

Summary of Current Agriculture Related Research Within California

August 18, 2005

Livestock Research

Project Name/Description	Key Project Goals	Principal Investigator and Staff	Affiliation	Funding Source	Funding	Completion Date
Evaluating Dairy Reactive Organic Gas Emissions	Chemically speciate TOG samples collected at dairies. Attempt to develop emission factors for dairies and some individually tested dairy processes.	C. Krauter D. Goorahoo B. Goodrich M. Beene	CSU Fresno	ARB, CSU Foundation	\$100,000 ARB About \$20,000 from other sources	December 2005
Evaluating Dairy Process Emissions Using Flux Chambers	Using environmental flux chambers at a working dairy, evaluate relative emission levels of individual process including lagoons, flush lanes, and corrals.	CE Schmidt	Contractor	ARB, SJVUAPCD	\$50,000	Complete
Measuring Dairy Cow Emissions in an Environmental Chamber	Place cows into an environmentally controlled chamber and evaluate speciated VOC emissions emitted directly from cows and from fresh waste products.	F. Mitloehner R. Flocchini J. Peters	UC Davis	USEPA	\$75,000 EPA	December 2005
Dairy Operations: An Evaluation and Comparison of Baseline and Potential Mitigation Practices for Emissions Reductions In the San Joaquin Valley	Project is designed to obtain data needed to better estimate baseline dairy emissions and to estimate the emission reductions achievable with available control technologies.	C. Krauter D. Goorahoo B. Goodrich M. Beene	CSU Fresno	ARB and possible matching funds from ARI	\$250,000 ARB \$250,000 ARI (tentative)	Jun-08
Process-Based Farm Emission Model to Estimate Air Emissions from California Dairies (Project Under ARB Processing and Review - Not yet funded)	Using biological principles and engineering studies, develop a feed/waste stream process-based dairy farm emission model for VOC emissions.	R. Zhang F. Mitloehner A. Goldstein	UC Davis UC Berkeley	ARB	\$300,00	July 2008 (estimated)
Dairy Air Quality Monitoring of ROG and Ammonia in the Central Valley of California	Maintain staffing and supplies for field and laboratory work to continue the ARB funded ROG project until 2006	C. Krauter D. Goorahoo B. Goodrich M. Beene	CSU Fresno	CSU Agricultural Research Initiative	\$208,000 ARI to match ARB and SJVAPCD funding	January 2007
Evaluating Dairy Ammonia, Methane, and Hydrogen Sulfide Emissions Using Tunable Diode Lasers	Develop real-time methods for evaluating process and time specific emission profiles for NH ₃ , CH ₄ , and H ₂ S at dairies.	D. Goorahoo C. Krauter B. Goodrich M. Beene	CSU Fresno	CSU Agricultural Research Initiative	\$98,000 ARI to match ARB and Boreal Lasers funding	June 2006
Evaluation of Dairy Emission Mitigation Practices	Evaluate dairy PM ₁₀ , 2.5, VOC, and ammonia emission mitigation practices for potential effectiveness. Includes lagoon and corral areas.	F. Mitloehner R. Zhang P. Robinson J. Fadel	UC Davis	Merced County via SWRCB	\$600,000	December 2006

Project Name/Description	Key Project Goals	Principal Investigator and Staff	Affiliation	Funding Source	Funding	Completion Date
Covered Lagoon Digester Emission Measurements	Measurements of NH ₃ , methane, and VOCs at dairies with CEC funded dairy digester installations.	TBD	TBD	CEC	\$500,000	TBD
Establishment of testing protocols for manure treatment (not sure if project was ever funded)	Compile a database of manure additives and commercial products claimed to mitigate NH ₃ or VOC emission. Investigate the mechanism for creating the reduction by each product. Evaluate multimedia effects of products on dairies. Develop a protocol to test the claims of reductions.	D. Meyer W. Powers E. Tooman T. Cassel	UC Davis	SCAQMD	Unknown	Unknown
Agricultural sources of PM ₁₀ and ozone precursors	Compile PM ₁₀ and NH ₃ emission factors. Measure concentrations of VOC relevant to ozone formation upwind and downwind of dairies	R. Flocchini C. Parnell R. Higashi	UC Davis and Texas A&M	USDA	\$374,145	July 2006
Developing a Process Based Model for GHG for California Dairies	Using biological principles and mass balance, develop a cradle-to-grave emissions model to provide greenhouse gas emissions estimates for dairies.	F. Mitloehner R. Zhang W. Salas	UC Davis and Others	CEC	\$500,000	June 2007
Development of a Process-Based Ammonia Model for Livestock Sources	Develop a process-based model of ammonia emissions from five types of animal feeding operations: dairy, beef, swine, chicken, and turkey.	G. Tonnesen Z. Wang R. Zhang J. Fadel G. Mansell J. Haasbeek	UC Riverside UC Davis ENVIRON International Corporation	LADCO Lake Michigan Air Directors Consortium	\$250,000	Complete
Measuring Broiler Emissions in Tunnel Ventilated Housing	Measure PM ₁₀ , ammonia, and speciated TOG emissions emitted from a tunnel ventilated broiler house during various stages of bird growth.	M. Summers D. Duke	CDFA Foster Farms	California Poultry Federation	\$40,000	Complete

Pesticide Research

Project Name/Description	Key Project Goals	Principal Investigator and Staff	Affiliation	Funding Source	Funding	Completion Date
Reducing Emissions of Volatile Organic Compounds from Agricultural Soil Fumigation	Provide information that can be used to determine if proposed methods to control VOC emissions are adequate to achieve required reductions.	S. Yates J. Gan M. Majewski D. Wang Q. Wang W. Zheng	UC Riverside	ARB	\$200,000	Dec-07
Investigation of Atmospheric Ozone Impacts of Selected Pesticides	Develop methods for estimating and quantifying ozone impacts for selected pesticide compounds for which such estimates are not currently available.	W. Carter	UC Riverside	ARB	\$100,000	Feb-06
Agricultural Pesticide VOC Sources and their Photochemical Ozone Formation Potential	Improve current understanding of the photochemical tO ₃ formation potential of VOCs from agricultural pesticide applications in the San Joaquin Valley.	R. Flocchini R. Higashi M. Kleeman P. Green	UC Davis	USDA	\$400,000	Jun-07
Commercialization of Intermittent Water Sealing	Identify optimal water management strategies for water sealing commercial-scale application of fumigants.	D. Sullivan H. Ajwa J Radewald	Sullivan Environmental Consulting	USDA	\$78,000	2005

On-Field Research

Project Name/Description	Key Project Goals	Principal Investigator and Staff	Affiliation	Funding Source	Funding	Completion Date
Improvement of PM10 emission factors for almond harvesting	Refine existing almond harvest particulate matter emissions.	R. Flocchini C. Parnell	UC Davis Texas A&M	Almond Board of California		June 2004
Improved Statewide Estimates of Ammonia Emissions from Native Soils in California	Develop California specific ammonia emission factors and modeling for native soils within California	C. Krauter C. Potter S. Klooster	CSU Fresno NASA Ames CSU Monterey	ARB	\$200,000	December 2005
Monitoring of Ammonia Emissions from Crop Production With a Tunable Diode Laser	Evaluate the use of a TDL system for the determination of ambient ammonia levels and ammonia emissions from specific agricultural operations.	C. Krauter D. Goorahoo B. Goodrich M. Beene	CSU Fresno	CSU Agricultural Research Initiative	\$296,000 ARI to match ARB and UniSearch funding	June 2005

Summary of Completed Agriculture Related Research Within California

Project Name/Description	Key Project Goals	Principal Investigator and Staff	Affiliation	Funding Source	Funding	Completion Date
Interim Report Sources and Sinks of PM10 in the San Joaquin Valley, August 2001	Evaluate on-field PM10 emissions. Evaluate PM10 and ammonia emissions for feedlots and dairies.	R. Flocchini T. Cassel	UC Davis	USDA		August 2001
Statewide Inventory Estimates of Ammonia Emissions from from Native Soils and Chemical Fertilizers in Fertilizers in California	Measure and model ammonia emissions from agricultural fertilizer application and natural soils. Report available at: ftp://ftp.arb.ca.gov/carbis/reports/l522.pdf	C. Krauter C. Potter S. Klooster	CSU Fresno NASA Ames CSU Monterey	ARB	\$186,425	June 2001
Results of the Measurement of PM10 Precursor Compounds from Dairy Industry Livestock Waste	Using environmental flux chambers, evaluate dairy ammonia and ROG emissions. http://www.aqmd.gov/rules/proposed/pr1127.html	C. Schmidt	Consultant	South Coast AQMD		June 1996
Results of the Measurement of Volatile Organic Compounds from Livestock Wastes	Evaluate process specific VOCs from dairies in the Sacramento region.	C. Schmidt	Consultant	U.S. EPA	\$25,000	January 1995
Survey Current Livestock Waste Management Practices in the South Coast Air Basin	Evaluate manure management practices in the SCAQMD http://www.aqmd.gov/rules/proposed/pr1127.html	Egigian-Nichols	Tetra Tech Inc	South Coast AQMD		January 2002
Literature Survey and National Programs, Livestock Waste Management Practices Survey and Control Option Assessment	Literature survey of waste management and control options. http://www.aqmd.gov/rules/proposed/pr1127.html	Egigian-Nichols	Tetra Tech Inc	South Coast AQMD		March 2003
Identify Potential Waste Management Practices Reducing Ammonia and VOCs, Livestock Waste Management Practices Survey and Control Option Assessment	Identify livestock practices to reduce emissions. http://www.aqmd.gov/rules/proposed/pr1127.html	Egigian-Nichols	Tetra Tech Inc	South Coast AQMD		March 2003
Emissions of Particulate Matter and Ammonia from Cattle Feedyards and Dairies: a Texas-California Partnership	Quantify the effects of water application and manure harvest frequency on PM and NH3 emission from dry lots housing beef or dairy animals (heifers).	B. Auvermann W. Harman D. Meyer	Texas cooperative extension UC Davis	national center for manure and animal waste management		Dec-03

For changes or additions, contact:
Patrick Gaffney
California Air Resource Board
916-322-7303
pgaffney@arb.ca.gov