

## **Brent Walter Auvermann**

Professor of Biological and Agricultural Engineering  
Texas AgriLife Extension Service/Texas AgriLife Research  
6500 Amarillo Blvd W  
Amarillo, TX 79106

### **Education**

- Abilene Christian University, Abilene, TX  
Courses toward the Master of Arts in History and Theology (GPR 4.0/4.0)  
Advisor: Dr. Douglas Foster  
2006-Present
- Colorado State University, Ft. Collins, CO  
Doctor of Philosophy in Chemical and Bioresource Engineering  
Advisor: Dr. David B. McWhorter  
Degree conferred 1996
- Texas A&M University, College Station, TX  
Master of Science in Agricultural Engineering  
Advisor: Dr. Marshall J. McFarland  
Degree conferred 1990
- Texas A&M University, College Station, TX  
Bachelor of Science in Agricultural Engineering  
Degree conferred 1986

### **Honors and Awards**

#### Individual

Nolan Mitchell Young Extension Worker award, American Society of Agricultural and Biological Engineers, 2004.

Robert E. Stewart Engineering-Humanities award, American Society of Agricultural and Engineers, 1991.

#### Team

Vice Chancellor's Award in Excellence for Research, Texas A&M AgriLife, 2009.

### **Extension Products**

#### *Environmental Assessment Tools*

Powers, W., et al. 2010. National Air Quality Site Assessment Tool (NAQSAT). Lansing, MI: Michigan State University. Published to web at <http://naqsat.tamu.edu>.

#### *Bulletins and Major Fact Sheets*

Mukhtar, S., and B. W. Auvermann. 2009. Improving the air quality of animal feeding operations with proper facility and manure management. Bulletin E-585, Texas AgriLife Extension Service, College Station, TX.

Preece, S. L., and B. W. Auvermann. 2009. Dairy footbaths and the environmental toxicity of copper. Bulletin E-562, Texas AgriLife Extension Service, College Station, TX.

Sweeten, J. M., and B. W. Auvermann. 2008. Composting manure and sludge. (Major revision.) Bulletin E-479 (formerly L-2289), Texas AgriLife Extension Service, College Station, TX.

Upadhyay, J. K., B. W. Auvermann, K. J. Bush, and S. Mukhtar. 2008. Nitrogen deposition in the southern High Plains. Bulletin E-464, Texas AgriLife Extension Service, College Station, TX.

Auvermann, B. W., S. Mukhtar, and K. Heflin. 2006. Composting large animal carcasses. Bulletin E-422, Texas Cooperative Extension, College Station, TX.

Mukhtar, S., and B. W. Auvermann. 2006. Air quality standards and nuisance issues for animal agriculture. Bulletin E-401, Texas Cooperative Extension, College Station, TX.

Auvermann B. W. 2003. CAFO requirements for the beef production area. LPES curriculum fact sheet #12. Ames, IA: MidWest Plan Service. 6 pp. (Accessed 8/24/07 on the Internet at [http://www.lpes.org/CAFO\\_PDF\\_Prod.html](http://www.lpes.org/CAFO_PDF_Prod.html).)

Wright, P. and B. W. Auvermann. 2003. CAFO requirements for the production area. LPES curriculum fact sheet #10. Ames, IA: MidWest Plan Service. 7 pp. (Accessed 8/24/07 on the Internet at [http://www.lpes.org/CAFO\\_PDF\\_Prod.html](http://www.lpes.org/CAFO_PDF_Prod.html).)

Sweeten, J. M., R. Miner and B. W. Auvermann. 2003. Alternative treatment systems. LPES curriculum fact sheet #7. Ames, IA: MidWest Plan Service. 11 pp. (Accessed 8/24/07 on the Internet at [http://www.lpes.org/CAFO\\_PDF\\_Gen.html](http://www.lpes.org/CAFO_PDF_Gen.html).)

Auvermann, B. W. 2001. Section 3: Outdoor air quality. Bulletin MWPS-18 (Revised), Midwest Plan Service, Ames, IA.

Auvermann, B. W., D. B. Parker and J. M. Sweeten. 2000. Manure harvesting frequency: the feedyard manager's #1 tool for dust control in a summer drought. Bulletin E-52, Texas Agricultural Extension Service, College Station, TX.

Auvermann, B. W., L. A. McDonald, R. Devin and J. M. Sweeten. 1999. Composting horse manure. Bulletin B-6084, Texas Agricultural Extension Service, College Station, TX.

Mukhtar, S., J. M. Sweeten and B. W. Auvermann. 1999. Solid-liquid separation of animal manure and wastewater. Bulletin E-13, Texas Agricultural Extension Service, College Station, TX.

### *Curriculum Modules, Chapters and Handbooks*

Upadhyay, J. K., and B. W. Auvermann. 2007. Introduction to visibility. Draft chapter submitted to USDA-NRCS for the National Engineering Handbook (provisionally accepted; in final review).

Faulkner, B., B. W. Shaw and B. W. Auvermann. 2007. Fugitive dust. Draft chapter submitted to USDA-NRCS for the National Engineering Handbook (provisionally accepted; in final review).

Mukhtar, S. and B. W. Auvermann. 2004. Environmental quality management of animal feeding operations curriculum, Modules A-J. Cooperative Extension Curriculum Project, available on line at <http://agextonline.tamu.edu/admin/>.

Alberta Agriculture, Food and Rural Development. 2002. Contributing author of Beneficial Management Practices: Environmental Manual for Feedlot Producers in Alberta. Edmonton, AB: AAFRD.

Alberta Agriculture, Food and Rural Development. 2002. Contributing author of Beneficial Management Practices: Environmental Manual for Hog Producers in Alberta. Edmonton, AB: AAFRD.

Auvermann, B. W. 2001. Controlling dust and odor from open-lot livestock facilities. Lesson 42 in Livestock and Poultry Environmental Stewardship (LPES) Curriculum, Midwest Plan Service, Ames, IA.<sup>1</sup>

Auvermann, B. W. 2001. Sources of odor in the cattle feedyard. Chapter 5.1 in Environmental Practice Guidelines for Alberta Feedlots, Alberta Cattle Feeders Association, Calgary, Alberta, Canada.

Auvermann, B. W. 2001. Measuring and regulating odors. Chapter 5.2 in Environmental Practice Guidelines for Alberta Feedlots, Alberta Cattle Feeders Association, Calgary, Alberta, Canada.

Auvermann, B. W. 2001. Preventing and suppressing feedyard odors. Chapter 5.3 in Environmental Practice Guidelines for Alberta Feedlots, Alberta Cattle Feeders Association, Calgary, Alberta, Canada.

Auvermann, B. W. 2001. Health effects of odor from the cattle feedyard. Chapter 5.4 in Environmental Practice Guidelines for Alberta Feedlots, Alberta Cattle Feeders Association, Calgary, Alberta, Canada.

Auvermann, B. W. 2001. Feedyard dust. Chapter 6 in Environmental Practice Guidelines for Alberta Feedlots, Alberta Cattle Feeders Association, Calgary, Alberta, Canada.

Feagley, S., B. W. Auvermann, S. Stokes and E. Jordan. 1999. Dairy manure management handbook. Texas Agricultural Extension Service, College Station, TX.

Feagley, S., B. W. Auvermann and L. W. Greene. 1999. Feedyard manure management handbook. Texas Agricultural Extension Service, College Station, TX.

Feagley, S., J. B. Carey and B. W. Auvermann. 1998. Poultry waste management handbook. Texas Agricultural Extension Service, College Station, TX.

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<sup>1</sup> This national curriculum received ASABE's Blue Ribbon award in the "Extension Educational Materials" category at the Association's 2002 Annual International Meeting in Chicago, IL.

### *Newsletters, Minor Fact Sheets, and Web (“eXtension”) Resources*

Auvermann, B. W., R. Maghirang, R. Todd, N. A. Cole, K. D. Casey, and R. McGee. 2009. Air emissions from cattle feedyards and dairies: measurements and control strategies. Webcast presented to the Livestock and Poultry Environmental Learning Center (eXtension Community of Practice), March 27.

Zering, K., and B. W. Auvermann. 2008. Value of manure as an energy source. eXtension resource deployed to [http://www.extension.org/pages/Value\\_of\\_Manure\\_as\\_an\\_Energy\\_Source](http://www.extension.org/pages/Value_of_Manure_as_an_Energy_Source) on October 7.

Auvermann, B. W. 2008. What is the difference between the higher heating value and the lower heating value of a biomass fuel, and why is the difference important? Frequently Asked Question (FAQ) series, <http://faq.extension.org>, FAQ #27554.

Auvermann, B. W. 2008. How much fuel energy is contained in feedlot manure? Frequently Asked Question (FAQ) series, <http://faq.extension.org>, FAQ #27543.

Auvermann, B. W., A. N. Paila, J. Bush, B. Chaffin, G. Marek and K. Heflin. 2006. Visibility as a surrogate measure of ambient dust concentrations. Amarillo, TX: Texas Agricultural Experiment Station fact sheet series.

Auvermann, B. W., T. H. Marek, W. C. Rogers, G. Marek, K. Heflin, J. Bush and B. Chaffin. 2005. The "water curtain" - an edge-of-feedyard dust-control technique. Amarillo, TX: Texas Agricultural Experiment Station fact sheet series.

Chaffin, B., G. Marek, K. Heflin and B. W. Auvermann. 2005. Mechanical simulation of fugitive feedlot dust emissions. Amarillo, TX: Texas Agricultural Experiment Station fact sheet series.

Heflin, K., G. W. Marek and B. W. Auvermann. 2005. Using nature to dispose safely of large animal carcasses. Amarillo, TX: Texas Agricultural Experiment Station fact sheet series.

Auvermann, B. W. 2005. Ensuring Amarillo’s air quality meets federal standards. Amarillo, TX: Texas Agricultural Experiment Station fact sheet series.

Marek, G. W., K. Heflin and B. W. Auvermann. 2005. Measuring the water demand for sprinkler dust control on cattle feedyards. Amarillo, TX: Texas Agricultural Experiment Station fact sheet series.

Auvermann, B. W. 2005. Engineering support for USDA’s Environmental Quality Incentives Program (EQIP) for feedyard dust control. Amarillo, TX: Texas Agricultural Experiment Station fact sheet series.

Auvermann, B. W., J. Bush, B. Chaffin, K. Heflin and G. Marek. 2005. Continuous monitoring of particulate matter at a commercial feedyard. Amarillo, TX: Texas Agricultural Experiment Station fact sheet series.

Auvermann, B. W. and S. Howard. 2003. Clearing the air: A newsletter for High Plains feedyards. Amarillo, TX: Texas Cooperative Extension. 4 issues.

## **Workshops, Local and Regional Presentations**

### *Workshops Coordinated*

Feedyard and Dairy Air Quality Workshop Series, Phase I (Hereford, TX; Stratford, TX; and Garden City, KS), August 24-26, 2010. Total attendance: 25, representing nearly 2,000,000 head of one-time feedyard capacity.

### *Other Local and Regional Presentations*

“Technical review of proposed dairy regulations in New Mexico,” invited presentation to the New Mexico Environment Department, Albuquerque, NM, November 30, 2009.

“Air quality research at cattle feedyards,” invited presentation to the Arizona Cattle Feeders Association, Casa Grande, AZ, November 5, 2009.

“BMPs for control of fugitive PM<sub>10</sub> from cattle feedyards and open-lot dairies,” invited presentation to the Arizona Department of Environmental Quality, Phoenix, AZ, November 4, 2009.

“Lagoon management and odor control,” invited presentation to the TCEQ Annual Inspectors' Training, Clear Lake, TX, November 19, 2008.

“Particulate matter and dairies: monitoring techniques,” invited presentation to NRCS field-office personnel, Albuquerque, NM, October 22, 2008. Technical content evaluation: 69% excellent, 31% average. Presentation/delivery evaluation: 69% excellent, 31% average. Audience self-assessment of knowledge status: poor (pre-workshop), good (post-workshop).

“Particulate matter and dairies: BMPs and mitigation strategies,” invited presentation to NRCS field-office personnel, Albuquerque, NM, October 22, 2008. Technical content evaluation: 63% excellent, 38% average. Presentation/delivery evaluation: 56% excellent, 44% average. Audience self-assessment of knowledge status: fair (pre-workshop), good (post-workshop).

“Management of corral surfaces to optimize the biofuel value of cattle feedyard manure,” invited presentation to visiting officials from Frito-Lay, Inc., Amarillo, TX, April 4, 2008.

“Cultivating prophets: hopeful reflections on West Texas A&M’s PhD program in systems agriculture,” invited speech to the faculty of the WTAMU Agricultural Sciences Department, Canyon, TX, February 21, 2008.

“From emission to deposition: a short history of nitrogen along the Front Range,” invited speech to the Colorado Farm Show/Dairy Days, Greeley, CO, January 31, 2008.

“Recent developments in feedyard air quality,” invited speech to the Arizona Cattle Feeders Association, Casa Grande, AZ, November 20, 2007.

“Lagoon and holding pond hydraulics and management,” Sulphur Springs, TX, October 30, 2007.

“Total quality manure management and its implications for fuel and fertilizer value,” Hereford, TX, May 15, 2007.

“Measures of manure quality,” Hereford, TX, May 15, 2007.

Manure-harvesting practices and strategies on the ground,” Hereford, TX, May 15, 2007.

“Airborne emissions: regulations, nuisance and greenhouse-gas equivalents,” Sulphur Springs, TX, October 30, 2007.

“On-site discussion of dust-suppression options,” Ordway Cattle Feeders, Ordway, CO, November 17, 2006.

“Emjoules and ecofootprints,” Sulphur Springs, TX, October 31, 2006.<sup>2</sup>

“Lagoon and holding pond hydraulics,” Sulphur Springs, TX, October 31, 2006.<sup>3</sup>

“Composting large animal carcasses,” Deaf Smith County stocker-cattle meeting, Hereford, TX, October 25, 2006.

“Composting dairy carcasses,” NM/TX dairy conference, Clovis, NM, October 11, 2006.

“On-site discussion of renewable energy options,” Dairy Fountain dairy, Hale County, TX, September 19, 2006.

“Dairies and air quality,” Sulphur Springs, TX, November 1, 2005.

“Lagoon and holding pond hydraulics,” Sulphur Springs, TX, November 1, 2005.

“Composting for the home gardener,” Hutchinson County Master Gardeners meeting, April 19, 2005.

“From ammonia to PM<sub>2.5</sub>,” Colorado State University Cooperative Extension, Ft. Collins, CO, February 9, 2005.

“Dairies and air quality,” Sulphur Springs, TX, November 2, 2004.

“Lagoon and holding pond hydraulics,” Sulphur Springs, TX, November 2, 2004.

“Air quality research,” presented to visiting dairymen from Ohio, November 1, 2004.

“Odor control methodology and air quality permits,” presented to the National CAFO Roundtable (EPA and TCEQ), San Antonio, TX, October 7, 2004.

“The significance of airborne emissions from cattle feedyards,” presented to the Pulmonary Care Unit faculty and technical staff, University of Nebraska Medical Center/Omaha, March 11, 2004.

“Animal waste and nutrient management in the High Plains,” presented to visiting dairymen from Colorado, March 31, 2004.

“The no-discharge provision in federal and state CAFO rules: an endangered species,” Sulphur Springs, TX, November 12, 2003.

USDA-NRCS South Central Region workshop on air pollution from animal feeding operations, Ft. Worth, TX, May 7, 2003.

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<sup>2</sup> Audience assessment (0=low, 5=high) 3.7/5.0 (n=19).

<sup>3</sup> Audience assessment (0=low, 5=high) 4.7/5.0 (n=10).

“Composting carcasses from the beef feedlot,” result demonstration coordinating meeting, Bowie, TX, April 28, 2003.

“Composting for the home gardener,” Hutchinson County Master Gardeners program, Borger, TX, April 25, 2003.

“Recent developments in feedyard dust control,” Kansas State University Extension, Garden City, KS, February 25, 2003.

“Air and water quality issues concerning animal waste management,” Texas Section of the American Society of Agronomy, Canyon, TX, February 24, 2003.

“Grain dust explosions,” GEAPS workshop, Amarillo Civic Center, January 28, 2003.

“Particulate matter from cattle feedyards and dairies,” USDA-NRCS national training conference, St. Louis, MO, November 5-7, 2002.

“Recent developments in feedyard dust control,” Texas Section ASAE, Lubbock, TX, October 10, 2002.

“Controlling odor and dust from open-lot livestock facilities,” LPES Lesson 42, LPES Regional Workshop, Denver, CO, April 15, 2002.

“Livestock feeding and environmental air quality,” Great Plains Foundation annual conference, Amarillo, TX, April 3, 2002.

“Composting for the home gardener,” Hutchinson County Master Gardeners program, Borger, TX, March 28, 2002.

“Health effects of CAFO emissions,” Whole-Farm Nutrient Management Conference, Greeley, CO, March 22, 2002.

“Principles and management of large-carcass composting,” Seminar sponsored by Elanco, Inc., Amarillo, TX, March 5, 2002.

“Documented human health effects of airborne emissions from CAFOs,” presented to the Alberta Cattle Feeders Association, Red Deer, AB, February 22, 2002.

“Controlling odor and dust from open-lot livestock facilities,” LPES Lesson 42, LPES Regional Workshop, Sacramento, CA, February 21, 2002.

“Air quality near large feedlots,” KSU annual air quality symposium, Manhattan, KS, January 7, 2002.

## **Refereed Publications**

### *Journal Articles*

Guo, L., R. G. Maghirang, E. B. Razote, and B. W. Auvermann. 2011. Laboratory evaluation of the dust control effectiveness of pen surface treatments for cattle feedyards. Submitted to the Journal of Environmental Quality (in review).

Vanderlick, F., R. McGee, C. B. Parnell, Jr., B. W. Auvermann, B. Lambeth, S. Skloss, and D. Roark. 2010. Comparison of TEOM and gravimetric methods of measuring PM concentrations. Accepted for publication in *Journal of Natural and Environmental Sciences* (edition pending).

Bonifacio, H., R. G. Maghirang, B. W. Auvermann, et al. 2011. Determining PM<sub>10</sub> emission rates from beef cattle feedlots in Kansas using inverse dispersion modeling. Accepted for publication in *Transactions of the ASABE* (edition pending).

Rhoades, M., D. B. Parker, R. Todd, N. A. Cole, E. Caraway, B. W. Auvermann, D. R. Topliff, and G. L. Schuster. 2010. Continuous ammonia emission measurements from a commercial beef feedyard in Texas. *Transactions of the ASABE* 53(6):1823-1831.

Hiranuma, N., S. D. Brooks, and B. W. Auvermann. 2010. Unique properties of agricultural aerosol: emissions from a cattle-feeding operation. Submitted to *Journal of Geophysical Research* (in review).

Sakirkin, S. L. P., B. W. Auvermann, and C. L. S. Morgan. 2010. Effect of sample pre-processing and data post-processing methods on the determination of ash content in solid cattle manure with visible near-infrared diffuse reflectance spectroscopy. *Transactions of the ASABE* 53(2):421-428.

O'Connor, A. M., B. W. Auvermann, D. Bickett-Weddle, S. Kirkhorn, J. M. Sargeant, A. Ramirez, and S. G. Von Essen. 2009. The association between proximity to animal feeding operations and health outcomes in community members: a systematic review approach to evaluating the evidence. *PLoS ONE* 5(3): e9530. doi:10.1371/journal.pone.0009530.

Hiranuma, N., S. D. Brooks, D. C. O. Thornton, and B. W. Auvermann. 2009. Atmospheric ammonia mixing ratios at an open-air cattle feeding facility. *Journal of the Air & Waste Management Association* 60(2):210-218.

Preece, S. L., C. L. S. Morgan, B. W. Auvermann, K. Wilke, and K. Heflin. 2009. Determination of ash content in solid cattle manure with visible near-infrared diffuse reflectance spectroscopy. *Transactions of the ASABE* 52(2):609-614.

Upadhyay, J. K., B. W. Auvermann, A. N. Paila (graduate student), and N. Hiranuma (graduate student). 2008. Open-path transmissometry to determine the atmospheric extinction efficiency of feedyard dust. *Transactions of the ASABE* 51(4):1433-1441.

Hiranuma, N. (graduate student), S. D. Brooks, B. W. Auvermann, and R. Littleton. 2008. Using environmental scanning electron microscopy to determine the hygroscopic properties of agricultural aerosols. *Atmospheric Environment* 42(9):1983-1994.

Cole, N. A., R. Todd, B. W. Auvermann, and D. B. Parker. 2008. Auditing and assessing nutrient management for air quality. *The Professional Animal Scientist* 24(1):1-22.

Kalbasi, A., M. Schutz, and B. W. Auvermann. 2008. Carcass rendering system for farm mortalities: a review. *Journal of Environmental Engineering and Science* 7(3):199-210.



Wyatt, T. A., R. E. Slager, J. DeVasure, S. Von Essen, B. W. Auvermann, T. Mathisen, and D. J. Romberger. 2007. Feedlot dust stimulation of interleukin-6 and -8 requires protein kinase C-epsilon human bronchial epithelial cells. *American Journal of Physiology-Lung Cellular and Molecular Physiology* 293(5):L1163-L1170.

Kalbasi, A., S. Mukhtar, S. E. Hawkins, and B. W. Auvermann. 2006. Design, utilization, biosecurity, environmental and economic considerations of carcass composting. *Compost Science and Utilization* 14(2):90-102.

Von Essen, S. and B. W. Auvermann. 2006. Health effects from breathing the air near CAFOs for feeder cattle or hogs. *Journal of Agromedicine* 10(4): 55-64.

Razote, E. B., R. G. Maghirang, B. Z. Predicala, J. P. Murphy, B. W. Auvermann, J. P. Harner III, and W. L. Hargrove. 2006. Laboratory evaluation of the dust-emission potential of cattle feedlot surfaces. *Transactions of the ASABE* 49 (4):1117-1124.<sup>4</sup>

Kalbasi, A., S. Mukhtar, S. E. Hawkins, and B. W. Auvermann. 2005. Carcass composting for management of farm mortalities: a review. *Compost Science and Utilization* 13(3):180-193.

Mukhtar, S., J. U. Ullman, B. W. Auvermann, S. E. Feagley, and T. A. Carpenter. 2004. Impact of anaerobic lagoon management on sludge accumulation and nutrient content for dairies. *Transactions of the ASABE* 47(1):251-257.

Corey, A. T. and B. W. Auvermann. 2003. Transport by advection and diffusion revisited. *Vadose Zone Journal* 2(4):655-663.

McCullough, M. C., D. B. Parker, C. Robinson, and B. W. Auvermann. 2001. Changes in hydraulic conductivity, bulk density and electrical conductivity in the soil profile of a newly constructed feedlot. *Applied Engineering in Agriculture* 17(4):539-544.

Shi, Y. (graduate student), D. B. Parker, N. A. Cole, B. W. Auvermann, and J. E. Mehlhorn. 2001. Surface amendments to minimize ammonia emissions from beef cattle feedlots. *Transactions of the ASAE* 44(3):677-682.<sup>5</sup>

Parker, D. B., L. J. Perino, B. W. Auvermann, and J. M. Sweeten. 2000. Water use and conservation at Texas High Plains beef cattle feedyards. *Applied Engineering in Agriculture* 16(1):77-82.

Auvermann, B. W. 1999. Book review: Risk-Based Contaminated Land Investigation and Land Assessment. *Agricultural Water Management* 41(1):71-72.

Parker, D. B., B. W. Auvermann, and D. L. Williams. 1999. Comparison of evaporation rates from feedyard pond effluent and clear water as applied to seepage predictions. *Transactions of the ASAE* 42(4):981-986.

Sweeten, J. M., C. B. Parnell, Jr., B. W. Shaw, and B. W. Auvermann. 1998. Particle size distribution of cattle feedlot dust emission. *Transactions of the ASAE* 41(5):1477-1481.

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<sup>4</sup> ASABE Honorable Mention Award, journal articles category, awarded June 2007.

<sup>5</sup> ASABE Superior Paper Award, journal articles category, awarded July 2002.

Auvermann, B. W., M. J. McFarland, and D. W. Hill. 1992. In-situ determination of soil thermal characteristics. *Transactions of the ASAE* 35(3):833-839.

### *Book Chapters*

Sweeten, J. M. and B. W. Auvermann. 2003. Manure management, beef cattle industry requirements. In: *Encyclopedia of Water Science* (B. A. Stewart and T. A. Howell, eds). New York: Marcel-Dekker Inc. pp. 601-602.

Sweeten, J. M., C. B. Parnell, B. W. Auvermann, B. W. Shaw and R. E. Lacey. 2000. Food and Agricultural Industry: Livestock Feedlots. *Air Pollution Engineering Manual* (2nd edition, W. Davis, ed). New York: John Wiley & Sons, Inc. pp. 488-496.

### *Standards*

Koelsch, R., W. Powers, G. Erickson, B. W. Auvermann et al. 2005. D384.2: Manure production and characteristics. *Standards of the American Society of Agricultural and Biological Engineers*, St. Joseph, MI.

### *White Papers and Task Force Reports*

Jacobson, L. J., F. Mitloehner, A. Sutton, H. Xin, R. Massey, and B. W. Auvermann. 2010. Air issues associated with animal agriculture: a North American perspective. Council for Agricultural Science and Technology (CAST), Ames, IA. (in review)

Sweeten, J. M., L. D. Jacobson, A. J. Heber, D. R. Schmidt, J. C. Lorimor, P. W. Westerman, J. R. Miner, R. H. Zhang, C. M. Williams and B. W. Auvermann. 2001. Odor mitigation for concentrated animal feeding operations: white paper and recommendations. National Center for Manure and Animal Waste Management, North Carolina State University, Raleigh, NC.

Auvermann, B. W., R. Bottcher, A. Heber, D. Meyer, C. B. Parnell, Jr., B. Shaw, and J. Worley. 2001. Particulate matter emissions from confined animal feeding operations: management and control measures. National Center for Manure and Animal Waste Management, North Carolina State University, Raleigh, NC.

## **Proceedings and Presentations**

### *Conference Proceedings with Manuscripts, 2002-present*

Cottle, L. M., L. A. Baker, J. L. Pipkin, D. B. Parker, R. E. DeOtte, Jr., and B. W. Auvermann. 2010. Sodium pentobarbital residues in compost piles containing carcasses of euthanized equines. *Proceedings of the International Symposium on Air Quality and Manure Management for Agriculture*, Dallas, TX, September 12-15.

Auvermann, B. W., K. J. Bush, G. W. Marek, K. Heflin, W. B. Wilhite, and S. L. P. Sakirkin. 2010. Time-varying PM<sub>10</sub> emissions from open-lot dairies and cattle feedyards. *Proceedings of the International Symposium on Air Quality and Manure Management for Agriculture*, Dallas, TX, September 12-15.

Bonifacio, H., R. Maghirang, and B. W. Auvermann. 2010. Particulate control efficiency of a water sprinkler system at a beef cattle feedlot in Kansas. *Proceedings of the International*

Symposium on Air Quality and Manure Management for Agriculture, Dallas, TX, September 12-15.

Klar, S. R., T. Kwon, and B. W. Auvermann. 2010. Development of low-cost dust generation chamber and wireless nephelometers for a feedlot dust study. Proceedings of the International Symposium on Air Quality and Manure Management for Agriculture, Dallas, TX, September 12-15.

Sakirkin, S. L. P., B. W. Auvermann, T. Kwon, G. W. Marek, K. Heflin, and K. J. Bush. 2010. Photometric measurement of ground-level fugitive dust emissions from concentrated animal feeding operations. Proceedings of the International Symposium on Air Quality and Manure Management for Agriculture, Dallas, TX, September 12-15.

Todd, R., N. A. Cole, K. D. Casey, R. Hagevoort, and B. W. Auvermann. 2010. Methane emissions from a New Mexico dairy lagoon system. Proceedings of the International Symposium on Air Quality and Manure Management for Agriculture, Dallas, TX, September 12-15.

O Connor, A. M., B. Auvermann, D. Bickett-Weddle, S. Kirkhorn, J. M. Sargeant, A. Ramirez, and S. G. Von Essen. 2008. The association between proximity to animal feeding operations and community health: a systematic review evaluating the evidence. Presented at the Midwest Rural Agricultural Safety & Health Forum, Johnston, IA, November 18-19.

Rhoades, M. B., D. B. Parker, N. A. Cole, R. W. Todd, B. W. Auvermann, E. A. Caraway, G. Schuster, and J. Spears. 2008. Ammonia concentration and modeled emission rates from a beef cattle feedyard. Presented at the Annual Meeting of the American Society of Biological and Agricultural Engineers, Providence, RI, June 29. Paper No. 08-4445.

Auvermann, B. W., A. N. Paila, N. Hiranuma, J. Upadhyay and J. Bush. 2007. Open-path transmissometry to determine the atmospheric extinction efficiency associated with feedyard dust. Presented at the International Symposium on Waste Management and Air Quality for Agriculture, Broomfield, CO, September 19.

Sweeten, J. M., K. Heflin, B. W. Auvermann and K. Annamalai. 2007. Beef feedlot manure quality: two-year variations in combustion and nutrient properties. Presented at the annual meeting of the American Society of Agricultural and Biological Engineers, Minneapolis, MN, June 17-20. Paper no. 07-4075.

Casey, K. D., D. B. Parker, J. M. Sweeten, B. W. Auvermann, S. Mukhtar and J. A. Koziel. 2006. Hydrogen sulfide emissions from southern Great Plains beef feedlots: a review. Presented at the Workshop on Agricultural Air Quality: State of the Science, Potomac, MD, June 5-8.

Sweeten, J. M., K. Heflin, K. Annamalai, B. W. Auvermann, F. T. McCollum and D. B. Parker. 2006. Combustion-fuel properties of manure or compost from paved vs. unpaved cattle feedlots. Presented at the annual meeting of the American Society of Agricultural and Biological Engineers, Portland, OR, July 9-12. Paper No. 06-4143.

Auvermann, B. W., N. Hiranuma, K. Heflin and G. Marek. 2004. Open-path transmissometry for measurement of visibility impairment by fugitive emissions from livestock

facilities. Presented at the annual meeting of the American Society of Agricultural Engineers, Ottawa, Ontario, Canada, August 1. Paper no. 04-4010.

Razote, E. B., R. G. Maghirang, B. Z. Predicala, J. P. Murphy, B. W. Auvermann, J. P. Harner III and W. Hargrove. 2004. Dust emission potential of cattle feedlots as affected by feedlot surface characteristics. Presented at the annual meeting of the American Society of Agricultural Engineers, Ottawa, Ontario, Canada, August 1. Paper no. 04-4015.

Marek, G. T. H. Marek, K. Heflin and B. W. Auvermann. 2004. Determination of feedyard evaporation using weighing lysimeters. Presented at the annual meeting of the American Society of Agricultural Engineers, Ottawa, Ontario, Canada, August 1. Paper no. 04-4014.

Auvermann, B. W. 2003. A mechanistic model of fugitive dust emissions from cattle feedyards. Presented at the Third International Conference on Air Pollution from Agricultural Operations, Durham, NC, October 12.

Auvermann, B. W., T. H. Marek and J. M. Sweeten. 2003. Evaluation of a pilot-scale water curtain for suppression of fugitive dust from cattle feedyards. Presented at the Third International Conference on Air Pollution from Agricultural Operations, Durham, NC, October 12.

Erickson, G. E., B. W. Auvermann, R. Eigenberg, L. W. Greene, T. Klopfenstein and R. Koelsch. 2003. Proposed beef cattle manure excretion and characteristic standard for ASAE. Presented at the Ninth International Symposium on Agricultural and Food Processing Wastes, Durham, NC, October 12.

Parker, D. B., M. B. Rhoades, B. W. Auvermann and J. Koziel. 2003. Odor characterization at open-lot beef cattle feedyards using triangular forced choice olfactometry. Presented at the annual meeting of the American Society of Agricultural Engineers, Las Vegas, NV, July 28-31.

Mukhtar, S., B. W. Auvermann, K. Heflin and C. Boriack. 2003. A low maintenance approach to large carcass composting. Presented at the annual meeting of the American Society of Agricultural Engineers, Las Vegas, NV, July 28-31.

Morton, A. D., G. M. Chapman, N. H. Mullin and B. W. Auvermann. 2003. Sludge accumulation rate determination and comparison for nursery, sow and finisher lagoons. Presented at the annual meeting of the American Society of Agricultural Engineers, Las Vegas, NV, July 28-31.

Cassel, T., D. Meyer, E. Tooman, and B. W. Auvermann. 2003. Effects of sprinkling of pens to reduce particulate emissions and subsequent efforts in ammonia emissions from open-lot dairy facilities. Presented at the International Symposium of Gaseous and Odour Emissions from Animal Production Facilities, Horsens, Jutland, Denmark, June 1-4.

Parker, D. B., D. L. Williams, N. A. Cole, B. W. Auvermann and W. J. Rogers. 2002. Dry nonheated anaerobic biogas fermentation using aged beef cattle manure. Poster presented at the annual meeting of the American Society of Agricultural Engineers, Chicago, IL, July 28-31. Paper no. 02-4142.

*Posters and Abstracts, 2002-present*

Auvermann, B. W., B. Weinheimer, P. B. DeLaune, K. Heflin, M. Rhoades, and M. Conine. 2010. Environmental training program for manure haulers and land-application contractors in the Texas High and Rolling Plains. Poster presented at the annual meeting of the Texas Soil and Water Conservation District Directors, Lubbock, TX, October 25-26.

Auvermann, B. W., and T. Kwon. 2010. Adaptation of visibility-based measurement of fugitive dust from open-lot livestock operations. Poster presented at the annual Project Directors' meeting, USDA-NIFA-AFRI Air Quality program (R. Knighton, Program Director), Amarillo, TX, August 23.

Upadhyay, J., and B. W. Auvermann. 2008. In situ extinction efficiency of fugitive dust from cattle feedyards. Extended abstract presented at the AWMA specialty conference, "Aerosol & Atmospheric Optics: Visual Air Quality and Radiation," Moab, UT, April 29. Poster/Abstract No. 10.

Hiranuma, N., S. D. Brooks, B. W. Auvermann and R. Littleton. 2007. Size distribution and hygroscopic properties of agricultural aerosols. Poster presented at the 87th annual meeting of the American Meteorological Society, San Antonio, TX, January 15.

Hiranuma, N., S. D. Brooks, S. D., L. Cheek, D. C. O. Thornton, B. W. Auvermann, and R. Littleton. 2007. Hygroscopic, morphological, and chemical properties of agricultural aerosols. Poster presented at the annual meeting of the American Geophysical Union, City, San Francisco, CA. Poster No. 2360.

Auvermann, B. W. 2006. Visibility measures can be used to estimate feedyard dust concentrations. Poster presented at the Workshop on Agricultural Air Quality: State of the Science, Potomac, MD, June 5-8.

Auvermann, B. W., K. J. Bush and B. Chaffin. 2006. How do property-line concentrations of feedyard PM<sub>10</sub> vary with time of day, season and short-term weather phenomena? Poster presented at the Workshop on Agricultural Air Quality: State of the Science, Potomac, MD, June 5-8.

Auvermann, B. W., T. H. Marek and G. Hartmann. 2006. An early look at Integrated Corral Management as a BMP for feedyard dust control. Poster presented at the Workshop on Agricultural Air Quality: State of the Science, Potomac, MD, June 5-8.

Moon, S., R. Littleton, B. W. Auvermann and S. Brooks. 2005. Chemical and hygroscopic properties of agricultural particulates. Poster presented at the annual meeting of the American Association for Aerosol Research, Austin, TX, October 18-20.

Brooks, S. D., N. Hiranuma, R. Littleton, and B. W. Auvermann. 2005. Poster presented at the fall meeting of the American Geophysical Union, San Francisco, CA, December 5-9. Abstract A53A-0169.

Heflin, K. and B. W. Auvermann. 2005. Demonstration of an ultrasonic, remotely controlled sludge-depth measurement system for wastewater holding ponds. Poster presented at the annual meeting of the American Society of Agricultural and Biological Engineers, Tampa, FL, July 18.

*Invited Speeches with Slide Sets, 2002-present*

“Research update: Environmental Quality and Natural Resources Program, Texas AgriLife Research/Amarillo,” invited presentation to the TCFA Research Committee, Amarillo, TX, December 14, 2010.

“Cattle feeding, air quality, and biomass energy: a look ahead,” invited presentation to the Academy of Veterinary Consultants, Irving, TX, April 9, 2010.

“Air quality research at cattle feedyards,” invited presentation to the Arizona Cattle Feeders Association, Casa Grande, AZ, November 5, 2009.

“BMPs for control of fugitive PM<sub>10</sub> from cattle feedyards and open-lot dairies,” invited presentation to the Arizona Department of Environmental Quality, Phoenix, AZ, November 4, 2009.

“Particulate matter and dairies: monitoring techniques,” invited presentation to NRCS field-office personnel, Leavenworth, WA, June 16, 2009.

“Particulate matter and dairies: BMPs and mitigation strategies,” invited presentation to NRCS field-office personnel, Leavenworth, WA, June 16, 2009.

“Particulate matter and dairies: monitoring techniques,” invited presentation to NRCS field-office personnel, Twin Falls, ID, May 19, 2009.

“Particulate matter and dairies: BMPs and mitigation strategies,” invited presentation to NRCS field-office personnel, Twin Falls, ID, May 19, 2009.

“All cattle were not created equal,” invited presentation to the Western Dairy Air Quality Symposium, Albuquerque, NM, April 16, 2009.

“Fugitive dust from cattle feedyards: measurements and control strategies,” invited presentation to the National Cattlemen’s Beef Association (NCBA) Property Rights and Environmental Management Subcommittee, Englewood, CO, April 7, 2009.

“Lagoon management and odor control,” invited presentation to the TCEQ Annual Inspectors' Training, Clear Lake, TX, November 19, 2008.

“Particulate matter and dairies: monitoring techniques,” invited presentation to NRCS field-office personnel, Albuquerque, NM, October 22, 2008. Technical content evaluation: 69% excellent, 31% average. Presentation/delivery evaluation: 69% excellent, 31% average. Audience self-assessment of knowledge status: poor (pre-workshop), good (post-workshop).

“Particulate matter and dairies: BMPs and mitigation strategies,” invited presentation to NRCS field-office personnel, Albuquerque, NM, October 22, 2008. Technical content evaluation: 63% excellent, 38% average. Presentation/delivery evaluation: 56% excellent, 44% average. Audience self-assessment of knowledge status: fair (pre-workshop), good (post-workshop).

Auvermann, B. W. 2007. Rocky Mountain National Park: ground zero for a growing Front Range and Colorado agriculture. Introductory comments presented to the opening plenary session at the International Symposium on Waste Management and Air Quality for Agriculture, Broomfield, CO, September 17.

Sweeten, J. M., B. W. Auvermann, S. Mukhtar, N. A. Cole, R. DeOtte, B. Weinheimer, D. B. Parker, K. Casey, C. B. Parnell, Jr., R. Todd, B. W. Shaw and J. Upadhyay. 2007. Natural resource management: air quality, water quality and manure management. Presented at High Plains Livestock 2027: Shaping the Future of Food Animal Production, Amarillo, TX, September 5.

Auvermann, B. W. 2007. Sustainability research for animal-feeding operations: what is achievable in the next 20 years? Presented at the annual meeting of the American Society of Agricultural and Biological Engineers, Minneapolis, MN, June 19.

Auvermann, B. W. 2007. CAFOs: What's all the fuss about public health? Presented at the annual meeting of the Animal Agriculture Alliance, Crystal City, VA, March 20.

Auvermann, B. W. 2006. Agricultural nitrogen control practices and options. Presented at the CASA Science Symposium on Nitrogen, Lake Louise, AB, Canada, September 27-29.

Auvermann, B. W. 2006. Recent developments in air quality from dairies and cattle feedyards. Presented at the Southwest Nutrition and Management Conference, Tempe, AZ, February 23-24.

Auvermann, B. W. 2006. Toward a black-gold standard. Presented at the John Airy Beef Conference, Kansas City, MO, January 6.

Auvermann, B. W. 2005. Return to the ivory tower. Keynote address to the combined S-1000/National Center for Manure and Animal Waste Management meeting, San Antonio, TX, January 5.

Auvermann, B. W. and J. M. Sweeten. 2005. Methodological challenges to a systems approach to the management of animal residuals. Presented at State of the Science: Animal Manure and Waste Management, San Antonio, TX, January 4-7.

Moon, S., B. W. Auvermann and W. J. Rogers. 2005. Open-path transmissometry to determine atmospheric extinction efficiency associated with feedyard dust. Presented at the annual conference of the Air & Waste Management Association, Minneapolis, MN, June 20-25.

Auvermann, B. W. 2005. Environmental aspects of carcass disposal. Presented at the Western Dairy Management Conference, Reno, NV, March 9-11.

Auvermann, B. W. 2004. On-farm burial as a carcass-disposal option. Presented at "The Science and Policy of Carcass Disposal," Davis, CA, October 6.

Auvermann, B. W. 2004. Carcass disposal impacts on the environment. Presented at "The Science and Policy of Carcass Disposal," Davis, CA, October 6.

Auvermann, B. W. and S. M. Howard. 2004. Targeting air quality with EMS principles. Poster presented at the national forum for "Partnerships for Livestock Environmental Management Systems," Bozeman, MT, March.

Heflin, K., B. W. Auvermann, W. C. Rogers and G. W. Marek. 2004. Evaluation of a water curtain for edge-of-feedyard suppression of fugitive dust. Presented at the annual meeting of the American Society of Agricultural Engineers, Ottawa, Ontario, Canada, August 1.

Howard-Gunter, S. M., B. Dye and B. W. Auvermann. 2004. Clearing the air for High Plains cattle feeders. Presented at the annual meeting of the American Society of Agricultural Engineers, Ottawa, Ontario, Canada, August 1.

Auvermann, B. W. 2003. Dust and odor control for cattle feedyards. Presented at Manure Management 2003, Lethbridge, AB, Canada, June 26.

Auvermann, B. W. 2003. Open-lot livestock production and air quality. Presented at the Florida Ruminant Nutritionists' Conference, Gainesville, FL, June 16.

Auvermann, B. W. et al. 2003. Particulate matter emissions from confined animal feeding operations – NCMAWM White Paper Series. Presented at the American Water Resources Association annual meeting, Kansas City, MO, May 14.

Auvermann, B. W. 2002. Air quality policy and Alberta Pork: scientific principles, health effects and a strategy for the future. Presented at the Alberta Pork annual meeting, Calgary, AB, Canada, December 4-5.

Auvermann, B. W. Air quality issues associated with open-lot cattle feedyards and dairies. Presented at the Annual Meeting of the American Association of Bovine Practitioners, Madison, WI, September 26, 2002; also convened "Clinical Forum" titled, "Environmental management for beef feedyards."

Auvermann, B. W. et al. 2002. Evaluation of water curtain for edge-of-feedyard suppression of fugitive dust. Presented at the annual meeting of the American Society of Agricultural Engineers, Chicago, IL, July 30.

Romanillos, A. and B. W. Auvermann. 2002. Revisiting the feedyard emission factor. Presented at the annual meeting of the American Society of Agricultural Engineers, Chicago, IL, July 31.

Romanillos, A. and B. W. Auvermann. 2002. Fugitive dust emissions from cattle feedyards. Presented at Particulate Matter In and From Agriculture, Braunschweig, Germany, June 2-5.

Auvermann, B. W. 2002. Air quality issues associated with open-lot cattle feedyards and dairies. Presented at the annual meeting of the American Association of Bovine Practitioners, Madison, WI, September 26.

Auvermann, B. W. 2002. Ammonia emissions from open-lot livestock facilities. Presented at the Discover Conference, Nashville, IN, April 30.



## Grants and Contracts

### *Proposals Submitted as Senior Author, 2002-present*

Auvermann, B. W. 2010. Federal air quality initiative (year 8). Submitted to the USDA National Institute for Food and Agriculture (NIFA). Auvermann share \$149,151. (funded)

Auvermann, B. W., K. D. Casey, R. Todd, and N. A. Cole. 2010. Producer-driven dairy research and extension projects in New Mexico and the Southwest through the Southern Great Plains Dairy Consortium, Task 1: Air emissions study (R. Hagevoort, NMSU Project Director). Auvermann share \$52,855. (funded)

Auvermann, B. W. 2010. Federal compliance monitoring of ambient fine particulate matter in Amarillo, TX. Submitted to Texas Commission of Environmental Quality. \$28,618. (funded at \$13,258)

Auvermann, B. W., K. D. Casey, and P. DeLaune. 2009. New Mexico dairy regulatory issues in relation to production practices. Submitted to the Dairy Industry Group for a Clean Environment. Auvermann share \$10,531. (funded)

Auvermann, B. W., R. Eigenberg, and B. Woodbury. 2009. Remote sensing platform for spatial surveys of fuel-grade biomass from livestock operations. Preproposal submitted to the Norman Hackerman Advanced Research Program. \$156,000. (rejected)

Auvermann, B. W., and K. D. Casey. 2009. Baseline fugitive air emissions from open-lot dairy production in eastern New Mexico. Submitted to New Mexico State University. Auvermann share \$32,187. (funded)

Auvermann, B. W. 2009. Estimating fugitive PM<sub>10</sub> emissions from cattle feedyards using the integrated horizontal flux method. Submitted to the USDA-CSREES Agricultural and Food Research Initiative. \$188,359. (rejected)

Auvermann, B. W. 2009. Federal compliance monitoring of ambient fine particulate matter in Amarillo, TX. Submitted to Texas Commission of Environmental Quality. \$27,122. (funded)

Auvermann, B. W. 2009. Optimizing the net biofuel yield of carcass compost for thermochemical gasification. Preproposal submitted to the South Central Region Sun Grant program. \$67,000. (rejected)

Auvermann, B. W., and R. DeOtte. 2009. Optimization of the higher heating value of partially composted livestock carcasses. Submitted to the Texas AgriLife Research Bioenergy Initiatives program. \$292,500. (rejected)

Auvermann, B. W. 2008. Federal compliance monitoring of ambient fine particulate matter in Amarillo, TX. Submitted to Texas Commission of Environmental Quality. \$25,830. (funded)

Auvermann, B. W., and T. Kwon. 2008. Visibility-based measurement of fugitive dust from open-lot livestock operations. Submitted to the USDA-CSREES National Research Initiative. \$489,000. (funded at \$174,404; subsequently funded at \$507,244)

Auvermann, B. W. 2007. Logistical support for the continuous air-monitoring project at feedyards A, C and E. Submitted to the Texas Cattle Feeders Association. \$7,000. (funded)

Auvermann, B. W. 2007. Federal air quality initiative - year 6. Submitted to USDA-CSREES within umbrella proposal by J. M. Sweeten et al. Auvermann share \$153,835.

Auvermann, B. W. 2007. Federal compliance monitoring of ambient fine particulate matter. Submitted to Texas Commission of Environmental Quality. \$24,600.

Auvermann, B. W. 2006. Federal air quality initiative – year 5. Submitted to USDA-CSREES. Auvermann share \$228,561.

Auvermann, B. W. 2006. Federal biomass energy initiative. Submitted to USDOE. Auvermann share \$85,735.

Auvermann, B. W. 2006. Federal compliance monitoring for fine PM in Amarillo, TX: Bridge funding. Submitted to Texas Commission of Environmental Quality. \$9,357.

Auvermann, B. W. 2006. Personnel and logistical support for the continuous-monitoring projects at Feedyards A, C and E. Submitted to the Texas Cattle Feeders Association. \$14,230. (funded at \$5,000)

Auvermann, B. W. 2006. Federal compliance monitoring of ambient fine particulate matter. Submitted to Texas Commission of Environmental Quality. \$24,600.

Auvermann, B. W. and K. Casey. 2006. Expansion of TAES environmental quality research field lab. Submitted to Texas Agricultural Experiment Station. INTERNAL. \$38,000. (funded at \$15,000)

Auvermann, B. W. 2005. Acquisition of an environmental-monitoring trailer and mobile electronics laboratory for the federal fine-particle monitoring site (CAMS 320). \$21,533.

Auvermann, B. W. 2005. Federal air quality initiative – year 4 work plan, objectives 1 (emissions processes), 2 (abatement measures) and 5 (technology transfer). Submitted to USDA-CSREES. Auvermann share \$93,640.

Auvermann, B. W. 2005. Continuing support for the real-time monitoring project at Feedyard C. Submitted to the Texas Cattle Feeders Association. \$23,871. (funded at \$10,000)

Auvermann, B. W. 2004. Tapered-element oscillating microbalance and accessories for real-time monitoring of fugitive emissions from cattle feedyards. Submitted to the Texas Agricultural Experiment Station. INTERNAL. \$33,893. (funded at \$28,393)

Auvermann, B. W. and B. W. Shaw. 2004. National Engineering Handbook, Part 629, Agricultural Air Quality Chapter 6 (fugitive dust), Chapter 7 (chemical drift) and Chapter 8 (visibility). Submitted to the USDA Natural Resources Conservation Service (NRCS) under the Gulf Coast Cooperative Ecosystem Studies Unit. Auvermann share \$60,000.

Auvermann, B. W. and T. H. Marek. 2004. Mitigating fugitive emissions from open-lot AFOs via integrated corral management. Submitted to USDA-CSREES National Research Initiative. \$382,436. (funded at \$369,051)

Auvermann, B. W. 2004. Federal air quality initiative – year 3. Submitted to USDA-CSREES. Auvermann share \$93,312.

Auvermann, B. W. 2004. Cost-share assistance for the purchase of two outdoor environmental enclosures for tapered-element oscillating microbalances (TEOMs). Submitted to the Texas Cattle Feeders Association. \$5,545.

Auvermann, B. W. and S. M. Howard. 2003. Partnerships for livestock environmental management systems: supplemental grant for stakeholder training workshop. Submitted to the University of Wisconsin. \$3,750.

Auvermann, B. W. and J. Koziel. 2003. Monitoring of fine particulate matter in Amarillo, TX. Submitted to the Texas Commission on Environmental Quality. \$89,652.

Auvermann, B. W. 2003. Federal air quality initiative – year 2. Submitted to USDA-CSREES. Auvermann share \$98,185.

Auvermann, B. W., S. Mukhtar, K. Phillips and J. Savell. 2002. Carcass disposal working group. Subcontract of the National Agricultural Biosecurity Center Consortium. Submitted to USDA-APHIS. \$268,453.

Auvermann, B. W. 2002. Interagency transfer of an Optec LPV-2 open-path transmissometer. Submitted to the Texas Commission on Environmental Quality. Net market value \$18,000.

Auvermann, B. W. 2002. Composting as a disposal alternative for large livestock carcasses. Submitted to USDA-CSREES National Integrated Water Quality Program. \$185,000.

Auvermann, B. W. 2002. Water curtain: supplemental funding. Submitted to the Deaf Smith Air Quality Project. \$4,000.

Auvermann, B. W. 2002-03. Water curtain: supplemental funding. Submitted to the Texas Cattle Feeders Association. \$15,000 total in two grants.

Auvermann, B. W. 2002. Water curtain: supplemental environmental project (SEP). Submitted to the Texas Natural Resources Conservation Commission. \$5,000.

Auvermann, B. W. 2002. Federal air quality initiative - year 1. Submitted to USDA-CSREES. Auvermann share \$75,225.

### *Proposals as Junior Author, 2002-present*

Lesikar, B. J., and B. W. Auvermann. 2010. Delivering opportunities in the new potential bio-economy to produce and motivate an emerging bio-energy value chain with heightened technical, educational, socio-economic, and scientific skills. Submitted to USDA-NIFA-AFRI as a subaward through New Mexico State University (J. Lillywhite, Project Director). \$1,000,000. (not funded)

Erickson, G. E., R. R. Stowell, and B. W. Auvermann. 2010. Greenhouse gas emissions and nitrogen cycling from beef production systems: effect of climate, season, production system, diet, and management. \$49,960 (Auvermann share \$0). (funded)

Radcliffe, J. S., W. Powers, T. Applegate, J. Classen, and B. W. Auvermann. 2010. Understanding and evaluating current and future impacts of swine and poultry production systems in the Midwest within the context of climate change. Submitted to USDA-NIFA. \$20,000,000 (Auvermann share \$768,660). (not funded)

Marek, G. W., B. W. Auvermann, K. Heflin, and J. Berg. 2010. Exploring current and potential feedyard manure markets with dynamic simulation modeling. Submitted to the Texas Cattle Feeders Association. \$13,950. (not funded)

DeOtte, R., C. Bouma, L. Cottle, and B. W. Auvermann. 2010. Investigation into the degradation and transport processes of pyrimidine compounds within hydrologic systems using sodium pentobarbital from composting of euthanized horse carcasses. Submitted to the National Science Foundation - Hydrological Sciences Program. \$349,076. (not funded)

DeOtte, R., B. W. Auvermann, J. Pipkin, and C. Robinson. 2010. Sodium pentobarbital: metabolization and degradation during controlled composting, and fate and transport of residues in a controlled soil environment. Submitted to the National Science Foundation - Environmental Engineering Program. \$388,594. (not funded)

DeOtte, R., B. W. Auvermann, and R. Stewart. 2009. National Needs Fellowships in modeling agro-ecological systems: supporting the cattle-feeding and affiliated industries of the southern High Plains. Submitted to USDA-CSREES. \$158,000. (rejected)

DeOtte, R., E. Hunt, K. D. Casey, and B. W. Auvermann. 2009. Acquisition of a global sizing velocimeter, aerodynamic particle sizer, and tethersonde array to advance aerosol technology engineering and science on the High Plains. Submitted to the National Science Foundation - Major Research Instrumentation program. \$469,671. (funded)

Marek, G. W., and B. W. Auvermann. 2008. Optimizing water application and sprinkler management for dust control on cattle feedyards. Submitted to the Texas Water Resources Institute. \$5,000. (not funded)

Weinheimer, B., B. W. Auvermann, and D. B. Parker. 2008. Environmental training for custom manure/compost haulers and crop producers in the Sweetwater Creek and Buck Creek watersheds and the Texas High Plains. Submitted to the Texas State Soil and Water Conservation Board's Section 319(h) program. Auvermann share \$168,884. (funded)

Sweeten, J. M., B. W. Auvermann, S. Mukhtar, S. Capareda, C. Engler and W. Harman. 2007. Renewable energy and environmental sustainability using biomass from dairy and beef animal production facilities. Submitted to the Texas Agricultural Experiment Station, Texas A&M University System. \$200,000.<sup>6</sup>

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<sup>6</sup> This item appears on the surface to be an internal funding mechanism. However, the funding originated as the second year of a federal research grant for which we submitted a work plan directly to USDOE. When the federal legislative appropriations for special projects that year were zeroed out by Congress, Congress converted the funds to block grants to the states, which in turn passed the funding through to the Experiment Stations according to state- and agency-level discretion.

Parker, D. B., B. W. Auvermann and R. DeOtte. 2005. Acquisition of a gas chromatograph/mass spectrophotometer/olfactometer for characterization of environmental odors of arbitrary composition. Submitted to the NSF Major Research Instrumentation program. \$205,230.

Lacewell, R. L, K. Annamalai, J. M. Sweeten and B. W. Auvermann. 2005. Renewable energy, sustainability and profit from animal waste. Submitted to DOE. Auvermann share \$105,265.

Mukhtar, S., B. W. Auvermann and R. Srinivasan. 2003. Real-time lagoon monitoring system for dairies. Submitted to the Texas Water Resources Institute. \$10,000.

Sweeten, J. M. and B. W. Auvermann. 2003. Air quality management for animal feeding operations. Submitted to USDA-NRCS. \$20,000.

#### *Proposals as Senior Author, 1995-2001*

Auvermann, B. W. 2001. Particulate matter emissions from confined animal feeding operations: management and control measures. Submitted to the National Center for Manure and Animal Waste Management, North Carolina State University. \$13,000.

Auvermann, B. W. 2001. A partnership for assessing the environmental management of beef production systems in Texas. Submitted to the University of Wisconsin. \$98,000.

Auvermann, B. W. and W. J. Rogers. 2000. Literature review: documented health effects of airborne emissions from intensive livestock operations. Submitted to Alberta Pork. \$10,203.

Auvermann, B. W. 2000. Documented human health effects of gases, particulate matter and bioaerosols emitted from confined swine production facilities. Submitted to the National Pork Producers Council. \$6,938.

Auvermann, B. W., R. Devin, and J. Pipkin. 1999. Demonstration of horse manure composting at the WTAMU Equine Center. Submitted to the Farm Foundation. \$1,000.

Auvermann, B. W., T. H. Marek and M. Baker. 1998. Conversion of an abandoned farrowing house to an aquaponics system. Submitted to the TAEX Soil and Water Conservation Fund. \$9,750.

Auvermann, B. W. and T. H. Marek. 1998. Composted cattle manure as an economical source of phosphorus for irrigated corn in the Texas High Plains. Submitted to the Texas Corn Producers Board. \$14,000. (funded at \$7,980)

Auvermann, B. W. 1997. Heep Foundation internship for Arturo Romanillos. Submitted to the Texas Agricultural Experiment Station. \$2,500.

Auvermann, B. W., B. W. Shaw, C. B. Parnell and J. M. Sweeten. 1997. Physical characterization of fugitive particulate matter from cattle feedyards. Submitted to the Texas Cattle Feeders Association. \$31,000. (funded at \$15,000)

### *Proposals as Junior Author, 1995-2001*

Schiffman, S. S. and B. W. Auvermann. 2001. Health effects of emissions from animal feeding operations. Submitted to the National Center for Manure and Animal Waste Management, North Carolina State University. \$15,000.

Pullen, R., S. Mukhtar and B. W. Auvermann. 2000. Composting as a disposal alternative for cattle mortalities. Submitted to the North Texas Council of Governments. \$9,000.

Rush, C. M. and B. W. Auvermann. 2000. Airborne multispectral assessment of crop health and feedlot dust potential. Submitted to the NASA Remote Sensing Program. \$50,000.

Arimoto, R., J. L. Botsford, B. W. Auvermann and R. A. Duce. 1999. Ambient air quality issues related to confined animal feeding operations. Seed grant submitted to the USDA National Research Initiative Competitive Grants Program. \$49,976.

Parnell, C. B., B. W. Auvermann, and B. W. Shaw. 1999. Agricultural air quality fine particle project. Submitted to the Texas Natural Resources Conservation Commission. Auvermann share \$30,000.

Cole, N. A., D. B. Parker and B. W. Auvermann. 1997. Influence of soil amendments on gaseous emissions of nitrogen, carbon and sulfur from feedyards. Submitted to the Texas Cattle Feeders Association. \$10,010.

Chirase, N., N. A. Cole and B. W. Auvermann. 1996. Effect of humic acid supplementation on manure production and nutrient excretion from feeder steers. Submitted to the Texas Cattle Feeders Association. \$7,000.

### **Conferences and Workshops Organized**

Federal air quality initiative capstone workshop series, Hereford and Stratford, TX, and Garden City, KS, August 24-26, 2010.

Texas Animal Manure Management Conference, Austin, TX, September 29-30, 2009. (Program Chair)

USDA-CSREES Multistate Research Committee S-1032, Annual Meeting, Boulder, CO, May 27-30, 2008. (Planning Committee)

ASABE International Symposium for Animal, Agricultural and Food Processing Wastes and Air Pollution from Agricultural Operations, Broomfield, CO, September 16-19, 2007. (Interim Chair of Planning Committee; Air Quality Program Chair)

Manure Value for Biofuels and Fertilizer, Hereford, TX, May 15, 2007. (Workshop Chair, Presenter)

USDA-CSREES Multistate Research Committee S-1000, Annual Meeting, Aguadilla, PR, April 30-May 3, 2007. (Planning Committee)

USDA-CSREES Multistate Research Committee S-1000, Annual Meeting, Beltsville, MD, May 1-2, 2006. (Planning Committee)

Task Force on Agricultural Air Quality quarterly meeting, Amarillo, TX, June 21, 2005. (Local Arrangements Coordinator)

USDA-CSREES Multistate Research Committee S-1000, Annual Meeting, San Antonio, TX, January 5-7, 2005. (Planning Committee)

National Center for Manure and Animal Waste Management annual meeting, San Antonio, TX, January 5-7, 2005. (Local Arrangements Coordinator)

ASAE Third International Conference on Air Pollution from Agricultural Operations, Durham, NC, October 10-12, 2003. (Program Chair)

ASAE Second International Conference on Air Pollution from Agricultural Operations, Des Moines, IA, October 9-11, 2000. (Proceedings Chair)

Texas Animal Manure Management Conference, Austin, TX, September 8-10, 1999. (Conference Co-Chair)

## **Graduate Student Supervision**

### *Master of Science, 2002-2008*

Steubing, K. Texas A&M University (BAEN) (in progress).

Preece, S. L. West Texas A&M University. Determination of ash content in solid cattle manure with visible near-infrared diffuse reflectance spectroscopy. Environmental Science (conferred May 2008). Committee members: W. J. Rogers (WTAMU; Chair), B. W. Auvermann, D. B. Parker (WTAMU), and C. L. Morgan (TAMU).

Brown, L. C. West Texas A&M University. The effects of various co-composting materials on the decomposition of equine carcasses. Environmental Science (conferred 2007). Committee members: L. A. Baker (WTAMU; co-Chair), B. W. Auvermann (co-Chair), J. Pipkin (WTAMU), and D. B. Parker (WTAMU).

Heflin, K. West Texas A&M University. Combustion characteristics of high and low phosphorus partially composted feedlot manure. Environmental Science (conferred June 2003). Committee members: D. B. Parker (WTAMU; chair), B. W. Auvermann, and W. J. Rogers (WTAMU).

Hiranuma, N. (aka Seong-Gi Moon). West Texas A&M University. Open-path transmissometry to determine atmospheric extinction efficiency associated with feedyard dust. Environmental Science (conferred August 2005). Committee members: W. J. Rogers, (WTAMU; co-Chair), B. W. Auvermann (co-Chair), and D. B. Parker (WTAMU).

Koskei, S. West Texas A&M University. Analysis of a proposed dust control agent for the abatement of fugitive dust in cattle feedyards. Environmental Science (conferred fall 2008). Committee members: W. J. Rogers (WTAMU; Chair), B. W. Auvermann, D. B. Parker (WTAMU), and R. DeOtte (WTAMU).

Lubbers, B. W. West Texas A&M University. Soil sampling strategies for manure applied fields. Agriculture (conferred June 2006). Committee members: D. B. Parker (WTAMU; Chair), C. Robinson (WTAMU), B. W. Auvermann, and G. Schuster (WTAMU).

Marek, G. W. West Texas A&M University. Determination of feedyard evaporation using weighing lysimeters. Environmental Science (conferred June 2006). Committee members: D. B. Parker (WTAMU; co-Chair), B. W. Auvermann (co-Chair), and W. J. Rogers (WTAMU).

Paila, A. N. West Texas A&M University. Proposed atmospheric extinction efficiencies for fugitive dust from cattle feedyards. Environmental Science (conferred August 2007). Committee members: W. J. Rogers (WTAMU; co-Chair), B. W. Auvermann (co-Chair), and D. B. Parker.

Perschbacher, Z. West Texas A&M University. Beef cattle performance and economic evaluation of feedyard sprinkler systems. Environmental Science (conferred 2002). Committee members: B. W. Auvermann (co-Chair), F. T. McCollum (TCE-Amarillo), D. B. Parker (WTAMU; co-Chair) and J. E. Mehlhorn (U. of Kentucky).

Preece, S. L. West Texas A&M University. Determination of ash content in solid cattle manure with visible near-infrared diffuse reflectance spectroscopy. Environmental Science, West Texas A&M University (conferred August 2008). Committee members: B. W. Auvermann (co-Chair), D. B. Parker (WTAMU; co-Chair), W. J. Rogers (WTAMU), and C. Morgan (TAMU-Soil & Crops Sciences).

Rogers, W. C. West Texas A&M University. Reducing airborne dust concentrations downwind of cattle feedyards using water curtain technology. Environmental Science (conferred December 2005). Committee members: D. B. Parker (WTAMU; Chair), B. W. Auvermann, and W. J. Rogers (WTAMU).

#### *Doctor of Philosophy, 2002-present*

Marek, G. W. Agricultural Systems, West Texas A&M University. (in progress)

Heflin, K. Agricultural Systems, West Texas A&M University. (in progress)

Berg, J. Agricultural Systems, West Texas A&M University. (in progress)

#### *Master of Science, 1995-2001*

McCullough, C. West Texas A&M University. Evaluation of sealing of earthen feedyard surfaces. Environmental Science (conferred 1999). Committee members: D. B. Parker (Chair; WTAMU), B. W. Auvermann, and W. J. Rogers (WTAMU).

Meister, M. Texas A&M University. Air dispersion modeling of particulate matter from ground-level area sources. Agricultural Engineering (conferred May 2000). Committee members: C. B. Parnell, Jr. (co-Chair), B. W. Auvermann (co-Chair), J. Rock (TAMU-NUEN), and R. Conner (TAMU-AGEC).

Morton, A. Texas A&M University. Evaluation of two biofilter media for reduction of BOD<sub>5</sub> and ammonia concentrations in high-strength swine lagoon effluent. Agricultural Engineering (conferred August 2001). Committee members: B. W. Auvermann (co-Chair), A. Kenimer (co-Chair; TAMU-AGEN), and Bill Batchelor (TAMU-CVEN).

Niemann, D. Texas A&M University. Mineral status, bone characteristics, carcass characteristics, and performance of feedlot lambs implanted with zeranol. Animal Science



(conferred 1998). Committee members: L. W. Greene (TAES-Amarillo; Chair), B. W. Auvermann, and N. A. Cole (USDA-ARS).

Romanillos, A. Texas A&M University. Effect of stocking density manipulation on emissions of fugitive PM<sub>10</sub> from cattle feedyards. Agricultural Engineering (conferred August 2000). Committee members: B. W. Auvermann (Chair), C. B. Parnell, Jr. (TAMU-AGEN), and N. A. Cole (USDA-ARS).

See, S. West Texas A&M University. Evaluation of odor-control strategies for cattle feedyards. Environmental Science (conferred 2003). Committee members: D. B. Parker (WTAMU; Chair), B. W. Auvermann, and W. J. Rogers.

Shi, Y. West Texas A&M University. Thesis Title: Influence of soil amendments on gaseous emissions from feedyards. Environmental Science (conferred 1999). Committee members: D. B. Parker (Chair; WTAMU), B. W. Auvermann and C. Robinson (WTAMU).

#### *Doctor of Philosophy, 1995-2001*

None. The PhD program in Agricultural Systems at West Texas A&M University did not exist until 2005.

### **Classroom Teaching, 2001-present**

#### *West Texas A&M University, Canyon, TX*

“Environmental air sampling techniques,” WTAMU guest lecture, April 27, 2010 (Dr. Jim Rogers, instructor).

AGRI 8303 “Agricultural systems II,” co-instructor with Drs. Bob DeOtte and David Lust, spring 2010 (5 students).

AGRI 7375 “Agricultural systems I,” co-instructor with Drs. Bob DeOtte, Bob Stewart, and David Lust, fall 2009 (5 students).

“Environmental air sampling techniques,” WTAMU guest lecture, April 28, 2009 (Dr. Jim Rogers, instructor).

AGRI 8095 “Directed studies in agricultural systems modeling,” Instructor of record, fall 2008 (2 students).

AGRI 7375 “Agricultural systems I,” co-teacher with Drs. Bob DeOtte, Bob Stewart, and David Parker, fall 2008 (5 students).

“Systems modeling of animal feeding operations: energy and sustainability perspectives,” guest lecture to Agricultural Systems I, November 7, 2007 (Drs. Bob DeOtte, Don Topliff and Lance Baker, Instructors).

“Environmental air sampling techniques,” WTAMU guest lecture, April 23, 2007 (Dr. Jim Rogers, instructor).

“Environmental air sampling techniques,” WTAMU guest lecture, March 31, 2005 (Dr. Jim Rogers, instructor).

“Environmental air sampling techniques,” WTAMU guest lecture, April 2, 2004 (Dr. Jim Rogers, instructor).

“Math and science applications in environmental air quality research,” EPA-sponsored short course for elementary and secondary science and math teachers, July 15, 2003 (Dr. Jim Rogers, instructor).

“Principles of particulate matter and odor from cattle feedlots,” WTAMU guest lecture, 2003 (Dr. David Parker, Instructor).

“Environmental air sampling techniques,” WTAMU guest lecture, April 25, 2003 (Dr. Jim Rogers, instructor).

“Environmental air sampling techniques,” WTAMU guest lecture, April 26, 2002 (Dr. Jim Rogers, instructor).

“Biogas production from animal manure,” WTAMU guest lecture, October 24, 2001 (Dr. Greta Schuster, Instructor).

“Environmental air sampling techniques,” WTAMU guest lecture, May 2, 2001 (Dr. Jim Rogers, instructor).

### *Institut Supérieur d’Agriculture, Lille, France*

“Environmental management of confined livestock feeding operations,” English-only instruction of university-level French agricultural engineering students, Institut Supérieur d’Agriculture, Lille, Pas de Calais, France, February 28-March 4, 2005.

“Environmental management of confined livestock feeding operations,” English-only instruction of university-level French agricultural engineering students, Institut Supérieur d’Agriculture, Lille, Pas de Calais, France, February 16-20, 2004.

“Environmental management of confined livestock feeding operations,” English-only instruction of university-level French agricultural engineering students, Institut Supérieur d’Agriculture, Lille, Pas de Calais, France, February 17-21, 2003.

## **Result Demonstrations**

### **ENTER DEMONSTRATIONS FROM TCFA SECTION 319 PROJECT HERE**

Application of stockpiled feedyard manure on CRP grassland prior to controlled burning. 12-1-1996 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Swisher County, TX.

Vegetative filter strips, IPM and irrigation scheduling. 12-1-1996 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Hartley County, TX.

Sprigging knotgrass to stabilize soils in a playa floor. 12-1-1996 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Ochiltree County, TX.

Basal application of Remedy to control mesquite on native pasture, Phase I. 12-1-1996 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Floyd County, TX.

Composted cattle manure as a phosphorus source for sprinkler-irrigated corn, Phase I. 3-1-1997 through 9-30-1997. Result demonstration under the Playa Basin 319(h) Project, Moore County, TX.

A water quality management plan for a small cattle feedlot. 1-1-1997 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Potter County, TX.

Composting horse manure at a large-animal veterinary clinic. 1-1-1997 through 11-30-2000. Result demonstration under the Tierra Blanca Creek 319(h) Project, Randall County, TX.

A recirculating aquaponics system for polishing third-stage swine lagoon effluent. 2-1-1998 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Moore County, TX.

Composted cattle manure as a phosphorus source for sprinkler-irrigated corn, Phase II. 3-1-1998 through 9-30-1998. Result demonstration under the Playa Basin 319(h) Project, Moore County, TX.

Composted cattle manure as a phosphorus source for irrigated wheat. 7-1-1999 through 6-30-2000. Result demonstration under the Playa Basin 319(h) Project, Hutchinson County, TX.

Basal application of Remedy to control mesquite on native pasture, Phase II. 6-1-1999 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Potter County, TX.

Evaluation of polyacrylamide to stabilize manure-amended soils under furrow irrigation. 1-1-1999 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Randall County, TX.

Subsurface injection of swine manure to reduce nutrient losses in rainfall runoff from irrigated cropland. 5-1-2000 through under the Playa Basin 319(h) Project, Moore County, TX.

Composting horse manure at the Frank Phillips College Equine Center. 5-1-2000 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Hutchinson County, TX.

Basal application of Remedy to control mesquite on native pasture, Phase III. 6-1-2000 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Potter County, TX.

Conservation of water through center-pivot modification. 2-1-2000 through 12-31-2000. Result demonstration under the Playa Basin 319(h) project, Deaf Smith County, TX.

Regional survey of feedyard manure composition in the Texas Panhandle and South Plains. 1-1-2000 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project.

Composition of manure deposited by grazing livestock. 2-1-2000 through 4-1-2000. Result demonstration under the Playa Basin 319(h) Project, Potter County, TX.

Evaluation of a grassed filter strip to remove phosphorus from runoff from a small cattle feedlot. 1-1-2000 through 12-31-2000. Result demonstration under the Playa Basin 319(h) Project, Randall County, TX.

Demonstration of a pilot-scale "water curtain" for controlling feedyard dust. 1-1-2000 through 7-1-2001. Result demonstration, Parmer County, TX.

Composting beef cattle carcasses on ranchland. 6-1-2002 to present, J. A. Bush Farm, Potter County, TX.

Composting swine carcasses. 10-1-2002 to 9-30-2003. T. Higley Farm, Moore County, TX.

Composting beef cattle carcasses on ranchland. 8-1-2003 to present. Anonymous, Hemphill County, TX.

Composting equine carcasses. 9-1-2003 to present. West Texas A&M University Equine Center, Randall County, TX.

## **Intellectual Property Disclosures**

Eigenberg, R., B. Woodbury, T. Boman, J. M. Sweeten, and B. W. Auvermann. 2010. A non-invasive, in-situ sensing platform for mapping the quantity and quality of harvestable manure on open-lot livestock corral surfaces. Disclosure of Invention submitted to the Office of Technology Commercialization, Texas A&M System, January 4. Auvermann share 15%.

Auvermann, B. W., G. W. Marek, K. Heflin, B. Wilhite, and S. L. Preece. 2009. An in situ manure compactor for fugitive dust control in open-lot livestock facilities. Disclosure of Invention submitted to the Office of Technology Commercialization, Texas A&M System, April 29.

Auvermann, B. W., J. M. Sweeten, K. Annamalai and K. Heflin. 2007. Strategies to optimize the fuel value of premature livestock mortalities. Proposed addendum to J. M. Sweeten et al., "Method for the production of thermally advanced feedlot biomass for use as fuel," provisional patent application no. 60,917,820, U. S. Patent and Trademark Office, Washington, DC, May 14.

Sweeten, J. M., K. Annamalai, K. Heflin, B. W. Auvermann, L. A. McDonald, L. W. Greene, M. Freeman, and D. Tolleson. 2007. Method for the production of thermally advanced feedlot biomass for use as fuel. Provisional patent application no. 60,917,820, U. S. Patent and Trademark Office, Washington, DC, May 14.

## **Professional Service, Consulting, and Awards**

### *External Committees and Boards of Directors*

FASS/ASAE Working Group to replace ASAE Standard D384.1, "Manure Production and Characteristics;" beef subcommittee; proposed revised ASABE standard based on National Research Council nutrient-excretion equations.

American Society of Agricultural and Biological Engineers Committee SE-305 "Environmental Air Quality," Secretary (1998-1999), Vice-Chair (2000-2001), Chair (2002-2003)

American Society of Agricultural and Biological Engineers Committee SE-412 "Agricultural Waste Management," 1996-2007

### *USDA-NIFA Multistate Committees*

NCR-189 "Agricultural Air Quality," 2001-2003

S-275/S-1000/S-1032 “Sustainable Livestock Production,” member, Secretary (2005), Chair (2006), co-Chair of rewrite team (2006-2007)

#### *Internal TAMUS Committees and Task Forces*

CPRL Operations Study Committee, Texas AgriLife Research-Amarillo, 2011-present

PhD program steering committee, West Texas A&M University, 2007-present (Dr. Robert DeOtte, Chair)

#### *Faculty Search/Search Advisory Committees*

Geospatial hydrologist, Texas AgriLife Research-Vernon (Dr. Jim Ansley, Chair), 2010

Information technologies specialist, TAES-Amarillo (Mr. Thomas Marek, Chair)

Extension dairy specialist, TCE-Stephenville (Dr. Ellen Jordan, Chair)

Air quality engineer, TAES-Amarillo (Chair)

Communications specialist, TAES-Amarillo (Dr. L. Wayne Greene, Chair)

Environmental engineer/hydrology, WTAMU (Dr. David Parker, Chair)

Texas A&M University System West Texas Beef Industry Roundtable, Secretary, April 29, 2004

Texas Cooperative Extension subcontract to the National Center for Foreign Animal and Zoonotic Disease Defense (NCFAZDD), advisory committee for Project #9, “A conference on the science and policies associated with carcass disposal,” College Station, TX, November 2004

Texas Agricultural Experiment Station-Amarillo Signature Programs, 5-year strategic plan for the Environmental Quality and Natural Resources Program, September 2004

Dairy Science Program Review Task Force, 2002-2003

#### *Consulting or Ad Hoc Services Rendered*

USDA Task Force on Agricultural Air Quality, Livestock and Poultry Subcommittee (Ben Weinheimer, Chair): co-moderated (with Dr. Jerry Hatfield) a standardization workshop hosted by the U. S. Environmental Protection Agency, Research Triangle Park, NC, 27-28 September 2010.

Arizona Cattle Feeders Association: technical support for regulators and stakeholders in development of a BMP program to suppress fugitive dust from open-lot livestock facilities. April 2009-present.

Maughan Feedlot, LLC: expert testimony pertaining to Wyckoff Farms v. Maughan Feedlot, December 2008-present.

Louisiana Board of Regents: review of research proposals to the Research and Development Program/Board of Regents Support Fund, March 2007.

Alberta Intensive Livestock Working Group (ILWG): development of health effects research agenda and business plan, Edmonton, AB, Canada (November 17-20, 2002); Lethbridge, AB,

Canada (June 25-28, 2003); Calgary, AB, Canada (August 26-29, 2003); and quarterly conference calls.

State of Washington, Department of Ecology: feedyard dust-control assessment and recommendations, Simplot Feedyard, Pasco, WA, and Simplot headquarters, Boise, ID (April 21-22, 2003).

Alberta Research Council: review of the costs and benefits of using frequent manure removal. One-hour phone interview (December 12, 2008).

### *Short Course Contributions and Presentations*

“Title,” Texas Commission on Environmental Quality annual inspectors’ training, Clear Lake, TX, November 19, 2008.

“Air quality 101: open-lot animal feeding operations,” Texas Commission on Environmental Quality annual inspectors’ training, San Antonio, TX, December 1, 2005.

“Livestock-derived particulate matter,” USDA-NRCS short course on agricultural air quality, St. Louis, MO, November 4-6, 2002.

### *Awards*

#### Individual

Nolan Mitchell Young Extension Worker award, American Society of Agricultural and Biological Engineers, 2004.

Robert E. Stewart Engineering-Humanities award, American Society of Agricultural Engineers, 1991.

#### Team

Vice Chancellor’s Award in Excellence for Research, Texas A&M AgriLife, 2009.

Texas Environmental Excellence Award-Agriculture, Texas Commission on Environmental Quality, 2010.

National Excellence in Multistate Research Award, Southern Association of Agricultural Experiment Station Directors, April 2010.

## **Review Services Rendered, 1996-present**

### *Journal Manuscripts*

Andersen, D. S., R. T. Burns, L. B. Moody, and M. J. Helmers. 2010. Using total solids concentration to estimate nutrient content of feedlot runoff effluent from solids settling basins, vegetative infiltration basins, and vegetative treatment areas. Submitted to *Applied Engineering in Agriculture*, manuscript no. SE-08896-2010; reviewed 12/10/2010.

Bremer, V. R., A. J. Liska, T. J. Klopfenstein, G. E. Erickson, H. S. Yang, D. T. Walters, and K. G. Cassman. 2009. Emissions savings in the corn-ethanol life cycle from feeding co-products to feedstock. Submitted to the *Journal of Environmental Quality*; reviewed September 4.

McGinn, S. M., D. Chen, T. K. Flesch, B. Crenna, O. T. Denmead, T. Naylor, and D. Rowell. 2009. Coarse particulate matter (PM<sub>10</sub>) emissions from cattle feedlots in Australia. Submitted to the Journal of Environmental Quality, manuscript Q09-0240; reviewed August 3.

Wu-Haan, W., R. Burns, L. Moody, R. Raman, and D. Grewell. 2009. Evaluation of ultrasonic pretreatment on anaerobic digestion of different animal manures. Submitted to Transactions of the ASABE, manuscript SE-08066-2009; reviewed July 26.

Cantrell, K., P. Hunt, K. Ro, K. Stone, M. Vanotti, and J. Burns. 2009. Thermogravimetric characterization of irrigated bermudagrass as a combustion feedstock. Submitted to Transactions of the ASABE, manuscript SW-07990-2009; reviewed July 24.

Hoff, S., J. Harmon, D. Bundy, and B. Zelle. 2008. Hydrogen sulfide and ammonia receptor concentrations in a community of multiple swine emission sources: preliminary study. Submitted to Applied Engineering in Agriculture; reviewed April 11.

Environment Canada. 2008. National Agro-Environmental Standards Initiative (NAESI) report on agricultural ammonia emissions and their effect on ambient fine particulate matter concentrations in Canada; reviewed March 1.

Wulf, L. W., J. C. Lorimor and S. W. Melvin. 2003. Modeling alternative systems of feedlot runoff containment. Submitted to Applied Engineering in Agriculture; reviewed May 14.

Miller, J. J., B. P. Handerek, B. W. Beasley, L. J. Yanke, F. J. Larney, T. A. McAllister, B. M. Olson, L. B. Selinger, D. S. Chanasyk and P. Hasselback. 2003. Quantity and quality of runoff from a beef cattle feedlot in southern Alberta. Submitted to the Journal of Environmental Quality; reviewed July 10.

Woodbury, B. et al. 2004. Sustainability of a passive feedlot runoff control system using a vegetative filter strip for nutrient control. Submitted to Transactions of the ASAE, manuscript SW-05251-2004; review date unknown.

Miller, D. and V. Varel. 2005. Impacts of cattle feedlot soil moisture and manure content: I. Greenhouse gases, odor compounds, nitrogen losses and dust. Submitted to the Journal of Environmental Quality; review date unknown.

Kissinger, W. F., R. K. Koelsch, G. E. Erickson and T. J. Klopfenstein. 2006. Characteristics of manure harvested from beef cattle feedlots. Submitted to Transactions of the ASAE, manuscript SE-06526-2006; reviewed June 16.

Lim, T. T., H. Sun, J. Ni, L. Zhao, C. Diehl, A. J. Heber and S. M. Hanni. 2006. Field tests of a particulate impaction curtain on emissions from a high-rise layer barn. Submitted to Transactions of the ASAE, manuscript SE-06508-2006; reviewed June 5.

#### *Applications for Funding - Federal Review Panels*

USDA-CSREES, 2006. National Research Initiative Competitive Grants Program, 28.0 Air Quality, Washington, DC (Dr. Deanne Meyer, Panel Chair), October 18-19.

USDA-CSREES. 2006. Small Business Innovation Research (SBIR), Animal Waste Management program, Washington, DC (Dr. John Classen, Panel Chair), February 1-2.

*Applications for Funding - Ad Hoc Reviews*

\_\_\_\_\_. 2010. Photocatalytic and adsorptive system for odor control in lunar surface systems using silica-titania composites. SBIR Phase II proposal submitted to the State of Florida; review submitted November 15.

Davidson, D. A. 2009. Feasibility of pelletizing open-lot beef manure for use as a fertilizer. Proposal submitted to the USDA Small Business Innovation Research (Phase I) competitive grants program; review submitted February 15.

Bowser, E. 2008. Analyses of biomass moisture management for underground mine feedstock supply chain build-out. Submitted to the Missouri Small Business and Technology Development Centers SBIR Proposal Concept Review program; review submitted November 16.

Katsvairo, T. 2008. Fertilizer production from wood gasification/boiler ash. Submitted to the Enterprise Florida SBIR/STTR "Phase 0" Program; reviewed November 12.

Burns, R., N. Keren, R. Muhlbauer, H. Xin, and S. Hoff. 2008. Hydrogen sulfide spatial distribution and worker exposure in swine houses. Proposal submitted to the National Pork Board.

Campbell, M., D. McCurdy, and G. Wehner. 2007. Development and production of amylo maize corn hybrids as a source of resistant starch and swine feeding studies designed to examine its use as a feed additive for lowered fecal skatole and odor control. Proposal submitted to the Missouri Life Science Research Board/Life Science Trust Fund.

Johnson, P. J. 2007. Development of treatments for equine laminitis using an immunotherapeutic approach. Proposal submitted to the Missouri Life Science Research Board/Life Science Trust Fund.

Junk, W. P. 2007. Animal waste phosphorus management system. Proposal submitted to the Missouri Life Science Research Board/Life Science Trust Fund.

Linit, M. J. 2007. The gateway proposal: advancing animal and plant agricultural sciences in Missouri. Proposal submitted to the Missouri Life Science Research Board/Life Science Trust Fund.

Wright, D. 2007. Metalized FEP as an improved material for odor-sampling bags. Phase II proposal submitted to the USDA-CSREES Small Business Innovation Research (SBIR) program.

Lally, M. F. 2004. Use of finely ground rubber for the abatement of odors emitted from manure storage facilities. Proposal submitted to the USDA Small Business Innovation Research (Phase II) competitive grants program.

Cliver, D. O. and M. N. Hajmeer. 2003. Composting to destroy pathogens in carcasses. Proposal submitted to the USDA-CSREES National Research Initiative.



Schaperjahn and Robinson. Date unknown. Development of a delivery system to inject microorganisms into biosolids composting for enhanced odor control. Proposal submitted to the USDA Small Business Innovation Research (Phase I) competitive grants program.

### *External Institutions and Producer Associations*

USDA-ARS Office of Scientific Quality Review, 2010. NP 206/214 Manure Management Panel Review (Dr. Don Knowles, Scientific Quality Review Officer).

National Cattlemen's Foundation (NCF), 2010. Environmental Stewardship Award Program (ESAP) Review Committee meeting, Jackson, WY, June 25-26.

National Cattlemen's Foundation (NCF), 2009. Environmental Stewardship Award Program (ESAP) Review Committee meeting, Denver, CO, April 13-14.

National Cattlemen's Beef Association (NCBA), 2007. Environmental Stewardship Award Program (ESAP) Review Committee meeting, Aberdeen, MD, May 9-11.

National Pork Board, 2007. Post-publication review of Donham, K. J. et al. 2006. Community health and socioeconomic issues surrounding CAFOs. Environmental Health Perspectives (14 Nov 2006, p. 14). Review submitted January 15.

National Cattlemen's Beef Association (NCBA), 2005. Environmental Stewardship Award Program (ESAP) Review Committee meeting, Orlando, FL.

North Dakota State University, 2005. External review team to evaluate the animal waste management program at the NDSU Research and Extension Center at Dickinson, ND.

Texas Cattle Feeders Association, 2003. Review of TCEQ proposal to implement new federal CAFO rules, Amarillo, TX.

National Cattlemen's Beef Association (NCBA), 2003. Environmental Stewardship Award Program (ESAP) Review Committee meeting, Ardmore, OK.

National Cattlemen's Beef Association (NCBA), 2002. Environmental Stewardship Award Program (ESAP) Review Committee meeting, Las Vegas, NV.

National Cattlemen's Beef Association (NCBA), 2001. Environmental Stewardship Award Program (ESAP) Review Committee meeting, Kansas City, MO.

Texas Natural Resource Conservation Commission (TNRCC), 2000. Environmental Excellence Award. Review Committee, Austin, TX.

Texas Cattle Feeders Association (TCFA), 2000. Environmental Stewardship Award Program. Review Committee, Amarillo, TX.

National Cattlemen's Beef Association (NCBA), 2000. Environmental Stewardship Award Program (ESAP) Review Committee meeting, Kansas City, MO.

National Pork Producers Council (NPPC), 1999. Laboratory Evaluation of Manure Additives for Odor Control from Swine Facilities. Proposal and Facilities Review Team, Clive, IA; West Lafayette, IN; and Des Moines, IA.

National Cattlemen's Beef Association (NCBA), 1999. Environmental Stewardship Award Program (ESAP) Review Committee meeting, Indianapolis, IN.

Texas Cattle Feeders Association (TCFA), 1998. Environmental Stewardship Award Program. Review Committee, Amarillo, TX.

United States Environmental Protection Agency (USEPA) Region VI, 1996. Technical review of the Cumulative Risk Index Analysis (CRIA) Procedure for NPDES Permit Application Screening for CAFOs, Dallas, TX.

## **Professional Development**

### *Memberships in Professional Societies and National Committees*

American Society of [Biological and] Agricultural Engineers (ASABE), 1995-2008, 2010

Air & Waste Management Association (AWMA), 1996-1998, 2000

Society of Petroleum Engineers (SPE), 2008

CSREES Multistate Committee S-275/S-1000/S-1032, 1998-present

CSREES Multistate Committee NCR-189 (expired)

CSREES Multistate Committee NCR-132 (expired)

### *Participation in Annual Meetings*

#### ASABE - National/International

1996-2007

#### ASABE - Texas Section

1997-1998

#### AWMA

1996-1998, 2000

#### American Society of Animal Science (ASAS)

1998

### *Participation in Specialty Conferences*

#### ASABE

International Conference on Waste Management and Air Quality for Agriculture, Dallas, TX, September 14-16, 2010.

International Symposium for Animal, Agricultural and Food Processing Wastes and Air Pollution from Agricultural Operations, Broomfield, CO, September 16-19, 2007.

Third International Conference on Air Pollution from Agricultural Operations, Durham, NC, October 13-15, 2003.

Second International Conference on Air Pollution from Agricultural Operations, Des Moines, IA, October 9-11, 2000.

International Conference on Air Pollution from Agricultural Operations, Kansas City, MO, February 7-9, 1996.

#### USDA-NIFA Multistate Committee S-275/S-1000/S-1032

1997, 2003, 2005-2010

#### USDA Task Force on Agricultural Air Quality

Research Triangle Park, NC, September 29, 2010

Amarillo, TX, June 22-23, 2005.

Fresno, CA, June 17-19, 1997.

Amarillo, TX, April 8-9, 1998.

#### Other Organizations

EPA AgSTAR annual conference, Sacramento, CA, November 26-28, 2007.

TAMUS Energy Symposium and Workshop, College Station, TX, August 30-September 1, 2007.

Universities Council on Water Resources, Santa Fe, NM, July 18-20, 2007.

NCFAZDD Conference on Carcass Disposal, Austin, TX, November 13-14, 2006.

CASA Science Symposium on Nitrogen, Lake Louise, AB, September 26-29, 2006.

Workshop on Agricultural Air Quality: State of the Science, Potomac, MD, June 5-8, 2006.

National Center for Manure and Animal Waste Management (NCMAWM) Annual Meeting, Washington, DC, April 20-22, 2004.

Growing Links: International Meeting of the Society for Engineering in Agriculture, Adelaide, South Australia, Australia, April 2-5, 2000.

#### *Continuing Professional Development Courses*

##### Air Pollution: Modeling and Monitoring

AERMOD dispersion modeling training course. Lakes Environmental, Inc. Dallas, TX, February 26-27, 2009.

NADP Site Operators' Training Course. Champaign, IL, April 1-3, 2008.

Nashville, TN. 1996. AIR-215 Fundamentals of Dispersion Modeling. Annual Meeting of the Air & Waste Management Association.

Nashville, TN. 1996. AIR-245 Computer Modeling Laboratory. Annual Meeting of the Air & Waste Management Association.

Research Triangle Park, NC. 1998. Federal Reference Method PM<sub>2.5</sub> Monitors: Operation and Maintenance. United States Environmental Protection Agency.

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