

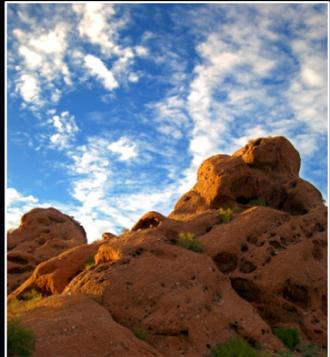
Cost Estimates of Candidate Agricultural Measures



Governor's Agricultural Best Management Practices Committee
June 22, 2021

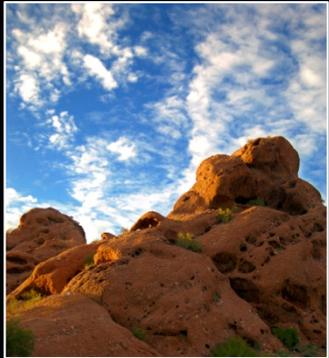
Background

ENVIRONMENTAL PROGRAMS



- **Trinity Consultants prepared a Final Report entitled “Analyses of Best Available Control Measures and Most Stringent Measures for the West Pinal County Serious PM-10 Nonattainment Area” on March 31, 2021.**
- **The Final Report contains cost data associated with implementing the identified measures in the report.**
- **A detailed spreadsheet that contains all of the cost assumptions associated with the identified measures in the Final Report was provided to ADEQ for use by the Governor’s Agricultural Best Management Practices Committee on June 1, 2021.**

ENVIRONMENTAL PROGRAMS



Background

- **The Final Report contains 21 candidate measures that apply to agricultural sources for consideration by implementing entities: 7 for dairies (#31-37), 7 for concentrated animal feeding operations (#38-44), and 7 for cropland/farms (#45-51).**
- **The cost estimates in the Final Report are provided as a reference on the possible costs of implementing a candidate measure based on cost information available at the time of report finalization. The cost estimates may or may not be pertinent to an implementing entity when evaluating candidate measures.**

Measure 31 – Tighten Definition of Dairies Subject to Fugitive Dust Rules

- **Key Analysis Assumption: It was found that all dairies in the nonattainment area already have at least 150 animals (ADEQ survey data). Therefore, lowering the applicability threshold down to 50 animals from 150 animals would not change the number of dairies being regulated.**
- **Cost: \$0 per dairy farm.**

Measure 32 – Increase the Number of Dairy Operations Fugitive Dust BMPs

- **Key Analysis Assumption:** This measure requires that the number of BMPs implemented at dairies increase from 1 to 2 for all operations. Costs are evaluated for specific dairy operations in Measures 33-36.
- **Cost: NA** – costs are evaluated for each specific dairy operation in Measures 33-36.

Measure 33 – Increase the Number of Dairy Operations Fugitive Dust BMPs for Arena, Corrals and Pens

- **Key Analysis Assumption: It was assumed that the second BMP chosen to reduce fugitive dust for arenas, corrals and pens was to install 3-foot high wind barrier fencing.**
- **Cost Estimate: \$3,861 per nonattainment area-year.**
- **Cost Data:**
 - **Wind barrier cost: \$0.53 per foot (Home Depot 3/4/2021).**
 - **Labor cost: \$923 (2 installers at 200 ft. per hour at \$20.01 an hour).**
 - **Area being fenced: 30.5 acres per dairy.**
 - **Cost per dairy, including labor: \$3,349.**
 - **Annualized per dairy cost, assuming a 10-year useful life: \$545.**
 - **Assumed 7.08 dairies will need to implement a second BMP (ADEQ survey data).**
 - **Final cost: $\$545 * 7.08 = \$3,861$.**

Measure 34 – Increase the Number of Dairy Operations Fugitive Dust BMPs for Animal Waste (and Feed) Handling and Transport

- **Key Analysis Assumption: Composite control efficiency was conservatively estimated by ADEQ as the maximum across all BMPs and the individual BMP control efficiencies were all identical. As such, simulating use of an additional BMP for applicable dairies resulted in no calculated increase in composite efficiency and no emission reductions. Further analysis of the BMP interactions within this activity category will be needed to estimate PM-10 emission reductions and cost effectiveness.**
- **Cost Estimate: NA – Further data is needed on the effects of adding a second BMP when the control efficiencies of all BMPs are identical.**

Measure 35 – Increase the Number of Dairy Operations Fugitive Dust BMPs for Unpaved Access Connections

- **Key Analysis Assumption: It was assumed that the second BMP chosen to reduce fugitive dust for unpaved access connections was to apply a synthetic dust suppressant.**
- **Cost Estimate: \$607 per dairy per nonattainment area-year.**
- **Cost Data:**
 - **Dust suppressant cost rate: \$3.00 per gallon (SoilWorks 3/3/2021).**
 - **Application rate: 200 gallons per acre (SoilWorks 3/3/2021).**
 - **Area dust suppressant applied: 0.72 acres per dairy (2.36% dairy acreage)**
 - **Total dust suppressant cost: \$432 per dairy per year**
 - **Water truck cost (for spraying dust suppressant): \$175 per dairy per year.**
 - **Final cost: \$432 + \$175 = \$607.**

Measure 36 – Increase the Number of Dairy Operations Fugitive Dust BMPs for Unpaved Roads of Feed Lanes

- **Key Analysis Assumption: It was assumed that the second BMP chosen to reduce fugitive dust for unpaved roads or feed lanes was to apply a synthetic dust suppressant.**
- **Cost Estimate: \$1,492 per dairy per nonattainment area-year.**
- **Cost Data:**
 - **Dust suppressant cost rate: \$3.00 per gallon (SoilWorks 3/3/2021).**
 - **Application rate: 200 gallons per acre (SoilWorks 3/3/2021).**
 - **Area dust suppressant applied: 2.16 acres per dairy (7.08% dairy acreage)**
 - **Total dust suppressant cost: \$1,297 per dairy per year**
 - **Water truck cost (for spraying dust suppressant): \$195 per dairy per year.**
 - **Final cost: \$1,297 + \$195 = \$1,492.**

Measure 37 – Increase the Number of Dairy Operations Fugitive Dust BMPs for Unpaved Vehicle/Equipment Traffic Areas

- **Key Analysis Assumption: It was assumed that the BMP chosen to reduce fugitive dust for unpaved vehicle/equipment traffic area was to apply a synthetic dust suppressant.**
- **Cost Estimate: \$779 per dairy per 1 acre area-year.**
- **Cost Data:**
 - **Dust suppressant cost rate: \$3.00 per gallon (SoilWorks 3/3/2021).**
 - **Application rate: 200 gallons per acre (SoilWorks 3/3/2021).**
 - **Area dust suppressant applied: 1 acre per dairy.**
 - **Total dust suppressant cost: \$600 per dairy per year**
 - **Water truck cost (for spraying dust suppressant): \$179 per dairy per year.**
 - **Final cost: \$600 + \$179 = \$779.**

Measure 38 – Tighten Definition of Cattle Confined Animal Feeding Operations Subject to Fugitive Dust Rules

- **Key Analysis Assumption: It was found that all cattle confined animal feeding operations (CAFO) in the nonattainment area already have at least 500 animals (ADEQ survey data). Therefore, lowering the applicability threshold down to 50 animals from 500 animals would not change the number of CAFOs being regulated.**
- **Cost: \$0 per CAFO.**

Measure 39 – Increase the Number of Cattle Confined Animal Feeding Operations Fugitive Dust BMPs

- **Key Analysis Assumption:** This measure requires that the number of BMPs implemented at CAFOs increase from 1 to 2 for all operations. Costs are evaluated for specific CAFO operations in Measures 40-43.
- **Cost: NA** – costs are evaluated for each specific CAFO operation in Measures 40-43.

Measure 40 – Increase the Number of Cattle CAFO Operations Fugitive Dust BMPs for Arena, Corrals and Pens

- **Key Analysis Assumption:** It was assumed that the second BMP chosen to reduce fugitive dust for arenas, corrals and pens was to water pens.
- **Cost Estimate:** \$54,420 - \$217,680 per nonattainment area-year.
- **Cost Data:**
 - **Watering costs:** \$0.60 - \$2.40 per head of cattle per year (<https://lpelc.org/water-requirements-for-dust-control-on-feedlots/> “Water Requirements for Dust Control on Feedlots” from *Mitigating Air Emissions From Animal Feeding operations Conference*, March 5, 2019)
 - **Estimated head of cattle in nonattainment area:** 90,700 (ADEQ survey data)
 - **Final cost:** $(\$0.60 - \$2.40) * 90,700 = \$54,420 - \$217,680$.

Measure 41 – Increase the Number of Cattle CAFO Operations Fugitive Dust BMPs for Animal Waste (and Feed) Handling and Transport

- **Key Analysis Assumption: Composite control efficiency was conservatively estimated by ADEQ as the maximum across all BMPs and the individual BMP control efficiencies were all identical. As such, simulating use of an additional BMP for applicable CAFOs resulted in no calculated increase in composite efficiency and no emission reductions. Further analysis of the BMP interactions within this activity category will be needed to estimate PM-10 emission reductions and cost effectiveness.**
- **Cost Estimate: NA – Further data is needed on the effects of adding a second BMP when the control efficiencies of all BMPs are identical.**

Measures 42 & 43 – Increase the Number of Cattle CAFO Operations Fugitive Dust BMPs for Unpaved Access Connections and for Unpaved Roads or Feed Lanes

- **Key Analysis Assumption: It was assumed that the second BMP chosen to reduce fugitive dust for unpaved access connections and unpaved roads/feed lanes was to apply a synthetic dust suppressant. Measures 42 and 43 costs are combined as these unpaved areas were not separated in ADEQ survey data.**
- **Cost Estimate: \$91,268 per nonattainment area-year.**
- **Cost Data:**
 - **Dust suppressant cost rate: \$3.00 per gallon (SoilWorks 3/3/2021).**
 - **Application rate: 200 gallons per acre (SoilWorks 3/3/2021).**
 - **Area dust suppressant applied: 136.5 acres (15.00% of CAFO acreage)**
 - **Total dust suppressant cost: \$81,895 per year**
 - **Water truck cost (for spraying dust suppressant): \$9,373 per year.**
 - **Final cost: \$81,895 + \$9,373 = \$91,268.**

Measure 44 – Increase the Number of Dairy Operations Fugitive Dust BMPs for Unpaved Vehicle/Equipment Traffic Areas

- **Key Analysis Assumption: It was assumed that the BMP chosen to reduce fugitive dust for unpaved vehicle/equipment traffic area was to apply a synthetic dust suppressant.**
- **Cost Estimate: \$779 per CAFO per 1 acre area-year.**
- **Cost Data:**
 - **Dust suppressant cost rate: \$3.00 per gallon (SoilWorks 3/3/2021).**
 - **Application rate: 200 gallons per acre (SoilWorks 3/3/2021).**
 - **Area dust suppressant applied: 1 acre per CAFO.**
 - **Total dust suppressant cost: \$600 per CAFO per year**
 - **Water truck cost (for spraying dust suppressant): \$179 per CAFO per year.**
 - **Final cost: \$600 + \$179 = \$779.**

Measure 45 – Increase the Number of BMPs to Control Fugitive Dust from Cropland Areas

- **Key Analysis Assumption: "Cropland" is a phase that is defined as the period from after final harvest until subsequent planting (excluding tilling). It is assumed that no activity-based emissions occur and windblown dust emissions only occur on high wind days during this phase. Control effectiveness reflecting 3 BMPs (up from 2) were simulated with the ADEQ survey data and composited by crop to calculate a crop acreage-weighted composite control effectiveness.**
- **Cost Estimate: NA – No verifiable cost data on cropland BMPs was available at the time of report publication.**

Measure 46 – BMPs to Control Fugitive Dust on Noncropland Areas That Area Not Tied to High-Risk Days

- **Key Analysis Assumption:** A new BMP would be required to control fugitive dust from noncropland (unpaved equipment/storage yards and unpaved traffic areas) on all days, not just on days forecast to be high risk dust days, when certain vehicle daily trip thresholds are met. No data was available to calculate the amount of unpaved equipment/storage yards and unpaved traffic that exist as part of noncropland areas in the nonattainment area. As such, no PM-10 emission reductions or cost effectiveness values were estimated for this measure.
- **Cost Estimate:** NA – No verifiable cost data on additional noncropland BMPs for unpaved equipment/storage yards and unpaved access areas were available at the time of report publication.

Measure 47 – Increase the Number of BMPs for the Control of Fugitive Dust From Commercial Farm Roads

- **Key Analysis Assumption: It was assumed that the second BMP chosen to control fugitive dust for commercial farm roads was to apply water or a synthetic dust suppressant.**
- **Cost Estimate: \$353,408 (suppressant) - \$1,277,408 (watering) per nonattainment area-year.**
- **Cost Data:**
 - **Dust suppressant cost rate: \$3.00 per gallon (SoilWorks 3/3/2021).**
 - **Application rate: 200 gallons per acre (SoilWorks 3/3/2021).**
 - **Area dust suppressant/water applied applied: 529 acres (12% of farm roads)**
 - **Total dust suppressant cost: \$353,408**
 - **Total watering costs: \$18,244 per watering day for 70 days a year (45 high risk days, 25 high activity days) = \$1,277,408**

Measure 48 – Stabilization Requirements for Off-Field Bulk Material Storage

- **Key Analysis Assumption:** This is a new requirement to select a BMP that would control fugitive dust from off-field bulk materials. Since no data on off-field bulk material storage is available for the nonattainment area at commercial farms, no PM-10 emission reductions or cost effectiveness values were estimated.
- **Cost Estimate:** NA – No verifiable cost data for off-field bulk material storage at commercial farms was available at the time of report publication.

Measure 49 – Fugitive Dust Controls for Off-Field Bulk Material Handling and Transport

- **Key Analysis Assumption: This is a new requirement to enclose, cover or tarp off-field bulk materials when being handled or transported. Existing statewide tarping requirements already in place would result in negligible emission reductions from implementation of this measure.**
- **Cost Estimate: \$0 – Assumption is that covering/tarping is already occurring to comply with statewide requirements.**

Measure 50 – Increase the Minimum Number of Agricultural Earth Moving BMPs

- **Key Analysis Assumption: No data on agricultural earth moving activities is available for the nonattainment area at commercial farms. As such, no PM-10 emission reductions or cost effectiveness values were estimated for the increase from 1 to 2 BMPs for this measure.**
- **Cost Estimate: NA – No verifiable cost data for earth moving activities at commercial farms was available at the time of report publication.**

Measure 51 – Require Implementation of BMPs to Control Windblown Dust from Crop Operations on All Days

- **Key Analysis Assumption: Existing ADEQ survey data on crop operations indicate that even though no BMP has been specifically required for the control of windblown dust on all days, the BMPs that are being implemented for other crop operations satisfy this requirement. Based on the survey data, no PM-10 emission reductions or cost effectiveness values were estimated.**
- **Cost Estimate: \$0 – Assumption is that existing use of BMPs on crop operations meet the requirements of this measure.**



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