



## Worksheet #20

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# Assessing Fugitive Dust and Particulate Matter Emissions From Dairy Facilities and Activities

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### **Why Should I be concerned?**

The Federal Clean Air Act established Ambient Air Quality Standards-including particulate matter (called PM<sub>10</sub> meaning less than 10 microns in size) decades ago. Elevated concentrations of PM<sub>10</sub> are associated with increased respiratory problems in certain segments of the population. Hot dry summers result in dry conditions in corrals, on roads, and in feeding areas. Activity on these dry surfaces by humans, cattle, or vehicles can cause PM<sub>10</sub> and dust particles to become airborne. The San Joaquin Unified Air Pollution Control District regularly monitors PM<sub>10</sub> concentrations. The increased amount of these directly emitted airborne particles along with gaseous compounds have resulted in the San Joaquin Valley "Serious" non-attainment designation status from the US Environmental Protection Agency for PM<sub>10</sub> requiring that the District develop and implement a plan to improve air quality.

It is not necessarily a simple task to prevent or reduce fugitive dust and PM<sub>10</sub> emissions. Some practices that reduce dust can result in increased nuisance conditions. For example, sprinkling water on corrals reduces dust. However, this practice may also cause fly and odor problems. Animal health concerns (potential increased mastitis) must also be considered when dealing with food producing animals. The important point is to recognize that the consequences of management alternatives need to be evaluated before practices are implemented.

### **How will this worksheet help me to protect my air quality?**

- It will take you step by step through options available to manage dust and particulate matter.
- It will rank your activities according to how much impact they have on air quality.
- It will provide you with easy-to-understand rankings that will help you analyze the emission potential of your management procedures.

- It will help you determine which of your practices are reasonably safe and effective, and which practices might require some modification to better protect air quality.

### **How do I complete the worksheet?**

Follow the directions at the top of the chart on the next page. It should take you about 15-30 minutes to complete this worksheet. During this process you will identify the critical areas at your dairy that may result at higher dust and particulate matter emissions from your facility. Handbook for Air Quality Conservation Management Practices for the San Joaquin Valley is available. This Handbook identifies a menu of management practices to reduce particulate emissions from your facility.

### **What do I do with the results?**

The information from this worksheet is intended to help you identify management practices to reduce particulate matter emissions.

- Include practices in your Conservation Management Plan. The last page of this document provides a place for you to identify areas you need to improve.
- Document facility improvements on the last page of this worksheet.
- Focus your attention on dust emissions as you tend to your daily activities throughout your dairy.
- Consider impacts to dust emissions as you purchase feed equipment, make facility improvements, and modify or expand the dairy.

This document was prepared for use in the Air Curriculum of the Environmental Stewardship Module of the California Dairy Quality Assurance Program. ©CDQAP May/2004. For more information on the program go to <http://www.cdqa.org> .

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Additional copies of this document are available from your University of California Cooperative Extension Dairy Advisor.

Information derived from FarmWASys worksheet is intended only to provide general information and recommendations to farmers regarding their own practices and potential impacts to the environment.

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## Dairy Facilities and Activities: Assessing Direct Particulate Matter Emissions

1. Use a pencil. You may want to make changes.
2. For each category listed on the left that is appropriate to your dairy, read across to the right and identify the statement that **best** describes conditions on your dairy operation. For some categories you will need to select appropriate conditions for both heifer and cow facilities. Skip and leave blank any categories that don't apply to your facility.
3. Then look above the description you identified to find your rank number (3, 2 or 1) and enter that number in the blank on the right side.
4. Identify management practices from the Handbook for Air Quality Conservation Management Practices to reduce your emissions of particulate matter for categories with High Emissions. Include these practices in your Conservation Management Plan.
5. Allow about 15 to 30 minutes to complete this worksheet.

EMISSION CATEGORY	LOW EMISSIONS (Rank 3)	MODERATE EMISSIONS (Rank 2)	HIGH EMISSIONS (Rank 1)	YOUR RANK
<b>CORRAL MANAGEMENT FOR LACTATING</b>				
<b>1 ) Housing type</b>	All cattle in freestalls with no exercise pens.	Freestalls with exercise pens or corrals with shades.	Corrals with no shades. No freestalls.	
<b>2) Corral shape and condition</b>	Pen shape and condition allows complete removal of dry manure.		Pens are irregularly shaped and/or have obstacles to complete removal of dry manure.	
<b>3) Surface characteristics</b>	Even, compacted surface with no holes, pits, or depressions to accumulate dust.	Holes, pits, or depressions are corrected at least annually after manure removal.	Holes, pits, or depressions that may accumulate dust are uncorrected.	
<b>4) Maximum depth of dry loose manure in corrals at cleaning</b>	Corrals are firm and hard with less than 1 inch of dry manure.	Corrals have between 1 and 3 inches of dry loose manure.	Corrals have more than 3 inches of dry, loose manure.	

<b>EMISSION CATEGORY</b>	<b>LOW EMISSIONS (Rank 3)</b>	<b>MODERATE EMISSIONS (Rank 2)</b>	<b>HIGH EMISSIONS (Rank 1)</b>	<b>YOUR RANK</b>
<b>CORRAL MANAGEMENT FOR REPLACEMENT HEIFERS AND DRY COWS</b>				
<b>5) Housing type</b>	All cattle in freestalls with no exercise pens.	Freestalls with exercise pens or corrals with shades.	Corrals with no shades. No freestalls.	
<b>6) Corral shape and condition</b>	Pen shape and condition allows complete removal of dry manure.		Pens are irregularly shaped and/or have obstacles to complete removal of dry manure.	
<b>7) Surface characteristics</b>	Even, compacted surface with no holes, pits, or depressions to accumulate dust.	Holes, pits, or depressions are corrected at least annually after manure removal.	Holes, pits, or depressions that may accumulate dust are uncorrected.	
<b>8) Maximum depth of dry loose manure in corrals at cleaning</b>	Corrals are firm and hard with less than 1 inch of dry manure.	Corrals have between 1 and 3 inches of dry loose manure.	Corrals have more than 3 inches of dry, loose manure.	
<b>9) Age of animals</b>	Only bottle fed calves raised on-site	Bred heifers reared on-site.	Growing and open heifers reared on-site.	

<b>EMISSION CATEGORY</b>	<b>LOW EMISSIONS (Rank 3)</b>	<b>MODERATE EMISSIONS (Rank 2)</b>	<b>HIGH EMISSIONS (Rank 1)</b>	<b>YOUR RANK</b>
<b>OVERALL MANAGEMENT</b>				
<b>10) Bulk materials (dry loose feed)</b>	Stored inside a commodity barn or covered with a tarp.	Materials partially covered or located partially inside commodity barn.	No protection from wind.	
<b>11) Bulk materials (bedding and dry manure)</b>	Covered with a tarp.	Materials partially covered.	No protection from wind.	
<b>12) Feed preparation</b>	High moisture ingredients added at beginning of mixing.	High moisture ingredients added at end of mixing.	No high moisture ingredients used.	
<b>13) Vegetative barriers downwind (between May and October) of corrals, and manure storage (shelterbelt)</b>	A dense shelterbelt or other vegetative barrier is maintained.	Sparse, immature or partial shelterbelt or other vegetative barrier present.	No vegetative barrier.	

<b>EMISSION CATEGORY</b>	<b>LOW EMISSIONS (Rank 3)</b>	<b>MODERATE EMISSIONS (Rank 2)</b>	<b>HIGH EMISSIONS (Rank 1)</b>	<b>YOUR RANK</b>
<b>UNPAVED ROADS</b>				
<b>14) Total daily vehicle trips (Regulation VIII &amp; CMP compliance)</b>	Less than 10 trips on any day	Between 10 and 75 trips per day	More than 75 trips per day	
<b>15) Road surface</b>	Treated and/or firm compacted surface.	Compacted coarse textured surface.	Untreated loose and/or fine textured surface.	
<b>16) Track out</b>	No access to public roadways from unpaved surfaces or access over track out control mechanisms.	Heavily used access points to public roadways that have only partial pavement or have track out controls.	All frequently used access points to public roadways are from unpaved roads without track out control.	

<b>EMISSION CATEGORY</b>	<b>LOW EMISSIONS (Rank 3)</b>	<b>MODERATE EMISSIONS (Rank 2)</b>	<b>HIGH EMISSIONS (Rank 1)</b>	<b>YOUR RANK</b>
<b>UNPAVED VEHICLE AND EQUIPMENT AREAS</b>				
<b>17) Road surface</b>	Treated and/or firm, compacted surface	Compacted coarse textured surface.	Untreated loose and/or fine textured surface.	
<b>18) Average annual daily vehicle trips (Regulation VIII &amp; CMP compliance)</b>	Less than 10	Between 10 and 150 trips for any one day in a 30 day period, <i>or</i> less than 50 average annual daily vehicle trips by two axles, <i>or</i> less than 25 average annual daily vehicle trips by three axles or more.	Greater than or equal to 150 trips for any one day in a 30-day period, <i>or</i> greater than or equal to 50 average annual daily vehicle trips by two axles, <i>or</i> greater than or equal to 25 average annual daily vehicle trips by three axles or more.	
<b>19) Track out</b>	No access to public roadways from unpaved surfaces or access over track out control mechanisms.	Heavily used access points to public roadways that have only partial pavement or have track out controls.	All frequently used access points to public roadways are from unpaved roads without track out control.	
<b>20) Vegetative barriers downwind (between May and October) of unpaved areas (shelterbelt)</b>	A dense shelterbelt or other vegetative barrier is maintained.	Sparse, immature or partial shelterbelt or other vegetative barrier present.	No vegetative barrier.	

The following two sections address air quality issues not necessarily related to particulate matter emissions.

<b>EMISSION CATEGORY</b>	<b>LOW EMISSIONS (Rank 3)</b>	<b>MODERATE EMISSIONS (Rank 2)</b>	<b>HIGH EMISSIONS (Rank 1)</b>	<b>YOUR RANK</b>
<b>NUISANCE CONDITIONS</b>				
<b>21) Direction of prevailing winds during summer months</b>	Prevailing winds from animal housing and manure storage areas blow away from neighbors		Prevailing winds from animal housing and manure storage areas blow towards neighbors	
<b>22) Proximity of animals and manure storage facilities to <i>NEAREST</i> business, home, school, church, etc., IN ANY DIRECTION</b>	More than 1.0 mile	Between .25 and 1.0 mile	Less than .25 mile	
<b>23) Proximity of animals and manure storage facilities to <i>NEAREST DOWNWIND</i> business, home, school, church, etc., from the property line</b>	More than 1.0 mile	Between .25 and 1.0 mile	Less than .25 mile	
<b>24) Intensity of wind gusts during summer months</b>	5 mph or less	Between 5 and 20 mph	20 mph or more	
<b>25) Proximity of animals and manure storage facilities to nearest roadway</b>	More than 1.0 mile	Between .25 and 1.0 mile	Less than .25 mile	

<b>EMISSION CATEGORY</b>	<b>LOW EMISSIONS (Rank 3)</b>	<b>MODERATE EMISSIONS (Rank 2)</b>	<b>HIGH EMISSIONS (Rank 1)</b>	<b>YOUR RANK</b>
<b>26) Roadside vegetation and fence line enhances aesthetics</b>	Well maintained and landscaped operation		No landscaping, debris and weeds present, facility in disrepair	
<b>27) Vector control management (flies, mosquitoes and rodents)</b>	Vector control plan implemented. Plan is in compliance with local regulations. Feed, animals, manure, etc., managed to minimize vectors.	Vector control plan developed but implementation lax.	No vector control plan in place.	
<b>28) Mortality management</b>	Mortality removed from corrals within 24 hours and isolated from scavengers, pets, rodents etc. Mortality not visible from roadside.	Mortality removed from corrals within 24 hours and isolated from scavengers, pets, rodents, etc. Stored away from roadside but still in public view.	Mortality not removed from corrals within 24 hours or mortality stored in public view at roadside.	
<b>29) Odor</b>	Odor management plan developed and implemented.	Odor management plan developed and not completely implemented.	No odor management plan.	

<b>EMISSION CATEGORY</b>	<b>LOW EMISSIONS (Rank 3)</b>	<b>MODERATE EMISSIONS (Rank 2)</b>	<b>HIGH EMISSIONS (Rank 1)</b>	<b>YOUR RANK</b>
<b>CONFINED SPACES</b>				
<b>30) Safety plan</b>	Plan developed and all staff and new employees trained.	Plan developed with incomplete training of employees.	No plan developed. <sup>1</sup>	
<b>31) Signage</b>	Signs clearly visible.	Signs partially visible.	Signage not present or visible.	
<b>32) Restricted access</b>	Access prevented to all confined spaces. Supervised access to milk tank.	Access restricted but not prevented to all confined spaces.	Unprotected access to confined spaces.	
<b>33) Rescue protocol/supplies</b>	Readily available and in good condition always.	Provided only during planned periods of access.	None present.	

<sup>1</sup> Occupational Safety and Health Agency requires confined space component to safety plans. This is not related to particulate matter emissions. It is included herein as it relates to safety regulations on dairies associated with air quality.

## Dairy Farm-A-Syst Emission Management Action Worksheet

Date: \_\_\_\_\_, 2004

Emission Category	Planned Action to Lower Emission	Projected time to complete	Estimated total cost	Date completed