Report

Teanaway Solar Reserve Fugitive Dust Control Plan Kittitas County, Washington

Prepared for

Teanaway Solar Reserve, LLC

February 2010

Prepared by

CH2MHILL

Printed on Recycled and Recyclable Paper

Contents

Appendices

Tables

Figures (*Provided in Appendix A*)

1.0 Introduction

The following Fugitive Dust Control Plan is for the proposed Teanaway Solar Reserve in Kittitas County, Washington. Teanaway Solar Reserve, LLC proposes to construct and operate the Teanaway Solar Reserve (project), a solar farm capable of generating up to 75 direct current megawatts (MWdc) of photovoltaic (PV) solar energy. This plan has been prepared in response to public and agency comments and for additional information as part of the addendum to the SEPA Expanded Checklist, originally submitted in August 2009.

2.0 Project Contacts

Table 1 provides the current project contacts for the project site during business hours, after hours, and weekend control when necessary.

TABLE 1
Project Contact List

Description	Name	Address	Work Phone	Other Phone
Project Owner	Howard Trott	218 E. First Street, Suite B Cle Elum, WA 98922	(206) 972-3800	
General Contractor or Builder	TBD			
Site Developer or Excavator	TBD			
24-Hour Contact Person	TBD			

3.0 Project Description

3.1 Projection Location

The proposed project site is located approximately 4 miles northeast of Cle Elum, Washington, in Township 20N, Range 16E, within Sections 22, 23, and 27 (see Figure 1 in Appendix A for site location). The site is located on the eastern slopes of the Cascade Mountains on Cle Elum Ridge, which runs generally from east to west at elevations ranging from approximately 2,200 to 2,600 feet. The Teanaway River is approximately 1 mile to the northeast of Cle Elum Ridge. The site is accessed from Highway 970 by way of county roads such as Red Bridge Road, private roads such as Loping Lane, and Wiehl Road, which is a dedicated public road that is maintained privately and not by the County.

The proposed project area consists of 982 acres. Based on site surveys, the project will utilize approximately 477 acres within the proposed project area. Solar arrays will be placed on approximately 399 acres. The undeveloped acres will remain as open space and be

preserved as part of the Wildlife Mitigation Plan (see Attachment H). An open corridor will be maintained to allow for wildlife migration through the site.

3.2 Soil Conditions

Soils on the proposed project site include the Teanaway Loam, 3 to 10 percent slopes, and the Teanaway Loam, 25 to 50 percent slopes (NRCS, 2008). These soils are formed in loess that overlies glacial till or outwash, with an influence of volcanic ash at the surface. These soils are described as moderately well-drained, moderately low to moderately high permeability, high available water capacity, and no flooding or ponding frequency. The Teanaway Loam is assigned to wind erodibility group (WEG) 5. The WEG consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to WEG 1 are the most susceptible to wind erosion, and those assigned to WEG 8 are the least susceptible. Therefore, the wind erosion potential of the soils onsite is considered low to moderate.

Based on observations at the site made during the geologic field reconnaissance (November 2009), the site soils consist primarily of silty to silty sand loess with volcanic ash, with numerous rounded cobbles and boulders scattered across the surface. Site slopes are typically less than 20 percent in steepness, with a few areas of slopes up to 30 percent. The slopes on the site are relatively planar or exhibit a drainage pattern typical of fluvial processes (i.e. surficial runoff) rather than mass movement.

No major areas of surficial soil erosion or gullying were observed during the geologic field reconnaissance. The erosional features present at the project site are typical of precipitation runoff.

3.3 Prevailing Wind Direction

A wind rose plot for Yakima, Washington, approximately and hour away from the project site, was used to estimate the prevailing wind direction for the project site. According to the Office of the Washington State Climatologist, the prevailing wind direction near the project site is to the east. Winds typically blow to the east at average speed of 6.51 knots (OWSC, 2010).

4.0 Potential Dust Sources

The following potential dust sources will exist at the project area. These dust sources are shown on Figure 2 (see Appendix A).

- Construction of a 6-acre electrical substation and associated facilities
- Construction of a 345-kilovolt (kV) transmission line and associated 300-foot corridor (TSR has delineated a 300-foot area within which the BPA transmission line could be sited. Of this 300-foot area, a maximum of 200 feet will be cleared for the placement of the BPA transmission line. Final design and placement will be determined by BPA.)
- Access and maintenance roads
- Installation of solar arrays
- Clearing and grading the site

5.0 Best Management Practices: Fugitive Dust Control Methods

The best management practices (BMPs) for this project were selected from two regional guidance documents (1) the Associated General Contractors (AGC) of Washington in the publication, *Guide to Handling Fugitive Dust From Construction Projects (*see Appendix B), and (2) the Eastern Washington Stormwater Management Manual. The following is a list of BMPs compiled by the AGC for control of fugitive dust. Copies of this publication can also be requested from WSDOT and Puget Sound Clean Air Agency. The Eastern Washington Stormwater Management Manual provides additional guidance for dust control: BMP C140 and BMP C126 (see Appendix C). The following is a list of commonly employed fugitive dust management practices for various construction related dust sources.

- Covering – Fabric/Other for Erosion Control
- Road Dust Suppressants
- Erosion Controls
- Flocculating Agent
- Minimize Disrupted Surface Area
- Schedule Work: Reschedule work around especially windy days
- Speed Reduction

Table 2 shows the selected methods to be used to control dust at the project sources. The Fugitive Dust Control Plan should be considered in conjunction with the overall construction Stormwater Pollution Prevention Plan (SWPPP), which is required as part of the National Pollutant Discharge Elimination System (NPDES) Permit, administered by the Washington State Department of Ecology.

TABLE 2
Dust Activities and Applicable Dust Control Measures

Activity	Applicable Dust Control Measures
Unpaved Roads and Lots	Applying dust suppressants
	Graveling
	Reducing vehicle speed
	Minimizing disrupted surface areas
	Erosion control

TABLE 2
Dust Activities and Applicable Dust Control Measures

Activity	Applicable Dust Control Measures
Construction and Landscaping	Graveling areas early
	Applying road dust suppressants
	Reducing vehicle speed
	Minimizing disrupted surface areas
	Restricting dust-causing activities during high wind periods
	Limiting vehicle traffic
	Using chutes and covered dumpsters
	Revegetating disturbed areas in accordance with the Revegetation Plan as soon as practical
Material Storage, Handling, and Transportation	Applying road dust suppressants
	Using wind impervious covers
	Minimizing truck load size
	Stabilized rock construction entrance

6.0 Best Management Practices: Contingency Measures

Although water can be one of the main control agents for dust, it is important to plan ahead for water shortages and consider the use of other measures. When water will not be available, exposed soils will be sprayed with a dust palliative. Chemical dust suppressant application will follow guidelines outlined in BMP C126 in Appendix C. Kittitas County staff have also recommended the use of chemical dust suppressants. Additional consideration will be given to alternative chemical dust suppressants listed in the Washington State Department of Transportation *Environmental Procedures Manual (*see Appendix D).

7.0 Self-Inspection Checklist

A self-inspection checklist will be used for each source of fugitive dust emissions to help incorporate routine tasks of fugitive dust control into daily schedule. The checklist will serve as a job reminder on a daily basis and as a record of efforts to keep dust problems to a minimum. Additionally, a separate checklist will be used to document weather conditions. These checklists are anticipated to be modified once the construction begins and as needed throughout the construction process. Self-inspection checklists are in Appendix E. These checklists will be incorporated into the weekly storm water inspections sheets required as part of SWPPP. Inspections will be conducted by personnel trained in all parts of the Fugitive Dust Control Plan as well as the SWPPP.

8.0 References

Associated General Contractors of Washington (AGC). 1998. *Guide to Handling Fugitive Dust From Construction Projects.*

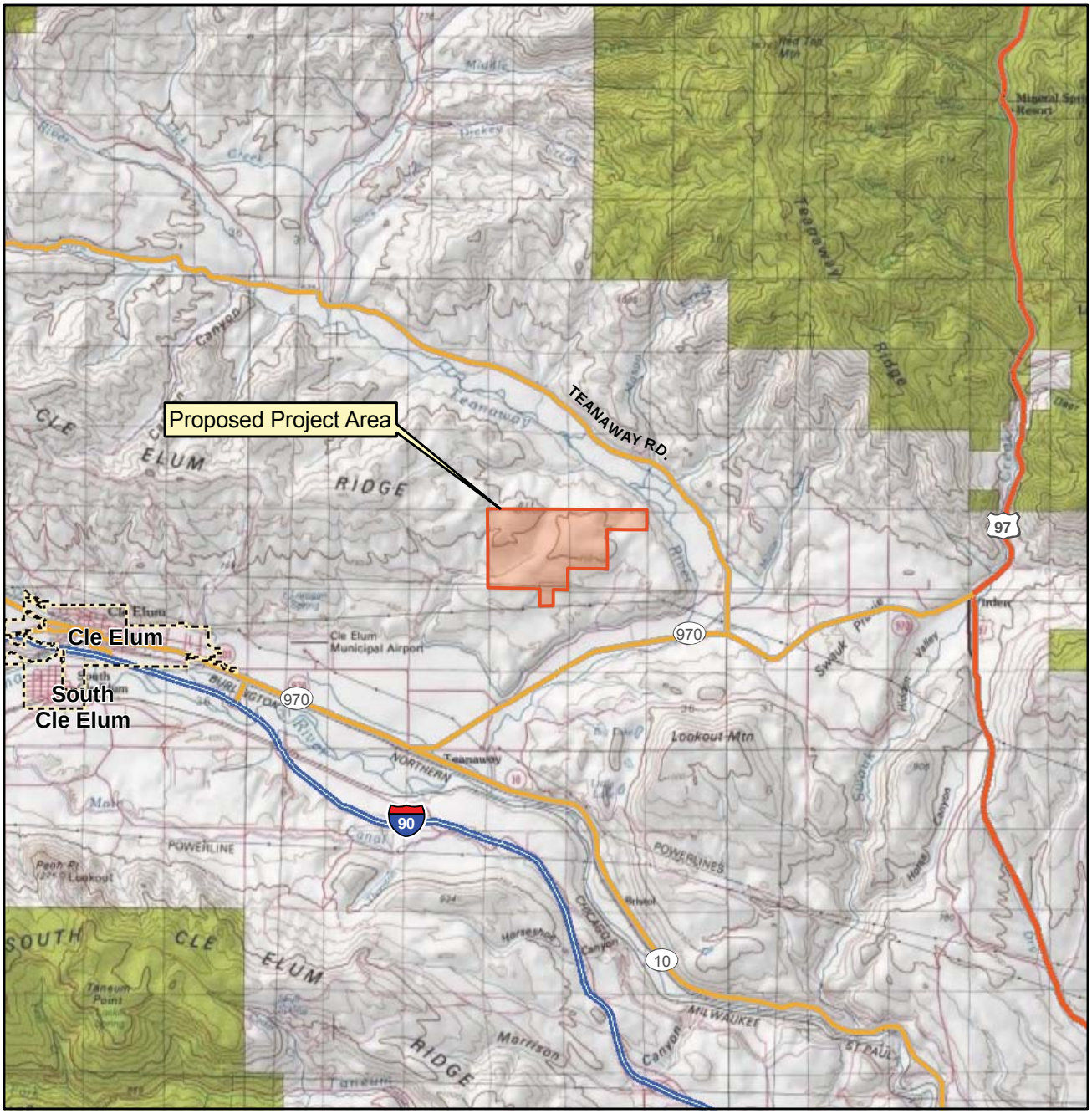
Office of the Washington State Climatologist (OWSC). 2009. Wind Rose Plot for Yakima, Washington. http://www.climate.washington.edu/climate.html.

Washington Department of Ecology (WDE). September 2004. *Stormwater Management Manual for Eastern Washington.* http://www.ecy.wa.gov/biblio/0410076.html.

Washington State Department of Transportation (WSDOT). 2009. *Environmental Procedures Manual*. http://www.wsdot.wa.gov/Publications/Manuals/M31-11.htm.

APPENDIX A

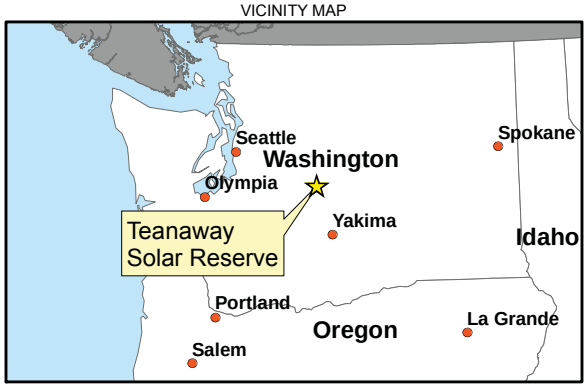
Figures



LEGEND

- Proposed Project Area
- City Boundary
- Interstate
- Highway
- Major Road

VICINITY MAP

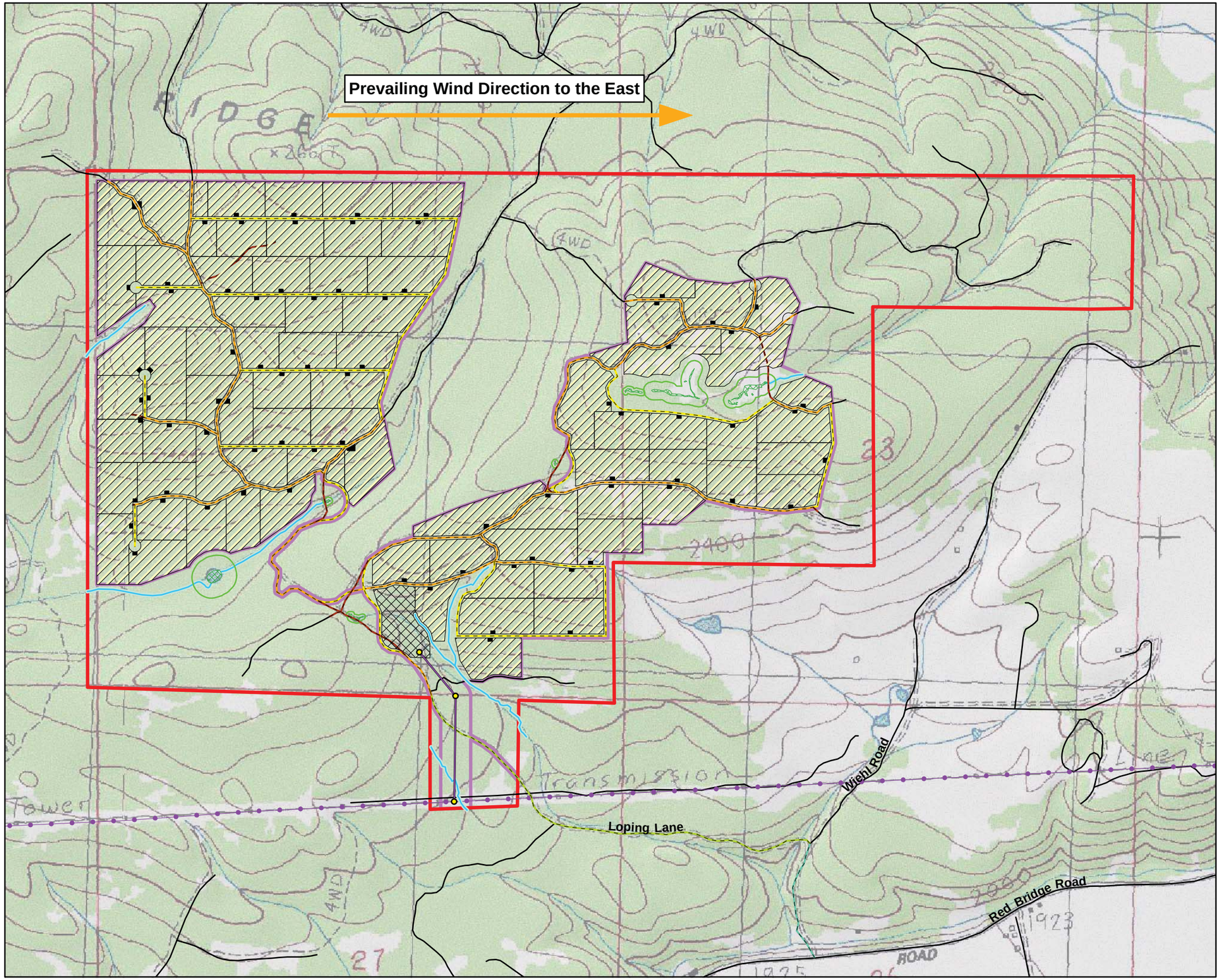


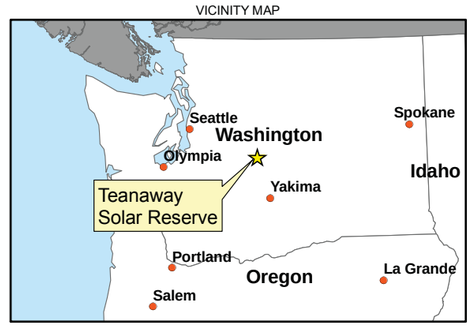
Note:
1. USGS 100K Quadrangle: Wenatchee.

0 1 2 Miles

N

FIGURE 1
Vicinity Map
Fugitive Dust Control Plan
Teanaway Solar Reserve
Kittitas County, Washington





LEGEND

Proposed Project Features

- Proposed Project Area (982 Acres)
- Proposed Project Site (477 acres)
- Proposed PV Array Block
- Proposed Field Inverter and Field Transformer
- Proposed Substation/O&M Facility
- Proposed Transmission Line
- Proposed Transmission Structure
- Proposed Maintenance Road
- Proposed Improved Maintenance Road
- Existing Maintenance Road (Planned Decommissioning)
- Proposed Improved County Access Road
- Proposed Improved Private Access Road

Existing Features

- Existing BPA Transmission Line and ROW
- Existing Road
- Stream
- Stream Buffer
- Wetland
- Wetland Buffer

N

0 1,000
Feet

1 inch = 1,000 feet

FIGURE 2
Proposed Site Layout
Fugitive Dust Control Plan
Teanaway Solar Reserve
Kittitas County, Washington

APPENDIX B

AGC Guide to Handling Fugitive Dust from Construction Projects

AGC OF WASHINGTON
EDUCATION FOUNDATION AND
FUGITIVE DUST TASK FORCE

GUIDE TO HANDLING FUGITIVE DUST FROM CONSTRUCTION PROJECTS

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GUIDE TO HANDLING *FUGITIVE DUST* FROM CONSTRUCTION PROJECTS

CONTENTS

INTRODUCTION

Fugitive Dust is particulate matter that is suspended in the air by wind or human activities and does not come out of a stack.

Air quality regulations require the use of control techniques to minimize *Fugitive Dust* emissions. The goal is to eliminate visible airborne *Fugitive Dust*. Therefore, state and local regulatory agencies expect that as many of these control techniques be employed as necessary to achieve this goal.

Reasons for *Fugitive Dust* Control

Fugitive Dust from construction projects is regulated by the Washington State air quality laws for several reasons:

1. *Fugitive Dust* can become a nuisance to neighbors by depositing on their property;
2. Inhaling *Fugitive Dust* particles can cause respiratory diseases;
3. *Fugitive Dust* can be a direct safety hazard.

Purpose of Brochure

This brochure is designed as a guide to provide practical examples of suggested best management practices necessary to comply with air quality regulations involved in the construction process.

While *Fugitive Dust* can be created from a variety of activities, such as agricultural activities, this brochure will focus on *Fugitive Dust* that is created by construction activities. Air pollution from debris burning, plant operations, rock crushing and abrasive blasting, sometimes associated with construction activities, are dealt with in other regulations and publications. For additional information on the subject, the numbers of local air quality agencies are listed in the back of this brochure.

WHY *FUGITIVE DUST* IS A PROBLEM

Nuisance

It is unlawful in the state of Washington to cause or allow air contaminant emissions in sufficient quantities and of such characteristics and duration that it unreasonably interferes with enjoyment of life and property.

Safety

Fugitive Dust from construction can reduce visibility on roadways and highways, resulting in traffic accidents.

Health

Fugitive Dust can also have significant health effects if it is inhaled in large amounts, or if dust contains crystalline silica, asbestos fibers, heavy metals or disease spores. Very small particles can be inhaled deep into lungs and are a particular health threat for the young, the old, and those with chronic respiratory problems.

Fugitive Dust can be created directly from the activities involved in construction, such as moving soils or demolishing structures. *Fugitive Dust* can also be generated by disturbing residual soils or materials that have been left behind by construction activities. For example, vehicles can generate *Fugitive Dust* from dirt on roadways that was tracked out as mud from construction sites.

PRE-CONSTRUCTION PLANNING

Fugitive Dust control planning is a partnership between the owner, general contractor, subcontractors and any other party whose activities during the project may lead to the generation of *Fugitive Dust*. This partnership extends to legal responsibilities as well in that all parties can be held liable for non-compliance and subsequent regulatory actions, including monetary penalties.

Incorporating *Fugitive Dust* control measures in the plans and specifications of the project can help ensure that the participants in the construction partnership avoid violations of *Fugitive Dust* regulations. Early planning can also help owners and project designers to "level the playing field" in the competitive bid process and avoid change orders.

A *Fugitive Dust* control plan might include:

- ◊ Identification of all *Fugitive Dust* sources.
- ◊ A description of the *Fugitive Dust* control method(s) to be used for each source.
- ◊ A schedule, rate of application, calculations or some other means of identifying how often, how much and when the control method is to be used.
- ◊ Provisions for monitoring and record-keeping.
- ◊ A backup plan in case the first control plan does not work or is inadequate.
- ◊ The name and phone number of the person responsible for making sure the plan is implemented and who can be contacted in the event of a *Fugitive Dust* complaint.
- ◊ Back-up or company phone number.
- ◊ Map or drawing of the site.

◊ Source and availability of materials such as water.

Weather, equipment and site conditions will require that field personnel make on the spot, common sense changes in order to address the intent of the regulations.

Incorporating a simple inspection checklist during the daily report process helps make the tasks of *Fugitive Dust* control more routine. A checklist system reduces paperwork, acts as a job reminder, and serves as a record of efforts to minimize *Fugitive Dust* problems. Categories that might be included in the checklist are:

◊ Date
◊ Time
◊ Preventative measures
◊ Frequency of control measures application
◊ Weather conditions
◊ Comments

REMEMBER: Fugitive Dust controls are only effective when they are monitored and managed through frequent inspections and maintenance of control measures.

SITE-SPECIFIC DESIGN CONSIDERATIONS

The specifics and level of complexity of each *Fugitive Dust* control plan will depend on a number of factors that are specific to each project. Consider the following:

Cost of Alternatives: Several factors must be taken into consideration when weighing various alternatives. Cost considerations include unit cost, total project cost, acquisition cost, maintenance cost, cost of non-compliance, capital cost, and the cost of time waiting for product or application. While one method may not be cost effective for large projects because the unit cost is high, it may be cost effective for small projects because the acquisition cost is low.

Environmental Constraints: Water application is one of the best short term methods for controlling *Fugitive Dust*. However, water run off containing mud and silt can cause damage to streams and other resources. A *Fugitive Dust* plan should be considered in conjunction with the overall Temporary Erosion and Sediment Control (TESC) plan. The Department of Ecology can be contacted for even more specific information.

Location: The proximity of the project to populated areas may dictate more controls, due to anticipated impacts, than a project in a remote location. Wildlife habitats and wetlands may also be affected by *Fugitive Dust*.

Project Size and Duration: The market place will not practically allow for the same rigors of control to be applied on all projects. For example, a land clearing project involving several acres or a major excavation project may call for truck wheel washing facilities, while this may not be practical for clearing a residential

lot. A project lasting several months may call for more durable measures where one lasting several days may rely solely on water.

Public Relations: Adopting a "good neighbor policy" by including a large sign with the company or job site phone number may help to make sure that local complaints are phoned directly to the site, rather than to the regulators. Controversial projects, or projects that do not have a high level of community support, are often times under more scrutiny. Care should be given to choosing not only the technically correct, but aesthetically correct solutions.

Risk to Others (Sensitive Populations)**:** *Fugitive Dust* can have particularly adverse health impacts on young children, the elderly, and persons with respiratory problems. Thus, additional control measures would be expected for a project near a hospital, nursing home, day care facility, school, etc.

Site Conditions: Topography and soil types can make a difference in the control of *Fugitive Dust*. Rocks and sand may be less dusty than hardpan, silts and clays. Hills, trees and shrubbery can serve as natural windbreaks; however, these are not control measures and do not meet the requirements of air pollution regulations. Soils that are disturbed on tops of hills or on wide open flat surfaces are more affected by wind.

Weather: Moisture, in the form of rain and humidity, are natural dust suppressants. However, extremely rainy conditions can carry soil, in the form of mud, to other areas where it can dry and become a *Fugitive Dust* hazard. Wind can intensify *Fugitive Dust* problems.

COMMON *FUGITIVE DUST* MANAGEMENT PRACTICES

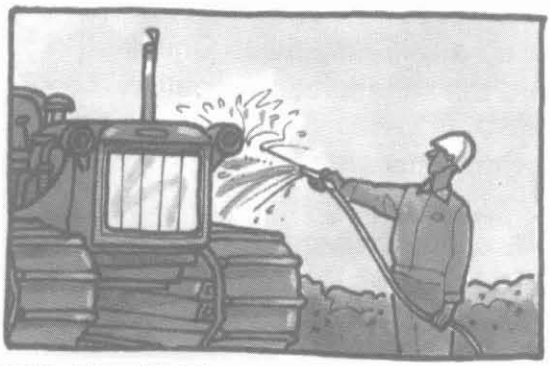
The following is a list of commonly employed *Fugitive Dust* management practices for various dust sources. The best management practices for a particular project should be selected based upon site-specific considerations.

GRADERS AND SCRAPERS:

- Use water truck or sprinklers to moisten soils before grading
- Minimize areas of clearing and grubbing to a manageable size
- Minimize timeframes between *Fugitive Dust*-creating activities and final solutions (ex., roadway excavation and paving)
- Avoid activity during high winds

FRONT-END LOADERS AND BACK-HOES:

- Use water truck to keep soils moist
- Use water sprays (e.g. garden hose) when dumping soils into haul trucks
- Minimize drop height
- Avoid activity during high winds



HAUL TRUCKS:

- Wet loads with garden hose
- Ensure adequate freeboard
- Cover loads
- Reduce speed on unpaved haul roads to less than 15 mph
- Use water truck to keep haul roads moist
- Surface haul roads with gravel

- Pave haul roads
- Pave exit aprons
- Surface exit aprons with quarry spalls (aka "rip rap")
- Brush off mud from wheels, wheel wells, running boards and tail gates
- Wash wheels and inner fender wells immediately prior to exiting (note: this control may require installation of a sedimentation basin)
- Use street sweeper to remove trackout from paved roadways (note: sweepers should be periodically checked to insure that the water storage tank is full and spray nozzles are in good working order)
- Flush streets with water (note: this control may require the installation of a sedimentation basin)

DEMOLITIONS:

- Use water sprays (e.g., fire hoses) before, during and after use of wrecking ball or bulldozer
- Avoid activity during high winds

RENOVATIONS:

- Use chutes and covered dumpsters for lowering dusty materials (e.g., sheetrock) from multi-story buildings
- Avoid activity during high winds

STORAGE PILES:

- Use sprinklers to keep piles moist
- Use tarps to cover piles
- Use soil stabilizers

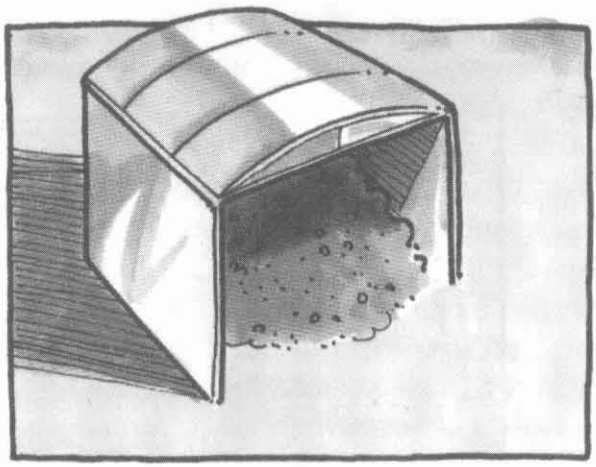
DESCRIPTIONS OF BEST MANAGEMENT PRACTICES

Fugitive Dust emissions can be prevented and reduced in four basic ways:

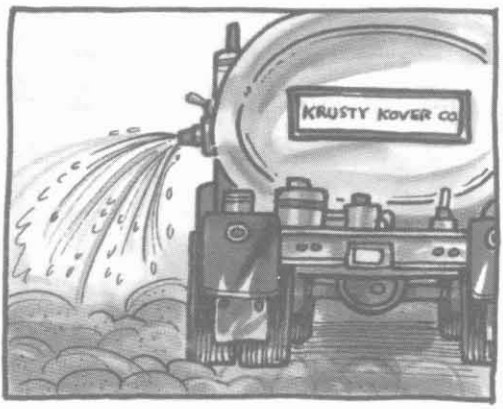
- ◊ Limiting the creation or presence of dust-sized particles.
- ◊ Reducing wind speed at ground level.
- ◊ Binding dust particles together.
- ◊ Capturing and removing *Fugitive Dust* from its sources.

These *Fugitive Dust* control measures are not mutually exclusive. Most situations require the use of two or more of these methods in combination for any particular situation, and several methods will be employed to handle the variety of situations that make up a particular job.

COVERINGS - FABRIC/OTHER, FOR EROSION CONTROL: Fabrics and plastics for covering piles of soils and debris can be an effective means to reduce *Fugitive Dust*. However, these materials can be costly and are subject to degradation from the sun, weather, and human contact. Straw and hay can also be used to cover exposed soil areas, although they can be disturbed by wind and track through.



DUST SUPPRESSANTS - CHEMICAL: There are many types and brands of Chemical Dust Suppressants which work by binding lighter particles. Chemical Suppressants may be applied as a surface treatment to "seal" the top of an area, or may be applied using an admix method that blends the product with the top few inches of the surface material.



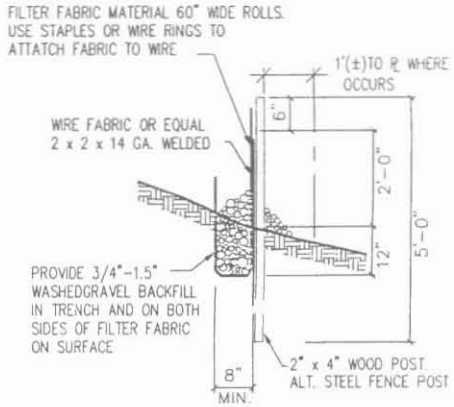
Examples of these products include, but are not limited to, hydrolyzed starch derivatives, calcium chloride, magnesium chloride, lignin derivatives, tree resin emulsions, and synthetic polymer emulsions. Other products, and properties of products, can be found in the Department of Ecology's "Techniques for Dust Prevention and Suppression", as well as from many vendors.

USED OIL CAUTION: It is important to note that used oil may **NOT** be used as a dust suppressant. RCW 70.951 specifically prohibits the use of used oil as dust suppressant, and is referenced in the "Applicable Washington Regulations" section of this brochure.

EROSION CONTROLS: Plants, bushes, trees, earthen banks and rock walls provide natural, and more permanent, windbreaks. Other erosion control measures, such as wood or porous fences can be installed for temporary measures. Because enclosures and wind screens can be costly the feasibility of

using this type of control must be determined on a case-by-case method.

FILTER FABRIC AROUND CATCH BASIN:
Filter fabric around a catch basin is used to collect sediment from muddy water run-off. Sediment, when left to dry, can cause *Fugitive Dust* emissions. Sediment collected in filtering systems must be dealt with on a regular basis. Treating mud with floculants, or "mucking out" catch basins, are two methods to deal with the residual debris.



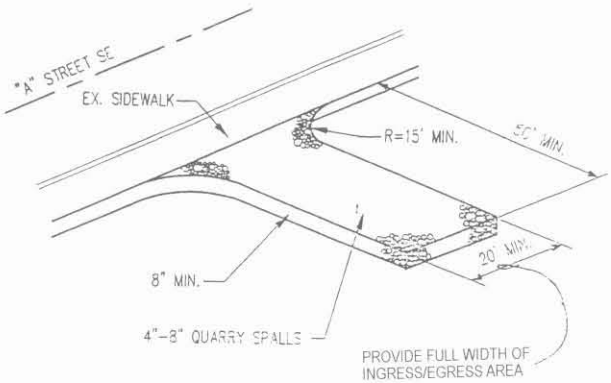
FLOCULATING AGENT: This is a method using a chemical agent to bind soil particles suspended in water so that when the material dries it does not become airborne. This method might be used after a sediment catch basin is no longer needed, but before water suspended soil can be dealt with in a more permanent way.

MINIMIZE DISRUPTED SURFACE AREA: A conscious effort, especially during sitework and/or demolition, to disrupt only those areas that absolutely need to be cleared in order to accomplish a project can provide a variety of benefits. Vegetation left in place during sitework reduces the area subject to wind erosion. In addition, minimizing the disrupted surface area can also reduce the size of the project, potentially reducing the types and cost of *Fugitive Dust* control.

Disturbing natural soil crusts in some geographical areas, such as Central and Eastern Washington, may unnecessarily create *Fugitive Dust* situations. Limiting vehicle access points to, and routes within, a project help to reduce these disruptions.

PAVING: This is a more permanent solution to *Fugitive Dust* control, suitable for longer duration projects or situations. High cost is the major drawback to paving. Paving may be an appropriate solution for access roads to large development projects, where the road can eventually be incorporated in the overall plan for the area. Another appropriate use of paving might be "maintenance" projects such as parking lots and staging areas, where gravel cover is not adequate for *Fugitive Dust* control or erosion.

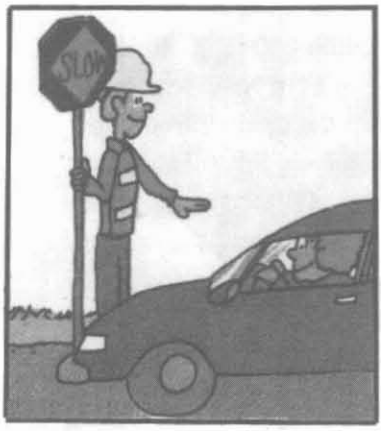
QUARRY SPALLS: These are buffer areas that minimize the amount of material tracked on to a trafficked road surface, sometimes called "rock entrances". These buffer areas consist of very large aggregate,usually 4" to 8" crushed quarry rock, which jars particles free from wheels and undercarriage, as vehicles travel over the spall. This aggregate is sometimes laid over a fabric road carpet to increase effectiveness. A spall with typical dimensions is illustrated below.



SCHEDULE WORK: Rescheduling work around especially windy days can potentially be one of the least expensive and easiest *Fugitive Dust* control measures. This can also be a totally impractical option if work crews are idle and/or this is a project with significant time constraints. It is also unreasonable to expect to discontinue work in geographical areas that are prone to high and continueous winds. However, limited use of rescheduling in extreme weather conditions, might be appropriate.

The high profile aspects of certain projects and population exposed should be taken into consideration when scheduling especially *Fugitive Dust* producing work. Evenings and weekends are possible alternatives for scheduling work in business and school locations; while mid-day may be more appropriate for residential areas because people are more likely to be away from home.

SPEED REDUCTION: High vehicle speeds increase the amount of *Fugitive Dust* created from unpaved roads and lots. Reducing the speed of a vehicle from 45 to 35 miles per hour can reduce emissions by up to 22 percent according to a Washington State Department of Ecology study. However, no more than 5 to 15 miles per hour is recommended for most conditions. Speed bumps are a commonly used method to ensure speed reduction. In cases where speed reduction cannot effectively reduce *Fugitive Dust*, it may be necessary to divert traffic.



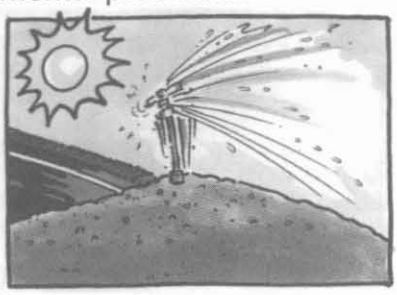
STREET SWEEPERS: Street sweepers are often used in conjunction with water. Some sweepers have a spray as well as brushes. However, sweepers can spread mud when there is a lot of wetness. Some sweepers, for parking lots and smaller jobs, actually have vacuum systems to trap *Fugitive Dust*. Dry sweeping is discouraged, especially in very dry climate conditions, because it causes dust particles to become airborne.

VEHICLE SPILLAGE: Covers for haul trucks help to prevent soils and other materials from being dropped on roads. However, covering loads is not required by state law if six inches of freeboard is maintained within the bed of the truck.

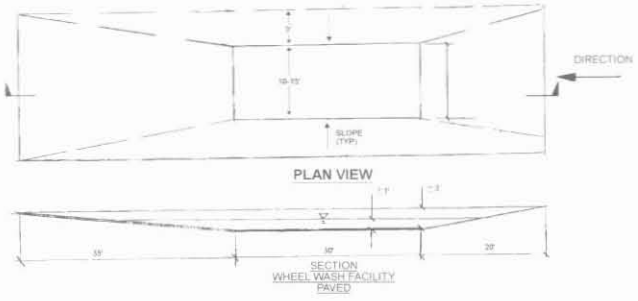
Vehicles driving over dirt and other debris tracked onto roads can cause significant *Fugitive Dust* emissions. Reducing the drop height for loading equipment, wet suppression, and wind guards are effective ways of minimizing the *Fugitive Dust* created during loading operations.

WATER SPRAY: Water spray, whether it is through a simple hose for small projects, or a water truck for large projects, is an effective way to keep *Fugitive Dust* under control. Misting systems and sprinklers are mechanisms that can be employed to deliver continuous wetness. However, there are several constraints in using water. Water can be very costly for larger projects in

comparison to other methods. Heavy watering can also create mud, run-off, and environmental problems.



WHEEL WASH: A wheel wash is a method to remove mud and dirt from wheels by driving through a shallow trench filled with water or onto an area where the wheel wells and undercarriage can be hosed down. Care should be taken to keep the trench deep enough that it is effective, but not so deep that it interferes with the mechanical operations of the vehicles. The trench may be lined with asphalt to ease maintenance in removing collected silt. A wheel wash can be used in conjunction with brooms or hoses to remove dirt from other areas of vehicles. Wheel washes must have a containment area to take care of the run-off.



VEHICLE SCRAPE: This is an alternative to a wheel wash when water disposal, or other environmental constraints, are present. Establishing a specific area where compact dirt or mud is removed from ledges of dump trucks, wheel wells, hitches, tires, and other confined areas, will reduce track out.

APPLICABLE WASHINGTON REGULATIONS

It is important to make sure that your *Fugitive Dust* control practices comply with federal, state and local laws. The following is a list of some of the regulations that apply; however contact your local Air Pollution Control Agency, County Health Department and/or Public Works Department to find out the specific requirements for the area in which your project is located.

Local Air Pollution Control Agency Regulations: Contact your local air pollution control agency for the specific regulations appropriate to the location of your project. These agencies and their phone numbers are listed on the last page of this brochure.

Chapter 70.94 RCW - Washington Clean Air Act and Chapter 173-400 WAC: These statutes require owners and operators of *Fugitive Dust* sources to prevent *Fugitive Dust* from becoming airborne and to maintain and operate sources to minimize emissions.

Chapter 70.951 RCW - Used Oil Recycling: This law prohibits the use of used oil as a dust suppressant. Used oil includes any oil that has been refined from crude oil, used, and as a result of such use, is contaminated by physical or chemical impurities. If you plan to use a chemical suppressant, verify that it does **not contain** any used oil as an ingredient. Also, be certain that if the product contains fuel oil ingredients that the fuel oil does not contain used oil.

Chapter 46.61.655 RCW - Dropping Load, Other Materials - Covering: This regulation prohibits the discharge of debris from vehicles and prescribes minimum loading standards in lieu of covering truck beds.

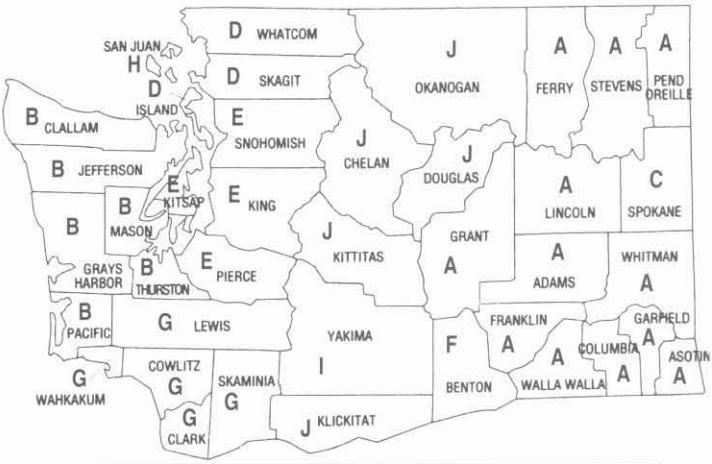
Chapter 90.48 RCW - Water Pollution Control: Section .080 prohibits the discharge of any material into surface or ground waters that could cause pollution as defined in WAC 173-200-020(22). If your site is near surface or ground water, use dust control measures that have zero or minimal aquatic impact. If you decide to use a chemical dust suppressant, select a product with no aquatic toxicity.

Chapter 70.105 RCW - Hazardous Waste Management: This statute prohibits the disposal to the ground of any dangerous (hazardous) waste. If you are planning to use a chemical dust suppressant, make sure it does **not** contain any dangerous waste ingredients.

Chapter 70.105D RCW - Hazardous Waste Cleanup - Model Toxics Control Act (MTCA): This law requires the identification and cleanup of hazardous sites. The Department of Ecology can investigate reports of releases or the presence of hazardous substances. If a hazardous product is used as a dust suppressant and Ecology later receives a complaint of contamination, a site assessment may be conducted.

Chapter 90.03 RCW - Surface Water Code and Chapter 90.44 RCW Regulations of Public Ground Water (wells): This regulation requires a water right permit for all surface water withdrawal and for any water from a well that will exceed 5,000 gallons per day. If you plan to use water, and have questions about it, call the Department of Ecology's Water Resources Program.

WASHINGTON STATE DEPT. OF ECOLOGY & LOCAL AIR POLLUTION CONTROL AGENCIES



A DEPARTMENT OF ECOLOGY - EAST REGION
North 4601 Monroe, Suite 202
Spokane, WA 99205-1295
(509) 456-2926

B OLYMPIC AIR POLLUTION CONTROL AUTHORITY
909 Sleater-Kinney Rd. SE, #1
Lacey, WA 98503
(360) 438-8768 or 1-800-422-5623

C SPOKANE CO. AIR POLLUTION CONTROL AUTHORITY
1101 West College Avenue, Suite 403
Spokane, WA 99201
(509) 477-4727

D NORTHWEST AIR POLLUTION AUTHORITY
1600 S. Second St.
Mount Vernon, WA 98273
(360) 428-1617 or 1-800-622-4627

E PUGET SOUND CLEAN AIR AGENCY
110 Union St., Suite 500
Seattle, WA 98101
(206) 343-8800 or 1-800-552-3565

F BENTON COUNTY CLEAN AIR AUTHORITY
650 George Washington Way
Richland, WA 99352
(509) 943-3396

G SOUTHWEST AIR POLLUTION CONTROL AUTHORITY
1308 N.E. 134th Street
Vancouver, WA 98685
(360) 574-3058 or 1-800-633-0709

H DEPARTMENT OF ECOLOGY - N.W. REGION
3190 - 160th Ave. SE
Bellevue, WA 98008-5452
(425) 649-7000

I YAKIMA COUNTY CLEAN AIR AUTHORITY
6 South 2nd St.,Room 1016
Yakima, WA 98901
(509) 574-1410 or 1-800-540-6950

J DEPARTMENT OF ECOLOGY - CENTRAL REGION
15 W. Yakima Ave., Suite 200
Yakima, WA 98902
(509) 575-2490

PARTICIPATING ASSOCIATIONS

Asphalt Paving Association
of Washington, Inc.
1200 Westlake Ave. N., Suite 604
Seattle, WA 98109
(206) 284-8780

Associated Builder & Contractors
of Western Washington
1756-114th Ave. S.E., Suite 120
Bellevue, WA 98004-6931
(425) 646-8000

Associated Builder & Contractors
Inland Pacific Chapter
P.O. Box 3787
Spokane, WA 99220
(509) 534-0826

Associated General Contractors
Inland Northwest Chapter
P.O. Box 3266
Spokane, WA 99220
(509) 535-0391

Associated General Contractors
Of Washington
1200 Westlake Ave. N., Suite 301
Seattle, WA 98109-3528
(206) 284-0061

Building Industry Association of
Washington
P.O. Box 1909
Olympia, WA 98507
(800) 228-4229

Building Industry Association of
Whatcom County
3323 Northwest Ave.
Bellingham, WA 98225
(360) 671-4247

Central Washington Home
Builders Association
1018 S. 33rd Ave.
Yakima, WA 98902
(509) 454-4006

Master Builders
2155-112th Ave. N.E., Suite 100
Bellevue, WA 98004
(425) 451-7920

Tri-City Construction Council
P.O. Box 6025
20 E. Kennewick Ave.
Kennewick, WA 99336
(509) 582-7424

APPENDIX C

Eastern Washington Stormwater Management Manual, BMP C140 and BMP C126

BMP C126: Polyacrylamide for Soil Erosion Protection

Purpose: Polyacrylamide (PAM) is used on construction sites to prevent soil erosion.

Applying PAM to bare soil in advance of a rain event significantly reduces erosion and controls sediment in two ways. First, PAM increases the soil's available pore volume, thus increasing infiltration through flocculation and reducing the quantity of stormwater runoff. Second, it increases flocculation of suspended particles and aids in their deposition, thus reducing stormwater runoff turbidity and improving water quality.

Conditions of Use

Conditions of Use: PAM shall not be directly applied to water or allowed to enter a water body. In areas that drain to a sediment pond, PAM can be applied to bare soil under the following conditions:

- During rough grading operations.
- Staging areas.
- Balanced cut and fill earthwork.
- Haul roads prior to placement of crushed rock surfacing.
- Compacted soil roadbase.
- Stockpiles.
- After final grade and before paving or final seeding and planting.
- Pit sites.

Sites having a winter shut down. In the case of winter shut down, or where soil will remain unworked for several months, PAM should be used together with mulch.

Design and Installation Specifications: PAM may be applied in dissolved form with water, or it may be applied in dry, granular or powdered form. The preferred application method is the dissolved form.

PAM is to be applied at a maximum rate of ½ pound PAM per 1000 gallons water per 1 acre of bare soil. Table 7.3.8 and Figure 7.3.6 can be used to determine the PAM and water application rate for a disturbed soil area. Higher concentrations of PAM do not provide any additional effectiveness.

Table 7.3.8
PAM and Water Application Rates

Disturbed Area (ac)	PAM (lbs)	Water (gal)
0.50	0.25	500
1.00	0.50	1,000
1.50	0.75	1,500
2.00	1.00	2,000
2.50	1.25	2,500
3.00	1.50	3,000
3.50	1.75	3,500
4.00	2.00	4,000
4.50	2.25	4,500
5.00	2.50	5,000

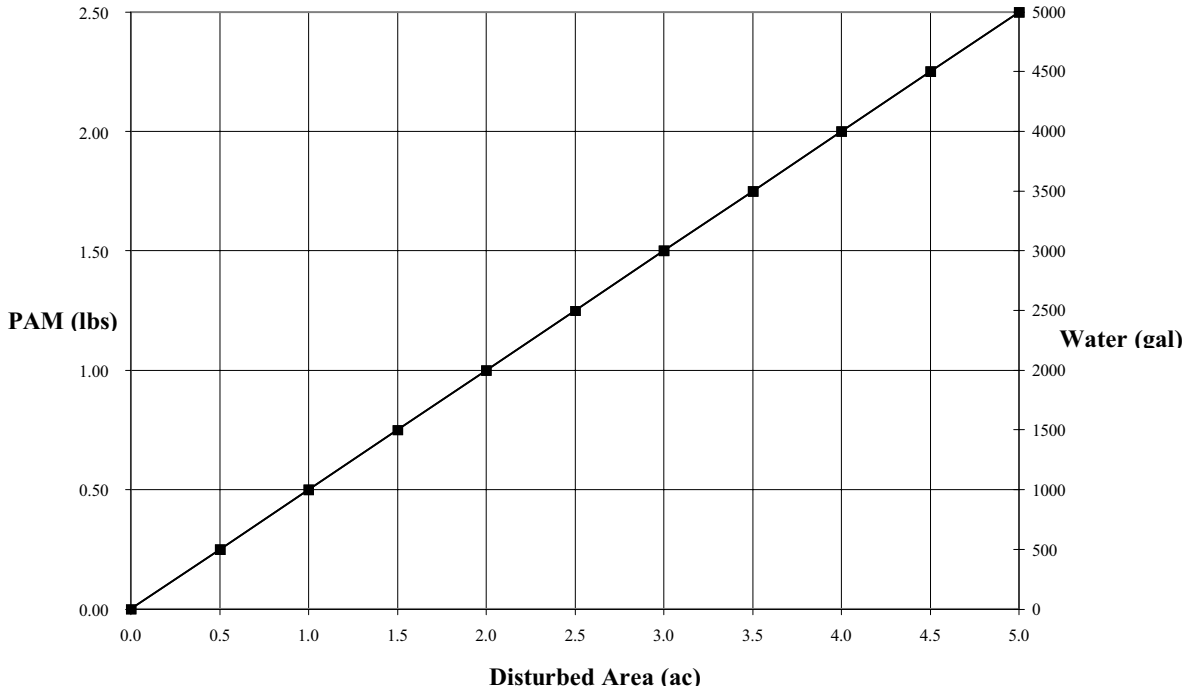


Figure 7.3.6 - PAM and Water Application

The Preferred Method:

- Pre-measure the area where PAM is to be applied and calculate the amount of product and water necessary to provide coverage at the specified application rate (1/2 pound PAM/1000 gallons/acre).
- PAM has infinite solubility in water, but dissolves very slowly. Dissolve pre-measured dry granular PAM with a known quantity of clean water in a bucket several hours or overnight. Mechanical mixing will help dissolve the PAM. Always add PAM to water - not water to PAM.
- Pre-fill the water truck about 1/8 full with water. The water does not have to be potable, but it must have relatively low turbidity – in the range of 20 NTU or less.
- Add PAM /Water mixture to the truck
- Completely fill the water truck to specified volume.
- Spray PAM/Water mixture onto dry soil until the soil surface is uniformly and completely wetted.

An Alternate Method:

PAM may also be applied as a powder at the rate of 5 lbs. per acre. This must be applied on a day that is dry. For areas less than 5-10 acres, a hand-held "organ grinder" fertilizer spreader set to the smallest setting will work. Tractor-mounted spreaders will work for larger areas.

The following shall be used for application of PAM:

- PAM shall be used in conjunction with other BMPs and not in place of other BMPs.
- Do not use PAM on a slope that flows directly into a stream or wetland. The stormwater runoff shall pass through a sediment control BMP prior to discharging to surface waters.
- Do not add PAM to water discharging from site.
- When the total drainage area is greater than or equal to 5 acres, PAM treated areas shall drain to a sediment pond.
- Areas less than 5 acres shall drain to sediment control BMPs, such as a minimum of 3 check dams per acre. The total number of check dams used shall be maximized to achieve the greatest amount of settlement of sediment prior to discharging from the site. Each check dam shall be spaced evenly in the drainage channel through which stormwater flows are discharged off-site.
- On all sites, the use of silt fence shall be maximized to limit the discharges of sediment from the site.

- All areas not being actively worked shall be covered and protected from rainfall. PAM shall not be the only cover BMP used.
- PAM can be applied to wet soil, but dry soil is preferred due to less sediment loss.
- PAM will work when applied to saturated soil but is not as effective as applications to dry or damp soil.
- Keep the granular PAM supply out of the sun. Granular PAM loses its effectiveness in three months after exposure to sunlight and air.
- Proper application and re-application plans are necessary to ensure total effectiveness of PAM usage.
- PAM, combined with water, is very slippery and can be a safety hazard. Care must be taken to prevent spills of PAM powder onto paved surfaces. During an application of PAM, prevent over-spray from reaching pavement as pavement will become slippery. If PAM powder gets on skin or clothing, wipe it off with a rough towel rather than washing with water-this only makes cleanup messier and take longer.
- Some PAMs are more toxic and carcinogenic than others. Only the most environmentally safe PAM products should be used.

The specific PAM copolymer formulation must be anionic. Cationic PAM shall not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, will be used for soil applications. Recent media attention and high interest in PAM has resulted in some entrepreneurial exploitation of the term "polymer." All PAM are polymers, but not all polymers are PAM, and not all PAM products comply with ANSI/NSF Standard 60. PAM use shall be reviewed and approved by the jurisdiction. The Washington State Department of Transportation (WSDOT) has listed approved PAM products on their web page.

- PAM designated for these uses should be "water soluble" or "linear" or "non-crosslinked". Cross-linked or water absorbent PAM, polymerized in highly acidic (pH<2) conditions, are used to maintain soil moisture content.
- The PAM anionic charge density may vary from 2-30 percent; a value of 18 percent is typical. Studies conducted by the United States Department of Agriculture (USDA)/ARS demonstrated that soil stabilization was optimized by using very high molecular weight (12-15 mg/mole), highly anionic (>20% hydrolysis) PAM.
- PAM tackifiers are available and being used in place of guar and alpha plantago. Typically, PAM tackifiers should be used at a rate of no more than 0.5-1 lb. per 1000 gallons of water in a hydromulch machine. Some tackifier product instructions say to use at a rate of 3 –5 lbs. per acre, which can be too much. In addition, pump problems can occur at higher rates due to increased viscosity.

Maintenance Standards: PAM may be reapplied on actively worked areas after a 48-hour period.

- Reapplication is not required unless PAM treated soil is disturbed or unless turbidity levels show the need for an additional application. If PAM treated soil is left undisturbed a reapplication may be necessary after two months. More PAM applications may be required for steep slopes, silty and clayey soils (USDA Classification Type "C" and "D" soils), long grades, and high precipitation areas. When PAM is applied first to bare soil and then covered with straw, a reapplication may not be necessary for several months.
- Loss of sediment and PAM may be a basis for penalties per RCW 90.48.080.

BMP C140: Dust Control

Purpose: Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters. Wind erosion is a significant cause of soil movement from construction sites in Eastern Washington. Although wind erosion can contribute to water quality impacts, dust control is regulated in some areas of Eastern Washington primarily through local air quality authorities. Where such an entity exists, contact the local air quality authority for appropriate and required BMPs for dust control to implement at your project site.

Conditions for Use: In areas (including roadways) subject to surface and air movement of dust where on-site and off-site impacts to roadways, drainage ways, or surface waters are likely.

Design and Installation Specifications:

- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes compliance with this BMP.
- Water applied to construction sites for dust control must not leave the site as surface runoff.
- See also "Techniques for Dust Prevention and Suppression," Ecology Publication Number 96-433, revised April 2002.
- Techniques that can be used for construction projects include:
- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition, if stable. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until surface is wet. Repeat as needed. To prevent carryout of mud onto street, refer to Stabilized Construction Entrance (BMP C105).
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer's instructions and cautions regarding handling and application. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP C126) added to water at a rate of 0.5 lbs. per 1,000 gallons of water per acre and applied from a water truck is more effective than water

alone. This is due to the increased infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may actually reduce the quantity of water needed for dust control, especially in eastern Washington. Since the wholesale cost of PAM is about $ 4.00 per pound, this is an extremely cost-effective dust control method.

Techniques that can be used for unpaved roads and lots include:

- Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
- Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.
- Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
- Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
- Encourage the use of alternate, paved routes, if available.
- Restrict use by tracked vehicles and heavy trucks to prevent damage to road surface and base.
- Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
- Pave unpaved permanent roads and other trafficked areas.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Limit dust-causing work on windy days.

Maintenance Standards:

- Respray area as necessary to keep dust to a minimum. Water applied to construction sites for dust control must not leave the site as surface runoff.

APPENDIX D

WSDOT Chemical Dust Suppressant List

Exhibit 425-5

Chemical Dust Suppressant Contact Information

Type	Brand Name	Manufacturer	Contact Information
Freshwater			
Seawater			
Calcium Chloride	Calcium Chloride Flakes	General Chemical	800-668-0433
	Calcium Chloride Liquid	General Chemical	800-668-0433
	Dowflake	Dow Chemical	800-447-4369
	Liquidow	Dow Chemical	800-447-4369
Magnesium Chloride	Chlor-Tex	Soil-Tech	702-873-2023
	DustGard	IMC Salt	800-323-1641
	Dust-Off	Cargill Salt Division	800-553-7879
Sodium Chloride	IMC Salt	IMC Salt	800-323-1641
	Morton Salt	Morton International	312-807-2000
Lignin Derivatives	DC 22	Dallas Roadway Products, Inc.	800-317-1968
	Dustac	Georgia Pacific West, Inc.	360-733-4410
	Dustac-100	Georgia Pacific West, Inc.	360-733-4410
	RB Ultra Plus	Roadbind America, Inc.	888-488-4273
Tree Resin Emulsions	Dust Control E	Pacific Chemicals, Inc. / Lyman Dust Control	800-952-6457
	Dustrol EX		
	Road Oyl	Soil Stabilization Products Co. Inc.	800-523-9992
Electrochemical	Bio Cat 300-1	Soil Stabilization Products Co. Inc.	800-523-9992
	EMCSquared	Soil Stabilization Products Co. Inc.	800-523-9992
	SA-44 System	Dallas Roadway Products, Inc.	800-317-1968
	TerraBond Clay Stabilizer	Fluid Sciences, LLC	888-356-7847
Synthetic Polymer Emulsions	Aerospray 70A	Cytec Industries	800-835-9844
	ECO-110	Chem-crete	972-234-8565
	Soil Master WR	Environmental Soil Systems, Inc.	800-368-4115
	Soil Seal	Soil Stabilization Products Co. Inc.	800-523-9992
	Soil Sement	Midwestern Industrial Supply, Inc.	800-321-0699
	Top Shield	Base Seal International, Inc.	800-729-6985
Bituments, Tars, and Resins	Asphotac	Actin	219-397-5020
	Coherex	Witco Corp.	800-494-8287
	PennzSuppress-D	Pennzoil-Quaker State Co.	713-546-4000
	Road Pro	Midwestern Industrial Supply, Inc.	800-321-0699
Geotextiles	Trevira Spunbound	Hoechst Celanese Corporation	

APPENDIX E

Self-Inspection Checklists

Self-Inspection Checklist: Fugitive Dust Control Method Log

Fugitive Dust Source: _____

Date	*Time*	*Control Method*	*Comments*

Self-Inspection Checklist: Weather Log

Date	*Temperature*	*Wind Speed/Direction*	*Amount of Rainfall*	*Comments*