

Calculation Worksheet – Ammonia and Hydrogen Sulfide Emissions Dairy Cow Operations

February _____, 2009

KEEP THIS WORKSHEET FOR YOUR RECORDS-DO NOT SUBMIT WITH YOUR REPORT

The final rule on EPCRA reporting issued by EPA on December 18, 2008 and effective January 20, 2009 requires reporting of ammonia and hydrogen sulfide emissions **if** the dairy has 700 or more mature dairy cows **and** the ammonia exceeds 100 lbs/day **or** the hydrogen sulfide exceeds 100 lbs/day. If the ammonia or hydrogen sulfide is less than 100 lbs/day, enter “N/A” in the appropriate cell of Section 4 in the reporting form. The EPA considers only mature cows at a site when establishing if the operation is a CAFO. Heifers need not be included in the animal count when both are present.

The following emissions estimates are derived from research reported by both: Gay, S.W., D.R. Schmidt, C.J. Clanton, K.A. Janni, L.D. Jacobson, S. Weisberg. 2003. Odor, Total Reduced Sulfur and Ammonia Emissions from Animal Housing Facilities and Manure Storage Units in Minnesota. Applied Engineering in Agriculture, 19(3) 347-360. ASAE St. Joseph, MI. and Pinter, R.W., N.J. Pekney, C.I. Davidson, P.J. Adams. 2004. A Process-Based Model of Ammonia Emissions from Dairy Cows: Improved Temporal and Spatial Resolution. Atmospheric Environment 38(2004) 1357-1365. Elsevier. These values are a good faith estimate of emissions from dairy operations of the CAFO size using freestall housing and sloped sided manure storages and located in a temperate climate.

Dairy Name: _____.

AMMONIA (NH₃) EMISSIONS ESTIMATE

The ammonia emission rates below are inclusive of freestall barns and sloped sided manure storages. Ammonia emission rates are generally lower in winter and higher in summer. Enter your head count in the blank and multiply times the Emission Rate to equal the emission estimate.

AMMONIA (NH₃) EMISSIONS ESTIMATE				
	Lowest Head Count (number of animals)		NH ₃ Emission Rate (pounds/hd/day)	NH₃ Lower Bound (pounds/day)
NH₃ Lower Bound =		X	0.025^a	=
^a winter emissions rate				
	Permitted Head Count (number of animals)		NH ₃ Emission Rate (pounds/hd/day)	NH₃ Upper Bound (pounds/day)
NH₃ Upper Bound =		X	0.25^b	=
^b summer emissions rate				

Hydrogen Sulfide (H₂S) EMISSIONS ESTIMATE

The hydrogen sulfide emission rates below are inclusive of freestall barns and sloped sided manure storages. Hydrogen sulfide emission rates are generally lower in winter and higher in summer. Enter your head count in the blank and multiply times the Emission Rate to equal the emission estimate.

Hydrogen Sulfide (H₂S) EMISSIONS ESTIMATE				
	Lowest Head Count (number of animals)		H ₂ S Emission Rate (pounds/hd/day)	H₂S Lower Bound (pounds/day)
H₂S Lower Bound =		X	0.005^a	=
^a winter emissions rate				
	Permitted Head Count (number of animals)		H ₂ S Emission Rate (pounds/hd/day)	H₂S Upper Bound (pounds/day)
H₂S Upper Bound =		X	0.05^b	=
^b summer emissions rate				

Calculation Worksheet – Ammonia and Hydrogen Sulfide Emissions

Dairy Heifer Operations

February _____, 2009

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The final rule on EPCRA reporting issued by EPA on December 18, 2008 and effective January 20, 2009 requires reporting of ammonia and hydrogen sulfide emissions **if** the dairy has 1,000 or more dairy heifers **and** the ammonia exceeds 100 lbs/day **or** the hydrogen sulfide exceeds 100 lbs/day. If the ammonia or hydrogen sulfide is less than 100 lbs/day, enter “N/A” in the appropriate cell of Section 4 in the reporting form. The EPA considers all cattle other than mature dairy cows at a site when establishing if the operation is a CAFO.

The following emissions estimates are derived from research reported by both: Gay, S.W., D.R. Schmidt, C.J. Clanton, K.A. Janni, L.D. Jacobson, S. Weisberg. 2003. Odor, Total Reduced Sulfur and Ammonia Emissions from Animal Housing Facilities and Manure Storage Units in Minnesota. Applied Engineering in Agriculture, 19(3) 347-360. ASAE St. Joseph, MI. and Pinter, R.W., N.J. Pekney, C.I. Davidson, P.J. Adams. 2004. A Process-Based Model of Ammonia Emissions from Dairy Cows: Improved Temporal and Spatial Resolution. Atmospheric Environment 38(2004) 1357-1365. Elsevier. These values are a good faith estimate of emissions from dairy operations of the CAFO size using freestall housing and sloped sided manure storages and located in a temperate climate.

Dairy Name: _____.

AMMONIA (NH₃) EMISSIONS ESTIMATE

The ammonia emission rates below are inclusive of freestall barns and sloped sided manure storages. Ammonia emission rates are generally lower in winter and higher in summer. Enter your head count in the blank and multiply times the Emission Rate to equal the emission estimate.

AMMONIA (NH₃) EMISSIONS ESTIMATE				
	Lowest Head Count (number of animals)		NH ₃ Emission Rate (pounds/hd/day)	NH₃ Lower Bound (pounds/day)
NH₃ Lower Bound =		X	0.013^a	=
^a winter emissions rate				
	Permitted Head Count (number of animals)		NH ₃ Emission Rate (pounds/hd/day)	NH₃ Upper Bound (pounds/day)
NH₃ Upper Bound =		X	0.125^b	=
^b summer emissions rate				

Hydrogen Sulfide (H₂S) EMISSIONS ESTIMATE

The hydrogen sulfide emission rates below are inclusive of freestall barns and sloped sided manure storages. Hydrogen sulfide emission rates are generally lower in winter and higher in summer. Enter your head count in the blank and multiply times the Emission Rate to equal the emission estimate.

Hydrogen Sulfide (H₂S) EMISSIONS ESTIMATE				
	Lowest Head Count (number of animals)		H ₂ S Emission Rate (pounds/hd/day)	H₂S Lower Bound (pounds/day)
H₂S Lower Bound =		X	0.003^a	=
^a winter emissions rate				
	Permitted Head Count (number of animals)		H ₂ S Emission Rate (pounds/hd/day)	H₂S Upper Bound (pounds/day)
H₂S Upper Bound =		X	0.025^b	=
^b summer emissions rate				