COOPER COUNTY HEALTH CENTER
HEALTH REGULATION 2019-6

WHEREAS, a County Commission and a County Health Center have authority under Article VI of the Missouri Constitution and § 192.300, RSMo to promulgate Regulations as will tend to enhance the public health in the County; and

WHEREAS, § 192.300, RSMo, provides that a County Commission or County Health Center may establish reasonable fees to pay for any costs incurred in carrying out such Regulations and that any such fees generated shall be deposited in the county treasury and shall be used to support the public health activities for which they were generated; and

WHEREAS, the Cooper County Health Board Center Trustees shall have exclusive control of the expenditures of all money's collected to the credit of the county health center fund. All money's received for the county health center shall be credited to the county health center and deposited in the depository thereof for the sole use of such county health center in accordance with the provisions of §§ 205.010 to 205.150, RSMo; and

WHEREAS, maintaining air quality and water quality are public health concerns over which the Cooper County Health Center has jurisdiction; and

WHEREAS, no provisions in Chapters 260, 640, 643 or 644, RSMo or any rules promulgated thereunder address, control, or regulate in any way air emissions of hydrogen sulfide, ammonia, and particulate matter from any Class I or II concentrated animal feeding operation; and

WHEREAS, no provisions in Chapters 260, 640, 643 or 644, RSMo or any rules promulgated thereunder address, control, or regulate in any way the location of subsurface manure containment structures at a Class I or II concentrated animal feeding operation in areas with karst topography or soils with classifications of “severe” or “moderate” shrink-swell characteristics; and

WHEREAS, no provisions in Chapters 260, 640, 643 or 644, RSMo or any rules promulgated thereunder address, control, or regulate in any way the location where land application of manure generated at a Class I or II concentrated animal feeding operation may occur in areas with karst topography.

THEREFORE, in order to enhance and protect public health, the Cooper County Health Center hereby adopts this Health Regulation as follows:

1. Air Quality.

A. Odorous emissions shall not be emitted or caused to be emitted from the property lines of any Class I or II concentrated animal feeding operation, as defined at § 640.703, RSMo, or beyond any of the property lines of any location where wastes generated by a Class I or II concentrated animal feeding operation are applied as fertilizer, in excess of the following performance standards:

(1) Hydrogen sulfide. Not to exceed 0.07 parts per million (ppm);

(2) Ammonia. Not to exceed 1.7 parts per million (ppm);

(3) Particulate Matter (PM2.5). 24-hour average concentration exceeding 35 micrograms per cubic meter (ug/cm3); and

(4) Particulate Matter (PM10). 24-hour average concentration exceeding 150 micrograms per cubic meter (ug/cm3).

B. Upon receipt of a complaint made by any person: (1) who is adversely affected by any such odorous emissions listed above, and (2) who leases or owns real property located in the County, an inspection will be conducted to determine whether any odorous emissions are occurring that exceed any of the performance standards listed above.

C. If such inspection finds noncompliance with any of the performance standards listed above, in addition to any other remedies, the person having control over the facility or property where such exceedance occurred, shall pay all reasonable costs incurred in conducting such inspection.

D. Measurements shall be made with a Nasal Ranger as manufactured by St. Croix Sensory, Inc., or by a similar instrument or technique that will give substantially similar results, or by any instrument reasonably capable of measuring the emissions listed in this Regulation, or any other instrument as approved by the Missouri Department of Natural Resources.

2. Water Quality.

A. Subsurface Manure Containment Structures.

(1) A Class I or II concentrated animal feeding operation may not construct or operate any subsurface manure storage structure in the County if:

(a) The U.S. Department of Agriculture, Natural Resources Conservation Service has designated the characteristics of the soils at the location of the structure as "severe" based on the shrink-swell characteristics of such soils, or

(b) The geologic setting at the site, as determined by mapping done by the Missouri Geological Survey, is composed of karst formations.

(2) A Class I or II concentrated animal feeding operation may construct a subsurface manure storage structure at a site where the U.S. Department of Agriculture, Natural Resources Conservation Service has designated the characteristics of the soils at the location of the structure as "moderate" regarding the construction of subsurface structures based on the shrink-swell characteristics of such soils, if:

(a) Plans and specifications concerning the design and construction materials for such subsurface structure and a groundwater monitoring system have been submitted to, reviewed, and approved by the Missouri Geological Survey and by the Cooper County Health Center; and

(b) The person having control over the proposed facility has paid all reasonable costs incurred in conducting such review.

B. Land Application of Wastes. Manure acquired through gift or contract from a Class I or II concentrated animal feeding operation shall not be land-applied at any location if the geologic setting at the land application site, as determined by mapping prepared by the Missouri Geological Survey, is composed of karst formations.

3. Cooperative Agreements and Contracts. The Cooper County Health Center may enter into cooperative agreements with other Counties and contracts with responsible vendors for the performance of any technical services required by this Health Regulation.

4. Severability. The provisions of this Health Regulation are severable, and if any phrase, clause, sentence, paragraph, or sections shall be declared unconstitutional or otherwise invalid by the valid judgement or decree of any Court of competent jurisdiction, such unconstitutionality or invalidity shall not affect any of the remaining phrases, clauses, sentences, paragraphs, or sections of this Health Regulation since the same would have been enacted without the incorporation in this Health Regulation of any such unconstitutional or invalid phrase, clause, sentence, paragraph, or section.

5. Repeal of Health Regulation. If any part of this Health Regulation shall be repealed or modified, either expressly or by implication, by a subsequent Health Regulation, that part of the Health Regulation thus repealed or modified shall continue in force until the subsequent Health

Regulation repealing or modifying the Health Regulation shall go into effect unless therein otherwise expressly provided; but no suit, prosecution, proceeding, right, fine or penalty instituted, created, given, secured or accrued under this Health Regulation previous to its repeal shall be affected, released, or discharged but may be prosecuted, enjoined, and recovered as fully as if this Health Regulation or provisions had continued in force, unless it shall be therein otherwise expressly provided.

6. Effective Date. This Heath Regulation shall be in full force and effect from and after its passage. Any operational Class I or II concentrated animal feeding operation having a valid CAFO permit issued by the Missouri Department of Natural Resources as of the effective date of this Health Regulation is exempt from the provisions of the Health Regulation as long as such CAFO permit remains in effect.

7. Appendices. The attached appendices published by the Centers for Disease Control, Agency for Toxic Substances & Disease Registry and the Colorado Department of Public Health & Environment are incorporated herein by reference.

8. Publication. It is hereby directed that copies of this Health Regulation shall be printed and made available for distribution to the public in the office of the county clerk, and a copy of such Health Regulation shall be published in a newspaper of general circulation in Cooper County for three successive weeks.

PASSED AND APPROVED THIS 13th DAY OF August 2019.

Board of Trustees Patty Dick, John Ward. Susan Felten, Cyndi Waller and Janet Harris

APPENDIX A. ATSDR MINIMAL RISK LEVELS AND WORKSHEETS

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [42 U.S.C. 9601 et seq.], as amended by the Superfund Amendments and Reauthorization Act (SARA) [Pub. L. 99–499], requires that the Agency for Toxic Substances and Disease Registry (ATSDR) develop jointly with the U.S. Environmental Protection Agency (EPA), in order of priority, a list of hazardous substances most commonly found at facilities on the CERCLA National Priorities List (NPL); prepare toxicological profiles for each substance included on the priority list of hazardous substances; and assure the initiation of a research program to fill identified data needs associated with the substances.

The toxicological profiles include an examination, summary, and interpretation of available toxicological information and epidemiologic evaluations of a hazardous substance. During the development of toxicological profiles, Minimal Risk Levels (MRLs) are derived when reliable and sufficient data exist to identify the target organ(s) of effect or the most sensitive health effect(s) for a specific duration for a given route of exposure. An MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse noncancer health effects over a specified duration of exposure. MRLs are based on noncancer health effects only and are not based on a consideration of cancer effects. These substance-specific estimates, which are intended to serve as screening levels, are used by ATSDR health assessors to identify contaminants and potential health effects that may be of concern at hazardous waste sites. It is important to note that MRLs are not intended to define clean-up or action levels.

MRLs are derived for hazardous substances using the no-observed-adverse-effect level/uncertainty factor approach. They are below levels that might cause adverse health effects in the people most sensitive to such chemical-induced effects. MRLs are derived for acute (1–14 days), intermediate (15–364 days), and chronic (365 days and longer) durations and for the oral and inhalation routes of exposure. Currently, MRLs for the dermal route of exposure are not derived because ATSDR has not yet identified a method suitable for this route of exposure. MRLs are generally based on the most sensitive chemical-induced end point considered to be of relevance to humans. Serious health effects (such as irreparable damage to the liver or kidneys, or birth defects) are not used as a basis for establishing MRLs. Exposure to a level above the MRL does not mean that adverse health effects will occur.

MRLs are intended only to serve as a screening tool to help public health professionals decide where to look more closely. They may also be viewed as a mechanism to identify those hazardous waste sites that are not expected to cause adverse health effects. Most MRLs contain a degree of uncertainty because of the lack of precise toxicological information on the people who might be most sensitive (e.g., infants, elderly, nutritionally or immunologically compromised) to the effects of hazardous substances. ATSDR uses a conservative (i.e., protective) approach to address this uncertainty consistent with the public health principle of prevention. Although human data are preferred, MRLs often must be based on animal studies because relevant human studies are lacking. In the absence of evidence to the contrary, ATSDR assumes that humans are more sensitive to the effects of hazardous substance than animals and that certain persons may be particularly sensitive. Thus, the resulting MRL may be as much as 100-fold below levels that have been shown to be nontoxic in laboratory animals.

Proposed MRLs undergo a rigorous review process: Health Effects/MRL Workgroup reviews within the Division of Toxicology, expert panel peer reviews, and agency-wide MRL Workgroup reviews, with participation from other federal agencies and comments from the public. They are subject to change as new information becomes available concomitant with updating the toxicological profiles. Thus, MRLs in the most recent toxicological profiles supersede previously published levels. For additional information regarding MRLs, please contact the Division of Toxicology, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road NE, Mailstop F-32, Atlanta, Georgia 30333.

APPENDIX A

MINIMAL RISK LEVEL (MRL) WORKSHEET

Chemical Name: Ammonia
CAS Number: 7664-41-7
Date: July 2004
Profile Status: Third Draft Post-Public
Route: [X] Inhalation [ ] Oral
Duration: [X] Acute [ ] Intermediate [ ] Chronic
Graph Key: 14
Species: Human

Minimal Risk Level: 1.7 [ ] mg/kg/day [X] ppm

Reference: Verberk MM. 1977. Effects of ammonia in volunteers. Int Arch Occup Environ Health 39:73-81.

Experimental design: The study examined the effects of exposure to ammonia in a group of 16 volunteers. Eight of them (experts) knew the effects of ammonia from the literature, but had had no personal contact, whereas the remaining eight subjects (non-experts) were students from a non-science faculty and were not familiar with ammonia or experiments in laboratory situations. All members of a group were exposed on the same day to one of the concentrations tested (50, 80, 110, or 140 ppm). The testing was repeated with a 1-week interval. Immediately before and after exposure, vital capacity, forced expiratory volume, and forced inspiratory volume were measured. During exposure, each subject recorded subjective feelings every 15 minutes as no sensation (0), just perceptible (1), distinctly perceptible (2), nuisance (3), offensive (4), or unbearable (5). No statistical analysis was performed and there was no group exposed to air only. A few weeks after the experiments, the subjects were tested to measure (pre-existing) non-specific reactivity of the airways to exogenous stimuli.

Effects noted in study and corresponding doses: None of the participants was hypersusceptible to non-specific irritants. Results of the pulmonary function tests after exposure were not statistically significantly different from pre-exposure values. For the non-experts, there was a clear increase in the number of reported symptoms for smell, eye irritation, throat irritation, cough, and general discomfort as the exposure concentration increased. The latter was not as clear for the experts. The number of symptoms recorded with a score >3 (nuisance) for smell, eye irritation, nose, throat, and urge to cough for the 50, 80, 110, and 140 ppm exposure groups was 2, 2, 7, and 11 , respectively, for the experts and 6, 12, 18, and 29, respectively, for the non-experts. It should also be mentioned that the subjective responses appeared more pronounced in the non-expert group than in the expert group.

Dose and end point used for MRL derivation: 50 ppm for mild irritation to the eyes, nose, and throat in humans exposed to ammonia gas for 2 hours.

Because the effects observed were local irritation effects, they were not time-dependent (but rather concentration-dependent), an adjustment to 24-hour exposure was not necessary.

[ ] NOAEL [X] LOAEL

Uncertainty Factors used in MRL derivation:

[X] 3 for use of a minimal LOAEL
[ ] 10 for extrapolation from animals to humans
[X] 10 for human variability

Was a conversion used from ppm in food or water to a mg/body weight dose?
N/A

If an inhalation study in animals, list the conversion factors used in determining human equivalent dose:
N/A

Other additional studies or pertinent information which lend support to this MRL: Although the Verberk et al. (1977) study has limitations (no statistical analysis, subjective end points, no control group), it demonstrates that concentrations of 50 ppm ammonia can produce minimal discomfort in healthy members of the general population and therefore, should be avoided. Additional relevant information is provided by a study by Ferguson et al. (1977). In that study, a group of six healthy volunteers, not previously accustomed to working in an ammonia environment, were exposed 5 days/week to 25 ppm (2 hours/day), 50 ppm (4 hours/day), or 100 ppm (6 hours/day) of ammonia, or to 50 ppm of ammonia 6 hours/day for 6 weeks. End points monitored included subjective and objective measures of eye and throat irritation as well as pulse rate, respiration rate, pulmonary function (FVC, FEV), assessment of neurological function (reflex, balance, and coordination), and body weight. The exposure protocol consisted of a pre-exposure evaluation by a physician, 3 hours of exposure (this conflicts with exposure data on table 2 of the study and mentioned above), a mid-point physician's observation, lunch break, 3 additional hours of exposure, and a third physician's observation 30 minutes after exposure ceased. The conjunctiva and mucosa of the nose and throat were examined by a physician before and after each daily exposure and the degree of irritation noted was described as mild, moderate, or marked. Exposure to ammonia had no significant effect on the measures of respiratory function or in the neurological tests conducted. The results of the evaluations of irritation conducted by the physician showed no significant differences between the exposure groups, including the 0 ppm exposure group (pre-exposure). All subjects experienced some watering of the eyes and a sensation of dryness in the nose and throat and there was one observation of definite redness in the mucosa of the nose after a 6-hour exposure to 100 ppm during which time, there was an excursion to 200 ppm ammonia. No redness was observed in this subject the following morning. Throughout the study, the physician observed 6 cases of eye irritation, 20 of nose irritation, and 9 of throat irritation, and most cases appeared to have occurred the first week of the study during exposure to 50 ppm. It is difficult to determine in this study a NOAEL or LOAEL for irritation due to the different exposure durations experienced by the subjects, but it would appear that an exposure concentration of 100 ppm ammonia for 6 hours caused no significant changes in the vital functions measured and that 50 ppm can cause eye, nose, and throat irritation.

NIOSH (1974) reviewed 15 studies of case reports in which subjects were exposed to very high, but unquantified, concentrations of ammonia. The 15 reports provided a representative array of documented clinical findings including death, permanent eye lesions, and chronic respiratory symptoms, as well as acute lower and upper respiratory symptoms. The only quantitative information available was that a worker died 6 hours after estimated exposure to 10,000 ppm ammonia for an unspecified time (Mulder and Van der Zalm 1967). Studies with volunteers, also reviewed by NIOSH (1974), generally used concentrations of ammonia much higher than those in the studies by Verberk et al. (1977) or Ferguson et al. (1977) and/or exposure durations of only minutes. For example, exposure to a concentration of 500 ppm for 30 minutes caused respiratory irritation graded as severe by 2 out 7 subjects (Silverman et al. 1949). Four out of 6 volunteers exposed to 50 ppm ammonia for 10 minutes graded the irritation as "moderate" and none described it as "discomforting" or "painful" (MacEwen et al. 1970). All of the

subjects rated the odor as “highly penetrating” at 50 ppm and 3 subjects gave the same rating to 30 ppm. IBT (1973) exposed 10 subjects to 32, 50, 72, and 134 ppm for 5 minutes and the frequency of positive findings was as follows: at 32 ppm, 1 subject complained of dryness of the nose; at 50 ppm, 2 subjects complained of dryness of the nose; at 72 ppm, 3 subjects experienced eye irritation, 2 had nasal irritation, and 3 had throat irritation; and at 134 ppm, 5 subjects had signs of lacrimation, 5 had eye irritation, 7 had nasal irritation, 8 had throat irritation, and 1 had chest irritation.

Collectively, the available information from studies in humans supports the 50 ppm exposure level from the Verberk et al. (1977) study as a minimal LOAEL for irritation in acute studies. In general, studies in animals have used higher exposure concentrations. For ammonia, a corrosive irritant gas that affects the portal of entry and produces irritation of the eyes and respiratory tract, use of human data should be preferred over animal studies.

Agency Contact (Chemical Manager): Nickolette Roney, MPH

APPENDIX A. ATSDR MINIMAL RISK LEVELS AND WORKSHEETS

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are not expected to cause adverse health effects. Most MRLs contain a degree of uncertainty because of the lack of precise toxicological information on the people who might be most sensitive (e.g., infants, elderly, nutritionally or immunologically compromised) to the effects of hazardous substances. ATSDR uses a conservative (i.e., protective) approach to address this uncertainty consistent with the public health principle of prevention. Although human data are preferred, MRLs often must be based on animal studies because relevant human studies are lacking. In the absence of evidence to the contrary, ATSDR assumes that humans are more sensitive to the effects of hazardous substance than animals and that certain persons may be particularly sensitive. Thus, the resulting MRL may be greater than 100-fold below levels that have been shown to be nontoxic in laboratory animals.

Proposed MRLs undergo a rigorous review process: Health Effects/MRL Workgroup reviews within the Division of Toxicology and Human Health Sciences, expert panel peer reviews, and agency-wide MRL Workgroup reviews, with participation from other federal agencies and comments from the public. They are subject to change as new information becomes available concomitant with updating the toxicological profiles. Thus, MRLs in the most recent toxicological profiles supersede previously published levels. For additional information regarding MRLs, please contact the Division of Toxicology and Human Health Sciences, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road NE, Mailstop F-57, Atlanta, Georgia 30329-4027.

APPENDIX A

MINIMAL RISK LEVEL (MRL) WORKSHEET

Chemical Name: Hydrogen Sulfide
CAS Number: 7783-06-4
Date: November 2016
Profile Status: Final
Route: [x] Inhalation [ ] Oral
Duration: [x] Acute [ ] Intermediate [ ] Chronic
Graph Key: 17
Species: Human

Minimal Risk Level: 0.07 [ ] mg/kg/day [x] ppm

Reference: Jäppinen P, Vikka V, Marttila O, et al. 1990. Exposure to hydrogen sulphide and respiratory function. Br J Intern Med 47:824-828.

Experimental design: This study evaluated lung function in three male and seven female subjects with bronchial asthma requiring medication for 1–13 years; none of the subjects had severe asthma. The subjects were exposed to 2 ppm hydrogen sulfide for 30 minutes. Respiratory function in response to a histamine challenge was assessed prior to exposure and after exposure.

Effect noted in study and corresponding doses: No statistically significant changes in forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), and forced expiratory flow were noted. Airway resistance (Raw) and specific airway conductance (SGaw) did not show statistically significant changes when examined as a group. In two subjects, there were changes of over 30% in both Raw and SGaw; these changes were suggestive of bronchial obstruction. Additionally, 3 of 10 subjects complained of headaches after exposure.

Dose and end point used for MRL derivation:

[ ] NOAEL [X] LOAEL

Uncertainty Factors used in MRL derivation:

[x] 3 for use of a minimal LOAEL
[ ] 10 for extrapolation from animals to humans
[x] 3 for human variability
[x] 3 for database deficiencies

The 2 ppm concentration was considered a minimally adverse effect level because the changes in airway resistance and specific airway conductance were only observed in 2 of 10 subjects. Because the study was conducted using asthmatics (who are likely to be a sensitive subpopulation) a partial uncertainty factor of 3 was used to account for human variability. An additional uncertainty factor of 3 was used for database deficiencies due to concern for the short (30-minute) exposure duration in the principal study.

Was a conversion factor used from ppm in food or water to a mg/body weight dose? No.

If an inhalation study in animals, list conversion factors used in determining human equivalent dose: No.

Was a conversion used from intermittent to continuous exposure? Not applicable.

Other additional studies or pertinent information that lend support to this MRL: Bhambhani et al. (1996b) evaluated the acute effects of hydrogen sulfide on the physiological and hematological health of male and female volunteers exposed to 5 ppm during two 30-minute sessions of submaximal exercise (50% of maximum aerobic power). No significant changes in any parameter were noted in the women, whereas the men showed a significant decrease in muscle citrate synthetase as well as nonsignificant changes in lactate, lactate dehydrogenase, and cytochrome oxidase. Together, these changes were considered indicative of compromise of aerobic metabolism.

No respiratory or cardiovascular effects were observed in 16 male volunteers exposed by oral inhalation to hydrogen sulfide at 0.5, 2, or 5 ppm for >16 minutes while exercising (Bhambhani and Singh 1991). The end points examined included heart rate, oxygen uptake, carbon dioxide output, and blood gases. Airway resistance and conductance were not measured in this study. No significant changes in pulmonary function parameters were noted in individuals exposed to 10 ppm hydrogen sulfide for 15 minutes during exercise (Bhambhani et al. 1996a).

Respiratory distress was noted in two workers exposed to >40 ppm hydrogen sulfide for under 25 minutes (Spolyar 1951). In animals, impacts on the respiratory system such as increases in the cellularity and lactate dehydrogenase and alkaline phosphatase activity in bronchial lavage fluids have been seen at exposures as low as 10 ppm for 4 hours (Lopez et al. 1987), although without a dose-related trend.

Moderate to massive pulmonary edema was observed in rats exposed to 375 or 399 ppm for 4 hours (Prior et al. 1990). A significant dose-related decrease in lung microsomal cytochrome c oxidase activity was seen in rats following a 4 hour exposure to 50, 200, or 400 ppm hydrogen sulfide (Khan et al. 1990). Similarly, succinate oxidase activity also decreased in a dose-related fashion; although no affect was observed at the lowest dose. Cytochrome oxidase levels returned to normal by 24 hours postexposure in animals in the 200 ppm group, but not the 400 ppm group. Exposure at the two higher dose levels was also associated with complete abolition of the zymosan-induced stimulation of respiratory rates of pulmonary alveolar macrophages and there were significant decreases in the number of viable macrophages in lung lavage fluids at the highest dose (Khan et al. 1991).

Agency Contact (Chemical Manager): Selene Chou

COLORADO DEPARTMENT OF PUBLIC HEALTH and ENVIRONMENT
ENVIRONMENTAL AGRICULTURE PROGRAM

SCENTOMETRY (ODOR CONCENTRATION MEASUREMENT) POLICY FOR HOUSED COMMERCIAL SWINE FEEDING OPERATIONS

Colorado Department of Public Health and Environment

Environmental Agriculture Program
and Air Pollution Control Division
4300 Cherry Creek Drive South
Denver, CO 80246

January 25, 2001
Revised May 3, 2010

Introduction
The Colorado Department of Public Health and Environment's (department) Environmental Agriculture Program (Ag Program) and Air Pollution Control Division (division) developed this policy to provide owners and operators of housed commercial swine feeding operations (HCSFOs) with testing, monitoring parameters and methods to demonstrate compliance with the odor standards that must be met at or beyond the property boundary as required by the Colorado Air Pollution Control Commission Regulation No. 2., Part B. The Ag Program intends for this policy to address all facets of odor concentration testing and monitoring at HCSFOs. Any questions concerning odor standard requirements should be directed to the Ag Program at (303) 692-2135.

Regulatory Requirement (Regulation No. 2, Part B, Section III.)
Regulation No. 2, Part B, requires all HCSFOs to manage odor emissions from all aspects of the operations such that odor emissions from the operations shall not be detected at or beyond the property boundary after the odorous air has been diluted with seven (7) or more volumes of odor free air.

HCSFOs are also subject to an additional performance standard that odor emissions shall not be detected at any off-site receptor after the odorous air has been diluted with two (2) or more volumes of odor free air.

Producer Compliance Requirements and Protocol
In order to determine compliance with the odor standard, the department requires a division odor school certified person to conduct bi-annual (two times per year) odor concentration testing. For each farm, odor concentration measurements shall be taken at three locations and shall be repeated at each location for a total of six odor measurements. The locations for the odor measurements are to include the following locations: downwind of the odor plume at the property line; at, or near, an off-property location upwind of the odor plume; and in the strongest odor plume within the property boundary (i.e., on the berm of the impoundment(s) or downwind of the barns).

> An odor ***reading*** is defined as two measurements of odor concentration separated by at least 15 minutes but no longer than 60 minutes at each of the three locations. Both measurements at or beyond the property line must be 7:1 to be considered a reportable violation of the property line odor standard. If a violation of the 7:1 standard is obtained the producer must report the violation to the Ag Program and the local health department within two hours. A phone message or an email is considered adequate notification, if the inspector cannot be reached in person.

Monitoring Frequency
Odor observation readings must be taken at two times each year with one test taken during the months of March/April and one test taken during the months of June/July.

Sampling Method
The person conducting the odor concentration readings in addition to being certified by

the division must follow the division's scentometer protocol provided below. Measurements shall be taken with a properly calibrated and maintained scentometer or Nasal Ranger®. The scentometer and Nasal Ranger® are the only approved devices for measuring odor concentrations at HCSFOs currently available.

The locations for HCSFO compliance testing are as follows:

- At the closest property line downwind of the strongest odor plume at the operation;
- At, or near, the property line upwind of the production facility; and,
- Downwind of the strongest source of odor at each production facility within the property boundary (i.e., downwind of the barns or at the berm of an impoundment).

When sampling at these locations, two measurements must be taken for a total of six (6) measurements using a division-approved device (scentometer or Nasal Ranger®). If an odor reading is 7:1 or higher at or off the property downwind of the odor plume, the HCSFO must report the violation to the Ag Program and the local health department within two hours.

If the wind shifts more than 30 degrees during the sample period, sampling for that test must be suspended. The person conducting the odor measurements must then move into the middle of the odor plume corresponding to the new direction and begin the series of odor measurements from the beginning to obtain six measurements following the required time periods.

Recordkeeping and Reporting Requirements

The odor concentration observed by the certified odor evaluator should be recorded on a field report, including all supporting documentation such as time of test, date, weather conditions, temperature, wind direction, wind speed and legible maps indicating the location of each reading, the HCSFO property line (or boundary of odor easements) and a legend that accurately identifies north. All field records should be summarized in a table and included in the semi-annual or annual report with the labeled maps. In addition, a copy of the odor evaluator's annual odor certification form, as provided by the division, must be included in the reports. A copy of the latest calibration certification for the scentometer or Nasal Ranger® should be retained for availability upon request.

Scentometer Protocol (as provided in the division's odor school)

The odor observation procedures 3 through 9 should be followed when using a division-approved Scentometer or Nasal Ranger® while conducting odor observation readings at Colorado HCSFOs:

1. Locate source of odor using triangulation if needed.
2. Locate the odor plume downwind and off-property of the source of odor origination.
3. Insert scentometer into nostrils, making sure of leak-tight fit.
4. Leak check the fit by attempting to inhale with all inlets (both odor and odor-free) closed.

5. Open odor-free ports (leaving odor inlets closed) for a period of time long enough so no odor sensation is noted. This will refresh the nasal cavity.
6. Start the odor observation by opening the smallest (largest dilution) odor inlet and determine if an odor sensation is noted at that dilution. Hold the scentometer at a 90° angle to the wind. If no odor sensation is noted, move on to the next larger inlet.
7. Record the dilution-to-threshold ratio (D/L) of that odor inlet when an odor response is first detected (highest dilution). Also record the time and wind direction.
8. Close the odor inlets and breathe through the scentometer for a long enough period of time so that no odor sensation is observed.
9. Close all ports and again document a leak-tight fit.
10. Move to an upwind (off-property) location and document time, wind direction, and that no odor is observed.
11. Return to the downwind location and repeat steps 1-9.

The division requires annual certification for HCSFO or health department personnel taking official odor observations at the property line. The division administers odor school certification courses throughout the year. Classes are on a first come basis with a maximum of 20 slots available. There is a fee for the class. For the division's upcoming class schedule(s) and current fee information, contact Roy Doyle at: (303) 692-3159.

Local Health Inspector and Department Inspection and Complaint Protocols
Division odor school certified local health inspectors and department staff are the only people that can validate an odor violation as a result of an odor complaint. The validation process for an odor complaint is as follows:

- The local/state inspector determines the source of odor and takes an odor measurement following the division scentometer protocol (using triangulation to determine the source of odor) as described below.
- If an odor measurement of 7:1 or stronger (15:1, 31:1) occurs at or beyond the property line, then a second odor measurement separated by at least 15 minutes, but no longer than 60 minutes, is required to validate the odor violation.
- If the second odor measurement is below 7:1, the HCSFO is not considered to be in violation of the property line standard.
- If the second odor measurement is at or above 7:1, a violation of the property line standard has been validated.

See the Ag Program's Odor Complaint Policy for additional information at:

http://www.cdphe.state.co.us/oeis/eap/eapdocs/odorpolicy.pdf