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 upper bound is less than 100 lbs/day, enter "N/A" in both of the appropriate cells of Section 4 in the reporting form. The EPA considers only mature cows at a site when establishing if the operation is a CAFO and must report. Heifers need not be included in the animal count when both are present. However, emissions from heifers do need to be reported when both are present. Combine the results of the two worksheets when heifers and cows 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. Elsvier. 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 (NH_3) 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 (NH_3) EMISSIONS ESTIMATE					
	Lowest Head Count (number of animals)		NH_3 Emission Rate (pounds/hd/day)		**NH_3 Lower Bound** (pounds/day)
NH_3 Lower Bound =		**X**	**0.025** [a]	=	
[a] winter emissions rate					
	Permitted Head Count (number of animals)		NH_3 Emission Rate (pounds/hd/day)		**NH_3 Upper Bound** (pounds/day)
NH_3 Upper Bound =		**X**	**0.25** [b]	=	
[b] summer emissions rate					

Hydrogen Sulfide (H_2S) 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 (H_2S) EMISSIONS ESTIMATE					
	Lowest Head Count (number of animals)		H_2S Emission Rate (pounds/hd/day)		**H_2S Lower Bound** (pounds/day)
H_2S Lower Bound =		**X**	**0.005** [a]	=	
[a] winter emissions rate					
	Permitted Head Count (number of animals)		H_2S Emission Rate (pounds/hd/day)		**H_2S Upper Bound** (pounds/day)
H_2S Upper Bound =		**X**	**0.05** [b]	=	
[b] summer emissions rate					

Revised 2-9-09

Calculation Worksheet – Ammonia and Hydrogen Sulfide Emissions
Dairy Heifer 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 operation has 1,000 or more dairy heifers **and** the ammonia exceeds 100 lbs/day **or** the hydrogen sulfide exceeds 100 lbs/day. The EPA considers all cattle other than mature dairy cows at a site when establishing if the operation is a non-dairy CAFO and must report. If the ammonia or hydrogen sulfide is less than 100 lbs/day, enter "N/A" in both of the appropriate cells of Section 4 in the reporting form. Heifers need not be included in the animal count when both cows and heifers are present. However, emissions from heifers do need to be reported when both are present. Combine the results of the two worksheets when heifers and cows 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. Elsvier. 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 (NH_3) 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 (NH_3) EMISSIONS ESTIMATE					
	Lowest Head Count (number of animals)		NH_3 Emission Rate (pounds/hd/day)		**NH_3 Lower Bound** (pounds/day)
NH_3 Lower Bound =		**X**	**0.013** [a]	=	
[a] winter emissions rate					
	Permitted Head Count (number of animals)		NH_3 Emission Rate (pounds/hd/day)		**NH_3 Upper Bound** (pounds/day)
NH_3 Upper Bound =		**X**	**0.125** [b]	=	
[b] summer emissions rate					

Hydrogen Sulfide (H_2S) 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 (H_2S) EMISSIONS ESTIMATE					
	Lowest Head Count (number of animals)		H_2S Emission Rate (pounds/hd/day)		**H_2S Lower Bound** (pounds/day)
H_2S Lower Bound =		**X**	**0.003** [a]	=	
[a] winter emissions rate					
	Permitted Head Count (number of animals)		H_2S Emission Rate (pounds/hd/day)		**H_2S Upper Bound** (pounds/day)
H_2S Upper Bound =		**X**	**0.025** [b]	=	
[b] summer emissions rate					