September

2018

STUDY SESSION

AND

BOARD MEETING

for

Yakima Regional Clean Air Agency

Yakima Regional Clean Air Agency
MEETING LOCATION: Yakima City Hall
City Council Chambers
129 N. 2nd Street, Yakima

September 13, 2018
Study Session
1:30 p.m.
Regular Board Meeting
2:00 p.m.

AGENDA

Study Session

Continuing discussion on reducing litigation risk associated with the Air Quality Management Policy for Dairy Operations

Regular Meeting

1. **Call to Order**
2. **Roll Call**
3. **Additions or Deletions to the Agenda**
4. **Public Comments**
   If you wish to address the Board you may do so now. Please approach the podium, state your name and the agenda item you wish to address. Please limit your comments to three (3) minutes.
5. **Approval of Consent Agenda**
   - 5.1 Board Meeting Minutes – August 2018
   - 5.2 Accept YRCAA August 2018 Monthly Activity Report
6. **Regular Agenda**
   - 6.1 Executive Director's Report
7. **Action Items**
   - 7.1 Fiscal Vouchers and Payroll Authorization Transfers for June & July 2018
   - 7.2 Reappointment of the Air Pollution Control Officer (APCO)
   - 7.3 Reappointment of the Primary & Alternate Auditing and Investment Officers
   - 7.4 YRCAA v. Heaney d/b/a DisplayVisions and/or Apex Co.
8. **Other business**
9. **Adjournment**

STUDY

SESSION

RESOLUTION NO.: 2018-11A
BEFORE THE GOVERNING BOARD OF THE YAKIMA REGIONAL CLEAN AIR AGENCY (YRCAA)

Rescinding YRCAA resolution 2013-06, adopting the Air Quality Management Policy for Dairy Operations:

WHEREAS, the Board of Directors of the YRCAA, as set forth in chapter 70.94 of the Revised Code of Washington, is vested with the authority to adopt, amend and repeal its own rules, operating policies and procedures implementing the Revised Code of Washington and Washington Administrative Codes applicable to air pollution; and

WHEREAS, the Board of Directors for the YRCAA approved resolution 2013-06, adopting the Air Quality Management Policy for Dairy Operations on June 13, 2013; and

WHEREAS, the YRCAA Governing Board of Directors believes it to be in the best interest of the public to rescind YRCAA resolution 2013-06;

NOW THERFORE BE IT RESOLVED that the YRCAA Governing Board of Directors hereby rescinds resolution 2013-06:

On motion of _____, seconded by _____, the foregoing resolution is hereby PASSED AND ADOPTED by the Yakima Regional Clean Air Agency Board of Directors on this 13th day of September, 2018.

_____	_____
Jon DeVaney, Chair	Ron Anderson, Director
_____	_____
Steven Jones, Director	Carmen Mendez, Director
_____	_____
Norm Childress, Director	Mary Wurtz, Clerk of the Board

RESOLUTION NO.: 2018-11B
BEFORE THE GOVERNING BOARD OF THE YAKIMA REGIONAL CLEAN AIR AGENCY (YRCAA)

Rescinding YRCAA resolution 2013-06, adopting the Air Quality Management Policy for Dairy Operations:

WHEREAS, the Board of Directors of the YRCAA, as set forth in chapter 70.94 of the Revised Code of Washington, is vested with the authority to adopt, amend and repeal its own rules, operating policies and procedures implementing the Revised Code of Washington and Washington Administrative Codes applicable to air pollution; and

WHEREAS, the Board of Directors for the YRCAA approved resolution 2013-06, adopting the Air Quality Management Policy for Dairy Operations on June 13, 2013; and

WHEREAS, the YRCAA Governing Board of Directors believes it to be in the best interest of the public to rescind YRCAA resolution 2013-06;

WHEREAS, the YRCAA Governing Board of Directors also believes it to be in the best interest of the public to develop and maintain a current and accurate record of air contaminant sources within Yakima County;

NOW THERFORE BE IT RESOLVED that the YRCAA Governing Board of Directors hereby rescinds resolution 2013-06: and

BE IT FURTHER RESOLVED that the YRCAA Governing Board of Directors hereby directs the agency to maintain the registration of all Dairy Operators within YRCAA jurisdiction: and

BE IT FURTHER RESOLVED that the YRCAA Governing Board of Directors hereby directs the agency to publish the Resource Guide and Best Management Practices for Dairy Operations as a free resource for all dairy operators:

On motion of _____, seconded by _____, the foregoing resolution is hereby PASSED AND ADOPTED by the Yakima Regional Clean Air Agency Board of Directors on this 13th day of September, 2018.

_____	_____
Jon DeVaney, Chair	Ron Anderson, Director
_____	_____
Steven Jones, Director	Carmen Mendez, Director
_____	_____
Norm Childress, Director	Mary Wurtz, Clerk of the Board

RESOURCE GUIDE

and

BEST MANAGEMENT PRACTICES

for

DAIRY OPERATIONS

August 2018

YAKIMA REGIONAL CLEAN AIR AGENCY

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INTRODUCTION

The Yakima Regional Clean Air Agency (YRCAA) began working with local beef cattle feedlots in 1993 to minimize fugitive dust emissions from confined cattle feeding operations. This partnership resulted in the agency publishing the Fugitive Dust Control Guidelines and Best Management Practices for Confined Cattle Feeding Operations policy. In 2001 YRCAA again partnered with heifer replacement feeding operators to publish the Fugitive Dust Control Guidelines and Best Management Practices for Confined Heifer Replacement Feeding Operations policy. In 2010 the agency's Board of Directors instructed staff to develop recommendations for addressing fugitive emissions from dairy operations. On February 10, 2011 the YRCAA Board of Directors approved the Air Quality Management and Best Management Practices for Dairy Operations policy as a pilot research project aimed at gathering information, testing the feasibility of implementing the policy, and measuring the effectiveness of the policy. The YRCAA worked with eight producers at fifteen dairy facilities throughout the county who voluntarily participated in the pilot project. The pilot project work was completed in December 2011. In March of 2012 the Board of Directors approved the policy for a one-year trial implementation period to provide opportunity for more dairies to comply with the policy. The trial implementation work was completed in December 2012. From 2012 through 2018 the agency used the policy to conduct inspections of approximately 41 dairies operating 59 milking facilities throughout the county.

The data collected over the initial six year period of the policy forms the basis for this resource guide. This guide can be used by dairy operators to prevent or reduce fugitive emissions of Ammonia (NH3), Nitrous Oxide (N2O), Hydrogen Sulfide (H2S), Volatile Organic Compounds (VOC), Odor, Particulate Matter (PM), Methane (CH4) and Oxides of Nitrogen (NOx) from the nine dairy operational systems of: Nutrition, Feed Management, Milk Parlor, Housing - Freestall Barns, Housing - Drylot Pens, Grazing Management, Manure Management, Land application of Manure, and "other" systems;

PURPOSE

This Resource Guide is intended to:

- Provide a broad, though not all inclusive, set of demonstrated Best Management Practices (BMPs) that can be applied to reduce/prevent fugitive air emissions from dairy operational systems.
- Provide technical tools and information to aid in the reduction and prevention of air emissions from dairy operations.
- Provide dairy operators options for choosing the best BMPs for their specific operational conditions.
- Enable dairy operators to target/prioritize air emission reductions based on the eight listed air pollutants.
- Be used as a tool to help in reducing/preventing air emissions from the various systems within any dairy operation.
- This guide may be used by any dairy operation, whether located in the state of Washington or in other states.

SECTION A – POLLUTANT-SPECIFIC BEST MANAGEMENT PRACTICES

The purpose of this section is to present a list of best management practices (BMPs) for reducing emissions from specific air pollutants or pollutant groups. BMPs as they apply to specific dairy operation systems are presented below.

General Principles

- The principle mechanism by which most BMPs operate is to foster conditions which prevent emissions of pollutants addressed by the use of the BMPs; and
- Nothing in this reference guide should be construed to limit the ability of an Operation to be innovative or to use effective management practices that differ from those offered in this guide.

The following is a list of various BMPs for consideration in reducing emissions from each pollutant or pollutant group. The BMPs have not been prioritized for practicality, economic feasibility, ease of use, or efficacy. These are important factors to consider in the successful selection and implementation of BMPs.

I. Ammonia (NH_3)

NH_3 is formed when urea in the urine and the urease enzyme found in feces and manure laden soils are combined together. The reaction is very quick and the peak to volatilization is just several hours. Volatilization of NH_3 depends primarily on four factors: the protein (N) content in the feed, manure management strategies, the pH of the manure or soil, and the meteorology in general (i.e., temperature and wind speed, etc.). The lifetime of gaseous NH_3 is about 24 hours, after which time the NH_3 typically deposits near its source. This deposition can lead to eutrophication of surface water, airborne fertilization, and changes in ecosystems.

It is the objective of an NH_3 BMP to reduce NH_3 emissions and thus, its negative effects. Tradeoffs in NH_3 reductions must be carefully considered. Tradeoffs are actions which reduce emissions of one pollutant, but cause an increase in another pollutant emission. Tradeoffs could result due to things such as changes in pH or a shift to aerobic conditions. Therefore, the most effective method of reducing NH_3 is to target the source itself. In this case, the source is nitrogen (N) input into the dairy systems. BMPs which reduce NH_3 follow.

1. Reduce the amount of dietary protein (N) in the ration to match, rather than exceed, the animal's needs.
2. Practice phase-feeding.
3. Ensure proper ventilation of freestall barns.
4. Bedding selection and management.
5. Treat recycled lagoon water used for flushing.
6. Remove and spread (harrow) manure frequently.
7. Modify alleyway floors.

8. Provide shade for cattle.
9. Locate feed and water opposite in pens.
11. Use straw bedding in drylot pens.
12. Incorporate wood chips in surface layer.
13. Urease inhibitors.
14. Surface moisture content.
15. Stock appropriate number of animals.
16. Use rotational grazing.
17. Move water and feeding areas frequently.
18. Irrigate pastures immediately after grazing.
19. Manure solids separation.
20. Lagoon or storage covers.
21. Surface aeration of lagoons.
22. Reduce the pH of lagoons and manure piles.
23. Apply N fertilizer below no-till residue.
24. Inject or incorporate fertilizer into soil within 24 hours of application.
25. Apply nutrients according to agronomic recommendations based on soil test results.
26. Do not over-irrigate.
27. Utilize cover crops.
28. Apply during cool weather and on still rather than windy days.

II. Nitrous Oxide (N_2O)

Emissions of N_2O result from two different biological processes. There is a very small amount of N_2O produced during nitrification (the biological aerobic process of converting ammonium to nitrate) though this source is relatively insignificant. The primary pathway of N_2O formation is the anaerobic process of denitrification (the conversion of nitrate to N_2 or nitrogen gas), in which N_2O is an obligatory intermediate product. Therefore, many of the emission reduction strategies are associated with minimizing these anaerobic conditions. BMPs which reduce N_2O follow.

1. Reduce the amount of dietary protein (N) in the ration to match, rather than exceed, an animal's needs.

2. Urease inhibitors.

3. Surface moisture content.

4. Stock appropriate number of animals.

5. Use rotational grazing.

6. Move water and feeding areas frequently.

7. Apply nutrients according to agronomic recommendations based on soil test results.

8. Do not over-irrigate.

9. Utilize cover crops.

III. Hydrogen Sulfide (H_2S)

H_2S is produced in anaerobic environments from the microbial reduction of sulfate or the decomposition of sulfur-containing organic matter in manure. Most atmospheric H_2S is oxidized to sulfur dioxide (SO_2), which is then either dry deposited or oxidized to aerosol sulfate and removed primarily by wet deposition. The residence time of H_2S and its reaction products is of the order of days. BMPs which reduce H_2S follow.

1. Properly manage and minimize overfeeding sulfur in the diet.

2. Bedding selection and management.

3. Surface moisture content management.

4. Manure solids separation.

5. Lagoon or storage covers.

6. Scrub exhaust of enclosed waste containers.

7. Surface aeration of lagoons.

8. Encourage purple sulfur bacterial formation in anaerobic lagoons.

9. Properly manage composted solid manure.

10. Properly manage stockpiled manure.

IV. Volatile Organic Compounds (VOC)

VOCs vaporize easily at room temperature and include fatty acids, nitrogen heterocycles, sulfides, amines, alcohols, aliphatic aldehydes, ethers, *p*-cresol, mercaptans, hydrocarbons, and halocarbons. The major constituents of dairy VOC emissions that have been identified include organic sulfides, disulfides, C_4 to C_7 aldehydes, trimethylamine, C_4 amines, quinoline, dimethylpyrazine, and C_3 to C_6 organic acids, along with lesser amounts of aromatic compounds and C_4 to C_7 alcohols, ketones, and aliphatic hydrocarbons. Fresh manure and fermentation of feedstuffs have been identified as the primary sources of VOC emissions. BMPs which reduce VOC emissions follow.

1. Properly manage ensiled feedstuffs.
2. Store feed in a weatherproof storage structure.
3. Remove spilled and unused feed from feeding area on a regular basis.
4. Remove manure from barns frequently.
5. Modify alleyway floors.
6. Surface moisture content management.
7. Knock down and remove fence line manure.
8. Manure solids separation.
9. Lagoon or storage covers.
10. Surface aeration of lagoons.

V. Odor

Odor from dairies is not caused by a single species but is rather the result of a large number of contributing compounds including NH_3, VOCs, and H_2S. Hundreds of compounds contribute to odor from a dairy. A further complication is that odor involves a subjective human response. Although research is under way to relate olfactory response to individual odorous gases, odor measurement using human panels appears to be the method of choice now and for some time to come. Since odor can be caused by hundreds of compounds and is subjective in human response, estimates of odor inventories are not currently possible. BMPs which reduce odor emissions follow.

1. Properly manage and minimize overfeeding sulfur in the diet.
2. Properly manage ensiled feedstuffs.
3. Store feed in a weatherproof storage structure.
4. Remove spilled and unused feed from feeding area on a regular basis.
5. Ensure proper ventilation of freestall barns.

6. Bedding selection and management.

7. Treat recycled lagoon water used for flushing.

8. Remove manure from barns and pens frequently.

9. Modify alleyway floors.

10. Use straw bedding in drylot pens.

11. Incorporate wood chips in surface layer.

12. Surface moisture content management.

VI. Particulate Matter (PM)

This guide considers particulate matter as $PM_{>10,}$ PM_{10} and $PM_{2.5}$. $PM_{>10}$ is commonly defined as airborne particles with aerodynamic equivalent diameters (AEDs) more than 10 μm. PM_{10} is commonly defined as airborne particles with AEDs less than 10 μm. Similarly, $PM_{2.5}$ refers to particles with AEDs less than 2.5 μm. Dairies can contribute directly to primary PM through several mechanisms, including: animal activity; animal housing fans; air entrainment from soil and manure; and indirectly to secondary PM by emissions of NH_3, NO, and H_2S, which are converted to aerosols through reactions in the atmosphere. Particles produced by gas-to-particle conversion generally are small and fall into the $PM_{2.5}$ size range. Key variables affecting the emissions of PM_{10} include the amount of mechanical and animal activity on the soil-manure surface, the moisture content of the surface, and the fraction of the surface material in the 0-10 μm size range.

The diameter of PM is critical to its health and radiative effects. $PM_{2.5}$ can reach and be deposited in the smallest airways (alveoli) in the lungs, whereas larger particles tend to be deposited in the upper airways of the respiratory tract. Smaller particles are also most effective in attenuating visible radiation, causing regional haze. BMPs which reduce PM emissions are listed below.

1. Store feed in a weatherproof storage structure.

2. Remove spilled and unused feed from feeding area on a regular basis.

3. Do not mix feeds during windy times.

4. Ensure proper ventilation of freestall barns.

5. Provide shade for cattle.
6. Locate feed and water opposite in pens.

7. Remove and spread (harrow) manure frequently.

8. Use straw bedding in drylot pens.

9. Incorporate wood chips in surface layer.

10. Surface moisture content management.

11. Properly manage composted solid manure.

12. Properly manage stockpiled manure.

13. Apply N fertilizer below no-till residue.

14. Utilize cover crops.

15. Apply during cool weather and on still rather than windy days.

16. Installation of windbreaks or shelterbelts.

VII. Oxides of Nitrogen (NO_X)

Nitrification in aerobic soils appears to be the dominant agricultural pathway to Nitric Oxide (NO). Direct emissions of NO from dairy manure are believed to be relatively minor, but a fraction of manure nitrogen applied to soils as fertilizer can be emitted as NO.

The fraction of fertilizer nitrogen released as NO depends on the amount and form of nitrogen (reduced or oxidized) applied to soils, the vegetative cover, temperature, soil moisture, and agricultural practices such as tillage. A small fraction of other reduced nitrogen compounds in animal manure can also be converted to NO by microbial action in soils.

NO and nitrogen dioxide (NO_2) are rapidly interconverted in the atmosphere and the sum of all oxidized nitrogen species (except N_2O) in the atmosphere is often referred to as NO_X. The residence time of NO_X is of the order of days in the lower atmosphere, with the principal removal mechanism involving wet and dry deposition. In terms of environmental effects, NO_X is an important (and often limiting) precursor in tropospheric ozone (O_3) production. Furthermore, NO_3^- aerosol is a contributor to PM2.5, and nitrogen deposition in the forms of HNO_3, and aerosol NO_3^- can have ecological consequences.

NO_X is also emitted as a result of combustion processes (especially at higher temperature combustion), primarily as NO and NO_2. Since nitrification in soils is important to soil health and crop production, no BMPs are presented to reduce NO_X emissions caused by nitrification in soils. Following are BMPs which reduce combustion-caused emissions of NO_X.

1. Replace or retrofit older internal combustion engines.

2. Utilize alternatives to outdoor burning.

VIII. Methane (CH_4)

CH_4 is produced by microbial degradation of organic matter under anaerobic conditions. The primary source of CH_4 from livestock production is enteric fermentation in ruminant animals. Ruminants (sheep, goats, camels, cattle, and buffalo) have unique, four-chambered stomachs. In one chamber, called the rumen, bacteria break down grasses and other feedstuff and generate CH_4 as one of several byproducts. The production rate of CH_4 is affected by energy intake, which is in turn affected by several factors such as quantity and quality of feed, animal body weight, and age.

CH_4 is also emitted during anaerobic microbial decomposition of manure. The most important factor affecting the amount produced is how the manure is managed, because some types of storage and treatment systems promote an oxygen-depleted (anaerobic) environment. Metabolic processes of methanogens lead to CH_4 production at all stages of manure handling. Liquid systems tend to encourage anaerobic conditions and produce significant quantities of CH_4, while more aerobic solid waste management approaches may produce little or none. Higher temperatures and moist conditions also promote CH_4 production.

Methane is destroyed in the atmosphere by reaction with the hydroxyl (•OH) radical. Because of its long residence time (~8.4 years), CH_4 becomes distributed globally. Methane is a greenhouse gas and, under certain conditions, contributes to global warming with a potential 23 times that of CO_2. Following are BMPs which reduce emissions of CH_4.

1. Increase the level of starch in the diet.
2. Surface moisture content management.
3. Manure solids separation.
4. Lagoon or storage covers.
5. Scrub exhaust of enclosed waste containers.
6. Installation of an anaerobic digester.
7. Reduce the pH of lagoons and manure piles.
8. Properly manage composted solid manure.

SECTION B – SYSTEM-SPECIFIC BEST MANAGEMENT PRACTICES

The purpose of this Appendix is to present a list of BMPs as they apply to reducing emissions from specific dairy systems.

I. Nutrition

1. Reduce the amount of dietary protein (N) in the ration to match, rather than exceed, the animal's needs.
2. Increase the level of starch in the diet.
3. Properly manage and minimize overfeeding of sulfur in the diet.
4. Practice phase-feeding.

II. Feed Management

1. Properly manage ensiled feedstuffs.
2. Store feed in a weatherproof storage structure.
3. Remove spilled and unused feed from feeding area on a regular basis.
4. Do not mix feed during windy times.

III. Milk Parlor

1. Ensure proper ventilation.
2. Use recycled parlor (clean) water used for flushing/cleaning holding areas.
3. Treat recycled water used for flushing/cleaning holding areas.
4. Remove manure from holding areas frequently.

IV. Housing – Freestall Barns

1. Ensure proper ventilation of freestall barns.
2. Bedding selection and management.
3. Treat recycled lagoon water used for flushing.
4. Remove manure from barns frequently.
5. Modify alleyway floors to separate urine and feces.

V. Housing – Drylot Pens

1. Provide shade for cattle.
2. Locate feed and water opposite in pens.
3. Remove and spread (harrow) manure frequently.
4. Use straw bedding in drylot pens.
5. Incorporate wood chips in surface layer.
6. Urease inhibitors.
7. Surface moisture content management.
8. Knock down and remove fence line manure.

VI. Grazing Management

1. Stock appropriate number of animals.
2. Use rotational grazing.
3. Move water and feeding areas frequently.
4. Irrigate immediately after grazing.

VII. Manure Management

1. Manage solids separation.
2. Lagoon or storage covers.
3. Scrub exhaust of enclosed waste containers.
4. Installation of an anaerobic digester.
5. Surface aeration of lagoons.
6. Reduce the pH of lagoons and manure piles.
7. Encourage purple sulfur bacterial formation in anaerobic lagoons.
8. Properly manage composted solid manure.
9. Properly manage stockpiled manure.

VIII. Land Application – Manure and/or Chemical Fertilizer

1. Apply N fertilizer below no-till residue.
2. Inject or incorporate fertilizer into soil within 24 hours of application.
3. Apply nutrients according to agronomic recommendations based on soil test results.
4. Do not over-irrigate.
5. Utilize cover crops.
6. Apply during cool weather and on still rather than windy days.
7. Installation of windbreaks or shelterbelts.

SECTION C - DESCRIPTIONS OF BEST MANAGEMENT PRACTICES (BMPs) FOR AIR EMISSION REDUCTION ON DAIRY OPERATIONS

Produced in collaboration with N. M. Embertson[1] and P. M. Ndegwa[2]

[1]Whatcom Conservation District, Lynden, WA 98264
[2]Washington State University, Pullman, WA 99164

The purpose of this document is to present brief descriptions of available best management practices (BMPs) for controlling air emissions from dairy operations. The descriptions are presented in a system-specific manner which includes Nutrition, Feed Management, Housing (Freestall Barns), Housing (Drylot Pens), Grazing, Manure Management, and Land Application (Fertilizer and Manure). Not all components or BMPs presented here may apply to your farm. Pollutants impacted by each BMP are presented in parenthesis. These descriptions are not intended to provide detailed information as to how the BMPs should be implemented. It is expected that exact implementation will vary from farm to farm. When applicable, tradeoffs, limitations, or both are listed for each BMP.

***Definitions**: NH_3 – ammonia; N_2O – nitrous oxide; H_2S – hydrogen sulfide; CH_4 – methane; VOC – volatile organic compounds; PM – particulate matter.*

I. Nutrition

1. Properly Manage Level of Dietary Protein (%CP) in Diet to Match, Rather Than Exceed, an Animal's Needs (NH_3, N_2O, Odor)

The most effective and practical way of reducing NH_3 emissions is through proper feeding of dietary nitrogen (N). In the diet, the primary source of N is protein. Excess dietary nitrogen is excreted in the urine as urea, which reacts with the fecal enzyme urease and volatilizes as NH_3. In general, available research data has demonstrated that properly managed feeding of dietary protein N will result in an NH_3 reduction. Studies show that the maximum nitrogen retention efficiency in cows is approximately 50% (1), with the typical efficiency at 38%, so small changes can have a big effect. For example, reducing the protein in the diet from 19 to 14% has shown to reduce urinary urea excretion and subsequent NH_3 emission by 33% (2), with no reduction in milk production. The recommended level of CP in the diet is approximately 16%, with considerations made for MUN and herd efficiency factors.

Added advantages of ensuring proper levels of protein in the diet, in addition to reducing NH_3 emissions, include:1) reduced operating costs considering protein is the most expensive component of the feeds, 2) healthier animals, and 3) improved nitrogen to phosphorus (N:P) ratio for crops when manure is applied to crop land.

2. Increase the Level or Quality of Starch in the Diet (CH_4)

Increasing the level of starch or rapidly fermentable carbohydrates in the diet impacts the rumen pH and microbial population, both of which regulate methane production (3, 4). Since methane emission is the byproduct of incomplete digestion, higher quality diets will allow animals to better digest their feed, be more efficient, and decrease methane production potential. The recommended level of starch in the diet is approximately 23-26%.

3. Properly Manage and Minimize Overfeeding Sulfur in the Diet (H_2S, Odor)

A reduction in sulfur intake to maintenance levels will decrease excretion of sulfur compounds and thus, the emission of odorous gases such as hydrogen sulfide (H_2S). The recommended level of sulfur in the diet is 0.2-0.4% depending on stage of growth or lactation.

4. Practice Group and/or Stage of Lactation Feeding (NH_3)

Group feeding is the separation of cattle into groups (i.e., high milk cows, low milk cows, dry cows, heifers, and calves) based on the dietary needs of each group. The goal is to feed only the necessary nutrient levels, such as protein, for growth and/or milk production to each group. Phase-feeding is very effective in reducing NH_3 emissions because it matches the protein needs of each group more precisely without over or under feeding a nutrient to the whole herd. Phase feeding is synonymous with precision feeding and is both environmentally responsive and economical.

II. Feed Management

1. Properly Manage Ensiled Feedstuffs (VOC, Odor)

Due to the release of low molecular weight organic compounds during fermentation, silage has been found to be a significant source of volatile organic compounds (VOCs), which are responsible for odor in livestock operations. Properly covering, confining, and reducing the release of VOCs from silage storage can result in significant reduction of VOCs and odor emissions. Covered silage piles need to be properly managed during access to minimize VOCs emissions. The primary method of achieving this is to minimize the surface area of the face and the duration of face exposure where and when feed is accessed, respectively. The access face should be covered immediately after the required amount of silage has been obtained.

2. Store Feed in a Sheltered Storage Structure (VOC, Odor, PM)

Since moisture is primary to fermentation and fermentation primary to VOC and odor emission, it is important to minimize the potential for feed becoming wet via rainwater. Weatherproof storage will prevent feed from becoming wet and diminish potential for spoilage and fermentation. Store feed in a covered bunker with proper drainage, or cover exposed feed piles during the wet season. A feed bunker covered on three sides will also reduce PM emission by limiting wind exposure to and erosion of the pile.

3. Regularly Remove Spilled and Unused Feed from Feeding Area (VOC, Odor, and PM)

Spilled and unused feed is a source of VOC, odor, and PM emissions. Removal of such feed from the storage and loading areas at least every two weeks, or more frequently during wet periods, will significantly diminish the potential for VOCs, odor, and PM emissions.

4. Manage or Minimize the Mixing of Feed During Windy Times (PM)

Mixing, grinding, and chopping of feed during windy times can be a significant source of PM emissions, as well as a waste of feed. Avoiding such activities, or performing them in a sheltered area during wind events, will diminish the potential for PM emission and subsequent transport from the feed processing area.

III. Milk Parlor

1. Ensure Proper Ventilation (NH_3, Odor, and PM)

Temperature is a very important factor in the rate of NH_3 volatilization. As the ambient temperature increases, NH_3 emission increases. Studies show that an increase in ambient housing temperature from 50 to 75º F results in a 46% increase in NH_3 emissions (5). Thus, reducing the temperature inside of enclosed parlor and holding areas with proper ventilation and/or cooling reduces the NH_3 volatilization potential and reduces animal health effects, which can lower milk

production. Odor and PM emissions are likewise reduced by this BMP by circulating air and removing stagnant odor and airborne PM from the enclosed areas.

2. Use Recycled Parlor (Clean) Water Used for Flushing/Cleaning Parlor (NH_3, Odor)

Using clean water, recycled parlor water, or most dilute water from a multi-stage lagoon system will decrease the reintroduction of odorant materials and reduce emissions. Recycling concentrated liquid manure through the holding area may increase both NH_3 and odor emissions and should be avoided.

3. Treat Recycled Water Used for Flushing/Cleaning Holding Area (NH_3, Odor)

For holding pens and parlors that practice flushing as a means of manure removal, treatment in the form of additives that discourage NH_3 hydrolysis (i.e., pH reducers, urease inhibitors, or biological additives) can help reduce ammonia and odor emissions.

4. Remove Manure from Holding Area Frequently (NH_3, VOC, Odor)

Ammonia volatilization is a function of the mixing time of manure on the stall floor right after it is deposited. The production of NH_3 begins immediately and peaks only a few hours after mixing. Odor and VOC production also occurs immediately after manure deposition and continues until removal. Thus, an effective way of reducing emissions from parlors and holding areas is by removing manure at frequent intervals.

Typically, manure removal from parlors and holding areas is performed with a flush system. Studies have shown that a flush system is more effective at reducing NH_3 volatilization over a scrape system, and that more frequent manure removal, every 2-4 hours, reduces odor and NH_3 (6). Whether using a flush or scrape system, the most effective system is one that removes all manure from the alleyway without leaving piles on the edges or reducing it to a film on the surface. These inefficiencies can lead to an increase in NH_3 volatilization via increased mixing and surface exposure. This BMP is also effective in reducing, VOC, and odor emissions.

IV. Housing – Freestall Barns

1. Ensure Proper Ventilation of Freestall Barns (NH_3, Odor, and PM)

Temperature is a very important factor in the rate of NH_3 volatilization. As the ambient temperature increases, NH_3 emission increases. Studies show that an increase in ambient housing temperature from 50 to 75º F results in a 46% increase in NH_3 emissions (5). Thus, reducing the temperature inside of freestall barns with proper ventilation and/or cooling of the barns reduces the NH_3 volatilization potential and reduces animal heat stress, which can lower milk production. Odor and PM emissions are likewise reduced by this BMP by circulating air and removing stagnant odor and airborne PM from the barn.

2. Bedding Selection and Management (NH_3, H_2S, Odor)

The use of non-absorbent bedding materials may help reduce NH_3 and odor emissions when managed well. The most common bedding materials used in dairy barns include: sand, wood shavings, chopped straw, and recycled manure. Among these listed materials, studies have shown, for example, that sand-bedding results in the lowest NH_3 emissions when managed correctly (scraped daily, restocked weekly, and completely cleaned out annually). Sand is non-absorbent and allows urine to infiltrate through it, which reduces urine's contact time with ambient air. In contrast, composted manure-bedding does not allow urine to percolate through and, therefore, results in higher ammonia emissions than sand-bedding.

In general, however, proper management of *any* type of bedding including: frequent restocking, daily removal of solid manures, and annual bed change, will significantly reduce the potential of NH_3 volatilization from all bedding types. Hydrogen sulfide, which can form under anaerobic bedding conditions, and odor emissions are similarly reduced by this BMP. Most of all, keeping cows from defecating on the bedding material through proper sizing of freestalls has a significant reduction in emission potential by eliminating manure deposition on the beds in the first place.

3. Treat Recycled Lagoon Water Used for Flushing (NH_3, Odor)

For barns that practice flushing as a means of manure removal from alleyways, treatment in the form of solids removal or use of additives that discourage NH_3 hydrolysis (i.e., pH reducers, urease inhibitors, or biological additives) can help reduce ammonia and odor emissions. Using the cleanest or most dilute water from a multi-stage lagoon system will decrease the reintroduction of odorant materials and reduce emissions as well. Recycling concentrated liquid manure through the barn may increase both NH_3 and odor emissions and should be avoided.
Tradeoffs/Limitations: Infrastructure and additive cost.

4. Remove Manure from Barns Frequently (NH_3, VOC, Odor)

Ammonia volatilization is a function of the mixing time of manure on the stall floor right after it is deposited. In addition, the thin-spread manure provides more surface area, which exacerbates the respective emissions. The production of NH_3 begins immediately and peaks only a few hours after mixing. Odor and VOC production also occurs immediately after manure deposition and continues until removal. Thus, an effective way of reducing emissions from barns is by removing the manure at frequent intervals (every 2 to 4 hours (6)).

5. Manure Removal Technology and Efficiency (NH_3, VOC, Odor)

Typically, manure removal is performed with a scrape or vacuum system at milking times when cattle are out of the barn, but can occur more frequently with the use of a flush system or automatic scrapers. Studies have shown that a flush system is more effective at reducing NH_3 volatilization over a scrape system, and that more frequent manure removal, every 2 to 4 hours, reduces odor and NH_3 (6). However, the most effective system is one that removes all manure from the alleyway without leaving piles on the edges or reducing it to a thin film on the surface. These inefficiencies can actually lead to an increase in NH_3 volatilization via increased mixing and surface exposure. This BMP is also effective in reducing, VOC, and odor emissions.

6. Alleyway Floor Texture and Type (NH_3, VOC, Odor)

In freestalls, most manure is excreted in alleyways where the mixing rate is highest. Minor changes or modifications to the floor surface that reduce the contact time of urine and feces could make a significant difference in NH_3 emission. Modification to a 3% sloped floor, over a level (0%) one, encourages transport of urine away from solid manure and could reduce NH_3 emission by 21% (7, 8). A double slope with a gutter in the middle to trap the urine could reduce emission by 50% compared to solid floors (7). Grooved concrete floors that allow urine to collect in channels will help in reduction of NH_3, since the main objective is to separate the urine from the feces and reduce contact time. Besides reducing emission potential, surface texture or permeable matting will aid in traction and increased hoof health. This BMP is also effective in reducing, VOC and odor emissions.
Tradeoffs/Limitations: Modification with this BMP may not be possible for existing barns. New construction should consider these guidelines.

V. Housing – Drylot Pens

1. *Provide Shade for Cattle (NH_3, PM)*

Ammonia volatilization is dependent on the mixing of urea and the urease enzyme from urine and feces, respectively. By spreading out the distribution of urine and feces over the pen surface, the mixing potential is reduced. The installation of a shade structure in the center of the pen will aid in distribution of defecation events as the animals follow the shade during the day, dispersing manure and reducing the opportunity for mixing. This also helps to control course PM by more uniform surface wetting and compaction, and aids in reduction of animal heat stress.

2. *Sitting of Water Trough Within Pen (NH_3, PM)*

Placing the water-trough and feed bunk at opposite sides of the pen, or rotating the locations (when applicable), helps to spread feces and urine over a larger area of the pen surface, reducing the opportunity for mixing. This also helps to control coarse PM by more uniform surface wetting and compaction. Conversely, locating the water trough near the feed bunk concentrates surface wetting to a collected area (i.e., feed alley) and limits the movement of animals across a potentially dry pen, thus limiting course PM production.
Tradeoffs/Limitations: This BMP may not be possible for all pen designs.

3. *Remove and/or Spread (Harrow) Manure Frequently (NH_3, PM)*

Ammonia emissions from open drylot pens are due to infrequent manure removal. There are two types of in-pen manure management: (i) spreading or harrowing, and (ii) complete manure removal. In general, manure in drylot pens should be completely cleaned out every one to three months. The reduction in the quantity of manure results in less ammonia volatilization and also minimizes PM (dust) production from animal hoof action on the loose manure pack. More frequent (monthly, weekly) removal of manure from areas where manure deposition is highest (i.e., sleeping areas, feed bunks) is desirable. Installation of concrete alleyways adjacent to feed-bunks aids in daily collection of manure and further reduces ammonia volatilization potential. The daily harrowing of pens should be practiced to spread out the manure pack, but should only be done during times of the day when PM production will not be an issue, such as the early morning.

4. *Use Straw Bedding in Drylot Pens (NH_3, PM, Odor)*

The application of a layer of straw bedding to drylot pens is commonly used as a wintertime management tool to reduce pen wetness and provide animals with a dry layer. However, the addition of straw bedding also aids in the separation of urine and feces to reduce ammonia volatilization, and in reduction of particulate (PM) production from the pen surface. This practice can be utilized year-round for increased ammonia, PM, and odor reductions.

5. *Incorporate Wood Chips into Surface Layer (NH_3, PM, Odor)*

Incorporating woodchips (1/2 inch diameter average) into the pen surface layer will manage moisture content and encourage aeration of the manure pack. The increase in aeration reduces ammonia, odor, and PM. Woodchips should be placed approximately four inches thick in areas where animals tend to congregate and/or deposit manure (i.e., sleeping areas, under shades, near feed-bunks). These areas should also be harrowed daily to encourage aeration and reduce compaction of the surface layer, and restocked with woodchips as needed.

Additionally, if manure is harvested from pens for composting, the addition of woodchips to the pen increases the carbon content of the compost and eliminates the extra step of adding and mixing the woodchips later in the process.

5. Urease Inhibitors (NH_3, N_2O)

Reduction of NH_3 from drylot pens can be achieved through enzymatic treatment with urease inhibitors, which inhibit the urease enzyme in feces from reacting with urea and volatilizing as NH_3. Several inhibitors are available such as N-(n0butyl) thiophosphoric triamide (NBPT), which is the most effective in preventing the hydrolysis of urea. Urease inhibitors can either be fed to cattle in feed rations or surface applied to the pen surface. Similar to surface acidifiers, urease inhibitor effectiveness is highly variable and can be very costly to achieve significant reductions. This BMP is also relatively effective in reducing N_2O emissions by limiting nitrification. Tradeoffs/Limitations: Can be very expensive to install and maintain effectiveness of surface treatments.

7. Surface Moisture Content Management (NH_3, N_2O, VOC, Odor, CH_4, H_2S, Odor, PM)

Over-application of water on a dry pen surface activates the hydrolysis and nitrification process, leading to ammonia volatilization and nitrous oxide "bursts", respectively. Water should only be applied to pen surfaces as a dust (PM) mitigation tool and be applied such that it forms a cohesive moist layer on the surface, but does not penetrate too deeply into the surface. The dust (PM) from a dry pen is inversely proportional to the pen surface moisture content. Increasing the pen-surface moisture content binds surface manure and soil particles to limit the production of dust. Too much moisture, however, encourages the production of odorous compounds. A compromise surface moisture level of approximately 28% has been suggested to balance odor and dust (10). Maintaining this moisture level can be accomplished through regular water application, surface bonding additives, use of straw or wood chips to the surface layer, construction of a shade structure, and pen layout and design. This practice requires routine monitoring of surface moisture content.

On the extreme end, standing water should also be avoided. Standing water promotes anaerobic conditions, which are responsible for odor, CH_4, H_2S, and VOC emissions. Standing water can be mitigated by grading pens to a minimum 3% slope to channel water away from the pen and into a collection area. Contained runoff can then be treated or land applied. Daily harrowing of pens, filling of holes, and center piling will reduce pen conditions that encourage surface-ponding.

8. Knockdown and Remove Fence Line Manure (NH_3, VOC, Odor)

Over time, manure builds up along fence lines. This build-up of manure along fence lines provides opportunity for anaerobic decomposition (odor) and fly proliferation. Manure should be knocked down and either spread or removed when build-up is greater than 12 inches deep.

VI. Grazing Management

1. Stock Appropriate Number of Animals (NH_3, N_2O)

Overstocking of cattle increases NH_3 volatilization from pastures by increasing the concentration of manure on the field and reducing the amount of plant cover and N uptake. Stocking animals at appropriate rates and intervals for each field will reduce over application of manure and maintain pastures.

2. Use Rotational Grazing (NH_3, N_2O)

Practicing rotational grazing will help maintain pasture forage growth and health, which will maximize plant uptake of manure and reduce the potential of NH_3 or N_2O emission. Pastures

should be evaluated on a regular basis for plant height and quality, and animals should be removed when plants are less than three inches in height or stem density is less than 85%.

3. Move Water and Feeding Areas Frequently (NH_3, N_2O)

Since the volatilization of NH_3 is dependent on the mixing of urine (urea) and feces (urease), dispersing these events evenly over a pasture surface can help reduce NH_3 volatilization. Animals on pasture tend to concentrate elimination behaviors around the water trough, feeding, and/or sleeping areas. Studies show that the number of elimination events that occur in a location is highly correlated with the time spent at the location (18). Therefore, distribution of manure deposition can be effected via management and layout of the pasture environment. Moving water-troughs and feed-stations periodically to new locations will disperse cattle activity and thus manure deposition. This will also prevent plant suffocation and trampling in heavily populated areas of the pasture.

4. Irrigate Immediately after Grazing (NH_3)

Irrigating pastures following grazing will help incorporate manure into the soil and reduce ammonia volatilization potential. Over irrigation can, however, increase NH_3 volatilization and N_2O emission.

VII. Manure Management

1. Manure Solids Separation (NH_3, VOC, Odor, H_2S, CH_4)

Solid separation is the removal of the solid portion of the manure waste stream from the liquid portion. The liquid portion is transferred to the storage vessel (i.e., lagoon, tank) and the solid portion is stockpiled, composted, or land applied. Solid separation systems include: screens, rotary drums, centrifugal tanks, earthen pits, weeping walls, settling basins, screw-presses, and others. Approximately 25% of the total manure N is removed with the solids (1); the remaining N stays with the liquid portion of the manure. Solid separation reduces potential of NH_3, VOC, Odor, H_2S, CH_4 emissions from post-separation liquid storages.

2. Lagoon or Storage Covers (NH_3, H_2S, VOC, Odor, CH_4)

The emission rate from the surface of a lagoon is influenced by environmental factors such as ambient temperature, relative humidity, surface wind velocity, and precipitation. To control the effects of these factors, addition of a cover to the lagoon is necessary. Lagoon covers range from floating plastics, synthetic or natural peat, straw, polystyrene, and natural dry matter. When properly installed and managed well, any of these covers can reduce NH_3 losses by 80-90% (1), in addition to controlling odor, H_2S, and CH_4 losses. Any cracks in the cover should be taken care of immediately because they will compromise the efficiency of the cover.

The establishment of a natural crust on the lagoon surface, typically formed by the movement and cohesion of solids to the lagoon surface, can reduce ammonia losses by up to 50% (11). The formation of a natural crust will occur when the lagoon has a high solids-content, the ambient air is dry, and there is little precipitation to break the crust. While natural covers can reduce NH_3 and H_2S emissions, they need to be monitored for odor, which can emanate from the crust itself.

In general, covers *must* be checked regularly and maintained to prevent leakage and loss of pollutants from the cover. Secondary treatment methods of captured gas either via bio-filters, flaring, scrubbing, or other method should be maintained and operated effectively to minimize emission of untreated pollutants.
Tradeoffs/Limitations: Cost and maintenance time of covers can be high.

3. Scrub Exhaust of Enclosed Waste Containers (CH_4, Odor, H2S)

Using bio-filters to scrub the exit air from enclosed manure storage facilities can significantly reduce NH_3, H_2S, odor, and CH_4 emissions. Bio-filters vary in style, function, and effectiveness. A technical assistant is necessary to design and implement this BMP effectively.
Tradeoffs/Limitations: This practice requires technical assistance to install and maintain.

4. Proper Operation and Maintenance of Anaerobic Digester (CH_4)

Anaerobic digestion (AD) converts manure into biogas (CH_4 and CO_2), which can subsequently be used for providing energy or heating on the dairy or for sale back into the electric grid. The two common types of digesters found on dairy operations are the plug flow type or the complete mixed digesters. The former is more appropriate for operations with scrape manure systems, while the latter is more suitable for dairies with manure flushing systems. The overarching goal of AD is to reduce methane emission from manure. Other gases produced during AD (H_2S, CO_2) can be scrubbed from the exhaust to provide natural, gas grade CH_4. Although AD reduces CH_4, H_2S, and odor emissions from AD effluent, the digestion process increases the ammonia volatilization potential from the AD effluent. This BMP requires technical assistance and has a high cost associated with installation and operation.
Tradeoffs/Limitations: Increases ammonia volatilization potential from effluent; high cost of installation; and requires technical assistance to install and operate properly.

5. Surface Aeration of Lagoons (NH3, H2S, VOCs)

The biodegradable organic materials in manure can be oxidized to stable end products by aerobic bacteria. These microorganisms require oxygen to affect this process. In general, if enough oxygen is provided, the end products of aeration are odor-free. The main problem is the cost of providing adequate oxygen for this process.

To reduce the cost of aeration, surface aeration is suggested as a method for mitigation of odor and other gases from anaerobic lagoons, which are released from incomplete manure decomposition. Surface aeration can complement anaerobic digestion by acting as a biological-blanket, aerobically degrading odorous compounds from the layer of anaerobic decomposition below. The aerobic bacteria in this blanket consume odorous volatile compounds and releases odor-free gases into the air. For example, this layer oxidizes ammoniacal nitrogen (NH_4^+, NH_3) into nitrate (NO_3^-), and oxidizes sulfur containing compounds such as H_2S into elemental sulfur (S) or sulfates (SO_4^{2-}). This process thus mitigates emissions of NH_3 and H_2S as well other volatile organic odorous compounds that may try to escape from the anaerobic zone below the aerobic blanket.
Tradeoffs/Limitations: High cost associated with running aerators; reduced effectiveness in lagoon with high solids content.

6. Reduce the pH of Lagoons and Manure Piles (NH_3, CH_4)

The pH of stored manure, liquid or solid, greatly affects the rate of H_2S and NH_3 volatilization. If the pH of liquid manure stored in a lagoon or tank is maintained above 8 (basic), ammonia volatilization increases and losses may be up to 70% of the total nitrogen entering the lagoon (1). Additionally, in solid manure, the urease enzyme is very active at a pH between 6.8 and 7.6, amplifying the volatilization process from manure piles. At a pH below 6 (acidic), NH_3 is bound in solution or tied-up and little NH_3 volatilization will occur from liquid or solid manure, respectively. Methane emission is also reduced at a pH below 6.5. On the other hand, low pH in the lagoon may result in elevated H_2S emissions and loss of efficiency of the anaerobic process, which may result in increased odor emissions. Reduction of manure pH in lagoons and manure piles is achieved by addition of acidifying compounds such as alum or acids. However, due to the

natural buffering capacity of manure, large amounts of acidifiers are required to reduce pH and frequent monitoring is necessary.
Tradeoffs/Limitations: Decrease ammonia and methane, but increases hydrogen sulfide and odor production; high cost; and only effective over short-periods.

7. Purple Sulfur Bacterial Formation in Lagoons (H_2S, Odor)

Purple sulfur bacteria (PSB) are photosynthetic, anaerobic bacteria that grow in the presence of carbon dioxide (carbon source), nitrate (nitrogen source), and hydrogen sulfide (13). Purple sulfur bacteria oxidize the hydrogen sulfide in the lagoon for photosynthesis and produce elemental sulfur or sulfate as a photosynthetic by-product (14), both of which are less odorous than hydrogen sulfide. Since PSB are photosynthetic, the use and/or optimization of a solid separator can aid in light penetration and the proliferation of PSB in a lagoon. The conditions conducive to natural PSB formation are an anaerobic lagoon with low solids content and a pH in the 7.0 to 8.5 range (15). Population of PBS in a lagoon is very difficult to induce and typically happens naturally. Therefore, maintenance of an existing population is the most effective H_2S reduction method for lagoons.
Tradeoffs/Limitations: PSB conditions decrease hydrogen sulfide and odor production, but may increase ammonia volatilization; difficulty in inducing PSB formation.

8. Properly Manage the Composting of Solid Manure (H_2S, Odor, PM, CH_4)

The effectiveness of the composting process is highly dependent on good management of pile characteristics including temperature, moisture, carbon to nitrogen ratio (C:N), and aeration. Low temperature, high moisture, and low aeration will lead to anaerobic conditions inside the manure pile and increase odor, H_2S, and CH_4 emissions. A shift from anaerobic to aerobic process can cause a nitrification/denitrification cycle that can increase N_2O losses. Low C:N (below 12:1), high temperature, and high aeration of the compost pile will increase NH_3 volatilization, which can be up to 90% total N loss under these conditions (12). Low moisture will increase PM emissions. A C:N above 12:1, and optimally around 30:1, will have reduced NH_3 emissions, while still supporting an active composting process.

9. Properly Manage Stockpiled Manure (H_2S, Odor, PM)

Stockpiled manure can easily become anaerobic from compaction, too much moisture, or organic matter breakdown if not managed properly. Anaerobic piles will emit odor, H_2S, and CH_4. Stockpiles should be stored in a covered area to avoid over saturation with rainwater, or periodically turned to decrease compaction and achieve even moisture levels throughout the pile.

VIII. Land Application – Manure and/or Chemical Fertilizer

1. Apply N Fertilizer Below No-Till Residue (NH_3, PM)

The practice of no-till crop harvesting is beneficial in reducing soil erosion from wind (PM) and water transport, and increasing or maintaining soil tilth. The stubble left behind creates a surface cover that helps protect against soil loss. When applying fertilizer the following year to new crops, the fertilizer should be applied under the crop residue, not on top. Appling fertilizer on top of the residue increases exposure to ambient conditions and NH_3 volatilization losses.

2. Inject or Incorporate Fertilizer/Manure into Soil within 24 Hours of Application (NH_3, Odor)

All fertilizer or manure should be injected, incorporated, or applied as close to the ground surface as possible to mitigate NH_3 and odor emissions. Nitrogen applied to crop land is susceptible to

volatilization if left on the soil and leaf surfaces, or sprayed from some height above the soil surface. Incorporation of manure immediately after application (within 24 hours) via chisel or irrigation (or precipitation event under 0.15 inches) is suggested for annual crop fields and can reduce ammonia losses by up to 98% (1). Application of manure with an aerator, sleighfoot or other below leaf canopy surface applicator (i.e., drop hose irrigation) is recommended for forage fields to reduce NH_3 and odor. All of these methods work by moving fertilizer and/or manure into the soil profile away from the surface where volatilization and odor emissions occur. In addition to reducing emission losses, this method conserves more nitrogen in the soil, increasing efficiency and reducing fertilizer costs.

Application of manure using a "big gun" or overhead sprinkler has the highest rate of ammonia loss out of all application methods. The sprinkler exposes more manure surface area to the ambient air, allowing a significant portion of the total nitrogen to be volatilized as NH_3 before the liquid manure even reaches the soil surface. Furthermore, sprinkler application also enhances transport and dispersion of emissions especially during windy conditions. Broadcast application, which also exposes manure surface area to the ambient air, also has high NH_3 losses (20 to 30% of total N) if not immediately followed by manure-incorporation.

For certain crops, controlled-release fertilizers or fertigation is an effective way to deliver chemical fertilizer to the plants at specific rates and times. This is an effective way to match crop needs and fertilization delivery to reduce the amount of N available for volatilization. These are more costly methods and require installation of necessary irrigation infrastructure.
Tradeoffs/Limitations: Deep injection of manure decreases NH_3 volatilization, but may increase N_2O emissions via denitrification.

3. Apply Nutrients According to Agronomic Recommendations Based on Soil and Manure Test Results (NH_3, N_2O)

Application of chemical fertilizer and manure nutrients should always be made at agronomic rates to avoid excess application that exacerbates N losses. Agronomic application is the application of nutrients to meet crop needs. Agronomic application rate is determined by knowing the nutrient content of the soil (soil test), the nutrient content of the manure (manure test), and the crop nutrient needs at the time of application (estimated or historical value). By matching crop needs to available nutrients, over application of nitrogen and subsequent NH_3 and N_2O emission can be avoided. A nutrient planner can help determine agronomic rate and plan annual applications to match crop needs.

4. Do Not Over-irrigate (NH_3, N_2O)

Irrigation increases soil water content and may increase N_2O emissions when over applied by promoting anaerobic conditions and increasing denitrification. When combined with nitrogen from fertilizer or manure application, the rates of emissions are increased. Irrigation to very dry soil can also increase N_2O and/or NH_3 emission by microbial action. Irrigate at recommended levels and timing throughout the growing season.

6. Utilize Cover Crops (NH_3, N_2O, PM)

Cover crops reduce the amount of surface exposed and provide root structures to hold soil in place. The use of cover crops, instead of leaving fields bare/fallow, decreases wind erosion (PM) and losses of NH_3 and N_2O by providing surface cover and nutrient uptake, respectively. Cover crops also reduce nitrate leaching during the wet season by taking up soil nitrate.

6. Apply During Cool Weather and on Still Rather than Windy Days (NH_3, Odor, PM)

Temperature, humidity, wind speed, and precipitation all influence the rate of NH_3, PM, and odor losses. Ammonia loss increases exponentially with rising temperatures, and increases with greater wind speeds. PM losses also increase with increasing temperatures which dry out the soil, and increased wind speed that moves soil and manure particles from the surface into the ambient air. Therefore, the application of manure during cool, still weather will decrease the amount of PM and NH_3 volatilized from the manure (16). Appling in the early morning or late evening will not only reduce NH_3 volatilization, but will also reduce the transport of PM and odor to surrounding neighbors. Light precipitation (less than 0.15 inches) following application can also decrease NH_3 volatilization by binding NH_3 in the aqueous phase and moving it into the soil profile.

IX. Other

1. Installation of Windbreaks or Shelterbelts (NH_3, Odor, PM)

Windbreaks or shelterbelts could be either natural (e.g., a line of trees) or artificial (e.g., a solid brick or hay bale wall). Windbreaks mitigate emissions through multiple pathways. One, windbreaks break or slow the wind and thus reduces the transport of emitted gases, particulates, and odor from the dairy. A windbreak, composed of trees or a physical barrier, will partially reduce wind speeds for a distance of roughly 30 times its height (17). Two, windbreaks promote mixing and dispersion of emitted gases and odor, which dilute the respective emissions, with respect to the receiver. Three, windbreaks intercept particulates and odor, which subsequently break down as in the case of odorous compounds, or is deposited on site as in the case of particulates. The effectiveness of a windbreak, therefore, depends on its placement, height, spacing or porosity, and prevailing direction of wind and its fluctuations. Windbreak structures ranging even in modest heights ranging from 20 to 30 feet can provide significant mitigation of odor and particulate problems (19). These structures can be installed on individual systems (barns, lagoons, compost or manure piles, etc) in the dairy or on the entire dairy.

Other indirect benefits that accrue from installation of windbreaks, especially of the natural kind include: (i) alleviation of complaints which are sometimes influenced by visual images of the dairy, and (ii) enhanced landscape aesthetics of the dairy.

2. Vehicle Road Condition Management (PM)

Vehicle traffic on on-farm dirt roads can be a significant source of course particulate matter. Feed trucks, manure tankers, maintenance vehicles, etc. are constantly moving around the facility. Watering roads or applying a surface binder can significantly reduce the incidence of PM production from on-farm vehicle traffic. This should be conducted during dry times of the year and during high traffic times.

3. Engine Selection and Efficiency (NOx)

Engines used on-site for power generation should be energy efficient and properly maintained to minimize the production of NOx from combustion processes.

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SECTION D: DAIRY BMPs QUICK REFERENCE TABLE

BMP # (NOTE)	Best Management Practice	Ammonia (NH_3)	Nitrous Oxide (N_2O)	Hydrogen Sulfide (H_2S)	Volatile Organic Compounds (VOCs)	Odor	Particulate Matter (PM)	Methane (CH_4)	Oxides of Nitrogen (NO_X)
I. Nutrition									
I.1	Properly manage level of dietary protein (%CP) in diet to match, rather than exceed animal's needs.								
I.2	Increase the level or quality of starch in the diet.								
I.3	Properly manage and minimize overfeeding of sulfur in the diet.								
I.4	Practice group and/or stage of lactation feeding.								
II. Feed Management									
II.1	Properly manage ensiled feedstuffs.								
II.2	Store feed in a sheltered area or storage structure.								
II.3	Regularly re-pile or remove spilled and unused feed from feeding area.								
II.4	Manage or minimize feed mixing during windy times.								
III. Milking Parlor									
III. 1	Ensure proper ventilation.								
III. 2/3	Use recycled (clean) or treated water for flushing parlor.								
III. 2/3	Use recycled (clean) or treated water for cleaning holding pen.								
III. 4	Remove manure from barns frequently.								
IV. Housing - Freestall Barns									
IV. 1	Ensure proper ventilation.								
IV. 2	Bedding selection and management.								
IV. 3	Treat recycled lagoon water used for flushing.								
IV. 4	Remove manure from barns frequently.								
IV. 5	Manure removal technology and efficiency.								
IV. 6	Alleyway floor texture and type.								

SECTION D: DAIRY BMPs QUICK REFERENCE TABLE

BMP # (NOTE)	Best Management Practice	Ammonia (NH_3)	Nitrous Oxide (N_2O)	Hydrogen Sulfide (H_2S)	Volatile Organic Compounds (VOCs)	Odor	Particulate Matter (PM)	Methane (CH_4)	Oxides of Nitrogen (NO_X)
V. Housing - Drylot Pens									
V. 1	Provide shade for cattle.								
V. 2	Sitting of water trough within pen.								
V. 3(a)	Remove manure frequently.								
V. 3(b)	Spread (harrow) manure frequently.								
V. 4	Use straw bedding in pen (seasonal).								
V. 5	Incorporate wood chips in surface layer.								
V. 6	Use urease inhibitors.								
V. 7	Surface moisture content management.								
V. 8	Knock down and remove fence line manure.								
VI. Grazing Management									
VI.1	Stock appropriate number of animals.								
VI.2	Use rotational grazing.								
VI.3	Move water and feeding areas frequently.								
VI.4	Irrigate immediately after grazing.								
VII. Manure Management									
VII. 1	Manure solids - mechanical separation.								
VII. 1	Manure solids - settling basin.								
VII. 2	Lagoon or storage covers (natural or composite).								
VII. 3	Scrub exhaust of enclosed waste containers.								
VII. 4	Proper maintenance of installed methane digester.								
VII. 5	Surface aeration of lagoons.								
VII. 6	Reduce the pH of lagoons and manure piles below 6.								
VII. 7	Purple sulfur bacterial formation in anaerobic lagoons.								
VII. 8	Properly manage the composting of manure.								

SECTION D: DAIRY BMPs QUICK REFERENCE TABLE

BMP # (NOTE)	Best Management Practice	Ammonia (NH_3)	Nitrous Oxide (N_2O)	Hydrogen Sulfide (H_2S)	Volatile Organic Compounds (VOCs)	Odor	Particulate Matter (PM)	Methane (CH_4)	Oxides of Nitrogen (NO_X)
VII. 9	Properly manage stockpiled manure.								
VIII. Land Application - Manure or Chemical Fertilizer									
VIII. 1	Apply N fertilizer below no-till residue.								
VIII. 2(a)	Corn - Inject fertilizer/manure into soil at application.								
VIII. 2(b)	Forage - Manure/fertilizer application method and/or incorporation practice.								
VIII. 3	Apply nutrients according to agronomic recommendations based on soil and manure test results.								
VIII. 4	Do not over-irrigate.								
VIII. 5	Utilize cover crops in winter crop rotation.								
VIII. 6	Apply during cool weather on still rather than windy days.								
IX. Other									
IX. 1	Installation of windbreaks or shelterbelts.								
IX. 2	Vehicle road condition management.								
IX. 3	Engine selection and efficiency.								

Note: The BMP numbers correspond to the BMP numbers in Appendix D

This table provides a graphical depiction of which pollutants can be mitigated by implementing each BMP, within each system. Used in conjunction with Appendix D, it provides a quick reference for selecting BMPs which target specific pollutants, specific systems, or both.

SECTION E - AIR QUALITY BMP SELECTION MATRIX

The matrix presented here provides a tool for selecting best management practices (BMPs) for air quality emission reduction. For detailed descriptions of respective BMPs, refer to the sister-document entitled "Descriptions of Best Management Practices (BMP)". This current document is neither intended to provide detailed information as to how the BMPs should be selected (or implemented), nor is it the only feasible approach on selection (or implementation) of BMPs. It is expected that exact selection or implementation will vary from farm to farm. When applicable, be mindful of tradeoffs, limitations, or both for each BMP.

***Definitions**: NH_3 = ammonia; N_2O = nitrous oxide; H_2S = hydrogen sulfide; CH_4 = methane; VOC = volatile organic compounds; PM = particulate matter.*

The following matrix outlines the process for identifying sources of emissions on your facility and how to choose and implement BMPs to mitigate those emissions. Use this chart and the detailed example that follows it as guides when developing your Air Quality Management Plan.

I. List the sources of emissions on the dairy.

II. For each source, list the expected pollutants in order of importance
(Example: VOCs for silage storage area; PM for dry open feedlots; etc.).

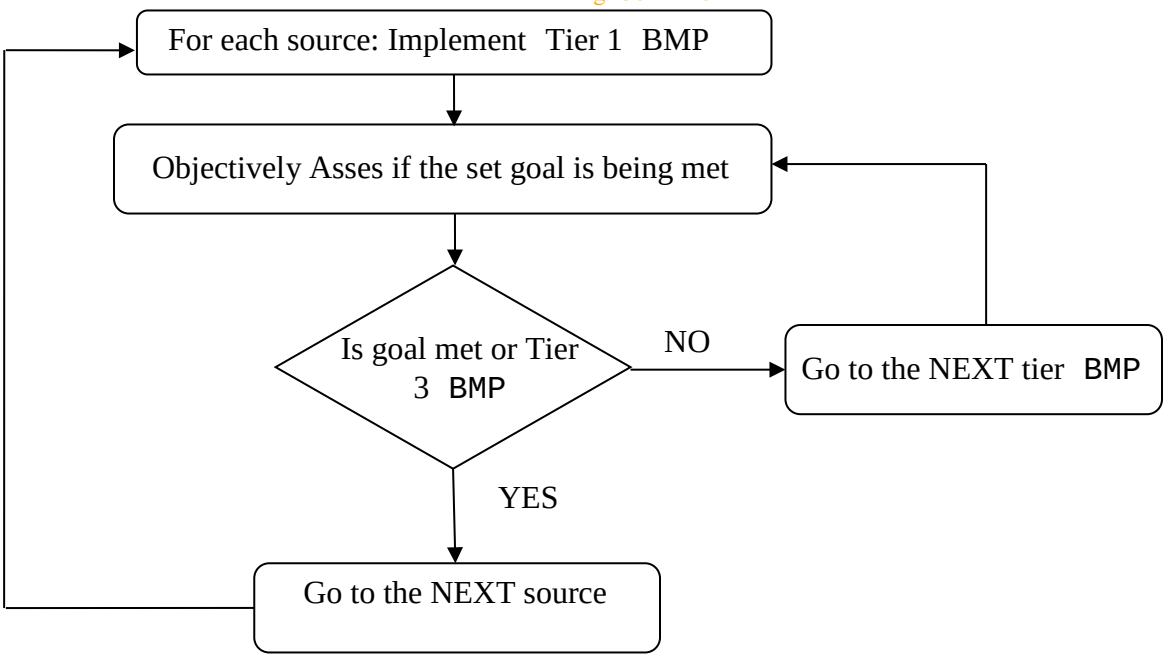
III. List the sources in order of importance with respect to expected or projected emission level
(Example: Open anaerobic lagoons because of their size and open nature, are likely be to more important with respect to air emissions than sand-settling basins; broadcast (big gun) land application is likely to have greater impact on air quality than injection; etc.).

IV. Define the emissions mitigation goal for each of the sources.
The goal for individual sources, for example, could be:

1. To address existing regulations – either local, State, or federal
2. To minimize nuisance lawsuits
3. To champion environmental stewardship
4. To address the most important pollutant in terms of volume or health impact
5. To address other goals

V. Depending on the goal for each source, list three BMPs to address the goal based on a three-tier-system with respect to effectiveness, cost, ease of implementation, compatibility with other BMPs, and in compatibility with your nutrient management plans.

1. Tier 1 being the least expensive and easy to implement
2. Tier 3 being the most advanced and most expensive to implement



List the sources of emission on the dairy. The following sources are the most common areas of air pollutant emission on a dairy operation. Not all areas may apply to your farm. Select the sources that do apply and list the specific factors (i.e., production areas) within that source that can contribute to air pollutant emission (e.g., Manure Storage may have manure holding pit, lagoon, and compost pile as areas within the source that can contribute emissions).

1. Nutrition
2. Feed Management
3. Milk Parlor
4. Housing - Freestall Barns
5. Housing - Drylot Pens
6. Grazing Management
7. Manure Management
8. Land Application
9. Other

For each source, list the expected pollutants in order of importance. For each source, the pollutants of concern have been listed below in general order of importance. Your farm may have a different order. When in doubt, use the order listed below.

1. Nutrition: NH_3, CH_4, H_2S, N_2O.
2. Feed Management: VOC, PM, Odor.
3. Milk Parlor: NH_3, VOC, Odor, H_2S.
4. Housing - Freestall Barns: NH_3, VOC, Odor, CH_4, H_2S.
5. Housing - Drylot Pens: NH_3, PM, Odor, H_2S, CH_4, VOC, N_2O.
6. Grazing Management: NH_3, N_2O.
7. Manure Management – Liquid: NH_3, H_2S, CH_4, Odor, VOC; Solid: NH_3, H_2S, PM, CH_4.
8. Land Application: NH_3, PM, Odor, N_2O.
9. Other

List the sources in order of importance with respect to expected or projected emission level. For each pollutant of concern, the primary sources that emit that pollutant have been listed below in order of importance. Your farm may have a different order; when in doubt, use the order listed below. For each source, identify and list the specific factors that are contributing to that pollutant (these should have been listed in **I.** above).

1. Ammonia (NH_3)
    a. Nutrition
    b. Housing - Freestall Barns
    c. Housing - Drylot Pens
    d. Milk Parlor
    e. Land Application
    f. Manure Management
    g. Grazing Management
    h. Feed Management
2. Methane (CH_4)
    a. Manure Management
    b. Nutrition
3. Hydrogen Sulfide (H_2S)
    a. Manure Management
    b. Housing - Drylot Pens
    c. Nutrition
4. Volatile Organic Compounds (VOC)
    a. Feed Management
    b. Housing - Freestall Barns
    c. Housing - Drylot Pens
    d. Milk Parlor
    e. Manure Management
5. Particulate Matter (PM)
    a. Housing - Drylot Pens
    b. Land Application
    c. Feed Processing
    d. Manure Management
6. Nitrous Oxide (N_2O)
    a. Nutrition
    b. Housing - Drylot Pens
    c. Land Application
    d. Grazing Management
7. Odor
    a. Land Application

b. Manure Management
c. Housing - Drylot Pens
d. Housing - Freestall Barns
e. Milk Parlor
f. Feed Management
g. Nutrition

Define the emissions mitigation goal for each of the sources. Emission mitigation goals are going to be specific to your farm, objectives, and source emissions. List goals for each source.

The goal for individual sources, for example, could be:

- To address existing regulations – either local or federal
- To minimize nuisance lawsuits
- To champion environmental stewardship
- To address the most important pollutant in terms of volume or health impact
- To address other goals

Depending on the goal for each source, list three BMPs to address the goal based on a three-tier-system with respect to effectiveness, cost, ease of implementation, compatibility with other BMPs, and in compatibility with your nutrient management plans. Tier 1 being the least expensive and easiest to implement. Tier 3 being the most advanced and most expensive to implement. Tier 1, 2, and 3 level BMPs have been listed for each source on a dairy farm. This list correlates to the BMPs listed in the "Descriptions of Best Management Practices (BMP)" document. This list is not exhaustive and tier level BMPs may vary for your individual farm. Refer to Table 1 (at the end of this Appendix) for a selection matrix guide for choosing tier level BMPs for each source.

1. Nutrition
    a. *Tier 1* - Properly Manage Level of Dietary Protein (%CP) in Diet to Match, Rather Than Exceed, an Animal's Needs (NH_3, N_2O, Odor); Properly Manage and Minimize Overfeeding Sulfur in the Diet (H_2S, Odor).
    b. *Tier 2* - Practice Group and/or Stage of Lactation Feeding (NH_3).
    c. *Tier 3* - Increase the Level or Quality of Starch in the Diet (CH_4); Utilize feed additives to maximize efficiency (NH_3, H_2S, CH_4).

2. Feed Management
    a. *Tier 1* - Regularly Remove Spilled and Unused Feed from Feeding Area (VOC, Odor, and PM); Manage or Minimize the Mixing of Feed During Windy Times (PM).
    b. *Tier 2* - Properly Cover and Manage Ensiled Feedstuffs (VOC, Odor).
    c. *Tier 3* - Store Feed in a Sheltered Storage Structure (VOC, Odor, PM).

3. Milk Parlor
    a. *Tier 1* - Use Recycled Parlor (Clean) Water Used for Flushing/Cleaning Parlor and Holding Area (NH_3, Odor); Ensure Proper Ventilation (NH_3, Odor, and PM).
    b. *Tier 2* - Remove Manure from Parlor and Holding Area Frequently (NH_3, VOC, Odor).
    c. *Tier 3* - Treat Recycled Water Used for Flushing/Cleaning Holding Area (NH_3, Odor);

4. Housing - Freestall Barns
    a. *Tier 1* - Remove Manure from Barns Frequently (NH_3, VOC, Odor); Ensure Proper Ventilation of Freestall Barns (NH_3, Odor, and PM).
    b. *Tier 2* - Bedding Selection and Management (NH_3, H_2S, Odor); Manure Removal Technology and Efficiency (NH_3, VOC, Odor).
    c. *Tier 3* - Treat Recycled Lagoon Water Used for Flushing (NH_3, Odor); Alleyway Floor Texture and Type (NH_3, VOC, Odor); Manure Removal Technology and Efficiency (NH_3, VOC, Odor).

5. Housing - Drylot Pens
    a. *Tier 1* - Spread (Harrow) Manure Frequently (NH_3, PM); Surface Moisture Content Management (NH_3, N_2O, VOC, Odor, CH_4, H_2S, Odor, PM).
    b. *Tier 2* - Remove Manure Frequently (NH_3, PM); Incorporate Wood Chips in Surface Layer (NH_3, PM, Odor); Use Straw Bedding in Drylot Pens (NH_3, PM, Odor); Knockdown and Remove Fence Line Manure (VOC, Odor).
    c. *Tier 3* - Urease Inhibitors (NH_3, N_2O); Provide Shade for Cattle (NH_3, PM); Siting of Water Trough within Pen (NH_3, PM).

6. Grazing Management
    a. *Tier 1* - Stock Appropriate Number of Animals (NH_3, N_2O); Use Rotational Grazing (NH_3, N_2O).
    b. *Tier 2* - Move Water and Feeding Areas Frequently (NH_3, N_2O).
    c. *Tier 3* - Irrigate Immediately after Grazing (NH_3).

7. Manure Management
    a. *Tier 1* - Manure Solids Separation (NH_3, VOC, Odor, H_2S, CH_4); Properly Manage the Composting of Solid Manure (H_2S, Odor, PM, CH_4); Properly Manage Stockpiled Manure (H_2S, Odor, PM).
    b. *Tier 2* - Lagoon or Storage Covers (NH_3, H_2S, VOC, Odor, CH_4); Scrub Exhaust of Enclosed Waste Containers (CH_4, Odor, H2S).
    c. *Tier 3* - Installation and Proper Operation of an Anaerobic Digester (CH_4); Surface Aeration of Lagoons (NH3, H2S, VOCs); Reduce the pH of Lagoons and Manure Piles (NH_3, CH_4); Encourage Purple Sulfur Bacterial Formation in Anaerobic Lagoons (H_2S, Odor).

8. Land Application – Manure and/or Chemical Fertilizer
    a. *Tier 1* - Apply Nutrients According to Agronomic Recommendations Based on Soil and Manure Test Results (NH_3, N_2O); Inject or Incorporate Fertilizer into Soil within 24 Hours of Application (NH_3, Odor); Do Not Over-irrigate (NH_3, N_2O); Apply During Cool Weather and on Still Rather than Windy Days (NH_3, Odor, PM).
    b. *Tier 2* - Utilize Cover Crops (NH_3, N_2O, PM); Apply N Fertilizer below No-Till Residue (NH_3, PM).
    c. *Tier 3* - Installation of Windbreaks or Shelterbelts (Odor, PM).

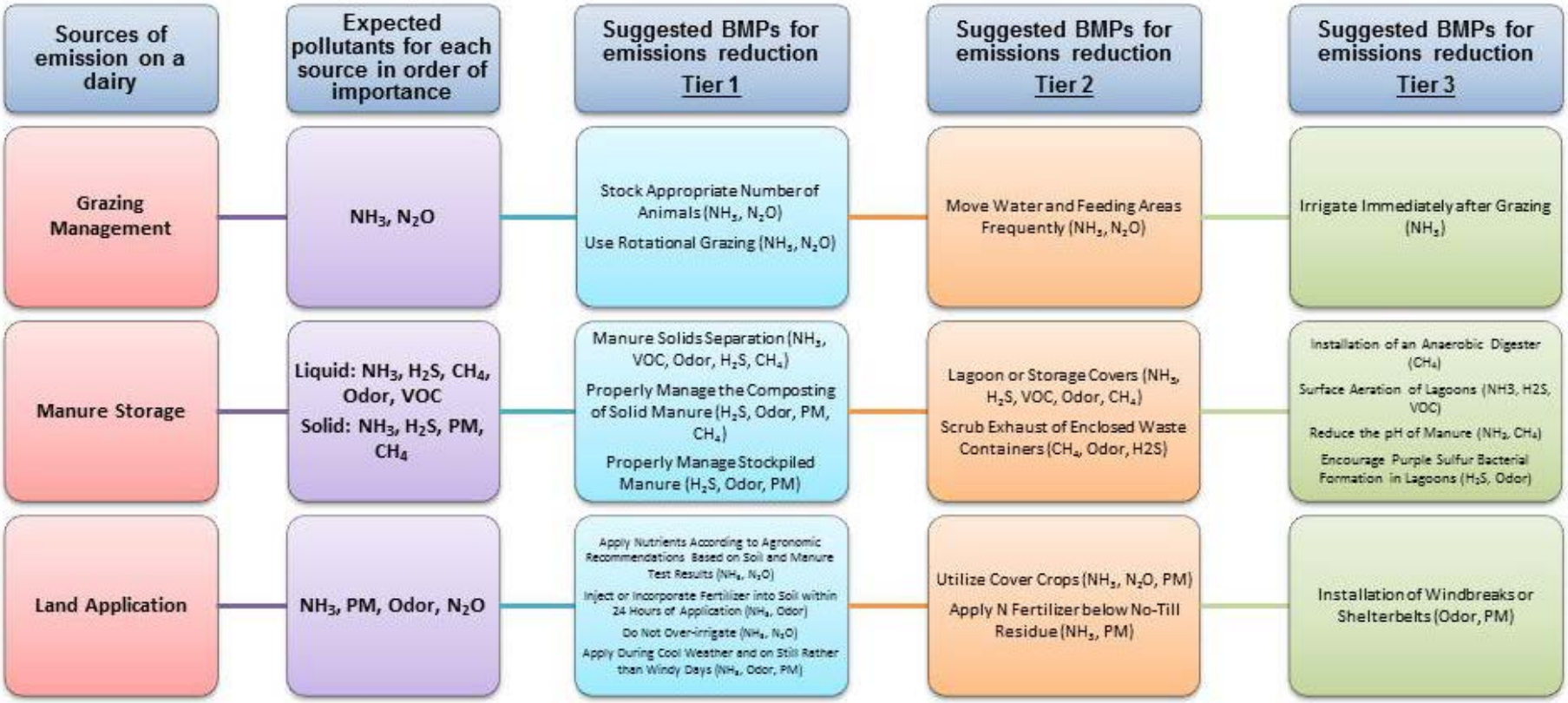
9. Other
    a. *Tier 1* - Installation of Windbreaks or Shelterbelts (NH_3, Odor, PM).
    b. *Tier 2* - Vehicle Road Condition and Management (PM).
    c. *Tier 3* - Engine Selection and Efficiency (NOx).

APPENDIX A: BMP Selection Matrix

Table 1. BMP selection matrix based on source and tier level mitigation

Sources of emission on a dairy	Expected pollutants for each source in order of importance	Suggested BMPs for emissions reduction Tier 1	Suggested BMPs for emissions reduction Tier 2	Suggested BMPs for emissions reduction Tier 3
Nutrition	NH_3, CH_4, H_2S, N_2O	Properly Manage Level of Dietary Protein (%CP) in Diet to Match, Rather Than Exceed, an Animal's Needs (NH_3, N_2O, Odor) Properly Manage and Minimize Overfeeding Sulfur in the Diet (H_2S, Odor)	Practice Group and/or Stage of Lactation Feeding (NH_3)	Increase the Level or Quality of Starch in the Diet (CH_4) Utilize feed additives to maximize efficiency (NH_3, H_2S, CH_4)
Feed Management	VOC, PM, Odor	Regularly remove Spilled and Unused Feed from Feeding Area (VOC, Odor, PM) Manage or Minimize the Mixing of Feed During Windy Times (PM)	Properly Cover and Manage Ensiled Feedstuffs (VOC, Odor)	Store Feed in a Sheltered Storage Structure (VOC, Odor, PM)
Milk Parlor	NH_3, VOC, Odor, H_2S	Use Recycled Parlor (Clean) Water Used for Flushing/Cleaning Parlor and Holding Area (NH_3, Odor); Ensure Proper Ventilation (NH_3, Odor, and PM)	Remove Manure from Parlor and Holding Area Frequently (NH_3, VOC, Odor)	Treat Recycled Water Used for Flushing/Cleaning Holding Area (NH_3, Odor)
Housing – Freestall Barns	NH_3, VOC, Odor, CH_4, H_2S	Remove Manure from Barns Frequently (NH_3, VOC, Odor); Ensure Proper Ventilation of Freestall barns (NH_3, Odor, and PM)	Bedding Selection and Management (NH_3, H_2S, Odor) Manure Removal Technology and Efficiency (NH_3, VOC, Odor)	Treat Recycled Lagoon Water Used for Flushing (NH_3, Odor) Alleyway Floor Texture and Type (NH_3, VOC, Odor) Manure Removal Technology and Efficiency (NH_3, VOC, Odor)
Housing – Drylot Pens	NH_3, PM, Odor, H_2S, CH_4, VOC, N_2O	Spread (Harrow) Manure Frequently (NH_3, PM) Surface Moisture Content Management (NH_3, N_2O, VOC, Odor, CH_4, H_2S, Odor, PM)	Remove Manure Frequently (NH_3, PM) Incorporate Wood Chips in Surface Layer (NH_3, PM, Odor) Use Straw Bedding in Drylot Pens (NH_3, PM, Odor) Knockdown and Remove Fence Line Manure (VOC, Odor)	Urease Inhibitors (NH_3, N_2O) Provide Shade for Cattle (NH_3, PM) Sitting of Water Trough within Pen (NH_3, PM)

APPENDIX A: BMP Selection Matrix



Facility: 0 **Date:** 0 **(Version 8; 10/28/11)**

AQ BMP SCORE SHEET

Description of Score Sheet - Scores entered in the gray boxes range from 0 to 5 for each pollutant (5 being optimum implementation). Scores for each BMP are based on the visual evaluation and/or documention of practices assessed during inspections. For descriptions of BMPs listed, refer to the document "Descriptions of Best Management Practices (BMPs)" (YRCAA, 2011).
How to use this table - 1) Review your overall score. A score above 80% is good, between 70-80% is adequate, and below 70% is poor and should be evaluated for improvements. 2) Review the score (%) for each category (i.e., Nutrition, Housing, etc.) and each pollutant (i.e., Ammonia, Nitrous Oxide, etc.). The values listed in the "*Category Level of BMP Implementation (%)*" row gives the relative effectiveness of the BMPs for that specific category as implemented at your facility at the time of inspection. A value below 70% should be evaluated and you should consider making improvements in that category. 3) Look at the individual score given to each BMP. Use these to identify the areas where improvements can be made.

				Good		Adequate	Poor - Needs improvement		
Overall Score (%) & Grade:		**#DIV/0!**	**#DIV/0!**	100-90%	90-80%	80-70%	70-60%	<60%	
				A	**B**	**C**	**D**	**E**	
BMP #	**Best Management Practice**	**Ammonia (NH_3)**	**Nitrous Oxide (N_2O)**	**Hydrogen Sulfide (H_2S)**	**Volatile Organic Compounds (VOCs)**	**Odor**	**Particulate Matter (PM)**	**Methane (CH4)**	**Oxides of Nitrogen (NOX)**
	I. Nutrition								
I. 1	Properly manage level of dietary protein (~16%CP)	0	0			0			
I. 2	Increased level or quality of starch in diet (23-26%)				0			0	
I. 3	Manage and minimize overfeeding of sulfur-containing feed			0		0			
I. 4	Practice group and/or stage of lactation feeding	0	0	0		0		0	
	Category Level of BMP Implementation (%)	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***NA***	***#DIV/0!***	***NA***
	II. Feed Management								
II. 1	Properly manage ensiled feedstuffs	0			0	0	0		
II. 2	Store feed in a sheltered storage structure				0	0	0		
II. 3	Regularly remove spilled and unused feed from feeding area	0			0	0	0		
II. 4	Manage or minimize feed mixing during windy times						0		
	Category Level of BMP Implementation (%)	***#DIV/0!***	***NA***	***NA***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***NA***	***NA***
	III. Milk Parlor								
III. 1	Ensure proper ventilation	0							
III. 2/3	Use recycled (clean) or treated water for flushing parlor	0		0	0	0			
III. 2/3	Use recycled (clean) or treated water for cleaning holding pen	0		0	0	0			
III. 4	Remove manure from holding area frequently	0			0	0			
	Category Level of BMP Implementation (%)	***#DIV/0!***	***NA***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***NA***	***NA***	***NA***
	IV. Housing - Freestall Barns								
IV. 1	Ensure proper ventilation	0							
IV. 2	Bedding selection and management	0				0	0		

IV. 3	Treat recycled lagoon water used for flushing	0		0	0	0			
IV. 4	Remove manure from barns frequently	0			0	0			
IV. 5	Manure removal technology and efficiency	0		0	0	0			
IV. 6	Alleyway floor texture and type	0				0			
	Category Level of BMP Implementation (%)	***#DIV/0!***	***NA***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***NA***	***NA***
	V. Housing - Drylot Pens								
V. 1	Provide shade for cattle	0				0	0		
V. 2	Sitting of water trough within pen	0		0		0	0		
V. 3 (a)	Remove manure frequently	0			0	0	0	0	
V. 3 (b)	Spread (harrow) manure frequently	0			0	0	0	0	
V. 4	Use straw bedding in pen (seasonal)	0				0	0	0	
V. 5	Incorporate wood chips into surface layer	0				0	0	0	
V. 6	Utilize urease inhibitors	0	0			0			
V. 7	Surface moisture content management	0	0	0	0	0	0	0	
V. 8	Knock down and remove fence line manure	0		0		0			
	Category Level of BMP Implementation (%)	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***NA***
	VI. Grazing Management								
VI. 1	Stock appropriate number of animals	0	0			0	0		
VI. 2	Use rotational grazing	0	0			0			
VI. 3	Move water and feeding areas frequently	0	0			0			
VI. 4	Irrigate immediately after grazing	0	0		0	0			
	Category Level of BMP Implementation (%)	***#DIV/0!***	***#DIV/0!***	***NA***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***NA***	***NA***
	VII. Manure Management								
VII. 1	Manure solids - mechanical separation	0		0		0			
VII. 1	Manure solids - settling basin	0		0		0		0	
VII. 2	Lagoon or storage covers (natural or composite)	0		0	0	0		0	
VII. 3	Scrub exhaust of enclosed waste containers	0		0	0	0		0	
VII. 4	Proper maintenance of installed methane digester				0	0		0	
VII. 5	Surface aeration of lagoons	0		0	0	0			
VII. 6	Reduce the pH of lagoons and manure piles below 6	0		0		0			
VII. 7	Purple sulfur bacterial formation in lagoons	0		0		0			
VII. 8	Properly manage the composting of manure			0		0	0		
VII. 9	Properly manage stockpiled manure			0		0	0	0	
	Category Level of BMP Implementation (%)	***#DIV/0!***	***NA***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***NA***

VIII. Land Application - Manure or Chemical Fertilizer									
VIII. 1	Apply N fertilizer below no-till residue	0	0	0		0	0		
VIII. 2(a)	Corn - Inject fertilizer/manure into soil at application	0	0	0	0	0	0	0	
VIII. 2(b)	Forage - Manure/fertilizer application method and/or incorporation practice	0	0	0	0	0	0	0	
VIII. 3	Apply nutrients according to agronomic recommendations based on soil and manure test results	0	0			0			
VIII. 4	Do not over-irrigate	0	0						
VIII. 5	Utilize cover crops in winter crop rotation	0	0				0		
VIII. 6	Apply during cool weather and on still rather than windy days	0		0	0	0	0		
	Category Level of BMP Implementation (%)	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***#DIV/0!***	***NA***
IX. Other									
IX. 1	Installation of windbreaks or shelterbelts	0		0		0	0		
IX. 2	Vehicle road condition management						0		
IX. 3	Engine selection and efficiency								0
	Category Level of BMP Implementation (%)	***#DIV/0!***	***NA***	***#DIV/0!***	***NA***	***#DIV/0!***	***#DIV/0!***	***NA***	***#DIV/0!***
	Overall Level of BMP Effectivity by Pollutant (%)	-	-	-	-	-	-	-	-

Yakima Regional Clean Air Agency
329 North First Street
Yakima, WA 98901
(509) 834-2050
Fax (509) 834-2060
yakimacleanair.org

Dairy Operations Registration

NOTE: Enter information from your *previous calendar year activities* and mail it back or email it to registration@yrcaa.org

Licensed Dairy Name _____

Operation Location _____

Mailing Address _____

Owner/ Operations Manager _____

Phone _____ Email _____

Preferred Contact Method: Mail ☐ Email ☐

1. Provide the annual averages of animal numbers, the actual maximum number of cattle which can be confined annually and the average weight of each category below.

	Annual Average	Max Capacity	Average Weight (lbs)
Milking			
Dry			
Heifer			
Calf			
Total			

2. Certification

I the undersigned do hereby certify that the foregoing is to the best of my knowledge, after reasonable inquiry, true and accurate.

Print Name & Title of Responsible Official	Signature	Date

CONSENT AGENDA ITEMS

SUMMARYOF THE GOVERNING
BOARD OF DIRECTORS
STUDY SESSION MEETING

August 9, 2018

Location and Time:
Yakima City Hall Council Chambers **1:30 pm**

STUDY SESSION

Called to Order at 1:31 pm by Chairman Jon DeVaney

Topic: Alternative Strategies for the YRCAA Air Quality Policy and Best Management Practices for Dairy Operations

Chair DeVaney opened the Study Session at 1:31 pm

Mr. Hurley read the Executive Memo concerning Alternative Strategies for the YRCAA Air Quality Policy and Best Management Practices for Dairy Operations. He presented five strategies for reducing litigation risk attributed to public records requests concerning dairy operations:

1) Maintain the Dairy Policy in its current form
2) Terminate the Dairy Policy
3) Modify the policy by significantly reducing the amount of supporting documentation required, thus significantly mitigating the litigation risks.
4) Terminate the policy and publish the document as a Resource Guide available to all dairy producers who want to apply the information to their operation
5) A blend of strategies 3 and 4 above

Mr. Hurley, after numerous internal discussions with staff, recommended that the following specific actions be considered for implementation:

1) Rescind the Air Quality Policy and Best Management Practices for Dairy Operations.
2) Direct staff to publish the policy as a resource guide for dairy operators
3) Direct staff to maintain registration of all dairy operations through the use of a scaled down dairy registration form.
4) In November adopt a reduced registration fee of $124 for dairies to cover the work performed in maintaining the scaled down dairy registration program.

After Mr. Hurley finished his presentation Chair DeVaney asked if anyone on the board felt they had a conflict of interest concerning this subject. Mr. Jones stated he did not feel that he had a conflict, but to protect the board and the agency he would recuse himself from participating in the study session.

Mr. Anderson asked what Mr. Hurley's recommendation would be. Mr. Hurley reviewed the cost of litigation and recommended making the Air Quality Policy and the Best Management Practices for Dairy Operations a resource guide for dairy operators and that the Board implements a basic registration program asking for contact information, dairy locations and total number of cattle. Having the total cattle numbers would lessen the impact, in the future, if the government promulgates a new rule for dairies. The agency would not have to go to another agency for cattle numbers.

Chair DeVaney asked how the current guidelines will be used as a resource guide. Mr. Hurley envisioned YRCAA offering technical assessment and help for the dairies as well as the guide being available on the website and free copies when requested.

Ms. Laurie Crowe, of the South Yakima Conservation District (SYCD), was invited to the table to speak to the Board. She stated that SYCD has their own Dairy Nutrient Management Plan which is quite extensive and the information in the plan was gathered from different agencies such as Clean Air, Department of Ecology, the EPA, etc. The dairies are inspected by the Department of Agriculture and if anything is amiss it would be caught then. There are tools that are available that would help a dairy to evaluate their property for emissions. Ms. Crowe is also putting together another web page that would list each reference. She felt that having a partnership with Clean Air would be beneficial to both agencies.

Chair DeVaney asked how this resource would be used in the case of a complaint regarding pollutants. Mr. Hurley stated Clean Air would perform the investigation as they do now; the resource guide would not be used in the investigation. Ms. Crowe added the SYCD receives a report of inspections performed by the Department of Agriculture and SYCD is the technical assistance to help people to resolve any issues brought up during the inspection.

Mr. Anderson wondered if notice would be given to dairies as to the changes. Mr. Hurley stated we would announce the change on our website as well as written notices sent to each dairy.

Ms. Mendez questioned if the policy is voluntary and if so do we have any power to enforce it. She also asked how many dairy facilities are in our jurisdiction and how many use the policy. Mr. Hurley replied we are able to enforce the Registration and Air Quality Management Plan (AQMP). We are not able to enforce the Best Management Practices. Clean Air has approximately 50 dairy facilities and there are about two or three that do not participate. Currently the industry as a whole tries to implement the policy.

Mr. Childress asked who authored the policy and Mr. Hurley answered the policy was authored by Clean Air with input from individuals from WSU and Whatcom Conservation District and approved by the Board after a pilot project.

Mr. Childress was concerned about being able to enforce the policy when we change them to guidelines. Mr. Hurley stated we do not have the authority at this time to enforce the policy. He has consulted with the State Attorney General's Office and was told it would have to be settled in a court of law. Mr. Hurley added the teeth of the program are in the registrations. Ms. Crowe added the teeth are also in the Department of Agriculture's inspection process through fines that are leveled. People can call in violations to the AG Department and they will respond. They have a local inspector that covers the entire valley and there are very few violations on the east side of the state.

Chair DeVaney stated YRCAA wants to keep the registrations for the dairies in case of future regulation and to model air emissions; how do we require other industries to register for modeling? Mr. Hurley responded that Clean Air does not require a business to register to model. Instead, an industry must take part in a New Source Review (NSR) for equipment that can contribute to air pollution. We look at the information and use approved modeling systems. We do not do modeling with agricultural entities as we do not have approved estimation methodologies and approved emission factors.

Chair DeVaney closed the study session at 2:03.

Yakima Regional Clean Air Agency
329 North First Street
Yakima, WA 98901
(509) 834-2050
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SUMMARYOF THE GOVERNING
BOARD OF DIRECTORS
REGULAR BOARD MEETING

August 9, 2018

Location and Time:
Yakima City Hall Council Chambers **2:00 pm**

REGULAR MEETING

1. **Chairman DeVaney** *called the meeting to order at 2:03 p.m.*

2. **Christa Owen, Acting Clerk of the Board**, *conducted roll call. There was a quorum.*

PRESENT WERE:	
BOARD MEMBERS: Steven Jones, Ph.D., County Representative Carmen Mendez, Large City Representative Jon DeVaney, Member at Large Ron Anderson, County Commissioners Norm Childress, Small City Representative **ABSENT:**	**LEGAL COUNSEL:** Gary Cuillier **STAFF:** Keith Hurley, Executive Director Christa Owen, Acting Clerk of the Board

3. Additions or Deletions to the Agenda

None

4. Public Comment *34:20*

Jean Mendoza approached the podium and stated she felt it was important that Yakima County has a Dairy Policy. She is also involved in a group that studies atmospheric deposition concerning the amount of ammonia that falls from the atmosphere. Ms. Mendoza feels that Clean Air should look at this subject and brought information for the Board to review.

5. Public Hearing on Revisions to the FY 2019 Budget *37:17*

Chair DeVaney opened the hearing at 2:08

Chair DeVaney asked if there was public testimony or comments on the revisions to the FY 2019 Budget and received none.

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Chair DeVaney closed the hearing at 2:09

6. Consider Approving the Consent Agenda Items 6.1 and 6.2 *38:15*

6.1 Approve Study Session and Board Meeting Minutes – June 2018

6.2 Accept YRCAA June and July 2018 Monthly Activity Reports

Mr. Anderson moved to approve **Ms. Mendez** seconded.
Motion approved with no dissension.

7. Regular Agenda *38:32*

Mr. Hurley mentioned the Miriam fire has grown to 1400 – 1500 acres and combined with the weather our readings will be a little high; the wood smoke is not as bad as last year. Mr. Hurley reviewed the graphs regarding the $PM_{2.5}$ and PM_{10} data for Yakima and Sunnyside.

The Woodstove Change-out Program received the biggest one year funding for the program. There will be a challenge to spend all the grant monies but Mr. Hurley was confident that Clean Air would be able to do it. Mr. Hurley mentioned we are advertising the program heavily and have contracted with various radio and television entities to get the word out. Ms. Mendez questioned whether Clean Air is advertising with any Hispanic stations. Mr. Hurley replied that reaching out to the Hispanic stations is a part of our procedures. He told Ms. Mendez he would bring a list of the stations that we contract with to the next meeting.

Education Outreach Program: Virginia Mason Memorial hospital requested that Clean Air would speak at their Better Breathers Club. The seminar was conducted by Mark Edler and Mr. Hurley feels this might turn into an annual event.

8. Action Items *43:07*

8.1 Fiscal Vouchers and Payroll Authorization Transfers for June and July 2018

Mr. Childress motioned to approve **Mr. Jones** seconded
Motion approved with no dissension

8.2 Proposed Revisions to FY 2019 Budget

Mr. Hurley explained in July 2018 YRCAA was awarded a $550,000 grant for the Woodstove Change-Out Program and as such the grant revenue and expenditures are being updated. Ms. Mendez questioned why there were reductions in the base operation salaries. Mr. Hurley answered that costs of hours and

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work were shifted to the grant program. There is a corresponding increase and decrease in revenues and expenditures.

Approval by minute action of:

Resolution 2018-07 Adopting the Revised Agency Fiscal Year (FY) 2019 Budget

Ms. Mendez motioned to approve **Mr. Childress** seconded
Motion approved with no dissension

8.3 Revisions to Administrative Code Part C *47:22*

Mr. Hurley stated he revised Administrative Code Part C to reflect the changes in the WAC that were implemented in March 2018. Mr. Hurley rewrote Code C without including the comments from the WAC and Code C was changed to reflect information that is unique to YRCAA. The intent was to make Code C easier to read and understand.

Mr. Childress questioned if changes to the Code were reviewed by YRCAA's general counsel and Ms. Mendez asked if Mr. Cuillier thought Mr. Hurley's recommendations are appropriate. Mr. Cuillier, YRCAA's general counsel, was in attendance and Chair DeVaney asked if he could approach the podium. Mr. Cuillier stated he had read the guide which is similar to the policy and has discussed all changes with Mr. Hurley. He said he was satisfied as to the changes and he felt the new code could possibly reduce litigation or missing documents by centralizing and simplifying the process.

Approval by minute action of:

Resolution 2018-08 Adopting Revised Administrative Code Part C-YRCAA Public Records Policy

Mr. Childress motioned to approve **Ms. Mendez** seconded
Motion approved with no dissension

8. Other Business *53:40*

Community Forum Discussion:

The Community Forum is held the Monday after the Board Meeting and conducted three times a year. The August forum was scheduled for August 13 but was cancelled due to staff shortage. Chair DeVaney expressed concern that the public and the Board had with last minute cancellations. He felt that the forum needs to be rescheduled and we must decide on the amount of time to be given for cancellations. Mr. Hurley stated that the forum was canceled on Tuesday, July 24, two weeks in advanced of it being held. He also stated that the board approved procedure is to allow topics for the forum to be submitted as late as the Friday prior to the Monday of the forum.

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Ms. Mendez asked what the forum looks like. Mr. Hurley replied the Forum was created when the Board was struggling with public comments taking an excessively long time during meetings. The Board decided to give the public an avenue to put forth a discussion topic for the agency. The topic decides who the facilitator is for that Forum. We used to have the forums quarterly but lack of participation and the smoke school commitments of the agency were the reasons the number of forums were reduced to three. Ms. Mendez felt that we should reschedule the August forum before the December forum. When the forum has been scheduled we will send the notice to the Board members.

Ms. Mendez asked when Clean Air is actually moving. Mr. Hurley stated Clean Air is starting the move October 1.

Continuation of Dairy Policy Discussion:

Chair DeVaney stated the Board has a recommendation from Mr. Hurley as to the action to take on the Dairy Policy. He recommends the Board not take action today but would like Mr. Hurley to bring back a specific actionable resolution for further discussion and allow for further public comment.

Mr. Jones had recused himself from the Study Session and said he has the option of asking the Board to reconsider if he is allowed to stay for the continuing discussion. Mr. Jones stated he has interactions with the Dairy industry but feels he could be fair in the discussion and would recuse himself for any vote. Chair DeVaney asked if anyone feels that Dr. Jones has a conflict. Mr. Anderson asked if he would recuse himself in case of a vote and Mr. Jones stated he felt he should not participate in making recommendations or voting. Ms. Mendez and Mr. Childress felt that Mr. Jones did not have a conflict of interest.

Mr. Jones asked in recent federal rules and regulations if animal operations were exempt from CERCLA and EPCRA. Mr. Hurley replied the ruling just came out last week and agricultural operations were exempt from reporting greenhouse gases. Mr. Jones also inquired if any other Washington State Clean Air Agency requires a dairy to register. Mr. Hurley stated they did not.

Chair DeVaney asked if there were any recommendations that the Board would like to see staff bring before the Board. Do they require further contemplation or discussion before they ask the staff for recommendations? Mr. Anderson and Ms. Mendez stated they did not.

Chair DeVaney stated in the past we have been cautious with asking the public to pay fees for our activities and he was concerned with maintaining fees for the sake of keeping a list of names for possible future activity. He felt that since the information is available from state sources we should be able to get it without maintaining a mandatory registration at the agency level. Mr. Hurley interjected that just because another agency has the information does not mean it would be readily accessible. Chair DeVaney agreed but he would like to see a non-fee option for the Board along with the registration fee option. He suggested the draft recommendations be posted in the October meeting packet but not decided until the November meeting, thereby giving the Board and members of the public a chance to

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review the options, discuss them and comment on them. Mr. Anderson and Ms. Mendez agreed with this. Mr. Childress asked if this was a time sensitive subject and Mr. Hurley said it was not.

Mr. Anderson brought up the notice in the paper regarding the burn ban notice and felt it was a confusing statement. Mr. Hurley stated that he will check into it.

9. Adjournment

Mr. Childress motioned to adjourn the meeting **Ms. Mendez** seconded**.**
Motion approved with no dissension

Meeting was adjourned at 2:49 p.m.

_____
Jon DeVaney, Board Chairman

_____
Mary Wurtz, Clerk of the Board

Date of Release: September 6, 2018
Date of Consideration: September 13, 2018
To: Board of Directors
From: Office of the Executive Director
Subject: Monthly Activity Report

Activity	FY18	Jun18	Jul18	Aug18	FY18 thru August	FY19 thru August
Minor Source Inspections	93	28	26	8	17	62
Complaints Received	153	7	4	9	30	20
NOVs Issued	67	5	0	1	3	6
AODs Issued	4	1	0	0	3	1
Warning Notices Issued	2	0	0	0	3	0
NOPs Issued	28	4	1	1	4	6
SEPA Reviews	246	38	26	31	40	95
AOP Applications Received	0	0	0	0	0	0
AOPs Issued or Renewed	0	0	0	0	0	0
Deviations/Upsets Reported	11	1	1	1	2	3
AOP Inspections	4	0	1	1	1	2
Public Workshops	1	0	0	0	0	0
Media Events	0	0	0	0	0	0
Media Contacts	17	0	4	7	7	11
Education Outreach Events	9	0	1	1	3	2
Sources Registered	331	3	0	0	0	3
NSR Applications Received	14	1	0	0	6	1
NSR Approvals Issued-Temporary	0	0	0	0	0	0
NSR Approvals Issued-Permanent	8	0	0	0	6	0
NODRs Received	204	24	14	16	45	54
Agricultural Burn Permits Issued	162	5	7	2	5	14
Conditional Use Permits Issued	7	0	0	0	0	0
Residential Burn Permits Issued	467	57	2	10	52	69
Burn Ban Days	66	0	0	18	15	18
Public Records Requests Fulfilled	24	1	2	1	3	4

Acronyms:

AOP - Air Operating Permit; **NODR** - Notification of Demolition and Renovation; **NOP** - Notice of Penalty; **NOV** - Notice of Violation; **NSR** - New Source Review; **SEPA** - State Environmental Policy Act

AGENDA ITEM 5.2

REGULAR

AGENDA

ITEMS

Yakima Regional Clean Air Agency
329 North First Street,
Yakima WA 98901
(509) 834-2050
yakimacleanair.org

Executive Memorandum

Date of Release: September 6, 2018

Date of Consideration: September 13, 2018

To: The YRCAA Board of Directors

From: Office of the Executive Director

Subject: Executive Director's Report

1. Department of Ecology's 2017 Air Monitoring Data Quality Assessment Report

Key Data Points:

- P. 10 – Fine Particulate Matter (FEM $PM_{2.5}$- Continuous) % Valid Data = 98
- P. 10 – Particulate Matter (PM_{10} FEM- Continuous) % Valid Data = 89
- P. 12 – Fine Particulate Matter ($PM_{2.5}$ Class I FEM – 24-hour) % Valid Data = 97
- P. 13 – $PM_{2.5}$ Chemical Speciation Network;
  - SASS Audit % Flow -Channel #1 = -3.31, Channel #2 = 0.49
  - URG Audit % Flow = -4.66%
- P. 15 – Sunnyside Nephelometer % Valid Data = 79
  - QC check failure, Nephelometer required recalibration. Malfunction due to heavy wildfire smoke during July & August. Monitor was replaced on 8/31/17

2. $PM_{2.5}$ exceedances due to wildfire smoke

As a result of the extreme wildfire smoke within the Yakima Valley this summer, Yakima County has experienced nine exceedances of the $PM_{2.5}$ Ambient Air Quality standard. As of the date of release, statewide there have been approximately 142 $PM_{2.5}$ exceedances, seven PM_{10} exceedances and 22 Ozone exceedances. The agency has begun preliminary work coordinating with the state Department of Ecology (Ecology) to flag all applicable $PM_{2.5}$ data generated during the wildfires.

3. Compliance & Engineering

The following table itemizes, by type, the complaints received and the number of NOVs issued for the month of August 2018:

Type of Complaint	# of Complaints	# of NOVs	# of AODs
Residential Burning	2	3	0
Agricultural Burning	0	0	0
Other Burning	0	0	0
Fugitive Dust	3	0	0
Agricultural Dust	1	0	0
Agricultural Odor	0	0	0
Surface Coating	0	0	0

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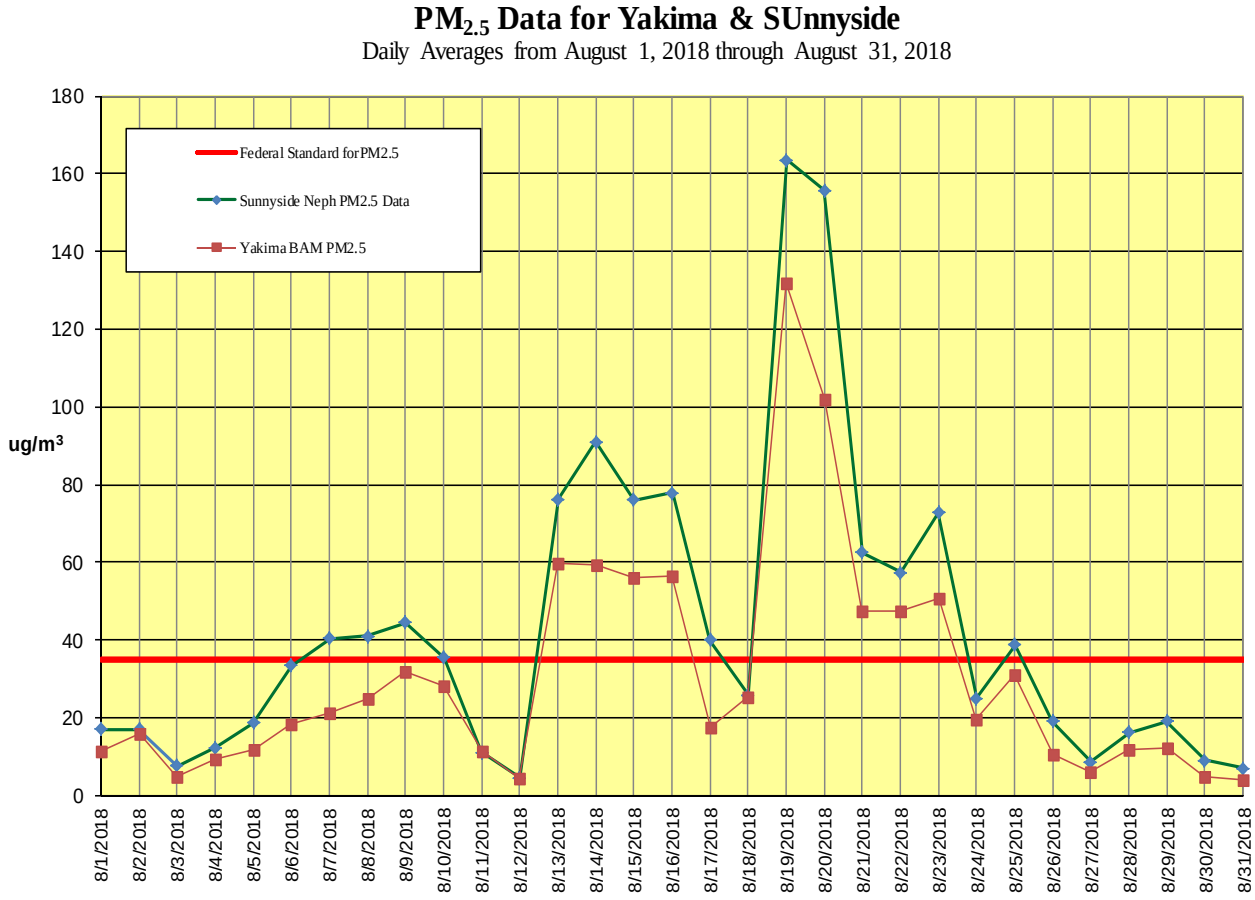
Agricultural Dust	1	0	0
Agricultural Odor	0	0	0
Surface Coating	0	0	0

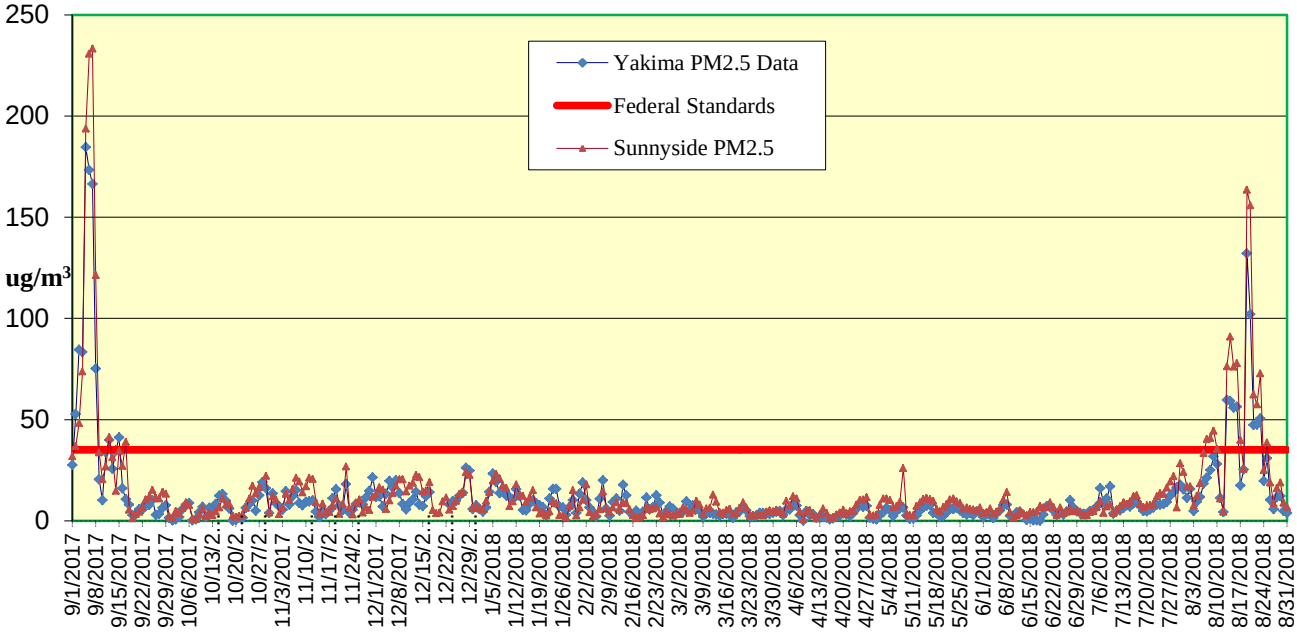
Odor	0	0	0
Asbestos	0	2	0
Others	0	0	0
TOTALS	**6**	**5**	**0**

Air Monitoring Data:



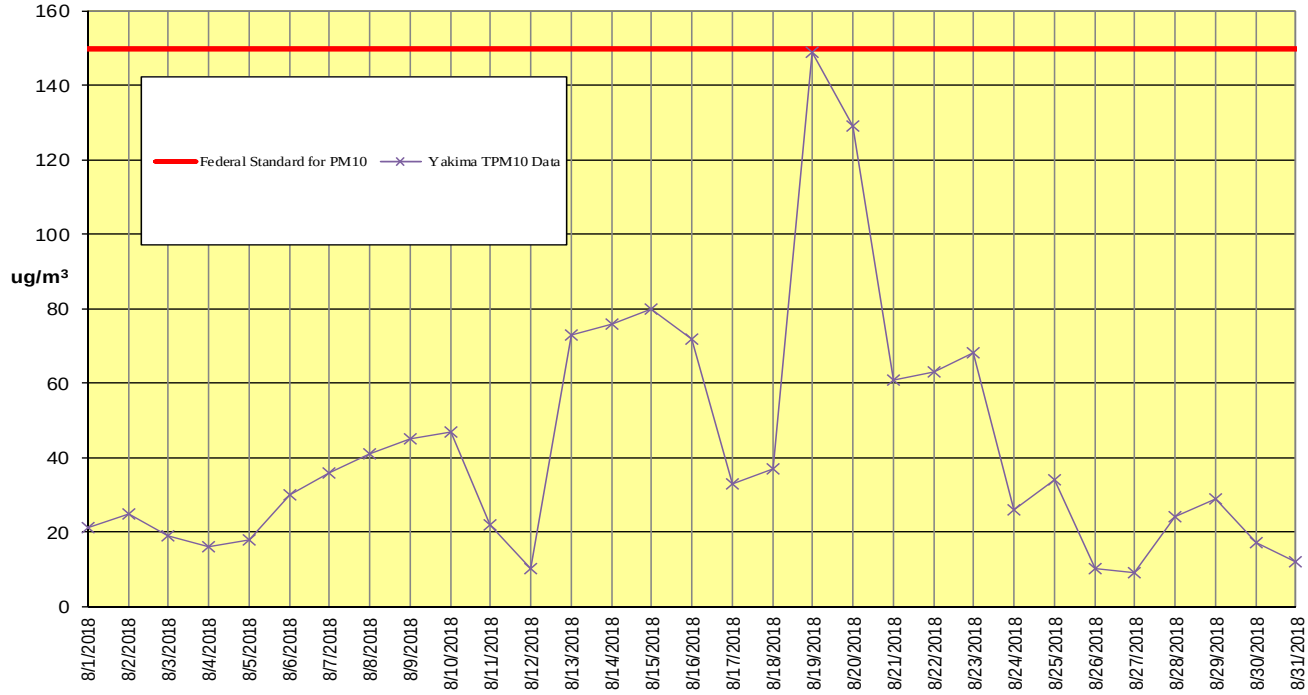
$PM_{2.5}$ Annual Air Monitoring Data for Yakima & Sunnyside

Daily Averages from September 1, 2017 through August 31, 2018



PM_{10} Data for Yakima

Daily Averages from August 1, 2018 through August 31, 2018



4. **YRCAA Regulation 1 Update**
   The agency has begun preliminary planning to update YRCAA Regulation 1. Updating the regulation last occurred in 2002 and is required due to repeal of older Washington Administrative Codes (WAC), the creation of new WACs, revisions to current WACs, and the need to update the PM_{10} and Carbon Monoxide (CO) Limited Maintenance Plans.

5. **PM_{10} and CO Limited Maintenance Plans Update**
   In tandem with the YRCAA Regulation 1 update work, the agency has also begun preliminary work on updating the Yakima PM_{10} and CO Limited Maintenance Plans. These are Federally mandated documents that require updating every ten years. Both documents are components of the Washington State Implementation Plan (SIP).

6. **YRCAA annual meeting with EPA**
   On September 10th the agency and representatives from the EPA will conduct our annual update meeting. Some topics for discussion will be; monitoring trends, woodstove change-out funding, rule development (YRCAA Regulation 1 update), PM_{10} and CO 2nd ten year Limited Maintenance Plan updates, the Agency for Toxic Substances and Disease Registry (ATSDR) study, YRCAA's Air Quality Management Policy for Dairy Operations, and the status of the complaint filed in 2016 by The Friends of Toppenish Creek alleging a violation of Title VI of the Civil Rights Act.

7. **Woodstove change out program**
   In the first two months of the 2019 Woodstove Change-Out Grant the agency has completed 15 woodstove change outs, six rebates for the purchase of new devices and 18 Bounty's for the destruction of old devices. The agency has expended a total of $114,933 and has an additional $106,787 in scheduled outstanding work to be completed for a total committed amount of $221,720.

DEPARTMENT OF
ECOLOGY
State of Washington

2017 Air Monitoring Data Quality Assessment Report

August 2018

Contact Information

For more information contact:

Anna Tai
Air Quality Program
P.O. Box 47600
Olympia, WA 98504-7600
Phone: 360-407-6819

Washington State Department of Ecology — www.ecology.wa.gov

- Headquarters, Olympia 360-407-6000
- Northwest Regional Office, Bellevue 425-649-7000
- Southwest Regional Office, Olympia 360-407-6300
- Central Regional Office, Union Gap 509-575-2490
- Eastern Regional Office, Spokane 509-329-3400

To request ADA accommodation including materials in a format for the visually impaired, call Ecology at 360-407-6800 or visit https://ecology.wa.gov/accessibility. People with impaired hearing may call Washington Relay Service at 711. People with speech disability may call TTY at 877-833-6341.

2017 Air Monitoring Data Quality Assessment Report

Air Quality Program

Washington State Department of Ecology

Olympia, Washington

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Table of Contents

List of Figures and Tables

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Figures

Tables

Acronyms and Abbreviations

AQP	Air Quality Program
AQS	Air Quality System
CO	carbon monoxide
CV	Coefficient of Variation
DQI	Data Quality Indicator
DQO	Data Quality Objective
EPA	United States Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
MQO	Measurement Quality Objective
NAAQS	National Ambient Air Quality Standards
NCore	National Core Monitoring Network
NIST	National Institute of Standards and Technology
NO	nitric oxide
NO_2	nitrogen dioxide
NOy	reactive nitrogen oxides
PE	Performance Evaluation
PQAO	Primary Quality Assurance Organization
PM_{10}	particulate matter with diameter less than 10 microns
$PM_{10-2.5}$	particulate matter with diameter less than 10 and 2.5 microns
$PM_{2.5}$	particulate matter with diameter less than 2.5 microns
ppb	parts per billion
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
SASS	Speciation Air Sampling System
SO_2	sulfur dioxide
WAQA	Washington Air Quality Advisory

1. Introduction

The Washington State Ambient Air Monitoring Network (Washington Network) is designed to collect vital air quality information for use by federal, state, and local air agencies as well as tribes, the research community, and the public. These entities use the data collected within the Washington Network to make decisions that will have public health, economic, and political impacts. Air monitoring data are never error free and always contain some level of uncertainty. Therefore, it is critical that ambient air monitoring data collected within the Washington Network are of known, acceptable, and comparable quality. A firm understanding of the amount of inherent error associated with air monitoring data helps reduce the likelihood of decision errors by data users.

In order to provide decision makers with data of known and acceptable quality, the Washington State Department of Ecology (Ecology) implements a quality system that governs the Washington Network ambient air monitoring activities. This quality system, and Ecology's role as the Primary Quality Assurance Organization (PQAO) for the Washington Network, is described in Ecology's Quality Assurance Plan (QAP). Ecology's goal as the PQAO is to implement practices, such as consistency across measurement methods, which will help to reduce the amount of uncertainty associated with data collection. EPA's Quality Assurance Handbook, Volume II, provides principles that help PQAO's achieve this goal:

- Operation by a common team of field operators according to a common set of procedures.
- Use of common standard operating procedures.
- Common calibration facilities.
- Oversight by a common quality assurance organization.
- Support by a common management, laboratory, or headquarters.

The quality assurance regulations set forth in 40 CFR Part 58 Appendix A have been developed to ensure that monitoring programs are planned such that decision makers understand the data quality requirements in order to determine compliance with the National Ambient Air Quality Standards (NAAQS). Washington Network operations are carried out in accordance with these regulations for its Federal Equivalent Method (FEM), NAAQS-compliance monitoring. In addition, Ecology has a goal to implement guidance, whenever practical, from the United States Environmental Protection Agency (EPA), Office of Air Quality Planning and Standards for these and other monitoring efforts within the Washington Network.

The 2017 Air Monitoring Data Quality Assessment Report describes the quality of the data collected from January 1 through December 31, 2017.

2. Data Quality

To provide decision makers with data of acceptable quality, EPA implemented the Data Quality Objective (DQO) process and established acceptance criteria for precision and bias. DQOs are a set of performance measures used in data collection that specifies the level of uncertainty (error) that the decision maker is willing to accept in the data. By knowing how much uncertainty is in the data, especially data collected at locations that are at risk of being declared "nonattainment" or are already in nonattainment, decision makers are provided additional confidence to make informed policy decisions regarding the protection of public health and the environment. DQOs are assessed using data quality indicators (DQIs), which are the quantitative statistics and the qualitative descriptors used to interpret the degree of acceptability or utility of data to the user. The DQIs are used to establish the Measurement Quality Objectives (MQOs). Data quality is assessed quarterly using the EPA's AMP256 QA Data Quality Indicator Report, downloaded from EPA's Air Quality System (AQS).

MQOs are based on confidence intervals. A confidence interval is a measurement of how accurate the measurement is. There is a difference between the biases being 5 percent ± 10 percent as compared to the bias being 5 percent ± 1 percent. Close attention to these intervals can be helpful in preventing data loss and providing decision makers greater confidence in the data and their decisions.

The assessment is divided into four categories: **Automated Data, Manual Data, Meteorological Data, and Washington Air Quality Advisory (WAQA) Data**, and subdivided into monitoring methods specifying allowable uncertainty levels required to meet the DQOs.

Automated, manual, and meteorological data are collected using EPA-tested and approved instruments that directly support rulemaking, enforcement, regulatory, or policy decisions. The data also support research projects of significant national interest requiring the most formal DQOs, including detailed and rigorous quality control (QC) and quality assurance (QA) for legal and scientific defensibility. Most instruments used in the collection of automated and manual data are listed as FEM or FRM.

Data used for the National Air Monitoring Strategy require, at a minimum, routine QC and QA checks as required in the CFR. Results from these checks are entered into the EPA AQS database and aggregated on quarterly, annual, and three-year intervals to assess precision and bias on a state and national level.

WAQA and Air Quality Index (AQI) data are collected with a mix of non-FRM/FEM instruments to report air quality to the public in near real time. However, one should use non-FRM/FEM data with caution when making decisions as there can be a greater degree of error inherent in the data.

2.1. Automated data

Data collected by instruments that continuously measure the ambient air are referred to as Automated Data. Automated instruments are designed to measure specific pollutants, including ozone (O_3), carbon monoxide (CO), nitric oxide (NO), nitrogen dioxide (NO_2), sulfur dioxide

(SO_2), and fine and course particulate matter ($PM_{2.5}$ and PM_{10}, respectively). Instrument calibrations are checked on a routine basis and the results are used to determine the quality of the data.

Data Quality Indicators for Gaseous Pollutants

- One Point QC Precision Estimate for Gaseous Pollutants (CV%)

On a routine basis, QC checks are performed on the station analyzer to determine the calibration drift of the instrument. The analyzer is challenged with gases traceable to National Institute of Standards and Technology (NIST) standards and the difference between the two is recorded by a data acquisition system and submitted to AQS.

To determine the measure of mutual agreement among the QC checks, the coefficient of variation CV% (precision estimate) is calculated every quarter as described in the Monitoring Rule to assess the precision of the instrument. Slight variations in the precision are acceptable provided the data is not biased too high or low. Large variations in precision are unacceptable and must be corrected.

- Bias Estimate (Bias)

The bias estimate is the systematic difference (or noticeable jump) of the expected concentrations and the measured concentrations over time, in percentage. As described in the Monitoring Rule, bias estimates are calculated to determine if there is a systematic or persistent distortion of the data, which causes error in one direction. A positive (+) bias indicates that the instrument is measuring above the actual (true) value. A negative (-) bias indicates that the instrument is measuring below the actual value. A "±" symbol represents the instrument "straddles the line" and is neither biased positive nor negative.

A continued bias in an instrument close to either side of "true value" is acceptable. However, a continued bias approaching the limits on the MQOs should be corrected before variations in the precision result in the instrument failing to meet the MQOs.

The one-point QC checks are submitted to AQS and aggregated by quarter, annual, and three-year periods to determine if the DQOs are being met on a national level.

- Completeness (% Valid Data)

Completeness is a term used to describe, in percentage, the actual amount of data (averaged in hours) collected compared to what was expected. The percentage of valid data is a critical measure of representativeness of the data obtained from a monitoring instrument in the calendar quarter or year to determine if the DQOs were met. Loss of data occurs on occasion and may be a result of a calibration error, malfunction, power loss, telemetry communications, or operator error. The AQP data completeness goal is that at least 80 percent of the expected data be collected each calendar quarter.

- Annual Performance Evaluations

Performance evaluations are independent evaluations of the monitoring site operations conducted by AQP QA personnel. Site evaluations are performed at all automated, manual, and

meteorological monitoring sites and concerns noted. The primary purpose of the evaluation is to provide an independent check to determine if the checks made by QA personnel agree with previous QC checks made at the site by automated or manual checks. A large difference between the two may indicate an instrument or systematic problem.

2.1.1. Ozone (O_3)

The MQO for the measurement of ozone is the precision estimate (CV%) and bias be within ± 7 percent.

Table 1: DQI Results for Ozone Analyzers in Percentage

Location	AQS Number	CV%	Bias	% Valid Data
Anacortes	530570011	1.28	- 1.22	94
Cheeka Peak	530090013	2.17	± 1.87	88
Cheney	530630001	1.58	± 1.42	97
Custer	530730005	0.95	± 0.75	95
Enumclaw	530330023	1.33	± 1.09	96
Greenbluff	530630046	1.67	± 1.30	91
Issaquah	530330010	1.72	± 1.52	97
Kennewick, S. Clodfelter	530050003	2.48	± 2.31	74*
Mt. Rainier, JVC	530530012	1.54	± 1.19	93
North Bend	530330017	1.01	± 0.94	94
Seattle, Beacon Hill (BH)	530330080	1.18	- 1.17	91
Vancouver	530110011	2.87	± 2.65	96
Yelm	530670005	1.32	± 1.12	97

* QC check failures likely due to heavy wildfire smoke during Aug–Sep. Issue was corrected after the wildfire events.

Annual Performance Evaluations for Ozone

An evaluation involves an independent assessment by AQP QA personnel who use independent equipment to challenge the station analyzer with gas concentrations at levels that best reflect ambient concentrations observed at the monitoring site. The difference is compared between the actual ozone concentrations (generated by the QA personnel equipment) against the station analyzer response. Two independent assessments are performed each year and the observations at each test level are averaged by year.

The analyzers are challenged with independent gas concentrations (Levels 2–6) to best reflect ambient concentrations observed at the monitoring site. The MQO for audit results is that the difference be within ± 7 percent for Levels 3–6 and within ± 1.5 ppb or ± 15 percent for Levels 1–2.

Table 2: Performance Evaluation Results for Ozone Analyzers in Percentage

Location	Level 1 4–6 ppb	Level 2 6–20 ppb	Level 3 20–40 ppb	Level 4 40–70 ppb	Level 5 70–90 ppb	Level 6 90–120 ppb
Anacortes	*	- 2.00	*	*	- 0.69	- 1.05
Cheeka Peak	*	- 2.50	*	*	- 0.76	- 2.95
Cheney	*	- 0.45	*	*	0.74	1.42
Custer	*	2.25	*	*	1.86	- 0.51
Enumclaw	*	12.00	*	*	3.68	2.80
Greenbluff	*	8.35	*	*	3.21	1.82
Issaquah	*	5.31	*	*	2.22	2.63
Kennewick, S. Clodfelter	*	7.00	*	*	3.96	3.90
Mt. Rainier, JVC	*	- 7.67	*	*	- 0.49	- 0.60
North Bend	*	2.61	*	*	1.74	0.93
Seattle, BH	*	1.06	*	*	0.70	0.18
Vancouver	*	- 1.65	*	*	0.19	- 4.95
Yelm	*	2.96	*	*	0.42	2.00

* No evaluation performed at this level.

2.1.2. Carbon monoxide (CO)

The MQO for the measurement of CO at the NCore (NC) sites is that the relative precision (CV%) and bias be within ± 15 percent. For instruments measuring CO for NAAQS attainment (Seattle, 10th & Weller), the relative precision (CV%) and bias must be within ± 10 percent. The table below represents the average precision and bias of the CO instruments in the Washington Network.

Table 3: DQI Results for CO Analyzers in Percentage

Location	AQS Number	CV%	Bias	% Valid Data
Cheeka Peak (NC)	530090013	3.96	± 3.23	77*
Seattle, BH (NC)	530330080	2.14	- 2.60	91
Seattle, 10th & Weller (near-road)	530330030	4.00	± 3.29	87

* QC check failures and telemetry communication error. The analyzer has been recalibrated and telemetry issue has been corrected.

Annual Performance Evaluations for CO

An evaluation involves an independent assessment by AQP QA personnel who use independent equipment to challenge the station analyzer with gas concentrations at levels that best reflect ambient concentrations observed at the monitoring site. The difference is compared between the

actual CO concentrations (generated by the QA personnel equipment) against the station analyzer response.

The NCore and near-road instruments are challenged with independent gas concentrations (Levels 1–5) to best reflect ambient concentrations observed at the monitoring sites. The MQO for performance evaluation results is that the difference be within ± 10 percent for Levels 3–8 and within ± 30 ppb or ± 15 percent for Levels 1–2.

Table 4: Performance Evaluation Results for CO Analyzers in Percentage

Location	Level 1 20–59 ppb	Level 2 60–199 ppb	Level 3 200–899 ppb	Level 4 900–2999 ppb	Level 5 3000–7999 ppb	Level 6 8000–15999 ppb	Level 7 16000–30999 ppb	Level 8 31000–39999 ppb
Cheeka Peak (NC)	*	0.13	- 4.42	- 0.14	*	*	*	*
Seattle, BH (NC)	*	- 2.93	- 4.57	- 2.58	*	*	*	*
Seattle, 10th & Weller	*	*	1.25	1.31	2.63	*	*	*

* No evaluation performed at this level.

2.1.3. Sulfur dioxide (SO_2)

The MQO for the measurement of SO2 is the relative precision (CV%) and bias be within ± 10 percent.

Table 5: DQI Results for SO_2 Analyzers in Percentage

Location	AQS Number	CV%	Bias	% Valid Data
Anacortes	530570011	3.82	2.93	95
Cheeka Peak	530090013	4.45	± 3.70	69*
Ferndale, Kickerville	530730013	2.95	± 2.18	90
Ferndale, Mtn. View Rd.	530730017	1.09	2.17	97
Malaga	530070012	1.94	- 5.14	96
Seattle, BH	530330080	2.17	± 2.12	74†

* QC check failures and ran out of calibration gas. The analyzer has been recalibrated and calibration gas replenished.

† Analyzer malfunction. The analyzer has been repaired and reinstalled.

Annual Performance Evaluations for SO_2

An evaluation involves an independent assessment by AQP QA personnel who use independent equipment to challenge the station analyzer with gas concentrations at levels that best reflect ambient concentrations observed at the monitoring site. The difference is compared between the

actual SO_2 concentrations (generated by the QA personnel equipment) against the station analyzer response.

The analyzers are challenged with independent gas concentrations (Levels 1–6) to best reflect ambient concentrations observed at the monitoring site. The MQO for performance evaluation results is that the difference be within ± 10 percent for Levels 4–6, within ± 15 for Level 3, and within ± 1.5 ppb or ± 15 percent for Levels 1–2.

Table 6: Performance Evaluation Results for SO_2 Analyzers in Percentage

Location	Level 1 0.3–2.9 ppb	Level 2 3–4.9 ppb	Level 3 5–7.9 ppb	Level 4 8–19.9 ppb	Level 5 20–49.9 ppb	Level 6 50–99.9 ppb
Anacortes	- 1.70	*	- 4.69	*	- 3.50	*
Cheeka Peak	- 12.40	*	- 12.00	*	- 3.56	*
Ferndale, Kickerville	*	*	*	- 0.56	- 1.67	2.14
Ferndale, Mtn. View Rd.	*	*	*	- 6.39	- 4.44	- 2.60
Malaga	*	*	*	- 0.33	- 1.20	1.67
Seattle, BH	- 9.07	*	- 8.61	*	- 6.77	*

* No evaluation performed at this level.

2.1.4. Nitrogen dioxide (NO_2)

The MQO for the measurement of NO2 is the relative precision (CV%) and bias be within ± 15 percent.

Table 7: DQI Results for NO_2 Analyzers in Percentage

Location	AQS Number	CV%	Bias	% Valid Data
Quincy	530251003	8.08	± 7.36	86
Seattle, 10th & Weller	530330030	3.65	6.17	80
Seattle, BH	530330080	4.66	± 3.92	66*
Tacoma, S 36th St.	530530024	6.10	± 4.96	91

* Analyzer malfunction and was taken offline for repair during Aug.-Sep. The analyzer has been repaired and reinstalled.

Annual Performance Evaluations for NO_2

An evaluation involves an independent assessment by AQP QA personnel who use independent equipment to challenge the station analyzer with gas concentrations at levels that best reflect ambient concentrations observed at the monitoring site. The difference is compared between the actual NO_2 concentrations (generated by the QA personnel equipment) against the station analyzer response.

The analyzers are challenged with independent gas concentrations (Levels 1–6) to best reflect ambient concentrations observed at the monitoring site. The MQO for performance evaluation results is that the difference be within ± 15 percent for Levels 3–7 and within ± 1.5 ppb or 15 percent for Levels 1–2.

Table 8: Performance Evaluation Results for NO_2 Analyzers in Percentage

Location	Level 1 0.3–2.9 ppb	Level 2 3–4.9 ppb	Level 3 5–7.9 ppb	Level 4 8–19.9 ppb	Level 5 20–49.9 ppb	Level 6 50–99.9 ppb	Level 7 100–299.9 ppb
Quincy	*	*	*	*	- 12.44	- 11.38	- 11.71
Seattle, 10th & Weller, near-road	*	*	*	*	- 11.78	- 11.25	- 7.50
Seattle, BH	*	*	*	- 1.31	- 11.00	- 6.17	*
Tacoma, S 36th St.	*	*	*	*	- 7.33	- 6.88	- 4.15
* No evaluation performed at this level.							

2.1.5. Trace nitric oxide (trace NO)

The MQO for the measurement of trace NO is the relative precision (CV%) and bias be within ± 15 percent. Note that the sites listed here use reactive nitrogen oxides (NOy) analyzers to measure low ambient NO and NOy concentrations as part of the NCore network. Reported CV% and bias are based on the NO channel of the NOy analyzer per EPA requirements.

Table 9: DQI Results for NOy Analyzers in Percentage

Location	AQS Number	CV%	Bias	% Valid Data
Cheeka Peak	530090013	3.98	- 3.58	85
Seattle, BH	530330080	1.78	± 1.66	95

Annual Performance Evaluations for trace NO

The MQO for performance evaluation results is that the difference be within ±10 percent for Levels 6–7, within ± 15 percent for Levels 3–5, and ± 1.5 ppb or ± 15 percent for Levels 1–2.

Table 10: Performance Evaluation Results for NOy Analyzers in Percentage

Location	Level 1 0.3–2.9 ppb	Level 2 3–4.9 ppb	Level 3 5–7.9 ppb	Level 4 8–19.9 ppb	Level 5 20–49.9 ppb	Level 6 50–99.9 ppb	Level 7 100–300 ppb
Cheeka Peak	*	*	- 0.67	*	2.12	*	6.75
Seattle, BH	*	*	- 1.83	*	5.22	*	2.78
* No evaluation performed at this level.							

Data Quality Indicators for Particulate Pollutants

- One-Point QC Precision Estimate for Particulate Pollutants (Average % D)

Every 30 days, a one-point flow rate verification (QC check) is performed on particulate instruments by measuring the actual and indicated flow of the instrument. The actual instrument flow is measured by the station operator using NIST-traceable standards. The difference between the actual flow and the indicated instrument flow is calculated and recorded by the station operator and submitted to the AQS.

- One-Point Flow Rate Bias Estimate (Bias)

The bias estimate is the systematic difference of the expected flows and the measured flows over time, in percentage. As described in the Monitoring Rule, bias estimates are calculated to determine if there is a systematic or persistent distortion of the data, which causes error in one direction.

Instrument flow rates can fluctuate over time. Therefore, a one-point flow rate verification (QC check) on the instrument is required every 30 days. The objective of the QC check is to measure the true flow rate of the instrument, using NIST traceable standards, while recording the indicated flow rate of the instrument. A positive (+) bias indicates that the instrument flow rates are operating above the actual (true) value while a negative (-) bias indicates that the instruments flow rate is below the actual value. A "±" symbol indicates that the instrument "straddles the line" and is neither positively nor negatively biased. The checks are aggregated by quarter, annual, and 3-year periods.

- Semi-Annual Flow Rate Audits (Audit % D)

In addition to monthly QC checks, QA personnel on a semi-annual basis perform an independent flow rate audit. The objective of the auditor is to measure the actual flow rate of the instrument using an independent, NIST-traceable standard, while recording the indicated flow rate of the instrument. The deviation between the two flows is calculated, recorded, and submitted to AQS.

2.1.6. Fine particulate matter ($PM_{2.5}$ FEM – continuous)

The MQO for the measurement of $PM_{2.5}$ using an FEM instrument is that bias and precision (Average % D) be within ± 4 percent. Audit results (Audit % D) must be within ± 4 percent and the Design Flow must be within ± 5 percent.

Table 11: DQI Results for Continuous FEM $PM_{2.5}$ Monitors in Percentage

Location	AQS Number	Average % D	Bias	Audit % D	% Valid Data
Anacortes (BAM 1020)	530570011	- 0.12	± 1.04	- 0.28	97
Bellingham (1405F TEOM)	530730015	- 0.80	± 2.06	0.25	93
Bremerton (8500 TEOM)	530350007	0.30	± 0.83	- 1.47	98
Darrington (8500 TEOM)	530610020	- 0.18	± 1.70	- 2.26	98
Ellensburg (BAM 1020)	530370002	1.05	2.03	0.91	95

Location	AQS Number	Average % D	Bias	Audit % D	% Valid Data
Kent (8500 TEOM)	530332004	0.46	± 1.16	- 1.79	96
Lynnwood (8500 TEOM)	530610005	- 0.84	- 1.26	- 1.15	86
Marysville (1405 TEOM)	530611007	0.07	± 1.13	- 1.76	90
Omak (BAM 1020)	530470013	- 0.25	± 0.52	0.01	82
Seattle, 10th & Weller (8500 TEOM), monitored Jan-Mar 2017	530330030	0.75	± 1.70	0.33	99
Seattle, 10th & Weller (BAM 1020), monitored Apr-Dec 2017	530330030	0.28	± 1.32	- 2.34	91
Seattle, BH (NC) (8500 TEOM)	530330080	- 1.21	- 1.72	- 0.16	99
Seattle, Duwamish (8500 TEOM)	530330057	- 0.61	± 1.43	- 2.28	96
Spokane, Augusta (BAM 1020)	530630021	- 0.18	± 2.02	0.89	98
Tacoma, S. 36th St. (BAM 1020)	530530024	- 0.16	± 1.10	0.00	96
Tacoma, S. L St. (1405 TEOM)	530530029	- 0.22	± 0.90	- 1.31	97
Toppenish (BAM 1020)	530770015	- 1.32	- 1.88	- 0.60	96
Vancouver 84th Ave. (BAM 1020)	530110024	- 0.84	- 1.23	0.64	93
Wenatchee, Fifth St. (BAM 1020), monitored Jan-Mar 2017	530070011	- 0.19	± 1.58	0.60	97
Yakima S. 4th Ave. (BAM 1020)	530770009	- 0.14	± 1.13	- 2.05	98

2.1.7. Particulate matter (PM_{10} FEM – continuous)

The MQO for the measurement of PM10 using an FEM instrument is that total bias be within ± 10 percent; precision (Average % D) and performance evaluation results (Audit % D) be within ± 4 percent.

Table 12: DQI Results for Continuous FEM PM_{10} Monitors in Percentage

Location	AQS Number	Average % D	Bias	Audit % D	% Valid Data
Burbank, monitored Aug-Dec 2017	530710006	- 2.70	- 5.74	- 8.81	94
Colville, E. 1st St.	530650005	0.52	± 3.08	- 0.50	99
Kennewick	530050002	1.28	± 2.95	0.87	100
Spokane, Augusta	530630021	- 0.01	± 1.67	- 1.83	99
Yakima S. 4th Ave.	530770009	0.17	± 0.97	- 1.32	89

2.2. Manual data

Manual data refers to filter-based monitoring methods, which require an operator to physically install and retrieve sample filters. Particulate matter is collected on a sample filter over a 24-hour period. After sampling has been completed, sample filters are collected by the operator and sent to the Manchester Environmental Laboratory for gravimetric analysis. Depending on the method used at the monitoring site, the instrument is designed to selectively collect particulate matter at a specific flow rate on scheduled days. Note that this method for $PM_{2.5}$ monitoring is now designated as Class I FEM with the configuration of a BGI VSCC™ $PM_{2.5}$ size separator per CFR 40 Part 50 Appendix L.

- One-Point QC Precision Estimate for Particulate Pollutants (Average % D)

Monthly QC checks are performed on the instrument by monitoring personnel. The difference between the actual flow and the indicated instrument flow is calculated, recorded, and submitted into the AQS.

- One-Point Flow Rate Bias Estimate (Bias)

Manual data monitoring methods require accurate flow rate measurements in order to accurately determine pollutant concentrations. Particulate matter concentrations are calculated by the mass of the sample on a filter divided by the volume of air. The volume of air is calculated by the flow rate of the instrument over the elapsed sampling time. Instruments are calibrated to operate at a designed flow rate. Differences in flow rates affect actual concentrations. Figure 1 illustrates how a four percent difference in flow rate impacts the actual concentration of a PM2.5 sample.

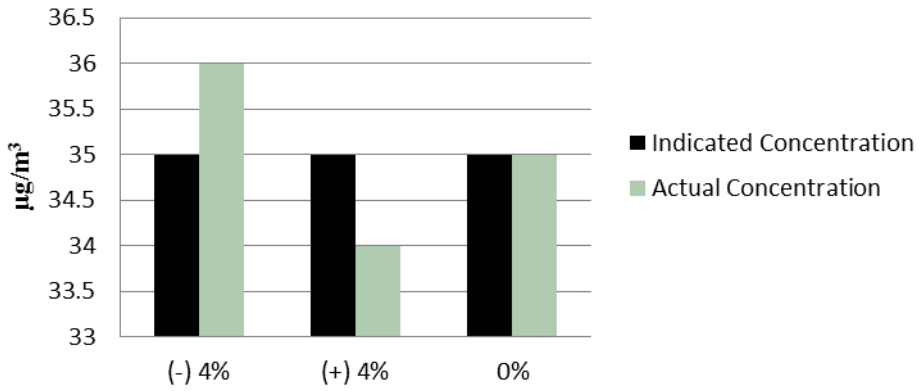

Figure 1: Graph illustrating how flows impact actual concentrations

Instrument flow rates can fluctuate over time. Therefore, a one-point flow rate verification (QC check) on the instrument is required every 30 days. The objective of the check is to measure the true flow rate of the instrument using NIST-traceable standards while recording the indicated flow rate of the instrument. The difference between the two is calculated in percentage to determine how "true" the indicated flow is. A positive (+) bias indicates that the instrument flow rate over time is operating above the actual (true) value. A negative (-) bias represents the

instruments flow rate is below the actual value. A "±" symbol represents the instrument "straddles the line" and is neither positively nor negatively biased.

- Semi-Annual Flow Rate Audits (Audit % D)

In addition to monthly QC checks, QA personnel on a semi-annual basis perform an independent flow rate check. The objective of the auditor is to measure the actual flow rate of the instrument using independent NIST traceable standards while recording the indicated flow rate of the instrument. The deviation between the two flows is then calculated and submitted to the AQS.

2.2.1. Fine particulate matter ($PM_{2.5}$ Class I FEM – 24 hour)

The MQO for the measurement of PM2.5 using Class I FEM manual, filter-based sampling is that total bias be within ± 10 percent; precision (Average % D) and performance evaluation results (Audit % D) be within ± 4 percent.

Table 13: DQI Results for FEM $PM_{2.5}$ Samplers in Percentage

Location	AQS Number	Average % D	Bias	Audit % D	% Valid Data
Seattle, BH	530330080	- 0.72	± 1.39	- 1.71	93
Tacoma, S. L St.	530530029	- 1.01	- 1.33	0.58	93
Tacoma, S. L St. (collocated)	530530029	- 1.07	- 1.36	- 0.15	90
Yakima, S. 4th Ave.	530770009	- 0.63	± 1.36	- 0.09	97

Precision Estimate for Manual and Continuous Collocated Samples ($PM_{2.5}$)

Precision for manual and automated particulate method sampling is estimated using collocated sampling. Unlike the gaseous criteria, pollutants where one can use a standard of a known concentration to estimate instrument precision, duplicate measurements are made on-site for comparison. The precision (CV %) should be within ± 10 percent. Note that the relatively low ambient $PM_{2.5}$ concentrations and the limited number of collected samples (every 12 days) at Tacoma South L St. may yield high imprecision that can be challenging to meet the recommended acceptance range.

Table 14: Precision Estimates for Collocated Samplers in Percentage

Location	EPA Method-Parameter	AQS Number	CV%
Tacoma, S. L St.	145 - Class I FEM (24-hour) $PM_{2.5}$	530530029	6.65

2.2.2. $PM_{2.5}$ chemical speciation network

The Chemical Speciation Network (CSN) is a national network of sites used to determine, over a period of several years, trends in concentration levels of selected ions, metals, carbon species, and organic compounds in $PM_{2.5}$. Flow checks are performed by station operators every 30 days and submitted to a national repository contracted by OAQPS.

In addition to monthly QC checks, QA personnel on a semi-annual basis perform an independent flow rate audit. The primary objective of the audit is to measure the true flow rate of the instrument using independent, NIST-traceable, standards while recording the indicated flow rate of the instrument. The deviation between the two flows is calculated. The MQO for the CSN is that the results be within ± 10 percent. Note that the Beacon Hill station is equipped with a Super SASS sampler that has two extra flow channels.

Table 15: Audit Results for Speciation Samplers in Percentage

Location	AQS Number	SASS CH 1 Audit % D	SASS CH 2 Audit % D	SASS CH 3 Audit % D	SASS CH 4 Audit % D	URG Audit % D
Seattle, 10th & Weller	530330030	- 3.52	- 1.90	---	---	1.70
Seattle, BH	530330080	- 4.55	- 4.62	- 4.74	- 4.61	1.50
Tacoma, S. L St.	530530029	- 1.52	- 1.48	---	---	- 0.79
Yakima S. 4th Ave.	530770009	- 3.31	0.49	---	---	- 4.66

2.3. Meteorological data

To ensure data of sufficient quality for modeling applications and permitting use, EPA guidelines for continuous monitoring for Prevention of Significant Deterioration (PSD) are followed for wind speed (WS), wind direction (WD), ambient temperature (AT), ambient pressure (PA) and relative humidity (RH).

Table 16: Data Capture for Meteorological Parameters

Location	AQS Number	WS	WD	AT	PA	RH
Cheeka Peak	530090013	96	96	97	98	97
Colville, E 1st St.	530650005	85	85	100	---	---
Enumclaw	530330023	99	99	100	---	---
Ferndale, Mtn. View Rd.	530730017	99	99	89	---	---
Kennewick	530050002	100	100	96	---	---
Malaga	530070012	99	99	100	---	---
North Bend	530330017	100	100	100	---	---
Omak	530470013	98	98	98	---	---
Quincy	530251003	98	98	99	---	---
Seattle, 10th & Weller	530330030	100	100	99	---	---
Seattle, BH	530330080	99	99	99	99	90
Spokane, Augusta	530630021	100	100	100	---	---
Tacoma, 36th St.	530530024	99	99	99	---	---
Tacoma, Tower Dr.	530531016	100	100	99	---	---

Location	AQS Number	WS	WD	AT	PA	RH
Toppenish	530770015	94	94	100	---	---
Vancouver, Blairmont	530110011	100	100	100	---	---
Wenatchee	530070011	100	100	100	---	---
White Swan	530770016	99	99	100	---	---

2.4. Washington Air Quality Advisory data

2.4.1. Light scattering of fine particulates (nephelometer)

The AQP uses a large network of instruments to report $PM_{2.5}$ air pollution information to the public in in near real-time via its WAQA that can be found on its public website. The majority of these instruments (nephelometers) measure light scattering of particulates, not $PM_{2.5}$ directly. Ecology and its partners follow EPA guidance to use nephelometers to report "FRM-like" $PM_{2.5}$ data. Because nephelometers are not an FRM or FEM, $PM_{2.5}$ data collected using nephelometers cannot be used for NAAQS compliance determinations. The data are displayed in near real-time on Ecology and EPA websites for public information.

Table 17: Completeness Results for Nephelometers

Location	AQS Number	% Valid Data
Aberdeen	530272002	98
Bellevue, 12th St.	530330031	96
Bellevue, Bellevue Way, discontinued 5/12/17	530330037	99
Cheeka Peak	530090013	97
Chehalis	530410004	100
Chelan	530070007	90
Clarkston	530030004	96
Colville, E 1st St.	530650005	95
Dayton	530130002	91
Ellensburg, discontinued 4/27/17	530370002	96
Kennewick	530050002	100
Lacey	530670013	99
LaCrosse	530750005	85
Lake Forest Park, re-established 12/11/17	530330024	86
Leavenworth	530070010	84

Location	AQS Number	% Valid Data
Longview	530150015	100
Mesa	530210002	91
Moses Lake	530251002	100
Mount Vernon	530570015	73*
Neah Bay	530090015	99
North Bend	530330017	99
Okanogan	530470004	98
Pomeroy	530230001	98
Port Angeles	530090017	92
Pt. Townsend	530310003	100
Pullman	530750003	87
Puyallup, 128th Ave.	530531018	100
Quincy	530251003	98
Ritzville	530010003	98
Rosalia	530750006	100
Seattle, South Park	530331011	82
Shelton	530450007	100
Spokane, Monroe	530630047	100
Sunnyside	530770005	79*†
Tacoma, Alexander Ave.	530530031	94
Taholah	530270011	97
Tukwila, established 7/1/17	530330069	88
Twisp	530470009	100
Walla Walla	530710005	89
Wellpinit	530650002	97
Wenatchee, 5th St.	530070011	100
White Swan	530770016	94
Winthrop	530470010	87
Yacolt	530110022	99

* QC check failures. The nephelometer has been recalibrated.

† Nephelometer malfunction due to heavy wildfire smoke during Jul-Aug. It was replaced on 8/31/17.

Note: No QA evaluations are performed on nephelometers. The quality of the data is not assessed.

ACTION

ITEMS

Yakima Regional Clean Air Agency
329 North First Street,
Yakima WA 98901
(509) 834-2050
yakimacleanair.org

Executive Memorandum

Date of Release: September 6, 2018

Date of Consideration: September 13, 2018

To: YRCAA Board of Directors

From: Office of the Executive Director

Subject: Fiscal Program Report

Issue:
Fiscal Reports

Discussion:
August 2018 Accounts Payable (AP) and Payroll Authorizations are enclosed for your approval. The Budget Verification Analysis (BVA) and Supplemental Income documents are included as informational items.

Recommendation:
Accept and approve by minute action the August 2018 AP Fiscal Vouchers, totaling $79,110.70, and the August Payroll Authorization, totaling $55,356.12.

Encl. 5

AGENDA ITEM NO. 7.1

AUTHORIZATION FOR ELECTRONIC FUNDS TRANSFER

Direct Deposit Payroll & Payroll Taxes

Date: 8/30/2018

District: Yakima Regional Clean Air Agency

Contact Person: Christa Owen

Address: 329 North First Street, Yakima, WA 98901

Telephone No. 834-2050 ext 104 **Telefax No. 834-2060**

Authorization is given for the Yakima County Treasurer to electronically transfer the amounts listed below:

Name of Bank: Key Bank of Washington

ABA Routing Number: [redacted]

Bank Account Number: [redacted]

Payroll Date: **September 4, 2018**

Transfer Amount(s): **$ 55,356.12**

Total Amount of Electronic Transfer: **$ 55,356.12**

Authorizing Signatures (*No facsimile signatures accepted.*):

Auditing Officer

Chairman Board of Directors

Alternate Auditing Officer

Date August 30, 2018

Note: The Yakima County Treasurer's Office must receive the completed authorization by 12:00 noon, two (2) business days prior to payroll date. An original must be provided to the County Treasurer's Office if a telefax is sent. *Do not consider a telefax delivered until you have verified with the Treasurer's Office that it has been received.*

Contact Persons at County Treasurer's Office: **Cindy**

Telephone Number: 509-574-2780 Telefax Number: 509-574-2801

(01-2008)

Yakima Regional Clean Air Agency
Phone: (509) 834-2050

329 North First Street, Yakima WA 98901
www.yakimacleanair.org

August 28, 2018

Fund 614-614 YRCAA

Fund 614-141 Enterprise

Name	Warrant/MICR #	GL #	Amount	Date
Absolute Comfort Technology, LLC*	33490	4101	$18,000.00	8/29/2018
Jack Albee*	33491	4101	$ 400.00	8/29/2018
Alliant Communications	33492	4101	$ 229.12	8/29/2018
Joseph Anna*	33493	4101	$ 750.00	8/29/2018
Bradley A. Mellotte	33494	4501	$ 3,801.40	8/29/2018
Budget Office Furniture, LLC	33495	3101	$ 595.10	8/29/2018
Coleman Oil Company	33496	3201	$ 91.61	8/29/2018
Enduris of Washington	33497	4601	$13,397.00	8/29/2018
Farwest Climate Control, Inc.*	33498	4101	$11,838.47	8/29/2018
Karen Goureau*	33499	4101	$ 400.00	8/29/2018
Inland Awning of Yakima*	33500	4101	$ 2,958.11	8/29/2018
Inland Contracting*	33501	4101	$ 982.89	8/29/2018
KeyBank	33502	Various	$ 85.33	8/29/2018
Greg Meloy*	33503	4101	$ 800.00	8/29/2018
Nth Degree Environmental Engineering Solutions	33504	4101	$ 900.00	8/29/2018
Northwest Community Action Center*	33505	4101	$ 200.00	8/29/2018
Carrol L. Tyler*	33506	4101	$ 250.00	8/29/2018
Volunteer Services (Catholic Charities)*	33507	4101	$ 680.00	8/29/2018
YRCAA	33508	Various	$ 349.89	8/29/2018

$ 56,708.92

***Reimbursement from Grant**

****NOC/Enterprise**

This is to certify that the invoices and warrants above for the Yakima Regional Clean Air Agency have been examined, audited and approved by the Alternate Auditing Officer for payment.

Total Amount: **$ 56,708.92**

Christa Owen 8/29/2018
Christa Owen, Alternate Auditing Officer

9/13/2018
Jon DeVaney, Board Chairman

Keith M. Hurley 8/29/2018
Keith M. Hurley, Auditing Officer

CLEAN AIR
Yakima Regional Clean Air Agency
Phone: (509) 834-2050

329 North First Street, Yakima WA 98901
www.yakimacleanair.org

August 14, 2018

Fund 614-614 YRCAA

Fund 614-141 Enterprise

Name	Warrant/MICR #	GL #	Amount	Date
Abadan Reprographics	33470	4801	$ 786.92	8/15/2018
Alliant Communications	33471	4101	$ 135.26	8/15/2018
Armstrong's Stove & Spa*	33472	4101	$15,617.00	8/15/2018
Charter Communications	33473	4201	$ 649.87	8/15/2018
Coleman Oil Company	33474	3201	$ 158.53	8/15/2018
Cuillier Law Office	33475	4101	$ 126.00	8/15/2018
EMSL Analytical, Inc.	33476	4102	$ 44.00	8/15/2018
FedEx	33477	4202	$ 24.34	8/15/2018
Invisible Ink	33478	4101	$ 82.50	8/15/2018
Leaf	33479	4501	$ 186.07	8/15/2018
Menke Jackson Law Firm	33480	4101	$ 1,293.75	8/15/2018
Javier Perez*	33481	4101	$ 500.00	8/15/2018
Lorena Perez*	33482	4101	$ 500.00	8/15/2018
Pitney Bowes Reserve Account	33483	4202	$ 500.00	8/15/2018
Felipa Sandoval*	33484	4101	$ 250.00	8/15/2018
Verizon Wireless	33485	4201	$ 337.32	8/15/2018
Lawrence M. White*	33486	4101	$ 500.00	8/15/2018
YRCAA	33487	4901	$ 309.27	8/15/2018
Yakima Area Arboretum & Botanical Garden**	33488	4501	$ 235.00	8/15/2018
Yakima County Sheriff's Department	33489	4101	$ 165.95	8/15/2018

$ 22,401.78

***Reimbursement from Grant**

****NOC/Enterprise**

This is to certify that the invoices and warrants above for the Yakima Regional Clean Air Agency have been examined, audited and approved by the Alternate Auditing Officer for payment.

Total Amount: **$ 22,401.78**

Christa Owen 8/15/2018
Christa Owen, Alternate Auditing Officer

9/13/2018
Jon DeVaney, Board Chairman

Keith M. Hurley 8/15/2018
Keith M. Hurley, Auditing Officer

FY 2019 Monthly BVA

August 2018 **Report Date:** September 13, 2018		**Budget**	**Actual Current**	**Actual Year to Date**	**Year to Date % of Budget**
	REVENUE				
REVENUE 614 YRCAA Base Operations					
Stationary Source Permit Fees					
614-32190001	Minor Sources	$ 162,000	$ -	$ 453	0.3%
614-32190008	Synthetic Minor Sources	$ 19,950	$ -	$ -	0.0%
614-32190006	Complex Sources	$ 20,300	$ -	$ -	0.0%
614-32290001	Title V Sources	$ 122,500	$ 90,255	$ 150,292	122.7%
614-32190002	New Source Review	$ 31,500	$ 4,244	$ 5,044	16.0%
	Subtotal, Stationary Source Permit Fees	***$ 356,250***	***$ 94,498***	***$ 155,788***	***43.7%***
Burn Permit Fees					
614-32290005	Residential Burn Permits	$ 60,500	$ 288	$ 3,600	6.0%
614-32290007	Agricultural Burn Permits	$ 30,500	$ 472	$ 1,956	6.4%
614-32290011	Conditional Use Burn Permits	$ 2,000	$ -	$ -	0.0%
	Subtotal, Burn Permit Fees	***$ 93,000***	***$ 760***	***$ 5,556***	***6.0%***
Compliance Fees					
614-32190005	Asbestos Removal Fees	$ 31,000	$ 1,506	$ 3,589	11.6%
614-32190009	Construction Dust Control Fees	$ 8,200	$ 155	$ 792	9.7%
	Subtotal, Compliance Fees	***$ 39,200***	***$ 1,661***	***$ 4,381***	***11.2%***
	Subtotal, All Permit Fee Revenue	***$ 488,450***	***$ 96,919***	***$ 165,725***	***33.9%***
Base Grants					
614-33366001	EPA, Core Grant	$ 107,395	$ -	$ 26,849	25.0%
614-33403101	DOE, Core Grant	$ 76,800	$ -	$ 19,204	25.0%
	Subtotal, Base Grants	***$ 184,195***	***$ -***	***$ 46,054***	***25.0%***
Fines & Penalties					
614-35990001	Civil Penalty	$ 2,500	$ -	$ 4,005	
614-35990001	Other Fines	$ -	$ -	$ -	
	Subtotal, Fines & Penalties	***$ 2,500***	***$ -***	***$ 4,005***	
Supplemental Income					
614-33831001	Supplemental Income	$ 100,789	$ -	$ 19,982	19.8%
	Subtotal, Supplemental Income	***$ 100,789***	***$ -***	***$ 19,982***	***19.8%***
Other Income					
614-36111001	Interest	$ 2,100	$ 582	$ 1,130	53.8%
614-36990014	Miscellaneous Income	$ 200	$ 100	$ 250	125.0%
	Subtotal, Other Income	***$ 2,300***	***$ 682***	***$ 1,380***	***60.0%***
	Total YRCAA Base Operations Revenue	***$ 778,234***	***$ 97,601***	***$ 237,145***	***30.5%***
REVENUE 614 YRCAA Grant Operations					
614-33403105	Wood Stove Ed	$ 5,331	$ 5,331	$ 5,331	100.0%
614-33403108	PM 2.5	$ 21,050	$ -	$ 5,263	25.0%
614-33403107	Woodstove Change-out	$ 550,000	$ 1,901	$ 2,039	0.4%
	Total YRCAA Grant Operations Revenue	***$ 576,381***	***$ 7,232***	***$ 12,632***	***2.2%***
REVENUE Enterprise Operations					
614-34317001	VE Certification Fees	$ 80,000	$ 2,950	$ 2,950	3.7%
614-34317002	Other Enterprise Revenue	$ 100	$ -	$ -	0.0%
	Subtotal , Enterprise Revenue	***$ 80,100***	***$ 2,950***	***$ 2,950***	***3.7%***
	Total Base, Grant and Enterprise Revenue	***$ 1,434,715***	***$ 107,784***	***$ 252,728***	***17.6%***

FY 2019 Monthly BVA

August 2018 **Report Date:** September 13, 2018		**Budget**	**Actual Current**	**Actual Year to Date**	**Year to Date % of Budget**
EXPENSES					
EXPENSES 614 YRCAA Base Operations					
Salaries					
614-1001	Salaries	$ 484,932	$ 35,601	$ 73,681	15.2%
614-2002	Benefits	$ 183,571	$ 12,508	$ 25,888	14.1%
614-1003	Overtime	$ -	$ -	$ -	#DIV/0!
	Subtotal, Salaries	***$ 668,503***	***$ 48,109***	***$ 99,569***	***14.9%***
Supplies					
614-3101	Office Supplies	$ 6,500	$ 799	$ 1,001	15.4%
614-3101	Safety Equipment	$ 500	$ -	$ -	0.0%
614-3201	Vehicles, Gas	$ 2,500	$ 250	$ 373	14.9%
614-3501	Small Tools/Equipment	$ 200	$ -	$ -	0.0%
614-3502	Computer Network	$ 4,000	$ 70	$ 140	3.5%
	Subtotal, Supplies	***$ 13,700***	***$ 1,119***	***$ 1,513***	***11.0%***
Services					
614-4101	Professional Services	$ 35,000	$ 2,933	$ 12,529	35.8%
614-4101	Laboratory Analyses	$ 200	$ 44	$ 70	35.0%
614-4125	Treasurer, Yakima County	$ 1,014	$ 85	$ 85	8.3%
614-4201	Communications, Phones/Internet	$ 12,800	$ 987	$ 2,059	16.1%
614-4202	Postage	$ 3,500	$ 595	$ 595	17.0%
614-4301	Travel & Transportation	$ 3,200	$ -	$ -	0.0%
614-4401	Public Education	$ 4,000	$ -	$ -	0.0%
614-4401	Publications, Legal Notices	$ 2,000	$ -	$ -	0.0%
614-4501	Rents & Leases, Equipment	$ 3,282	$ 186	$ 372	11.3%
614-4501	Rents & Leases, Space	$ 52,659	$ 3,801	$ 16,509	31.4%
614-4601	Insurance	$ 12,600	$ 13,397	$ 13,397	106.3%
614-4801	Maintenance, Motor Vehicles	$ 2,400	$ 61	$ 284	11.8%
614-4801	Maintenance, Equipment	$ 2,000	$ 787	$ 925	46.2%
614-4801	Maintenance, Computers	$ 250	$ -	$ -	0.0%
614-4801	Maintenance, Building	$ 1,500	$ -	$ -	0.0%
614-4901	Memberships	$ 920	$ 30	$ 30	3.3%
614-4901	Training	$ 2,500	$ -	$ -	0.0%
614-4901	Service Chgs & Interest	$ 5,000	$ 309	$ 874	17.5%
614-4901	Miscellaneous Services	$ 6,750	$ -	$ -	0.0%
614-4901	DOE Oversite Fees	$ 4,787	$ -	$ -	0.0%
	Subtotal, Services	***$ 156,362***	***$ 23,214***	***$ 47,729***	***30.5%***
Capital Out-Lay & Fixed Assets					
614-6401	Capital Out-Lay/Fixed Assets	$ -	$ -	$ -	
	Total YRCAA Base Operations Expenses	***$ 838,565***	***$ 72,443***	***$ 148,812***	***17.7%***
EXPENSES 614 YRCAA Grant Operations					
614-33403105 Wood Stove Ed					
Salaries					
614-1001	Salaries	$ 3,867	$ 319	$ 707	
614-2002	Benefits	$ 1,464	$ 112	$ 248	
614-1003	Overtime	$ -	$ -	$ -	
	Subtotal, Salaries	***$ 5,331***	***$ 431***	***$ 955***	
Supplies					
614-3101	Office Supplies	$ -	$ -	$ -	
	Subtotal, Supplies	***$ -***	***$ -***	***$ -***	

FY 2019 Monthly BVA

August 2018 **Report Date:** September 13, 2018		**Budget**	**Actual Current**	**Actual Year to Date**	**Year to Date % of Budget**
Services					
614-4139	Professional Services	$ 120	$ -	$ -	
614-4202	Postage	$ -	$ -	$ -	
	Subtotal, Services	***$ 120***	***$ -***	***$ -***	
	Subtotal, Woodstove Grant Expenses	***$ 5,451***	***$ 431***	***$ 955***	
614-33403108 PM2.5					
Salaries					
614-1001	Salaries	$ 15,270	$ 1,254	$ 2,249	14.7%
614-2002	Benefits	$ 5,780	$ 441	$ 790	13.7%
614-1003	Overtime	$ -	$ -	$ -	-
	Subtotal, Salaries	***$ 21,050***	***$ 1,695***	***$ 3,039***	***14.4%***
Supplies					
614-3101	Office Supplies	$ -	$ -	$ -	#DIV/0!
	Subtotal, Supplies	***$ -***	***$ -***	***$ -***	***#DIV/0!***
Services					
614-4101	Professional Services	$ -	$ -	$ -	#DIV/0!
	Subtotal, Services	***$ -***	***$ -***	***$ -***	***#DIV/0!***
Capital Out-Lay & Fixed Assets					
614-6401	Capital Out-Lay/Fixed Assets	$ -	$ -	$ -	#DIV/0!
	Subtotal, PM 2.5 Grant Expenses	***$ 21,050***	***$ 1,695***	***$ 3,039***	***14.4%***
614-33403107 Woodstove Change-out					
Salaries					
614-1001	Salaries	$ 59,845	$ 3,743	$ 7,285	12.2%
614-2002	Benefits	$ 22,655	$ -	$ 1,244	5.5%
614-1003	Overtime	$ -	$ -	$ -	#DIV/0!
	Subtotal, Salaries	***$ 82,500***	***$ 5,059***	***$ 9,845***	***11.9%***
Supplies					
614-3101	Office Supplies	$ 50	$ -	$ 185	370.0%
	Subtotal, Supplies	***$ 50***	***$ -***	***$ 185***	***370.0%***
Services					
614-4101	Professional Services	$ 467,500	$ 54,626	$ 70,059	15.0%
	Subtotal, Services	***$ 467,500***	***$ 54,626***	***$ 70,059***	***15.0%***
Capital Out-Lay & Fixed Assets					
614-6401	Capital Out-Lay/Fixed Assets	$ -	$ -	$ -	#DIV/0!
	Subtotal, Woodstove Change-out Grant Expenses	***$ 550,050***	***$ 59,685***	***$ 80,089***	***14.6%***
	Total, Grant Operations Expenses	***$ 576,551***	***$ 61,811***	***$ 84,083***	***14.6%***
EXPENSES 141 Enterprise Operations					
Salaries					
141-1001	Salaries	$ 11,810	$ 46	$ 46	0.4%
141-2002	Benefits	$ 4,470	$ 16	$ 16	0.4%
141-1003	Overtime	$ -	$ -	$ -	#DIV/0!
	Subtotal, Salaries	***$ 16,280***	***$ 62***	***$ 62***	***0.4%***

FY 2019 Monthly BVA

August 2018 **Report Date:** September 13, 2018		**Budget**	**Actual Current**	**Actual Year to Date**	**Year to Date % of Budget**
Supplies					
141-3101	Office Supplies	$ 200	$ -	$ -	0.0%
141-3201	Vehicles, Gas	$ 1,000	$ -	$ -	0.0%
141-3501	Small Tools/Equipment	$ 200	$ -	$ -	0.0%
	Subtotal , Supplies	***$ 1,400***	***$ -***	***$ -***	***0.0%***
Services					
141-4101	Professional Services	$ -	$ -	$ -	#DIV/0!
141-4202	Postage	$ -	$ -	$ -	#DIV/0!
141-4301	Travel & Transportation	$ 3,000	$ -	$ 1,371	45.7%
141-4501	Rents & Leases, Space	$ 2,000	$ 235	$ 235	11.8%
141-4801	Maintenance, Motor Vehicles	$ 200	$ -	$ -	0.0%
141-4801	Maintenance, Equipment	$ 500	$ -	$ -	0.0%
141-4901	Miscellaneous Services	$ -	$ -	$ -	#DIV/0!
	Subtotal, Services	***$ 5,700***	***$ 235***	***$ 1,606***	***28.2%***
Capital Out-Lay & Fixed Assets					
141-4500	Capital Out-Lay/Fixed Assets	$ -	$ -	$ -	#DIV/0!
	Total Enterprise Operations Expenses	***$ 23,380***	***$ 297***	***$ 1,668***	***7.1%***
Summary of Revenue vs Expenses:					
	Prior-Year Carry Over Funds	***$ 125,000***	***$ -***	***$ 125,000***	
	Total Revenue, Base, Grants & Enterprise	***$ 1,559,715***	***$ 107,784***	***$ 377,728***	***24.2%***
	Total Expenses, Base, Grants & Enterprise	***$ 1,438,496***	***$ 134,551***	***$ 234,563***	***16.3%***
	Fund Balance	***$ 121,219***	***$ (26,768)***	***$ 143,165***	
	Operating Reserves	**$ (3,781)**			
	Estimated Available Fund Balance	**$ 125,000**			

YAKIMA REGIONAL CLEAN AIR AGENCY

SUPPLEMENTAL INCOME STATUS for CY 2018 on August 31, 2018

a

City/Town	Past Due	Assessment Amount	Total Amt Due	Date Received	Amount Received	Balance Due	Responses
Grandview	$ -	$ 4,464	$ 4,464	1/11/2018	$ 4,464	$ -	Paid in full
Granger	$ -	$ 1,552	$ 1,552	7/2/2018	$ 1,164	$ 388	Pd 3/4
Harrah	$ -	$ 260	$ 260	1/30/2018	$ 260	$ -	Paid in full
Mabton	$ -	$ 926	$ 926	1/12/2018	$ 926	$ -	Paid in full
Moxee	$ -	$ 1,582	$ 1,582	1/16/2018	$ 1,582	$ -	Paid in full
Naches	$ -	$ 338	$ 338	1/11/2018	$ 338	$ -	Paid in full
Selah	$ -	$ 3,012	$ 3,012	1/12/2018	$ 3,012	$ -	Paid in full
Sunnyside	$ -	$ 6,616	$ 6,616	1/19/2018; 4/13/2018; 7/12/2018	$ 4,962	$ 1,654	Pd 3/4
Tieton	$ -	$ 514	$ 514	1/25/2018	$ 514	$ -	Paid in full
Toppenish	$ -	$ 3,620	$ 3,620	1/25/2018	$ 3,620	$ -	Paid in full
Union Gap	$ -	$ 2,480	$ 2,480	1/25/2018	$ 2,480	$ -	Paid in full
Wapato	$ -	$ 2,016	$ 2,016	1/22/2018	$ 2,016	$ -	Paid in full
City of Yakima	$ -	$ 37,364	$ 37,364	1/19/2018; 4/16/2018; 7/16/2018	$ 28,023	$ 9,341	Pd 3/4
Zillah	$ -	$ 1,258	$ 1,258	1/22/2018	$ 1,258	$ -	Paid in full
Yakima Co.	$ -	$ 34,358	$ 34,358	1/1/2018; 4/1/2018; 7/1/2018	$ 25,796	$ 8,563	Pd 3/4
Totals:	**$ -**	**$ 100,360**	**$ 100,360**		**$ 80,415**	**$ 19,946**	

Yakima Regional Clean Air Agency
329 North First Street,
Yakima WA 98901
(509) 834-2050
yakimacleanair.org

Executive Memorandum

Date of Release: September 6, 2018

Date of Consideration: September 13, 2018

To: The YRCAA Board of Directors

From: Office of the Executive Director

Subject: Reappointment of the Air Pollution Control Officer

ISSUE:
YRCAA Resolution 2017-04 appointed Keith M. Hurley as the Air Pollution Control Officer for the Agency. The resolution was valid until June 30, 2018.

DISCUSSION:
Section 70.94.170 of the Revised Code of Washington (RCW) requires the appointment of an Air Pollution Control Officer, whose sole responsibility shall be to observe and enforce the provisions of the chapter and all orders, ordinances, resolutions, or rules and regulations of such activated authority pertaining to the control and prevention of air pollution. YRCAA Regulation 1, Article 1, subsection 1.05, paragraph C requires the Board of Directors to appoint the Air Pollution Control Officer.
The Board previously accomplished this task by approving resolution 2017-04. That resolution was valid until June 30, 2018 and thus requires renewal.

RECOMMENDATION:
Approve Resolution 2018-09 re-appointing Keith M. Hurley as the Air Pollution Control Officer for the period defined.

RESOLUTION NO.: 2018-09
BEFORE THE GOVERNING BOARD OF THE
YAKIMA REGIONAL CLEAN AIR AGENCY (YRCAA)

Appointing Keith M. Hurley as Air Pollution Control Officer:

WHEREAS, the YRCAA is a statutorily created municipal corporation in accordance with section 70.94.081 of the Revised Code of Washington; and

WHEREAS, section 70.94.170 of the Revised Code of Washington requires the appointment of a full time Air Pollution Control Officer, whose sole responsibility shall be to observe and enforce the provisions of the chapter and all orders, ordinances, resolutions, or rules and regulations of such activated authority pertaining to the control and prevention of air pollution; and

WHEREAS YRCAA Regulation 1, Article 1, subsection 1.05, paragraph C requires the Board of Directors to appoint the Air Pollution Control Officer;

NOW THERFORE BE IT RESOLVED that:

1. Keith M. Hurley, Executive Director of the YRCAA, shall be appointed as Air Pollution Control Officer for the county of Yakima, in the state of Washington; and

2. That this appointment shall apply from July 1, 2018 through June 30, 2020, unless revised;

On motion of _____, seconded by _____, the foregoing resolution is hereby PASSED AND ADOPTED by the Yakima Regional Clean Air Agency Board of Directors on this 13th day of September, 2018.

_____	_____
Jon DeVaney, Chair	Ron Anderson, Director
_____	_____
Steven Jones, Director	Carmen Mendez, Director
_____	_____
Norm Childress, Director	Mary Wurtz, Clerk of the Board

Yakima Regional Clean Air Agency
329 North First Street,
Yakima WA 98901
(509) 834-2050
yakimacleanair.org

Executive Memorandum

Date of Release: September 6, 2018

Date of Consideration: September 13, 2018

To: The YRCAA Board of Directors

From: Office of the Executive Director

Subject: Primary and Alternate Auditing & Investment Officers

ISSUE

Resolution 2017-13 appointed Keith M. Hurley as the primary Auditing and Investment Officer. The resolution was valid until June 30, 2018. Christa Owen was appointed as the alternate Auditing & Investment Officer in 2016.

DISCUSSION

The Yakima County Treasurer requires the agency to appoint a primary and alternate Auditing and Investment Officer. In accordance with chapter 42.24 of the Revised Code of Washington (RCW), the agency Board must appoint by resolution an Auditing Officer for any claims presented against the agency by persons furnishing materials, rendering services or performing labor, or for any other contractual purposes. The appointments will run concurrently from July 1, 2018 through June 30, 2020, or until revised as needed.

RECOMMENDATION

Approve Resolution 2018-10 re-appointing Keith M. Hurley as the agency's Primary Auditing and Investment Officer and Christa Owen as the agency's Alternate Auditing and Investment Officer for the period defined.

AGENDA ITEM NO. 7.3

RESOLUTION NO.: 2018-10
BEFORE THE GOVERNING BOARD OF THE
YAKIMA REGIONAL CLEAN AIR AGENCY (YRCAA)

Appointing Keith M. Hurley as Primary Auditing and Investment Officer;
Appointing Christa Owen as Alternate Auditing and Investment Officer:

WHEREAS, the YRCAA is a statutorily created municipal corporation in accordance with section 70.94.081 of the Revised Code of Washington; and

WHEREAS, the Yakima County Treasurer requires the YRCAA to appoint the positions of Primary and Alternate Auditing and Investment Officer; and

WHEREAS, RCW 42.24.080 requires that the Board of Directors of the YRCAA appoint by resolution the agency Auditing Officer;

NOW THERFORE BE IT RESOLVED that:

1. Keith M. Hurley, Executive Director and Air Pollution Control Officer of the YRCAA, shall be appointed as the agency's Primary Auditing and Investment Officer; and

2. Christa Owen, Fiscal Programs Manager, shall be appointed as the agency's Alternate Auditing and Investment Officer; and

3. Such officers shall be authorized to:
   a. Receive monies and sign warrants to disburse funds;
   b. Audit claims against the agency;
   c. Sign authorizations to transfer funds within the agency's investment, general checking, and payroll accounts; and
   d. Sign warrant registers and void warrant agreements; and

4. That these appointments shall apply from July 1, 2018 through June 30, 2020, unless revised.

BE IT FURTHER RESOLVED, that the Board of Directors authorizes and directs Keith M. Hurley, YRCAA Executive Director to advise the Yakima County Treasurer of these appointments;

On motion of _____, seconded by _____, the foregoing resolution is hereby PASSED AND ADOPTED by the Yakima Regional Clean Air Agency Board of Directors on this 13th day of September, 2018.

_____	_____
Jon DeVaney, Chair	Ron Anderson, Director
_____	_____
Steven Jones, Director	Carmen Mendez, Director
_____	_____
Norm Childress, Director	Mary Wurtz, Clerk of the Board

Yakima Regional Clean Air Agency
329 North First Street,
Yakima WA 98901
(509) 834-2050
yakimacleanair.org

Executive Memorandum

Date of Release: September 6, 2018

Date of Consideration: September 13, 2018

To: YRCAA Board of Directors

From: Office of the Executive Director

Subject: YRCAA v. Heaney d/b/a DisplayVisions and/or Apex Co.

Issue:
Proposed offer of settlement from Mr. James Heaney.

Discussion:
In the fall of 2012, YRCAA was exploring the purchase of a digital sign to advise the public of burn bans and other agency information. Mark Edler was assigned the task to locate a sign and discovered Mr. James Heaney's company, DisplayVisions, while searching the internet for digital sign providers. On Mark's recommendation, the agency purchased a digital sign from DisplayVisions. Once received the sign was not able to be operated and items required to get the sign operational were not provided by Mr. Heaney's company. Numerous emails from November of 2012 through June of 2013 were sent requesting either a full refund or for production of the required items to get the sign working.

It appears that the agency initiated litigation through employment of the agency's legal counsel, Mr. Gary Cuillier, in July of 2013. Over the course of the last five and a half years the agency has expended a total of $20,465.75 for purchase of the sign and subsequent efforts to make the sign operable by using other providers. The agency has also expended approximately $11,662 for legal counsel at the rate of $140.00 per hour.

On June 15, 2018 Mr. Cuillier filed a motion for summary judgment with the court. That motion was subsequently scheduled for hearing on August 21, 2018. On August 23, 2018 Mr. Cuillier furnished the agency with a copy of a letter, dated August 10, 2018, from Mr. Heaney's attorney, Mr. Josh Busey (Attached). In the letter Mr. Busey explains that Mr. Heaney wishes to settle the case and has made an offer of $10,000 to fully settle YRCAA's claims against his company. In order to provide time for the agency to present the offer for settlement to the Board and to provide time for Mr. Heaney to obtain the funds to pay the offered settlement amount, the parties agreed to continue the summary judgment hearing and the court has rescheduled the hearing for December 12, 2018.

AGENDA ITEM NO. 7.4

Yakima Regional Clean Air Agency
329 North First Street,
Yakima WA 98901
(509) 834-2050
yakimacleanair.org

Recommendation:
The Executive Director recommends that the Board accept Mr. Heaney's offer for the following reasons:

- Accepting the offer provides the agency with the possibility to recoup the entire cost of the original sign.
- Accepting the offer at this time provides a three month window for Mr. Heaney to come up with the funds prior to the scheduled summary judgment hearing. It is important to note that if Mr. Heaney fails to pay the settlement or any portion of it, the agency can still request summary judgment.
- If the agency rejects the offer, Mr. Heaney will most likely file for bankruptcy. If Mr. Heaney were to file for bankruptcy the agency would not be listed as a secured creditor and in all probability would not be able to recoup any of its losses.

Gary M. Cuillier
ATTORNEY AT LAW

314 N. SECOND STREET
YAKIMA, WASHINGTON 98901

(509) 575-1800
FAX: (509) 452-4601

August 23, 2018

Keith Hurley, Executive Director
Yakima Regional Clean Air Agency
329 North 1st Street
Yakima, WA 98901-2303

Re: Yakima Regional Clean Air Agency v. Heaney d/b/a DisplayVisions and/or Apex Co.

Dear Keith,

Enclosed are an August 10, 2018 letter from attorney Josh Busey, a sworn Declaration of James Heaney, an August 15, 2018 letter from Josh Busey, a Stipulation to Continuance of Hearing Scheduled for August 21, 2018 at 2:30 p.m. and an Order Continuing Hearing to December 12, 2018 at 2:30 p.m. to allow Mr. Heaney time to pay the $10,000.00 offered within 60 days of the September 13 Board meeting should you and the Board agree to accept his offer.

The $731,156.00 owed on his house, the $36,770.00 owed to IRS for delinquent income taxes since 2011 and the monthly expenses exceeding his income by over $1,000.00 per month appear to be the main reasons why Mr. Heaney will have to borrow the proposed $10,000.00 settlement amount from his family or otherwise consider declaring bankruptcy so as to discharge any Judgment the YRCAA may obtain.

Since we agreed that this offer should be presented for a decision by the Board of Directors, I suggest that it be placed on the agenda for the September 13 meeting. That way the offered amount, if approved by the Board, would be paid prior to the continued court hearing regarding our Motion for Summary Judgment and we would dispense with the legal fees for arguing that Motion.

Give me a call to discuss this matter at your convenience. Thank you.

Yours very truly,

GARY CUILLIER

GMC: krr
Enclosures

TELEPHONE:
509.248.4282

FACSIMILE:
509.575.5661

BAILEY & BUSEY PLLC
411 N.2nd St.
Yakima, WA 98901

ROGER W. BAILEY
roger.bailey.attorney@gmail.com

JOSHUA J. BUSEY
joshua.busey.attorney@gmail.com

August 10, 2018

SUBJECT TO ER 408

Gary Cuillier
314 North 2nd Street
Yakima, WA 98901

Via Hand Delivery

Re: **Yakima Clean Air Authority v. Heaney**, Cause No. 13-2-03076-3
My Client: James Heaney
Your Client: Yakima Clean Air Authority

Gary:

Thank you for speaking to me a couple of weeks ago and for your letter of July 30, 2018. As we have discussed, your client requested, and my client was working on putting together, financial information to go along with an offer of settlement. As we discussed this morning, I will be contacting Maria to get a new summary judgment hearing for approximately the middle of December.

Enclosed you will find statements of assets and liabilities and of income and expenses for my client as of July 31, 2018. The statements are attached to my client's declaration. Along with this information, my client has authorized me to make an offer of settlement. As stated throughout this process, my client has very limited means to fund any settlement. Importantly, as the statements show, my client has no non-exempt assets that your client would be able to collect from, so a large judgment is essentially worthless.

With that in mind, my client has authorized me to offer $10,000.00 to fully settle the claims between our clients. If this is acceptable, it will be necessary for the settlement amount to be paid in installments. If acceptable, Mr. Heaney will be able to make a $5,000.00 payment upon finalization of the settlement with the balance payable within 60 days of the settlement date. It is my understanding that Mr. Heaney will have to borrow funds from his family to fund the payments. However, the funds available from family are limited. As such this is the best offer Mr. Heaney can make. If this is not acceptable, bankruptcy will have to be considered.

After you have had a chance to speak to you client on this issue, please let me know. I look forward to hearing from you.

Very truly yours,

Joshua J. Busey
Bailey & Busey, PLLC

cc: Client

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Declaration

I, James J. Heaney, III, hereby declare:

1. I am the defendant in the matter of Yakima Regional Clean Air Agency v. James Heaney, et. al., Yakima County Superior Court cause no. 13-2-03076-3.

2. Attached hereto as **Exhibit 1** is a Statement of Assets and Liabilities as of July 31, 2018.

3. Attached hereto as **Exhibit 2** is a Statement of Income and Expenses as of July 31, 2018.

4. The Exhibits attached hereto and the information therein were prepared at my request by my accountant. The attached and the information therein is true and correct to the best of my knowledge as of July 31, 2018.

I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct to the best of my knowledge and belief.

DATED this 13th day of August, 2018 at LA County, CA.

James J. Heaney, III

BAILEY & BUSEY PLLC
411 NORTH 2ND STREET
YAKIMA, WASHINGTON 98901
PHONE (509) 248-4282

EXHIBIT 1

JAMES J. HEANEY, III

STATEMENT OF ASSETS AND LIABILITIES

AS OF JULY 31, 2018

ASSETS

Cash - checking/savings/CD Accts		
Checking - JPMorgan Chase Acct # 4135	46	
Savings	0	
Certificates of Deposit	0	
Total Checking/Savings/CDs		46
Notes & Contracts Receivable		
Total Accounts Receivable		0
Life insurance (cash surrender value)		
Total Life Insurance		0
Personal property (autos, furnture, jewelry, etc.)		
2016 Ford Explorer (leased)	0	
Furniture, Jewelry & Other Personal Property	21,250	
Total Personal Property		21,250
Retirement Funds (IRA/401k)		
IRA Retirement Acct # XXXX3906	77,922	
Total Retirement		77,922
Real Estate (Market Value)		
Personal Residence - 4964 Vicwood Ave., La Crescenta, CA	795,075	
Total Real Estate		795,075
Other assets		
Total other assets		0
TOTAL CURRENT ASSETS		894,293

LIABILITIES & EQUITY

Accounts Payable		
Ford Motor Credit	315	
Southern Califormia Edison	74	
Southern California Gas Co	48	
The Water Co	309	
Time Warner Cable	120	
Total Accounts Payable		866

JAMES J. HEANEY, III

STATEMENT OF ASSETS AND LIABILITIES

AS OF JULY 31, 2018

Credit Cards		
CapitalOne M/C Acct # 7805	5,550	
Total Credit Cards		**5,550**
Mortgage Loans		
Freedom Mortgage Corp Ln # 88120225	375,366	
USBank Acct # ILF3000513611	355,790	
Total Mortgage Loans		**731,156**
Other Liabilities - Internal Revenue Service		
2017 Federal Income Tax - (1040 Extension Filed)	(200)	
2017 CA State Income Tax (540 Extension Filed)	(23)	
2016 Federal Income Tax - 1040	5,822	
2015 Federal Income Tax - 1040	1,069	
2014 Federal Income Tax - 1040	1,866	
2013 Federal Income Tax - 1040	8,364	
2012 Federal Income Tax - 1040	18,428	
2011 Federal Income Tax - 1040	1,443	
Total Income Tax Liabilities		**36,770**
Total Liabilities		**774,342**
NET EQUITY		
Balance Beginnig	64,749	
Capital in Residence	63,919	
Net Personal Income	(8,717)	
Total Equity		**119,951**
TOTAL LIABILITIES & EQUITY		**894,293**

EXHIBIT 2

JAMES J. HEANEY, III

STATEMENT OF INCOME AND EXPENSES

AS OF JULY 31, 2018

INCOME

INCOME FROM PROFESSION	CURRENT MONTH	YEAR TO DATE
SALARIES - Matrix LED Signs	6,414	45,195
Other Income (refunds & exchanges)	11	11
TOTAL Income from Salaries	**6,425**	**45,206**

EXPENSES

MORTGAGE & HOUSING	CURRENT MONTH	YEAR TO DATE
Freedom Mortgage Corp Ln # 88120225	2224	15,568
USBank Acct # ILF3000513611	529	3,703
County Property Tax	504	3,528
Homeowner Insurance	140	980
TOTAL Housing Expense	**3,397**	**23,779**
AUTO & TRANSPORTATION		
Auto Loans/Leases	315	2,205
Gas & Oil	329	2,103
Repairs & Mantenance	96	714
Insurance	143	1,001
Parking	0	122
Rentals	0	65
TOTAL Auto Expense	**882**	**6,210**
BANK CHARGES		
Monthly Service Fee - JPMorgan Chase	15	110
Other Bank Fees - NSF Charges	0	62
TOTAL Bank Service & Other Fees	**15**	**172**
CREDIT CARD INTEREST		
CapitalOne Mastercard	172	871
Cash Advance Fee	0	180
TOTAL Credit Card, Interest	**172**	**1,051**
ENTERTAINMENT		
Amazon Prime	0	156
NetFlix	11	77

JAMES J. HEANEY, III

STATEMENT OF INCOME AND EXPENSES

AS OF JULY 31, 2018

TOTAL Entertainment	**11**	**233**
FOOD & CLOTHING		
Food & Grocery	512	4,084
Clothing & Personal	96	743
TOTAL Food, Grocery, Clothing & Personal Care	**608**	**4,827**
INSURANCE & MEDICAL		
Medical & Dental	322	2,254
Copays and Deductibles	30	180
TOTAL Medical & Dental	**352**	**2,434**
INTERNET, CABLE, & COMPUTER		
Cable Charges	120	840
TOTAL Internet & Computer	**120**	**840**
NEWSPAPERS & PERIODICALS		
Los Angeles Times	15	398
TOTAL Newspapers & Peiodicals	**15**	**398**
POSTAGE & SHIPPING		
USPS Postage	30	118
TOTAL Postage & Shipping	**30**	**118**
INCOME TAX, SSA & MEDICARE		
Federal Income Tax	403	2,821
Social Security Tax	398	2,784
Medicare Tax	93	651
CA State Tax	78	546
CA SUI/SDI Tax	64	448
Other - IRS Payment Plan	560	3,920
TOTAL Income Tax Whdl & Payment Plan	**1,596**	**11,170**
TELEPHONE & UTILTITIES		
Electricity	74	709
Gas	48	443
Telephone	105	706
Water	119	833
TOTAL Telephone & Utilities	**346**	**2,691**

JAMES J. HEANEY, III

STATEMENT OF INCOME AND EXPENSES

AS OF JULY 31, 2018

	CURRENT MONTH	YEAR TO DATE
TOTAL INCOME	6,425	45,206
TOTAL EXPENSE	7,544	53,923
NET INCOMCE/LOSS	(1,119)	(8,717)

TELEPHONE:
509.248.4282

FACSIMILE:
509.575.5661

BAILEY & BUSEY PLLC
411 N.2nd St.
Yakima, WA 98901

ROGER W. BAILEY
roger.bailey.attorney@gmail.com

JOSHUA J. BUSEY
joshua.busey.attorney@gmail.com

August 15, 2018

VIA AMS

Gary Cuillier
314 North 2nd Street
Yakima, WA 98901

Re: **Yakima Clean Air Authority v. Heaney**, Cause No. 13-2-03076-3
My Client: James Heaney
Your Client: Yakima Clean Air Authority

Gary:

Please find enclosed the Stipulation to Continuance of Hearing Scheduled for August 21, 2018 signed by Mr. Busey. Once the stipulation has been entered, please send us a conformed copy. If you have any questions don't hesitate to call.

Sincerely,

Brooke Maloney
Legal Assistant to Josh Busey
Enclosure

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Roger W. Bailey
Joshua J. Busey
BAILEY & BUSEY PLLC
411 N. 2nd Street
Yakima, Washington 98901

Phone: 509.248.4282
Facsimile: 509.575.5661
E-Mail: roger.bailey.attorney@gmail.com

Attorneys for Defendant James Heaney

IN THE SUPERIOR COURT OF WASHINGTON
IN AND FOR THE COUNTY OF YAKIMA

YAKIMA REGIONAL CLEAN AIR AGENCY, a municipal corporation, Plaintiff, v. JAMES HEANEY and JANE DOE HEANEY, husband and wife, doing business as Display Visions and/or Apex Co., Defendants.	NO. 13-2-03076-3 **STIPULATION TO CONTINUANCE OF HEARING SCHEDULED FOR AUGUST 21, 2018 AT 2:30 P.M.**

The parties hereto, through their respective attorneys, stipulate to a continuance of the Summary Judgment hearing currently scheduled for August 21, 2018. The court has

BAILEY & BUSEY PLLC
411 NORTH 2ND STREET
YAKIMA, WASHINGTON 98901
PHONE (509) 248-4282

provided an available date of December 12, 2018 at 2:30 p.m. to reschedule the hearing. This date is agreeable to all parties.

DATED this 16TH day of August, 2018.

Joshua J. Busey (WSBA 34312)
Bailey & Busey, PLLC
Attorney for Defendant

Gary Cuillier (WSBA 3633)
Attorney for Plaintiff

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411 NORTH 2ND STREET
YAKIMA, WASHINGTON 98901
PHONE (509) 248-4282

2 pages

DECLARATION OF SERVICE

On this day the undersigned personally served a copy of this document upon Joshua J. Busey, the attorney for Defendant James Heaney, by leaving it at his office with the person in charge thereof. I certify under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

SIGNED on August 16, 2018, at Yakima, Washington.

Kevin R. Richardson

Kevin R. Richardson

FILED

AUG 16 2018

YAKIMA COUNTY CLERK

IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON
FOR YAKIMA COUNTY

YAKIMA REGIONAL CLEAN AIR AGENCY, a municipal corporation,

Plaintiff,

v.

JAMES HEANEY and JANE DOE HEANEY, husband and wife, doing business as Display Visions and/or Apex Co.,

Defendants.

NO. 13-2-03076-3

ORDER CONTINUING HEARING

Based on the Stipulation of the parties, the Motion for Summary Judgment hearing scheduled for August 21, 2018 at 2:30 p.m. is hereby continued to December 12, 2018 at 2:30 p.m.

DATED this 16th day of August, 2018.

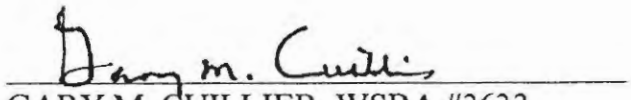
GAYLE M. HARTHCOCK

JUDGE

JUDGE / ~~COURT COMMISSIONER~~

Gary M. Cuillier
314 North 2nd Street
Yakima, WA 98901
Phone:(509) 575-1800
Fax: (509) 452-4601

Presented by:



GARY M. CUILLIER, WSBA #3633
Attorney for Plaintiff

Gary M. Cuillier
314 North 2nd Street
Yakima, WA 98901
Phone:(509) 575-1800
Fax: (509) 452-4601