

Final Report

Development of a National Air Quality Site Assessment Tool (NAQSAT)

NRCS CIG Agreement number 69-3A75-7-118

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The final product (National Air Quality Site Assessment Tool, NAQSAT) continues to reside at www.naqsat.tamu.edu. The project team met for the last time in December 2010 during which time plans were made to develop a document that related the product to NRCS standards. We also discussed development of a video that describes the tool and its application. That video was created in Vimeo and is now integrated into the website.

A new proposal for the CIG program was discussed that would allow the tool (product) to integrate better into NRCS standards and add in greenhouse gas data. That proposal was submitted (PD Archibeque) and has since been funded.

We continue to train staff around the country about the tool. In Michigan alone, over the past 12 months we have trained 20 Michigan Milk Producers Association field representatives how to use the tool and interpret results with their clients, all taught in a field setting. In 2012 we intend to offer a similar training to Michigan Department of Agriculture field staff that will provide them with experience using the tool thereby enabling them to work with swine, poultry, beef and dairy producers.

Tables included in this final report:

- 1) A list of NRCS practices relevant to the content of the NAQSAT tool
- 2) An outline of NRCS practices and corresponding aspects of the NAQSAT tool
- 3) Further elaboration of how the NAQSAT tool coordinates with NRCS practice standards

Table 1. NRCS practice standards considered relevant to the NAQSAT tool

Practice/Activity	Current Standard	Crop Production?	Animal Production?	Forest?	Wildlife / Natural Areas?	Farmstead?	GHD's	Ammonia	PM	Odor	Ozone Precursors	Review Date (yyyymm)
Composting of Ag Biomass	317		Y					-	-	+	?	200310
Conservation Cover	327	Y			Y		+		+			200002
Conservation Tillage: Conservation Crop Rotation	328	Y					+		+		+	200002
Crop Rotations	328	Y					+		+			200002
Conservation Tillage: Residue and Tillage Management, No Till/Strip	329	Y					+	+			+	200605
Direct Seeding	329	Y							+			200605
Non-burning of crop residue: Residue and Tillage Management, No Till/Strip	329	Y		Y					+		+	200605
Undercutting: Residue and Tillage Management, No Till/Strip	329	Y							+			200605
Smoke Management	338	Y		Y	Y		+		+		+	200601
Cover Crop	340	Y			Y		+		+		+	200605
Conservation Tillage: Residue Management, Seasonal	344	Y					+		+		+	200211
Non-burning of crop residue: Residue Management, Seasonal	344	Y		Y					+		-	200211
Undercutting: Residue Management, Seasonal	344	Y							+			200211
Conservation Tillage: Residue and Tillage Management, Mulch Till	345	Y					+		+		+	200508
Non-burning of crop residue: Residue and Tillage Management, Mulch Till	345	Y		Y					+		+	200508
Undercutting: Residue and Tillage Management, Mulch Till	345	Y							+			200508
Conservation Tillage: Residue and Tillage Management, Ridge Till	346	Y					+		+		+	200508
Non-burning of crop residue: Residue and Tillage Management, Ridge Till	346	Y		Y					+		-	200508
Undercutting: Residue and Tillage Management, Ridge Till	346	Y							+			200508
Anaerobic Lagoons	359		Y					+	+	+	+	200310
Anaerobic Digester, Ambient Temperature	365		Y				+	+		+		200309
Anaerobic Digester, Controlled Temperature	366		Y				+	+		+		200309
Waste Facility Cover	367		Y				+	+		+	?	200309
Windbreaks: Windbreak/Shelterbelt Establishment	380	Y	Y		Y	Y	+	-	+	-	+	200601
Firebreaks: Fuel Break	383	Y		Y	Y				+		+	200504
Firebreaks: Firebreak	394	Y		Y	Y				+		+	200504
Drip Irrigation: Microirrigation	441	Y		Y					+		+	200608
Subsurface drip: Microirrigation	441	Y		Y					+		+	200608
Solid Set Sprinkler	442		Y					-	+	+		200312
Subsurface drip: Surface and Subsurface	443	Y		Y					+		-	200303
Chemigation / Fertigation: Irrigation Water Management	449	Y		Y	Y				+		+	200502
Drip Irrigation: Irrigation Water Management	449	Y		Y					+		+	200502
Flow Meters	449	Y				Y						200502
Subsurface drip: Irrigation Water Management	449	Y		Y					+		+	200502
Polyacrylamide	450	Y	Y	Y		Y			+			200103
Mulching	484	Y		Y	Y				+			200207
Paving	560	Y	Y	Y	Y	Y			+			200310
Road and Heavy Use Area Protection: Access Road	560	Y	Y	Y	Y	Y			+			200310
Road and Heavy Use Area Protection: Heavy Use Area Protection	561	Y	Y	Y	Y	Y			+			200310
Chemigation / Fertigation: Nutrient Management	590	Y		Y	Y				+		+	200608
Nutrient/Nitrogen/Fertilizer Management	590	Y	Y	Y			+	+	+	+	+	200608
Amendments in Ag Waste	591		Y					+	+	+	+	200504
Feed Management (Nutrition)	592		Y					+		+	+	200306
IPM/Pesticide Application & Formulation	595	Y	Y	Y	Y						+	200103
Vegetative Treatment Area: Vegetative Barrier	601	Y	Y			Y				+		200310
A - Re-forestation / Orchard Establishment: Tree/Shrub Establishment	612	Y		Y	Y		+		+	+	-/+	200601
Biofilter	629		Y			Y	+	+	+	+	+	200504
Incinerators	629		Y			Y	-		+	+	-/+	200504
Manure Gasification	629		Y				+			+		200504
Scrubber	629		Y			Y		+	+	+	+	200504
Separators and Weeping Walls	629		Y						+	+	+	200504
Vegetative Treatment Area: Waste Treatment	629	Y	Y			Y				+		200504

Table 2. The NAQSAT tool implicates NRCS practice standards throughout

Emission	Management Phase	NRCS Practice Standards
Ammonia	Animals and Housing	371
	Feed and Water	592
	Collection and Transfer	634
	Manure Storage	360,367,371,591,629
	Land Application	590,591
	On-Farm Roads	
	Perception	
	Mortalities	316
Methane	Animals and Housing	371
	Feed and Water	592
	Collection and Transfer	634
	Manure Storage	359;360;367;371;591;629;
	Land Application	590,591
	On-Farm Roads	
	Perception	
	Mortalities	316
VOC's	Animals and Housing	371
	Feed and Water	592
	Collection and Transfer	634
	Manure Storage	317;359;360;366;367;371;591;629;
	Land Application	590,591
	On-Farm Roads	
	Perception	
	Mortalities	316
Hydrogen Sulfide	Animals and Housing	371,591
	Feed and Water	592
	Collection and Transfer	634
	Manure Storage	317;359;360;367;371;591;629;
	Land Application	590,591
	On-Farm Roads	
	Perception	
	Mortalities	316

Particulates	Animals and Housing	371;380;650
	Feed and Water	592
	Collection and Transfer	380;634;650
	Manure Storage	317;360;367;371;380;591;629;632;650
	Land Application	366;380;590;591;650
	On-Farm Roads	373;380;650
	Perception	380
	Mortalities	316;650
Odor	Animals and Housing	371;380;650
	Feed and Water	592
	Collection and Transfer	380;634;650
	Manure Storage	317;359;360;366;367;371;380;591;629;632;650
	Land Application	380;590;591;650
	On-Farm Roads	
	Perception	317;380;650
	Mortalities	316;380;650

Table 3. Coordination between NAQSAT and NRCS Practices Standards.

<i>Standard</i>	<i>Standard Title</i>	<i>Livestock Type</i>	<i>Management Phase</i>	Emission					
				<i>NH₃</i>	<i>CH₄</i>	<i>VOCs</i>	<i>H₂S</i>	<i>PM</i>	<i>Odor</i>
371	Air Filtration and Scrubbing	Swine	Animals and Housing	+	+	+	+	+	+
			Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception						
			Dairy	Animals and Housing	+	+	+	+	+
		Feed and Water							
		Collection and Transfer							
		Manure Storage		+	+	+	+	+	+
		Land Application							
		Mortalities							
		On-Farm Roads							
		Perception							
		Beef		Animals and Housing	+	+	+	+	+
			Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
Mortalities									
On-Farm Roads									
Perception									
Broiler Chickens	Animals and Housing		+	+	+	+	+	+	
	Feed and Water								
	Collection and Transfer								

			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception						
		Laying Hens	Animals and Housing	+	+	+	+	+	+
			Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception						
		Turkeys	Animals and Housing	+	+	+	+	+	+
			Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception						
591	Amendments for Treatment of Agricultural Waste	Swine	Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application	+	+	+	+	+	+
			Mortalities						
			On-Farm Roads						
			Perception						
		Dairy	Animals and Housing						
			Feed and Water						

		Collection and Transfer					
		Manure Storage	+	+	+	+	+
		Land Application	+	+	+	+	+
		Mortalities					
		On-Farm Roads					
		Perception					
	Beef	Animals and Housing					
		Feed and Water					
		Collection and Transfer					
		Manure Storage	+	+	+	+	+
		Land Application	+	+	+	+	+
		Mortalities					
		On-Farm Roads					
		Perception					
	Broiler Chickens	Animals and Housing					
		Feed and Water					
		Collection and Transfer					
		Manure Storage	+	+	+	+	+
		Land Application	+	+	+	+	+
		Mortalities					
		On-Farm Roads					
		Perception					
	Laying Hens	Animals and Housing					
		Feed and Water					
		Collection and Transfer					
		Manure Storage	+	+	+	+	+
		Land Application	+	+	+	+	+
		Mortalities					
		On-Farm Roads					
		Perception					
	Turkeys	Animals and Housing					

366	Anaerobic Digester	Swine	Feed and Water								
			Collection and Transfer								
			Manure Storage	+	+	+	+	+	+		
			Land Application	+	+	+	+	+	+		
			Mortalities								
			On-Farm Roads								
			Perception								
			Animals and Housing								
			Feed and Water								
			Collection and Transfer								
			Manure Storage				+		+	+	
			Land Application								
		Mortalities									
		On-Farm Roads									
		Perception					+		+	+	
		Animals and Housing									
		Feed and Water									
		Collection and Transfer									
		Manure Storage					+		+	+	
		Land Application									
		Mortalities									
		On-Farm Roads									
		Perception						+		+	+
		Animals and Housing									
Feed and Water											
Collection and Transfer											
Manure Storage						+		+	+		
Land Application											
Mortalities											
On-Farm Roads											
Perception							+		+	+	

	Dairy	Perception						
		Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage						
		Land Application						
		Mortalities	+	+	+	+	+	+
		On-Farm Roads						
	Beef	Perception						
		Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage						
		Land Application						
		Mortalities	+	+	+	+	+	+
		On-Farm Roads						
	Broiler Chickens	Perception						
		Animals and Housing						
Feed and Water								
Collection and Transfer								
Manure Storage								
Land Application								
Mortalities		+	+	+	+	+	+	
On-Farm Roads								
Laying Hens	Perception							
	Animals and Housing							
	Feed and Water							
	Collection and Transfer							
	Manure Storage							
	Land Application							
	Mortalities	+	+	+	+	+	+	
	On-Farm Roads							

360	Closure of Waste Impoundments	Turkeys	On-Farm Roads						
			Perception						
			Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage						
		Land Application							
		Mortalities	+	+	+	+	+	+	
		On-Farm Roads							
		Perception							
		Swine	Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
		On-Farm Roads							
		Perception	+	+	+	+	+	+	
		Dairy	Animals and Housing						
			Feed and Water						
			Collection and Transfer						
Manure Storage	+		+	+	+	+	+		
Land Application									
Mortalities									
On-Farm Roads									
Perception	+	+	+	+	+	+			
Beef	Animals and Housing								
	Feed and Water								
	Collection and Transfer								
	Manure Storage	+	+	+	+	+	+		
	Land Application								
	Mortalities								

317	Composting Facility	Broiler Chickens	Mortalities						
			On-Farm Roads						
			Perception	+	+	+	+	+	+
			Animals and Housing						
			Feed and Water						
			Collection and Transfer						
		Laying Hens	Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception	+	+	+	+	+	+
			Animals and Housing						
		Turkeys	Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
		Swine	Perception	+	+	+	+	+	+
			Animals and Housing						
			Feed and Water						
Collection and Transfer									
Manure Storage					+	+	+	+	

373	Dust Control on Unpaved Roads and Surfaces	Turkeys	Manure Storage	+	+	+	+
			Land Application				+
			Mortalities				
			On-Farm Roads				
			Perception				
			Animals and Housing				
			Feed and Water				
			Collection and Transfer				
			Manure Storage	+	+	+	+
			Land Application				+
		Swine	Mortalities				
			On-Farm Roads				
			Perception				
			Animals and Housing				
			Feed and Water				
			Collection and Transfer				
			Manure Storage				
			Land Application				
			Mortalities				
			On-Farm Roads				+
Dairy	Perception						
	Animals and Housing						
	Feed and Water						
	Collection and Transfer						
	Manure Storage						
	Land Application						
	Mortalities						
	On-Farm Roads				+		
	Perception						
	Beef	Animals and Housing					
Feed and Water							

			Collection and Transfer	
			Manure Storage	
			Land Application	
			Mortalities	
			On-Farm Roads	+
			Perception	
	Broiler Chickens		Animals and Housing	
			Feed and Water	
			Collection and Transfer	
			Manure Storage	
			Land Application	
			Mortalities	
			On-Farm Roads	+
			Perception	
	Laying Hens		Animals and Housing	
			Feed and Water	
			Collection and Transfer	
			Manure Storage	
			Land Application	
			Mortalities	
			On-Farm Roads	+
			Perception	
	Turkeys		Animals and Housing	
			Feed and Water	
			Collection and Transfer	
			Manure Storage	
			Land Application	
			Mortalities	
			On-Farm Roads	+
			Perception	
			Animals and Housing	
592	Feed Management	Swine		

		Feed and Water	+	+	+	+	+	+
		Collection and Transfer						
		Manure Storage						
		Land Application						
		Mortalities						
		On-Farm Roads						
		Perception						
	Dairy	Animals and Housing						
		Feed and Water	+	+	+	+	+	+
		Collection and Transfer						
		Manure Storage						
		Land Application						
		Mortalities						
		On-Farm Roads						
		Perception						
	Beef	Animals and Housing						
		Feed and Water	+	+	+	+	+	+
		Collection and Transfer						
		Manure Storage						
		Land Application						
		Mortalities						
		On-Farm Roads						
		Perception						
	Broiler Chickens	Animals and Housing						
		Feed and Water	+	+	+	+	+	+
		Collection and Transfer						
		Manure Storage						
		Land Application						
		Mortalities						
		On-Farm Roads						
		Perception						

590	Nutrient Management	Laying Hens	Animals and Housing						
			Feed and Water	+	+	+	+	+	+
			Collection and Transfer						
			Manure Storage						
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception						
			Turkeys	Animals and Housing					
		Feed and Water	+	+	+	+	+	+	
		Collection and Transfer							
		Manure Storage							
		Land Application							
		Mortalities							
		On-Farm Roads							
		Perception							
		Swine	Animals and Housing						
		Feed and Water							
		Collection and Transfer							
		Manure Storage							
		Land Application	+	+	+	+	+	+	
Mortalities									
On-Farm Roads									
Perception									
Dairy	Animals and Housing								
Feed and Water									
Collection and Transfer									
Manure Storage									
Land Application	+	+	+	+	+	+			
Mortalities									
On-Farm Roads									

	Beef	Perception						
		Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage						
		Land Application	+	+	+	+	+	+
	Broiler Chickens	Mortalities						
		On-Farm Roads						
		Perception						
		Animals and Housing						
		Feed and Water						
		Collection and Transfer						
Laying Hens	Manure Storage							
	Land Application	+	+	+	+	+	+	
	Mortalities							
	On-Farm Roads							
	Perception							
	Animals and Housing							
Turkeys	Feed and Water							
	Collection and Transfer							
	Manure Storage							
	Land Application	+	+	+	+	+	+	
	Mortalities							
	On-Farm Roads							

632	Solid/Liquid Separation Facility	Swine	On-Farm Roads		
			Perception		
			Animals and Housing		
			Feed and Water		
			Collection and Transfer		
			Manure Storage	+	+
		Land Application			
		Mortalities			
		On-Farm Roads			
		Perception	+	+	
		Dairy	Animals and Housing		
			Feed and Water		
			Collection and Transfer		
			Manure Storage	+	+
			Land Application		
			Mortalities		
		On-Farm Roads			
		Perception	+	+	
		Beef	Animals and Housing		
			Feed and Water		
Collection and Transfer					
Manure Storage	+		+		
Land Application					
Mortalities					
On-Farm Roads					
Perception	+	+			
Broiler Chickens	Animals and Housing				
	Feed and Water				
	Collection and Transfer				
	Manure Storage	+	+		
	Land Application				
	Mortalities				

635	Vegetated Treatment Area	Laying Hens	Mortalities		
			On-Farm Roads		
			Perception	+	+
			Animals and Housing		
			Feed and Water		
			Collection and Transfer		
		Turkeys	Manure Storage	+	+
			Land Application		
			Mortalities		
			On-Farm Roads		
			Perception	+	+
			Animals and Housing		
		Swine	Feed and Water		
			Collection and Transfer		
			Manure Storage	+	+
			Land Application		
			Mortalities		
			On-Farm Roads		
		Dairy	Perception	+	+
			Animals and Housing		
			Feed and Water		
Collection and Transfer					
Manure Storage					

Beef	Land Application
	Mortalities
	On-Farm Roads
	Perception
	Animals and Housing
	Feed and Water
	Collection and Transfer
	Manure Storage
	Land Application
	Mortalities
Broiler Chickens	On-Farm Roads
	Perception
	Animals and Housing
	Feed and Water
	Collection and Transfer
	Manure Storage
	Land Application
	Mortalities
	On-Farm Roads
	Perception
Laying Hens	Animals and Housing
	Feed and Water
	Collection and Transfer
	Manure Storage
	Land Application
	Mortalities
	On-Farm Roads
	Perception
	Animals and Housing
	Feed and Water
Turkeys	Collection and Transfer

367	Waste Facility Cover	Swine	Manure Storage						
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception						
			Animals and Housing						
		Dairy	Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
		Beef	Perception	+	+	+	+	+	+
			Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
		Broiler Chickens	Mortalities						
			On-Farm Roads						
			Perception	+	+	+	+	+	+
			Animals and Housing						
			Feed and Water						

			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
		Laying Hens	Perception	+	+	+	+	+	+
			Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
		Turkeys	Perception	+	+	+	+	+	+
			Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception	+	+	+	+	+	+
		Swine	Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage						
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception	+	+	+	+	+	+
313	Waste Storage Facility		Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage						
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception						
		Dairy	Animals and Housing						

Beef	Feed and Water
	Collection and Transfer
	Manure Storage
	Land Application
	Mortalities
	On-Farm Roads
	Perception
	Animals and Housing
	Feed and Water
	Collection and Transfer
Broiler Chickens	Manure Storage
	Land Application
	Mortalities
	On-Farm Roads
	Perception
	Animals and Housing
	Feed and Water
	Collection and Transfer
	Manure Storage
	Land Application
Laying Hens	Mortalities
	On-Farm Roads
	Perception
	Animals and Housing
	Feed and Water
	Collection and Transfer
	Manure Storage
	Land Application
	Mortalities
	On-Farm Roads

634	Waste Transfer	Turkeys	Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage						
			Land Application						
			Mortalities						
			On-Farm Roads						
		Swine	Perception						
			Animals and Housing						
			Feed and Water						
			Collection and Transfer	+	+	+	+	+	+
			Manure Storage						
			Land Application						
			Mortalities						
		Dairy	On-Farm Roads						
			Perception						
			Animals and Housing						
			Feed and Water						
			Collection and Transfer	+	+	+	+	+	+
			Manure Storage						
			Land Application						
Beef	Mortalities								
	On-Farm Roads								
	Perception								
	Animals and Housing								
	Feed and Water								
	Collection and Transfer	+	+	+	+	+	+		
	Manure Storage								
Land Application									
Mortalities									
On-Farm Roads									

629	Waste Treatment	Broiler Chickens	Perception						
			Animals and Housing						
			Feed and Water						
			Collection and Transfer	+	+	+	+	+	+
			Manure Storage						
			Land Application						
			Mortalities						
		Laying Hens	On-Farm Roads						
			Perception						
			Animals and Housing						
			Feed and Water						
			Collection and Transfer	+	+	+	+	+	+
			Manure Storage						
			Land Application						
		Turkeys	Mortalities						
			On-Farm Roads						
			Perception						
			Animals and Housing						
			Feed and Water						
			Collection and Transfer	+	+	+	+	+	+
			Manure Storage						
Swine	Land Application								
	Mortalities								
	On-Farm Roads								
	Perception								
	Animals and Housing								
	Feed and Water								
	Collection and Transfer								
Manure Storage	+	+	+	+	+	+			
Land Application									
Mortalities									

		On-Farm Roads						
		Perception	+	+	+	+	+	+
	Dairy	Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage	+	+	+	+	+	+
		Land Application						
		Mortalities						
		On-Farm Roads						
		Perception	+	+	+	+	+	+
	Beef	Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage	+	+	+	+	+	+
		Land Application						
		Mortalities						
		On-Farm Roads						
		Perception	+	+	+	+	+	+
	Broiler Chickens	Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage	+	+	+	+	+	+
		Land Application						
		Mortalities						
		On-Farm Roads						
		Perception	+	+	+	+	+	+
	Laying Hens	Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage	+	+	+	+	+	+
		Land Application						

359	Waste Treatment Lagoon	Turkeys	Mortalities						
			On-Farm Roads						
			Perception	+	+	+	+	+	+
			Animals and Housing						
			Feed and Water						
			Collection and Transfer						
		Swine	Manure Storage	+	+	+	+	+	+
			Land Application						
			Mortalities						
			On-Farm Roads						
			Perception	+	+	+	+	+	+
			Animals and Housing						
		Dairy	Feed and Water						
			Collection and Transfer						
			Manure Storage		+	+	+		+
			Land Application						
			Mortalities						
			On-Farm Roads						
		Beef	Perception						
			Animals and Housing						
			Feed and Water						
Collection and Transfer									
Manure Storage			+	+	+		+		
Land Application									

633	Waste Utilization	Broiler Chickens	Land Application				
			Mortalities				
			On-Farm Roads				
			Perception				
			Animals and Housing				
		Feed and Water					
		Collection and Transfer					
		Manure Storage	+	+	+	+	
		Land Application					
		Mortalities					
		On-Farm Roads					
		Perception					
		Laying Hens	Animals and Housing				
		Feed and Water					
		Collection and Transfer					
		Manure Storage	+	+	+	+	
		Land Application					
		Mortalities					
		On-Farm Roads					
		Perception					
Turkeys	Animals and Housing						
Feed and Water							
Collection and Transfer							
Manure Storage	+	+	+	+			
Land Application							
Mortalities							
On-Farm Roads							
Perception							
Swine	Animals and Housing						
Feed and Water							
Collection and Transfer							

		Manure Storage						
		Land Application	+	+	+	+	+	+
		Mortalities						
		On-Farm Roads						
		Perception						
	Dairy	Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage						
		Land Application	+	+	+	+	+	+
		Mortalities						
		On-Farm Roads						
		Perception						
	Beef	Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage						
		Land Application	+	+	+	+	+	+
		Mortalities						
		On-Farm Roads						
		Perception						
	Broiler Chickens	Animals and Housing						
		Feed and Water						
		Collection and Transfer						
		Manure Storage						
		Land Application	+	+	+	+	+	+
		Mortalities						
		On-Farm Roads						
		Perception						
	Laying Hens	Animals and Housing						
		Feed and Water						

			Collection and Transfer						
			Manure Storage						
			Land Application	+	+	+	+	+	+
			Mortalities						
			On-Farm Roads						
			Perception						
		Turkeys	Animals and Housing						
			Feed and Water						
			Collection and Transfer						
			Manure Storage						
			Land Application	+	+	+	+	+	+
			Mortalities						
			On-Farm Roads						
			Perception						
380	Windbreak/Shelterbelt Establishment	Swine	Animals and Housing					+	+
			Feed and Water						
			Collection and Transfer					+	+
			Manure Storage					+	+
			Land Application					+	+
			Mortalities						+
			On-Farm Roads					+	
			Perception					+	+
		Dairy	Animals and Housing					+	+
			Feed and Water						
			Collection and Transfer					+	+
			Manure Storage					+	+
			Land Application					+	+
			Mortalities						+
			On-Farm Roads					+	
			Perception					+	+
		Beef	Animals and Housing					+	+

		Feed and Water		
		Collection and Transfer	+	+
		Manure Storage	+	+
		Land Application	+	+
		Mortalities		+
		On-Farm Roads	+	
		Perception	+	+
	Broiler Chickens	Animals and Housing	+	+
		Feed and Water		
		Collection and Transfer	+	+
		Manure Storage	+	+
		Land Application	+	+
		Mortalities		+
		On-Farm Roads	+	
		Perception	+	+
	Laying Hens	Animals and Housing	+	+
		Feed and Water		
		Collection and Transfer	+	+
		Manure Storage	+	+
		Land Application	+	+
		Mortalities		+
		On-Farm Roads	+	
		Perception	+	+
	Turkeys	Animals and Housing	+	+
		Feed and Water		
		Collection and Transfer	+	+
		Manure Storage	+	+
		Land Application	+	+
		Mortalities		+
		On-Farm Roads	+	
		Perception	+	+

650	Windbreak/Shelterbelt Renovation	Swine	Animals and Housing	+	+
			Feed and Water		
			Collection and Transfer	+	+
			Manure Storage	+	+
			Land Application	+	+
			Mortalities		+
			On-Farm Roads	+	
			Perception	+	+
			Dairy	Animals and Housing	+
		Feed and Water			
		Collection and Transfer		+	+
		Manure Storage		+	+
		Land Application		+	+
		Mortalities			+
		On-Farm Roads		+	
		Perception		+	+
		Beef		Animals and Housing	+
			Feed and Water		
			Collection and Transfer	+	+
			Manure Storage	+	+
			Land Application	+	+
			Mortalities		+
			On-Farm Roads	+	
			Perception	+	+
Broiler Chickens	Animals and Housing		+	+	
	Feed and Water				
	Collection and Transfer	+	+		
	Manure Storage	+	+		
	Land Application	+	+		
	Mortalities		+		
	On-Farm Roads	+			
	Perception	+	+		
	On-Farm Roads	+			

		Perception	+	+
	Laying Hens	Animals and Housing	+	+
		Feed and Water		
		Collection and Transfer	+	+
		Manure Storage	+	+
		Land Application	+	+
		Mortalities		+
		On-Farm Roads	+	
		Perception	+	+
	Turkeys	Animals and Housing	+	+
		Feed and Water		
		Collection and Transfer	+	+
		Manure Storage	+	+
		Land Application	+	+
		Mortalities		+
		On-Farm Roads	+	
		Perception	+	+