved in order to handle the additional traffic generated by the use; or

(2) A Road Use Agreement is recommended specifying responsibility for improving and maintaining roads including remediation of damaged roads and specification of designated haul routes.

43.90 TRANSPORTATION IMPACT ANALYSES

(a) Contents: A Transportation Impact Analysis shall contain the following information at a minimum:

(1) An analysis of existing traffic on road segments and intersections from site access to a truck route.

(2) Traffic forecasts for road segments and intersections from site access to a truck route. Such forecasts shall be based on the maximum trips per day.

(3) An analysis of the impact of the proposed development on residential streets in the vicinity of the site to identify any potential adverse effects of the proposed development and mitigation measures to address any impacts. Examples of possible effects include, but are not limited to, non-residential traffic impacts on residential neighborhoods, schools, pedestrian and bicyclist safety hazards (especially at points where haul routes intersect with facilities having high levels of pedestrian or bicycle traffic), traffic noise, or turning movement conflicts with other driveways or local access roads.

(4) An analysis of level of service for intersections from site access to a truck route.

(5) An analysis of intersection sight distances.

(6) An analysis of the road's structural ability to handle trucks extending from site access to a truck route. Such analysis shall include an analysis of existing and projected cumulative equivalent single axle loads (ESALs) using the Minnesota Local Road Research Board (LRRB) Pavement Impacts of Large Traffic Generators methodology. A structural analysis shall also be completed for any bridge or culvert along a public road used for a haul or access route if identified as at risk for structural failure due to increased ESAL loadings from the proposed use.

(7) A finding that traffic impacts can either be handled by the roads studied or:

i. A list of infrastructure improvements needed to bring the route up to commonly accepted engineering design standards and access management criteria, and/or

ii. A list of roadbed, ride surface, or drainage improvements that are needed to increase the structural stability of roads and any substructure, superstructure or deck improvements needed to increase the structural stability of bridges and culverts.

43.91 ROAD USE AGREEMENTS

(a) A Road Use Agreement shall be prepared for developments subject to a Transportation Impact Analysis at the discretion of the City Engineer. Such agreement shall be developed in response to the findings of a Transportation Impact Analysis. The agreement may address, but is not limited to, any of the following road infrastructure matters:

(1) Responsibility for upgrading

a. Pavement sections, bridges, and culverts structural condition

b. Intersection signals and signage

c. Geometric design, including entrances, intersections, railroad and pedestrian/bicycle facility crossings, geometric design of bridges and culverts, and typical road cross-sections;

(2) Responsibility for exceptional maintenance attributable to the use, estimated based on Minnesota Local Road Research Board (LRRB) Pavement Impacts of Large Traffic Generators methodology;

(3) Responsibility for clean-up of spillage and public road dust control along haul routes;

(4) Establishment of financial accounts to address costs associated with upgrading and exceptional maintenance costs;

(5) Delineation of a haul route between site access and a truck route;

(6) Schedules of operation and hauling, including construction operations;

(7) Methods to verify and report type, number, and weight of truck loads;

(8) Emergency conditions creating a need for immediate road repairs or road closing;

(9) Required insurance; and

(10) Remedies and enforcement measures.

Minnesota Pollution Control Agency

Environmental Management at Aggregate Operations

B

Waste water permits #3.01, 9/04

- Aggregate production is an important Minnesota industry, producing sand, gravel and crushed stone for construction projects and other uses throughout the state.
- The Minnesota aggregate industry recognizes the economic and public relations benefits of progressive environmental management.

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This fact sheet summarizes pollution prevention opportunities and Minnesota Pollution Control Agency (MPCA) permitting requirements for aggregate operations. Some general information about permit programs administered by other agencies is also provided.

Environmental Review

If a new pit or quarry is started, or an existing one is expanded by 40 acres or more, and the pit will have a mean depth of at least 10 feet during its existence, the project needs to have an Environmental Assessment Worksheet prepared. If the new pit or expansion will cover at least 160 acres, mined to a mean depth of 10 feet or more, an Environmental Impact Statement is needed. For more information on this process, contact the Environmental Quality Board at (651) 296-8253, or visit their Web site at:
http://www.eqb.state.mn.us/review.html

Construction Storm Water

Construction storm water runoff at a new pit or quarry may require a construction storm water permit for the initial construction phases of operation. Construction activities, such as building roads, berms, containment devices, and grading at a new pit or quarry that involves one or more acres, may trigger the requirement to obtain a construction storm water permit, and to stabilize these initial disruptions before terminating the permit.

For more information on Construction Storm Water requirements and the publications available to help you comply, contact the MPCA Customer Assistance Center (CAC) or Small Business Assistance Program (SBAP), or visit our Web site at:
http://www.pca.state.mn.us/water/stormwater/stormwater-c.html

Industrial Storm Water and other Water Discharges

The aggregate industry deals with water throughout the construction season. To excavate gravel or rock, the water table may need to be lowered. Washing of sand, gravel or crushed stone may be needed to ensure it meets product specifications.

The following activities at aggregate operations require a water quality permit from the MPCA:

- Sand and gravel washing discharges that leave the mine or quarry pit, whether by gravity flow or pumping.

  Often, operators can recycle their wash water and/or allow it to infiltrate the pit floor, and avoid the need for wash water overflows and other discharges. This may change their requirement to have a permit.

- Pumping or siphoning out a mine or quarry pit to create a dewatering discharge.

  Good sump management to prevent accumulation of dirty water is important, particularly in quarry pits. Sometimes pit water can be reused in the plant, or for road dust control.

- The generation of wastewater by air emission control systems, particularly from the wet scrubbers used at some hot mix asphalt plants.

Minnesota Pollution Control Agency, 520 Lafayette Rd. N., St. Paul, MN 55155-4194
(651) 296-6300, toll-free (800) 657-3864, TTY (651) 282-5332 or (800) 657-3864
This material can be made available in alternative formats for people with disabilities.

- The discharge of any other water from the site.

- Storm water runoff from mine and quarry stockpiles and pit walls, as well as from equipment like rock crushers, hot mix asphalt, and concrete production plants.

  A site with runoff needs to have a Pollution Prevention Plan implemented for the operations at that particular site. Good management practices such as vegetative buffers, detention ponds, covered bulk containers and hazardous material storage areas, as well as the skillful placement of stockpiles and equipment, can greatly improve storm water management and erosion control at aggregate sites.

To apply for Water Quality permit coverage for aggregate operations, use the "Water Quality Transmittal Form" and "Attachment for Construction Sand & Gravel, Rock Quarrying and Hot Mix Asphalt Production Facilities" attachment form. For more information on Water Quality permits and requirements, contact the CAC or SBAP, or visit our Web site at: http://www.pca.state.mn.us/water/permits/sandgravel.html.

Fuel and Hazardous Materials Management

When equipment is refueled, maintained or repaired outside the shops, special care must be taken to prevent spills, and to quickly contain and collect accidental spills. The employees at each site should be trained under a spill control plan. Used oil, lubricants, antifreeze, paint, solvents, vehicle cleaning wastes, recovered freon, asbestos, PCBs and shop wastes should be properly contained, stored, and recycled or disposed of in compliance with MPCA requirements.

For more information on Hazardous Waste requirements and the publications available to help you comply, contact the CAC or SBAP, or visit our Web site at: http://www.pca.state.mn.us/waste/pubs/business.html

Liquid (including fuel) storage tanks, whether aboveground or underground, need to have effective containment and may need to be approved by the MPCA.

For more information on tanks requirements and the publications available to help you comply, contact the CAC or SBAP, or visit our Web site at: http://www.pca.state.mn.us/cleanup/tanks.html

Air Quality Management

All facilities must meet minimum standards for dust and noise control. Facilities with crushing operations may have to meet additional federal standards for emissions of particulates from processing equipment. It is important to control dust throughout the facility, including at crushers, screens, conveyors and hoppers. Due to potential air quality problems, materials containing asbestos (which is generally found in old buildings, and has been used in older roads and concrete materials) must not be crushed.

The use of fuels, other volatile chemicals, and/or generators may also dictate additional air quality requirements. Depending on production capacity and processing equipment, an Air Emission Permit may be required.

For more information on Air Quality requirements and the publications available to help you comply, contact the CAC or SBAP, or visit our Web site at: http://www.pca.state.mn.us/air/pubs/index.html

Solid Waste Management

Some aggregate operations store used asphalt and/or concrete, captured particulate emissions, or other demolition debris. The MPCA encourages recycling of these materials, and of scrap and trash materials, when possible. If this is not practical, used pavement must be disposed of in an approved sanitary or demolition debris landfill.

For more information on Solid Waste requirements and the publications available to help you comply, visit our Web site at: http://www.pca.state.mn.us/waste/pubs/solidwaste.html, or call the MPCA at (651) 297-6300 or (800) 657-3864 to be connected to solid waste staff for your regional area.

Water Withdrawals

Surface or ground water withdrawals (such as for dewatering, washing, makeup water for scrubbers, roadbed preparation, dust control, irrigation) of more than ten thousand gallons/day or one million gallons/year require a DNR water appropriation permit. Re-use of dewatering and wash water is encouraged and may help eliminate the

need for a permit or reduce DNR water use fees. A DNR water appropriation permit is not required if the water is taken from a municipal or other source of water for which there is a valid appropriation permit.

For more information on water use permits, contact the Department of Natural Resources at (651) 297-2835, or visit their web site at: http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/index.html

Riprap and Discharge Outlets

Riprap installation for outflows to public waters does not require a DNR permit if installed according to the following requirements:

a. The riprap consists of natural rock only.
b. The riprap is sized according to the guidelines in practice 6.18 of the MPCA publication "Protecting water quality in urban areas". This publication is available on-line at: http://www.pca.state.mn.us/water/pubs/sw-bmpmanual.html
c. The riprap conforms to the natural alignment of the shore or stream bank.
d. No excavation occurs below the top of the stream bank or the ordinary high water level of a basin or wetland.
e. The materials are placed less than 5 feet water ward of the ordinary high water mark.
f. The minimum finished slope is no steeper than 3 feet horizontal to 1 foot vertical (3:1).
g. No bank shaping or back sloping is required to achieve the 3:1 slope.
h. The materials do not obstruct receiving water flow.
i. The discharge is not directly to Lake Superior, DNR-designated trout waters, or a posted fish spawning area.

Trout waters are designated in Minn. R. 6264.0050, subp. 2 and 4; this list may be obtained from the DNR by calling (651) 296-3325. DNR Trout waters are also available on-line in the 'Special Waters Search' at http://www.pca.state.mn.us/water/stormwater/stormwater-c.html Information on DNR protected waters permits is available from the DNR at (651) 296-4800.

US Army Corps of Engineers

Activities that involve the discharge of dredged or fill material or excavation within waters and wetlands may require approval of the Corps of Engineers. Such activities could include the construction of access roads or the creation of storage areas and building sites.

Also, activities related to the construction of pit dewatering outfall structures and the excavation of water detention/retention ponds within waters and wetlands may require Corps approval.

For more information on Corps of Engineers requirements, contact the St. Paul District Office at (651) 290-5375, or visit their web site at: http://www.mvp.usace.army.mil/environment/

Additional Information

If you have questions or would like more information, contact:

Environmental Quality Board
Environmental Review Process ..... (651) 296-8253

Minnesota Pollution Control Agency
Customer Assistance Center (CAC) ..... (651) 297-2274 or
..... (800) 646-6247

Small Business Assistance Program (SBAP)* (651) 282-6143 or
(800) 657-3938

- Construction Storm Water
- Industrial Storm Water
- Waste Water Permitting
- Storage Tanks
- Hazardous Waste Management
- Air Quality

Solid Waste Questions or Issues ..... (651) 296-6300 or
..... (800) 657-3864

*Note that businesses with fewer than 100 employees company-wide can call our Small Business Assistance Program for free, nonregulatory, confidential environmental assistance.

Minnesota Department of Natural Resources
Water Use Permits..... (651) 297-2835
Protected Waters Permits ..... (651) 296-4800
Trout Waters Information..... (651) 296-3325

US Army Corps of Engineers
Dredge, fill or excavation to waters/wetlands . (651) 290-5375

C

City of Winona Moisture Testing Procedure

The intent of moisture testing is to ensure that particulates (specifically crystalline silica) are not being emitted into the ambient air in hazardous quantities. Moisture testing is meant to be a low-cost, proactive alternative to air quality monitoring. Air-quality monitoring may be substituted for moisture testing. Such monitoring should be completed in correspondence with the MPCA and according to applicable state regulations. Moisture testing is not required for fully enclosed processing, stockpiling, or transportation facilities or equipment. If testing already occurs, results sent to the City of Winona may be used fulfill the requirement for moisture testing. The general moisture testing procedure is below:

1) Test once weekly when operating. Test sand in <u>each</u> uncovered stockpile and in <u>one</u> uncovered railcar (if present). Test mid-day (11 a.m. -1 p.m.) and mid-train (after sand has been disturbed). Moisture content must be greater than 2.5%.

2) Use American Society for Testing and Materials (ASTM) method numbers D 2216-92 or D 4643-93 (or equivalent).

3) If three consecutive weekly tests at a single location show moisture contents greater than 2.5%, weekly testing is no longer required until the source of sand changes. The City may still conduct random tests of moisture content.

4) If a single test shows a moisture percentage equal to or less than 2.5%, re-test the next day between 11 a.m. and 1 p.m. If the re-test is greater than 2.5% continue with weekly tests. If the re-test shows a moisture percentage equal to or less than 2.5%, re-test again the next day. If three consecutive tests at a single location show moisture contents equal to or less than 2.5%, a moisture addition device must be utilized to wet sand prior to processing or loading.

5) The operator shall keep records of each moisture test used to satisfy the requirements above. The records must summarize the method used, results, date, time, initials of person performing test, and the source of sand. If appropriate, provide a map of sampling locations. Submit all information to the City of Winona monthly or upon completion of testing (number three above).

Sand Processing and Transportation Operations:

Fugitive Dust Control Plan Requirements

A fugitive dust control plan is required for all sand operations applying for a Conditional Use Permit. The plan should detail how dust will be controlled on-site and prevented from traveling beyond property lines in accordance with Minnesota State Rule 7011.0150:

> *No person shall cause or permit a building or its appurtenances or a road, or a driveway, or an open area to be constructed, used, repaired, or demolished without applying all such reasonable measures as may be required to prevent particulate matter from becoming airborne. All persons shall take reasonable precautions to prevent the discharge of visible fugitive dust emissions beyond the lot line of the property on which the emissions originate. The Commissioner may require such reasonable measures as may be necessary to prevent particulate matter from becoming airborne including, but not limited to, paving or frequent clearing of roads, driveways, and parking lots; application of dust-free surfaces; application of water; and the planting and maintenance of vegetative ground cover.*

The plan should:

1) Give a description of the operation

2) Provide a map of activities

3) List the activities which may produce both dust and particulates (e.g. truck travel on gravel roads, loading and unloading sand, stockpiled sand, etc.).

For each activity, plans to prevent dust and particulates from becoming airborne should be detailed (e.g. calcium chloride application, watering, consistent movement of wet stockpiled sand). A template to record such activities is attached. For reference, Best Management Practices for dust generated by typical activities at sand operations are also attached.

Source of Fugitive Dust Emissions:

Potential Cause(s) of Fugitive Dust	Control Strategy and Frequency	Inspection/Observation Criteria	Inspection Frequency

Source of Fugitive Dust Emissions:

Potential Cause(s) of Fugitive Dust	Control Strategy and Frequency	Inspection/Observation Criteria	Inspection Frequency

PAVED ROADS BMP 01

Paved roads refer to public access roads adjacent to the exit/entrance of the construction site that are used for access and hauling. Best management practices for paved roads include:

1) Clean spills from haul trucks.
   a) Tarp all loads.
   b) Use 3” freeboard,
   c) level all loads. no mounding is allowed
   d) Wet the hauled material.

2) Reduce construction carryout.
   a) Clean vehicles before entering the road.
   b) Pave construction access sites.
   c) Install gravel pads and grizzle/rumble grates.

3) Eliminate entrainment from unpaved adjacent areas.
   a) Pave/stabilize road shoulders(4’-12’ wide).
   b) Pave/stabilize parking areas and driveways.

4) Prevent soil erosion.
   a) Storm water control.
   b) Vegetative stabilization.
   c) Clean up of soil deposits,
   d) Use wind fence breaks and landscaping as wind breaks.

5) Use PM-10 certified vacuum sweepers to clean trackout.

6) Reduce traffic.

Figure 2. Track out on to the Public Access Roadway.18

See also: Appendix Q and P.

UNPAVED HAUL AND ACCESS ROADS BMP 02

Unpaved haul and access roads refer to routes for construction related traffic on unpaved interior and/or access roads. Best management practices for unpaved haul and access roads include:

1) Prevent visible fugitive dust emissions as not to exceed 20% opacity. Use the Opacity Test Method (Appendix G).
   a) Apply water so the surface is visibly moist
   b) Water to establish visible surface crust. Use the drop ball test to determine sufficient crust (Appendix I).
   c) Limit silt content on the road surface to 6% or less. Use the silt content test method (Appendix H).
   d) Limit silt loading to 0.33 oz/ft^2 or less.

2) Stabilize all haul routes with one of the following.
   a) Apply water to haul roads and maintain in a stabilized conditions.
   b) Apply a dust palliative to haul routes and maintain in stabilized condition.
   c) Apply gravel, recycled asphalt or other suitable material.
   d) Pave.

Alternatively, to comply with the Maricopa County 5% rule, the owner/operator can:

1. Limit number of vehicle trips to the maximum of 20 per day.
2. Include in the Dust Control Plan number of vehicle trips on the unpaved access road for each day.
3. Limit vehicle travel speeds to 15 mph.
4. Include description on how the vehicles speed will be restricted to 15 mph (bumps, dips).

Figure 3. Untreated Road Surface and Excessive Vehicle Speed.

See also: BMP 03,
CONSTRUCTION ENTRANCE AND EXIT TRACK OUT DEVICES.

CONSTRUCTION ENTRANCE AND EXIT TRACK OUT DEVICES BMP 03

Construction entrance and exit track out devices are used for prevention and cleanup of mud, silt and soil tracked out onto paved, public roadways from tires and the exterior surfaces of haul trucks and /or motor vehicles. Construction entrance and exit track out devices are:

1) Required at all work sites with a disturbed surface areas of 2 acres or larger.

2) Required at all work sites where 100 cubic yards of bulk materials are hauled on-site and /or off-site per day.

3) Required at all entrance/exit points.

Bets management practices for construction entrance and track out devices include:

1. Restrict access to minimum number of entrance/exit points; one preferred.

2. Install fencing around the construction site to redirect traffic.

3. Do not use soil to create a ramp for vehicles to access construction site over the curb.

4. Limit public access.

5. Cleanup spillage, carry-out, erosion, and/or track out on the following time-schedule:
   a. Immediately, when spillage, carryout, and/or track out extends more than 25 feet from the construction entrance.
   b. By 8 pm at the end of every workday, broom sweep/ vacuum clean first 25 feet from construction entrance.
   c. When needed, wet broom with sufficient water (kick broom, steel bristle broom, Teflon broom, and vacuum)..
   d. Daily, use PM-10 approved vacuum sweeper operated at manufacture's recommended speed (5 mph) to remove track out at distance 25 feet or greater from the construction entrance on public roads. Contractor will be cited a Notice of Violation if the vacuum operator violates dust control ordinances.

6. Prevent spillage; tarp and level all loads.

7. Install and maintain track out control device in effective condition at all access points where paved and unpaved access or travel routes intersect.
   a. Gravel pads shall be at minimum 50' long, 30' wide, 3"-6" deep with 1"-3" washed stone aggregate, refreshed periodically. Use water or other dust suppressants to knock down silt. These are required when there is material hauling or site is 2 acres or greater.

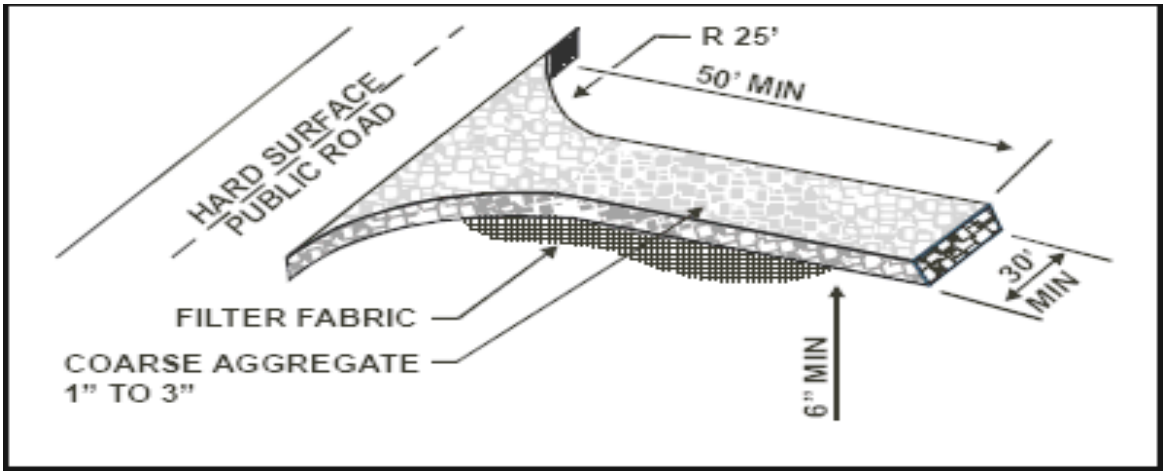

Figure 4. Gravel pad.

b Grizzly pads/shakers. Used to remove debris from tire threads and undercarriage or construction vehicles. Use at least two 8' by 20' sections (three sections recommended by manufacturer) to ensure one full tire rotation, maintain sufficient operating speed while crossing (5-10 mph), recess 25 feet from the pull out onto a public roadway. Most effective when combined with the wheel wash system.

Figure 5. Grizzly pad used with gravel pad.

c Wheel wash systems are used on larger construction projects; types include flooded basins, countercurrent channel, low pressure inundation, high pressure cleaning: high up front costs, lower support and maintenance support costs, minimum track out clean up.

d Paved areas. Should extend at least 100 feet back from the public roadway, 20 feet wide.

8. Use sediment catch basins, bale barriers for drain areas, curb inlet sump barriers or other curb and gutter sediment containment systems to prevent silt laden runoff originating from the construction entrances from entering the municipal sewer system (MS-4). See Appendix Q.

STORAGE PILES BMP 05

Storage piles are defined as areas of stockpiling of bulk materials such as fill dirt, rock, and debris used for future use or export. An open storage pile is any accumulation of bulk material with a 5% or greater silt content, which at any point attains a height of three feet and covers a total surface area of 150 square feet or more (rule 310). The silt content of the storage pile shall be assumed to be 5% or greater unless a person can show, by testing in accordance with ASTM Method C136-96A or other equivalent method approved in writing by the Control Officer and the Administrator of EPA, that the silt content is less than 5%. Best management practices for storage piles include

1) Stabilize surface soils where loaders, support equipment and vehicles will operate.
   a) Apply water to the area and maintain the soil surface crust where loaders, support equipment and vehicles will operate.
   b) Apply and maintain a dust palliative on surface soils where loaders, support equipment and vehicles will operate.

2) During the stacking, loading, and unloading operations apply water to maintain fugitive dust opacity of 20 % or less. Also see BMP 13 on Loading, Unloading, and Stacking.

   In addition choose <u>one</u> of the following methods when not conducting any loading, unloading, stacking operations.

3) Stabilize stockpile materials for storage.
   a) Apply water to maintain soil moisture content at a minimum of 12%, as determined by ASTM Method D2216-98.
   b) For areas with optimum moisture content of compaction less than 12%, as determined by ASTM Method 01557-91(1998), maintain at least 70% of the optimum soil moisture content, or

4) Cover storage piles with:
   a) Tarps.
   b) Plastic.
   c) Jute netting.
   d) Mulch.
   e) Vegetative cover.
   f) Other materials that can not be dislodged by wind, or

5) Meet one of the following requirements:
   a) Maintain a visible crust, or
   b) Maintain a threshold friction velocity (TFV) for disturbed surface areas, corrected for non-erodible elements of 100 cm/second or higher, or
   c) Maintain a flat vegetative cover (rooted vegetation or unattached vegetative debris lying on the surface with a predominant horizontal orientation that is not subject to movement by wind) that is equal to at least 50 %, or
   d) Maintain a standing vegetative cover equal or greater than 30%, or

e) Maintain a standing vegetative cover that is equal or greater than 10% and where the TFV is equal or greater than 43 cm/sec when corrected for non-erodible elements, or
f) Maintain a percent cover that is equal to or greater than 10% for non-erodible elements, or
g) Comply with a standard of an alternative test method, upon obtaining the written approval from the Control Officer and the Administrator of the EPA, or

6) Apply semi-permanent and permanent containment methods.
   a) Construct and maintain wind barriers, wind fences that are 3-5 foot tall with fabric at 50% porosity.
   b) Storage silos.
   c) Three-sided enclosures with walls, whose length is no less than equal to the length of the pile, whose distance with the pile is no more than twice the height of the pile, whose height is equal to the pile height, and whose porosity is no more 50%. In addition choose either to
      i) Maintain a threshold friction velocity (TFV) for disturbed surface areas, corrected for non-erodible elements of 100 cm/second or higher.
      ii) Apply water to maintain soil moisture content at a minimum of 12%, as determined by ASTM Method D2216-98. For areas with optimum moisture content of compaction less than 12%, as determined by ASTM Method 01557-91(1998), maintain at least 70% of the optimum soil moisture content.

Additional notes.
1. Consider applying dust suppressants other than water to stabilize surface of storage piles; expensive, less maintenance.
2. Reduce traffic around the storage piles.
3. Selective sitting where several piles are placed in close proximity can reduce wind erosion.

For temporarily disturbed surface areas after work hours, on the weekends on holidays:
1. Apply water or water in combination with dust suppressant at least <u>2 times per hour</u> to maintain visible crust.
2. Apply water or water in combination with dust suppressant at least <u>1 time per hour</u> to maintain visible crust if outside the non-attainment area.
3. Cover open storage piles with tarps, plastic or other material that will not be removed by wind.
4. Comply with Storage Piles BMP #5, subsections a through g.

See also: Appendix P. Wind barriers.

BLASTING OF SOIL AND ROCK BMP 11

Blasting of soil and rock is defined as explosive blasting of soil and rock at the construction site. Best management practices for blasting of soil and rock include:

1) All blasting must be performed by a state licensed blasting contractor.

2) No blasting within 1,500 feet of a residential area, occupied building or major roadway, when wind direction is toward these structures.

3) Limit blasting between the daylight work hours of 8:00 am and 4:30 pm., excluding Saturdays, Sundays, and holidays, unless prior permission was obtained.

4) If the wind gusts are above 25 miles per hour, discontinue blasting and cease operations.

5) Stabilize soil surface where the contractor's equipment, the vehicles will operate.
   a) Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
   b) Apply and maintain the dust palliative on the soil surface where the support equipment and vehicles operate.

6) Stabilize soil during the blast preparation activities.
   a) Minimize disturbance to the surrounding vegetation and surface soil crust.
   b) Limit the blast footprint area to no larger than can be practically stabilized after the blast.
   c) In addition, apply water (presoak) to all disturbed soils surfaces to depth of caliche or bedrock, as to prevent wind erosion using a sprinkling system, water trucks, water pulls (low), or
   d) Apply water with a tackifier mixture (presoak) to the caliche or bedrock depth (medium), or
   e) Apply water with surfactant mixture to the soil surface to the caliche, or bedrock depth (high).[15]

7) Stabilize demolition debris immediately following the blasting activity using methods spelled out in the BMP for Disturbed Land-Flat and Sloped Surfaces, if no additional activity will occur during the next 30 days.

See also: BMP 07, DISTURBED SURFACE AREAS, LONG TERM, if no continuing activity will occur within next 30 days.

STACKING, LOADING, UNLOADING, BMP 13

Stacking, loading and unloading are defined as loading and unloading of trucks with material including rock, soil and construction demolition debris. Best management practices for stacking, loading, and unloading include:

1) Stabilize surface soils where loaders, support equipment and vehicles will operate.
   a) Apply water to the area and maintain the soil surface crust where loaders, support equipment and vehicles will operate.
   b) Apply and maintain a dust palliative on surface soils where loaders, support equipment and vehicles will operate.

2) Choose combination of two dust suppressing methods prior and during stacking, loading and unloading.
   a) Spray material with water, as necessary, prior to stacking, loading, and unloading and,
   b) Spray material with water, as necessary, while stacking, loading, and unloading or,
   c) Spray material with a dust suppressant other than water, as necessary prior to stacking, loading, and unloading and,
   d) Spray material with a dust suppressant other than water, as necessary while stacking, loading, and unloading.

3) Empty loader slowly and keep bucket close to the truck while dumping.

4) When stockpiling or moving material short distances within the construction site
   a) Limit speed to less than 15 mph.
   b) Do not over load.
   c) Prevent spillage.

5) When stockpiling or moving material short distance outside the construction site and if crossing a public road,
   a) Limit speed to less than 15 mph.
   b) Exit/enter through well maintained track out devices.
   c) Cover loads.
   d) Prevent/ clean spillage.

Figure 11. Loading operation without dust control measures

HAULING, OFF-SITE BMP 15

Off-site hauling is defined as importing/exporting of soil, rock, debris, and other bulk material from or onto paved areas accessible to the public. Best management practices for off-site hauling include:

1) Limit visible dust opacity to less than 20 % from vehicular operations,
   a) Apply water and limit vehicle speeds to 15 mph on the work site.
   b) Apply and maintain dust suppressant on haul roads.

2) Secure loads as follows,
   a) Load all haul trucks such that the freeboard is not less than 3 inches high.
   b) Highest point of the bulk material can be no higher than the highest point at which the bulk material contacts the sides, front, and back of a cargo container area.
   c) Do not over load.
   d) Level all loads.
   e) Apply water to the top of the load.
   f) Cover the cargo compartment with tarp or other suitable closure <u>BEFORE</u> truck's front wheels touch surface of a public road to prevent Notice of Violation citation.
   g) Cover cargo compartment with a tarp or other suitable closure when cargo compartment is full or empty.

3) Prevent spillage, loss of bulk material from holes or the openings in the cargo compartment's floor, sides, and /or tailgate.
   a) Sweep off sides and rails to remove spilled material.
   b) Clean the interior of the cargo compartment.
   c) Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage.

4) Install and maintain track out devices at all entrances/exits.

5) Cease hauling operations after major rain event if/when track out cannot be effectively managed/ contained within the construction site.

Figure 12. Untarped and overloaded hauling vehicles.

See also: BMP 03, CONSTRUCTION ENTRANCE AND EXIT TRACKOUT DEVICES
BMP 13, STACKING, LOADING, UNLOADING,

HAULING, ON-SITE BMP 16

On-site hauling refers to bulk material hauling and transporting when on-site, within the boundaries of the worksite. Best management practices for on-site hauling include:

1) Limit visible dust opacity to less than 20% from vehicular operations,
   a) Apply water to the road surface to keep it visibly moist, or to maintain a visible soil crust.
   b) Apply and maintain dust suppressant other than water on haul roads.

2) When hauling within the work site, <u>not</u> crossing the public roadway,
   a) Limit vehicle speed limit to 15 mph or less while traveling on the work site.
   b) Apply water to the top of the load.
   c) Cover truck with a tarp or other suitable cover.

3) When hauling within the work site, crossing/accessing the public roadway
   a) Load all haul trucks such that the freeboard is not less than 3 inches high.
   b) Highest point of the bulk material can be no higher than the highest point at which the bulk material contacts the sides, front, and back of a cargo container area.
   c) Do not over load.
   d) Level all loads.
   e) Prevent spillage or loss of bulk material from holes or other openings in the cargo compartment's floor, sides, or tailgate.
   f) Install and maintain a suitable track out control device to prevent track out and to remove particulate matter from tires and the exterior surfaces of haul trucks and other vehicles.

Also see: Appendix O. Control efficiency of watering on unpaved roads.
Appendix K. Traffic Area Application Requirements, Liquid Dust Application Rates

SCREENING BMP 20

Screening is defined as bulk material screening of rock, soil or construction debris at the construction site. Best management practices for screening include:

1) Limit fugitive dust opacity to 20% or less.

2) Drop material through the screen slowly.

3) Minimize drop height.

4) Stabilize surface soils where loaders, support equipment and vehicles will operate.
   a) Apply water to the area and maintain the soil surface crust where loaders, support equipment and vehicles will operate.
   b) Apply and maintain a dust palliative on surface soils where loaders, support equipment and vehicles will operate.

5) Pre-treat material prior to screening.
   a) Apply sufficient water to obtain at least 70% optimum moisture in material prior to screening.
   b) Apply a dust suppressant to material prior to screening.
6) Stabilize material during screening.
   a) Mist material with water after it drops from the screen when screening.
   b) Dedicate water truck or large hose to screening operation to prevent dust.
   c) Install wind barrier upwind of screen as high as the screen drop point and made of material with a porosity of 50% or less.

7) Stabilize the screened material and surrounding area immediately after the screening.
   a) Apply water to the screened material and the surrounding area to form visible soil crust.
   b) Apply and maintain a dust palliative to stabilize the screened material and the surrounding area.

See also: BMP 05, STORAGE PILES.

DUST PALLIATIVE, SELECTION AND USE. BMP 21

Dust palliatives are dust suppressants that work by either agglomerating the fine particles, adhering/binding the surface particles together, or increasing the density of the road surface material. They reduce the ability of the surface particles to be lifted and suspended by vehicle tires or wind.[9]

Use of organic petroleum products, deliquescent/hygroscopic salts, and lignin-based palliatives are highly discouraged within twenty (20) yards of open bodies of water, including lakes, streams, canals, and drinking water well-heads, natural washes and flood control channels. This buffer zone is intended to prevent leaching from these palliatives from reaching an open body of water.

Typical dust suppressants, listed based on frequency of usage and popularity, include:

1) Water.
2) Water Absorbing Products (deliquescent/hydroscopic).
   a) Calcium chloride brine and flake.
   b) Magnesium chloride brine.
   c) Sodium chloride (salt).
3) Organic Petroleum Products.
   a) Asphalt emulsions.
   b) Cutback asphalt (liquid asphalt).
   c) Dust oils.
   d) Modified asphalt emulsions.
4) Organic Non-petroleum Products.
   a) Animal fats.
   b) Lignosulfonate.
   c) Molasses/sugar beet extracts.
   d) Tall oil emulsions
   e) Vegetable oils.
5) Electrochemical Products.
   a) Enzymes.
   b) Ionic products.
   c) Sulfonated oils.
6) Synthetic Polymer Products.
   a) Polyvinyl acetate.
   b) Vinyl acrylic.
7) Clay Additives.
   a) Bentonite.
   b) Montmorillonite.

Application tips that apply to all liquid dust suppressant products include:

1. Apply suppressants, especially salts, immediately following the wet season.
2. If possible, apply after rain so materials are wetter (aids mixing) and more workable. If applied just before a rain, the material may wash away.

3. Adhere to manufacturers' recommendations on minimum application rate, compaction, and curing time prior to allowing traffic.
4. If the surface material is dry, dampen, except when using cutback asphalt products.
5. If a hard crust is present, break up and loosen the surface.
6. Use a pressure distributor to uniformly distribute the dust suppressant.
7. Ensure that the necessary "residual" of the product is obtained. The residual is the amount of product that remains after the evaporation of water from the concentrate, as well as that used to dilute the product prior to application. The residual (sometimes called solids or binder) is the portion of the product that is responsible for the binding and/or agglomeration of the particles.

Water Application Tip:
Regular, light watering is more effective than less frequent, heavy watering.

Chloride Application Tip:
Light compaction is recommended after a chloride brine application.

Petroleum Application Tip:
Soil type and density greatly affect the rate and amount of penetration. In all instances, it is desirable to attain 12 to 25 mm (1/2 to 1 in) of penetration. Most products (with the exception of SS- and CSS-1) will penetrate and coat most soils if they have been loosened by scarification. For surfaces which have not been scarified, only those products with low viscosities will penetrate.

Organic Non-petroleum Application Tips:
Remove loose material prior to application unless the road surface will be mixed and/or compacted after the spray application. When applying vegetable oils, the top 25 to 50 mm (1 to 2 in) of the surface should be loose to improve penetration.

Electrochemical Application Tip:
Typically, these products are mixed into the road surface.

Polymer Application Tip:
Light compaction is recommended after a polymer application, unless the polymer is mixed into the road surface.

Clay Additive Application Tip:
Ensure that the clay and the associated water used for compaction is uniformly distributed throughout the surface material. This method requires a minimum of 8 passes with a motor-grader or use of a cross-shaft rotary mixer.

For Traffic area applications, guidelines are provided in Appendix K, Table 7: Traffic Area Application Requirements, Appropriate Use of Liquid Dust Palliatives and Application Rates.

For non-traffic area applications, guidelines are provided in Appendix K, Table 8: Non-Traffic Area Application Requirements, Appropriate use of Liquid Dust Palliatives and Application Rates.

Figure 10 presents the average performance curves for four chemical dust suppressants commonly used in the iron and steel industry; salts, petroleum resins, acrylic cements, and asphalt emulsions. See Appendix M and N for chemical suppressant and their descriptions.

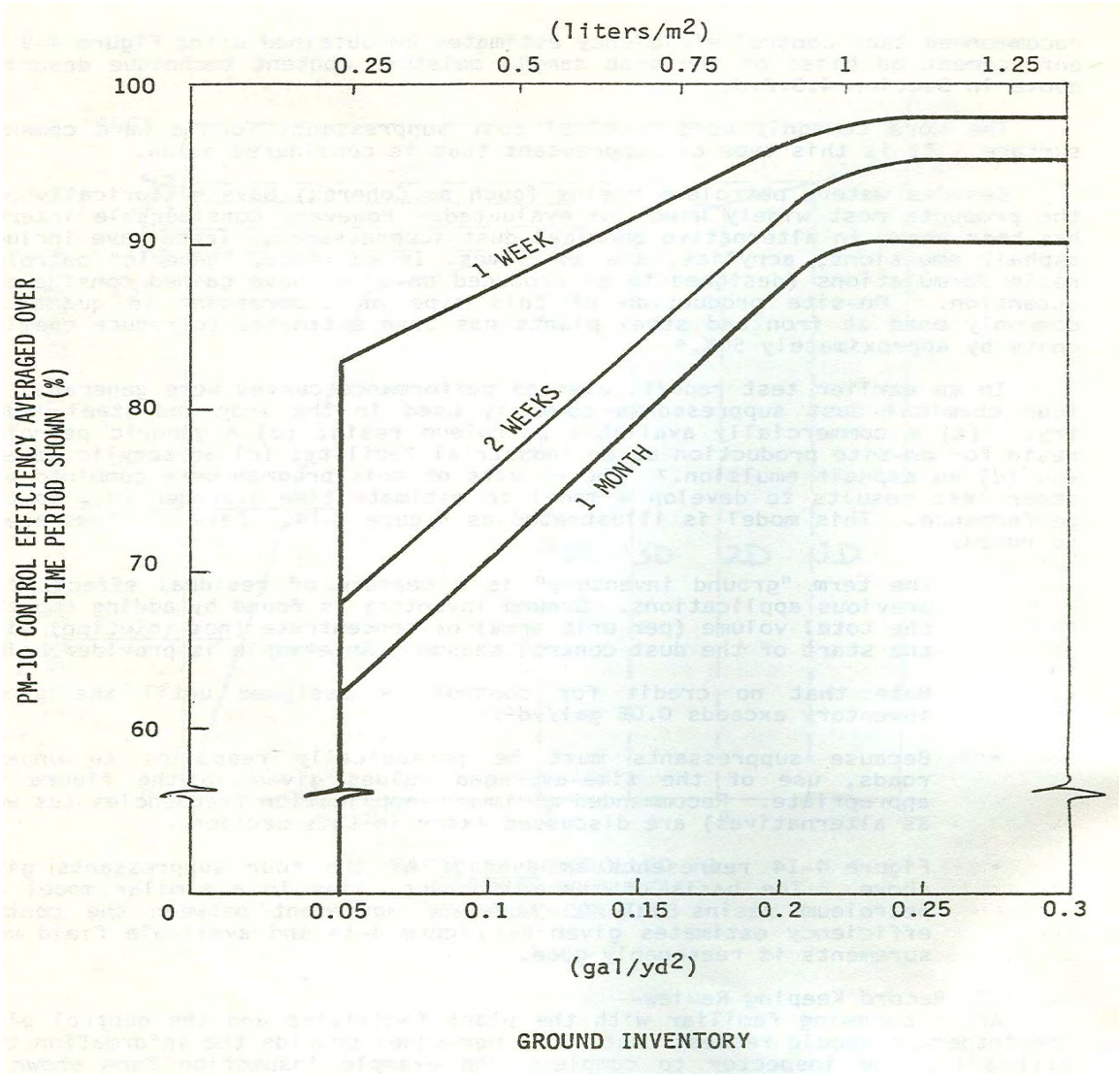

Figure 14. Average PM_{10} control efficiency for common chemical suppressants.[10]

WIND EVENT CONTROL MEASURES. **BMP 22**

Wind event control measures are defined as dust prevention control measures owner/operator is required to perform during the wind event, when the 60-minute average speed at the construction site is 25 mph or greater.[11] Best management practices include:

1) For dust generating operations, the owner/operator must implement one of the following control measures:*
   a) Stop dust generating operations when the 60-minute average wind speed is >25 mph. Stabilize the area after the operations are ceased for the remainder of the workday.
   b) Apply water or other suitable dust suppressant at least 2 times [1 time] per hour
   c) Apply water as necessary to maintain soil moisture content at a minimum of 12%, as determined by ASTM Method D2216-98 or other equivalent method approved by the Control officer and the EPA Administrator. For Areas that have an optimum moisture content of compaction of less than 12%, as determined by ASTM Method D1557-91 (1998) or other equivalent method approved by the control officer and the EPA Administrator, maintain at least 70% of the optimum soil moisture content.
   d) Implement 1(b) or 1(c), above, and construct fences, or 3-5 foot high wind barriers with 50% or less porosity adjacent to roadways or urban areas to reduce the amount of wind-blown material leaving a site.

2) For temporary disturbed surface areas after work hours, weekends, holidays, the owner/operator must implement one of the following,*
   a) Apply surface gravel or dust suppressant,
   b) Apply water to all disturbed surface areas 3 times per day. If evidence of wind-blown dust, increase water application to 4 times per day or more.
   c) Apply water on open storage piles at least 2 times [1 time] per hour,
   d) Cover open storage piles with tarps, plastic, or other materials such that wind will not remove the coverings.

* Control measures in [brackets] are to be applied only to dust generating operations outside the non-attainment area. Refer to Appendix E. The soil map and non-attainment map from USDA-NTCS Soil Survey Division of The Maricopa County Air Pollution Control Regulations.