

AGREEMENT NUMBER 13-C0027
REGISTRATION NUMBER 1314274

1. This Agreement is entered into between the State Agency and the Contractor named below:

STATE AGENCY'S NAME

Department of Pesticide Regulation

CONTRACTOR'S NAME

The Regents of the University of California

2. The term of this Agreement is: October 21, 2013 or upon final approval by the State, whichever occurs later, through December 31, 2015

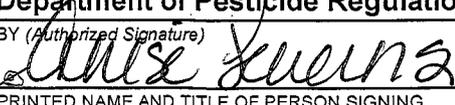
3. The maximum amount of this Agreement is: **\$ 225,016.00**
Two hundred twenty-five thousand sixteen dollars and no cents

4. The parties agree to comply with the terms and conditions of the following exhibits which are by this reference made a part of the Agreement.

Exhibit A – Scope of Work	7 Pages
Exhibit B – Budget Detail and Payment Provisions	4 Pages
Exhibit C* – General Terms and Conditions (GIA 610)	
Exhibit D - Special Terms and Conditions	2 Pages
Exhibit E – Additional Terms and Conditions	1 Page
Exhibit F – Principal Investigators' Qualifications	9 Pages

Items shown with an Asterisk (*), are hereby incorporated by reference and made part of this agreement as if attached hereto. *These documents can be viewed at <http://www.ols.dgs.ca.gov/Standard+Language/default.htm>*

IN WITNESS WHEREOF, this Agreement has been executed by the parties hereto.

CONTRACTOR	
CONTRACTOR'S NAME (if other than an individual, state whether a corporation, partnership, etc.) The Regents of the University of California	
BY (Authorized Signature) 	DATE SIGNED(Do not type) 9-25-2013
PRINTED NAME AND TITLE OF PERSON SIGNING Wendy Ernst Contracts & Grants Officer	
ADDRESS ANK Office of Contracts & Grants University of California ANK Bldg, Hopkins Road Davis, CA 95616	
AGENCY NAME Department of Pesticide Regulation	
BY (Authorized Signature) 	DATE SIGNED(Do not type) 10/8/13
PRINTED NAME AND TITLE OF PERSON SIGNING Anise Severns, Assistant Director	
ADDRESS 1001 I Street, Sacramento, CA 95814	

<p><i>California Department of General Services Use Only</i></p> <p></p> <div style="border: 2px solid black; padding: 10px; text-align: center;"> <p>APPROVED</p> <p>OCT 14 2013</p> <p>DEPT OF GENERAL SERVICES</p> <p><i>Kyatts</i></p> </div> <p><input type="checkbox"/> Exempt per:</p>

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EXHIBIT A
STANDARD AGREEMENT

SCOPE OF WORK

1. This Agreement is entered into between the Regents of the University of California, hereinafter referred to as UC Davis or Contractor, and the Department of Pesticide Regulation, hereinafter referred to as DPR.
2. This Agreement will commence on the start date October 21, 2013 as presented herein or upon final approval by the State, whichever is later and no work shall begin before that time. This Agreement is of no effect unless approved by the State. Contractor shall not receive payment for work performed prior to approval of the Agreement and before receipt of notice to proceed by the Contract Manager. This Agreement shall expire on December 31, 2015. The services shall be provided during normal working hours.
3. The Project Representatives during the term of this Agreement will be:
 - A. All official communications, except invoices, from the Contractor to DPR shall be directed to the attention of the DPR Contract Manager, Dr. Robert Budd, at:

Department of Pesticide Regulation
Environmental Monitoring Branch, MS 3B
1001 I Street
P.O. Box 4015
Sacramento, CA 95812-4015

Phone (916) 445-2505 Fax (916) 324-4088
E-mail: rbudd@cdpr.ca.gov

- B. All invoices from the Contractor to DPR shall be directed to:

Department of Pesticide Regulation
Attn: Accounts Payable
P.O. Box 4015, MS 4A
Sacramento, CA 95812-4015

- C. All programmatic communications from DPR to the Contractor shall be directed to the attention of Dr. Michael Cahn, or designee, at:

Dr. Michael Cahn
Irrigation and Water Resources Advisor
UC Cooperative Extension
1432 Abbott St
Salinas CA 93901

Phone: (831) 759-7377 Fax: (831) 758-3018
Email: mdcahn@ucanr.edu

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- D. All administrative communications, except payments, from DPR to the Contractor shall be directed to:

Heidi von Geldern
Senior contract & Grant Analyst
ANR Office of Contracts & Grants
University of California
ANR Bldg., Hopkins Road
Davis, CA 95616

Phone: (530) 754-8481 FAX: (530) 754-3943
Email Address: hvongeldern@ucant.edu

- E. All payments from DPR to the Contractor shall be directed to:

Cashier's Office
P.O. Box 989062
West Sacramento, CA 95798-9062

- F. The Project Representatives during the term of this Agreement may be changed by mutual written agreement without the necessity of formal amendment to this Agreement.

4. Background and Goals

Central coast watersheds are impacted by pesticides in agricultural runoff. Pesticides cause water and sediment toxicity and toxic concentrations of pesticides have been linked to ecological impacts in central coast rivers. These findings have led to federal Clean Water Act section 303(d) listings of central coast rivers and creeks, and subsequent total maximum daily load (TMDL) actions due to pesticides in general, and organophosphates such as chlorpyrifos, in particular. Recent research has demonstrated that vegetated treatment systems are partially effective at removing chlorpyrifos from cole crop tailwater, and that addition of the Landguard™ enzyme is required to reduce chlorpyrifos to non-toxic concentrations. Chlorpyrifos is particularly difficult to remove using traditional management practices because it is moderately soluble in water and therefore transported in water and water-suspended particulates. Because of its high toxicity to arthropods, anything less than complete removal in tailwater may result in surface water and/or sediment toxicity. While Landguard is effective, it is not clear this technology will remain available to growers, and alternative technologies may be required for mitigation of this pesticide.

This project will evaluate alternative treatment options for removing chlorpyrifos from cole crop tailwater runoff. In addition to the vegetated ditches that have proven to be partially effective, the current project will evaluate two additional technologies: compost mats and activated carbon filtration. Compost mats have shown promise as a pesticide

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removal treatment option in previous studies. Preliminary trials conducted in Salinas during 2011 indicated that compost mats spaced at 50 foot intervals in a ditch could reduce chlorpyrifos concentration in run-off by 40% over a distance of 250 feet.

Activated carbon filtration is commonly used in industrial applications as a method to remove organic compounds from wastewater and has been suggested for surface water treatment. This technology will be adapted for use in removing residual chlorpyrifos from broccoli tailwater runoff, and is intended as the primary alternative to Landguard.

This project is based on several assumptions regarding central coast broccoli production. The project assumes that chlorpyrifos will continue to be the primary pesticide used for treating root maggots in broccoli. Discussions with crop specialists, growers, University of California Cooperative Extension Specialists and central coast Pest Control Advisors (PCA) suggest that broccoli productivity suffers without treatment of root maggots with this pesticide, and there are no viable alternatives readily available. This project also assumes that while incremental refinement of integrated pest management practices can likely result in reduced loading of chlorpyrifos, implementation of these practices will not be sufficient to meet current water quality criteria for chlorpyrifos (<25 ng/L). The required chlorpyrifos application rate for root maggot control combined with current irrigation practices will likely continue to result in toxic concentrations of chlorpyrifos in runoff. In addition, improvements in irrigation efficiency are not anticipated to eliminate runoff, and storm water runoff will continue to result in unacceptable pesticide loading. This project is designed to combine optimized runoff treatment procedures to minimize surface water contamination by chlorpyrifos.

5. **Objectives** The overall objective of this project is to combine on-farm mitigation practices to reduce chlorpyrifos in agricultural run-off. Specific objectives are:
 - A. Evaluate the efficacy of separate mitigation practices (vegetated ditches, compost mats, and activated charcoal) for treating chlorpyrifos in irrigation run-off
 - B. Combine these practices into an integrated treatment system and demonstrate chlorpyrifos loading reduction and associated water toxicity reduction in replicated field trials
 - C. Communicate results through a technical report, extension materials that summarize the key findings of the project, conference presentations, and a peer-reviewed journal article.

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6. Hypotheses Field trials will be designed to test the following hypotheses:

Use of an integrated treatment system that combines vegetation, compost mats and activated carbon will reduce loading of chlorpyrifos in tailwater to meet regulatory requirements (<25 ng/L).

7. Work To Be Performed

Objective 1 During the first year of the project UC Davis will evaluate the efficacy of potential mitigation practices in trials conducted at the United States Department of Agriculture – Agricultural Research Services' (USDA-ARS) Spence research farm, in Salinas CA. UC Davis will conduct trials using simulated run-off containing chlorpyrifos at concentrations typically found in tail water from coastal vegetable fields (200 to 1000 ng/L). Replicated trials will evaluate the efficacy of vegetated ditches, compost mats and activated charcoal to reduce load and concentration of chlorpyrifos relative to no treatment (bare ditch). Trials will be conducted on parallel vegetated and bare ditches of 1800 foot lengths and a slope of approximately 3%. The vegetated ditch was constructed in 2010 and has a V-shaped cross-section of 16 feet in width, and 3 feet in depth and was seeded with a combination of native grass species, including red fescue, tufted hair grass, bent grass, and june grass. A bare ditch of 10 feet in width and 3 feet in depth will be established adjacent to the vegetated ditch before beginning the trials. All treatment evaluations will be replicated 3 times. The bare ditch will be divided into individual plots of 300 foot lengths and randomly assigned treatments of 1) bare, 2) bare with compost mats, and 3) bare with activated charcoal filters. The vegetated ditch will also be divided into 300 ft length plots where simulated run-off events will be conducted. Compost mats will be constructed from permeable geo-textile sleeves (filtrexx®) filled with compost from a local supplier, and secured at the bottom of the bare ditch, perpendicular to the water flow direction at 50 foot intervals using wooden stakes. Activated charcoal filters, either constructed on a wooden frame or using geo-textile sleeves will be placed in the bare ditch at 50 ft intervals.

Each plot will be subjected to a 3 to 4 hour simulated run-off event. Run-off will be simulated using ground water mixed with sediment. A metering pump will add a consistent concentration of chlorpyrifos to the run-off water before entering the inlet of the ditch. UC Davis will monitor flow rate and total volume of run-off water applied to the inlet of the ditch. Water at the outlet of the ditch will be collected into a sump and pumped through a flow meter to record the volume of run-off exiting the ditch. Flow meters will be interfaced with the data loggers to record flow at 5 minute intervals. Automated samplers located at 5, 75, 150, 225, and 295 ft below the inlet of the ditch will collect subsamples of run-off into stainless steel containers at 5 minute intervals. Composite samples of the run-off water will be transferred into amber glass bottles at the end of the run-off event and maintained at 40°F. Samples will be analyzed for

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chlorpyrifos using enzyme-linked immunosorbent assays (ELISA, Strategic Diagnostics Inc, Newark, DE) and confirmed with GC/MS (EPA Method 8141). Water column toxicity will be evaluated using 96h *Ceriodaphnia dubia* toxicity tests (USEPA, 1993).

Treatment removal rate will be estimated by the difference between the mass of pesticide measured at the inlet and outlet of the ditch. The velocity of the run-off flow will be measured directly during the run-off event using food dye, and will also be calculated from the flow rate data and estimates of ditch volume and length. Run-off velocity data will be used to calculate 1) treatment half-life of the pesticide (time to achieve half the concentration of pesticide in the run-off) and 2) treatment half-ditch length (ditch length needed to achieve half the concentration of pesticide in the run-off).

Objective 2 During the second year UC Davis will evaluate the efficacy of a combination of mitigation practices on reducing chlorpyrifos load in simulated run-off. Mitigation practices will be a combination of the vegetated ditch, compost mats, and activated charcoal. The combined practices will be tested four times (replicates) using simulated chlorpyrifos run-off events following procedures as described in objective 1. Ditch length will be increased to 400 ft and the simulated run-off events will be increased to 4 to 5 hours. Run-off volume will be measured at the inlet and outlet of the treatment system and composite samples of the run-off will be collected at varying distances from the run-off source and analyzed for chlorpyrifos using procedures described in objective 1. Both load and concentration of chlorpyrifos, and aquatic toxicity will be compared among treatments.

Objective 3 UC Davis will present results of the trials during the end of the second year of the project. Activities will include development of a technical report and extension materials that summarize the key findings of the project, as well as conference presentations and a peer-reviewed journal article.

8. Deliverables

Objective 1 Evaluate the efficacy of individual mitigation practices (vegetated ditches, compost mats, and activated charcoal) for treating chlorpyrifos in irrigation run-off.

Task 1 Conduct field trials evaluating the efficacy of the separate practices for mitigating chlorpyrifos in irrigation run-off

Subtask 1a Conduct simulated run-off trials comparing mitigation treatments at the USDA-ARS Spence Rd. research farm. UC Davis will conduct three tests of each management practice including the bare ditch (control) treatment.

**EXHIBIT A
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- Subtask 1b Analyze water samples for chlorpyrifos, nutrients ($\text{NO}_3 + \text{PO}_4$), total dissolved solids (TDS), turbidity and aquatic toxicity to water fleas *C. dubia*.
- Subtask 1c Summarize and report results of trials.
- Objective 2. Evaluate the efficacy of integrated mitigation practices (vegetated ditches, compost mats, and activated charcoal combined as a series) for treating chlorpyrifos in irrigation run-off.
- Task 2 Conduct field trials evaluating the efficacy of combined practices for mitigating chlorpyrifos in irrigation run-off
- Subtask 2a Conduct simulated run-off trials comparing mitigation treatments at the USDA-ARS Spence Rd. research farm. UC Davis will conduct 4 tests of the combined management practices including the bare ditch (control) treatment. Samples for laboratory chemistry and toxicity evaluations will be conducted during each test.
- Subtask 2b Analyze water samples for chlorpyrifos, nutrients ($\text{NO}_3 + \text{PO}_4$), total dissolved solids (TDS), turbidity and aquatic toxicity to water fleas *C. dubia*.
- Subtask 2c Summarize and report results of trials.
- Objective 3 Communicate results
- Task 3 Present results through presentations at conferences, a technical report and journal article and in extension publications.

9. Project Evaluation

UC Davis will evaluate efficacy of mitigation practices tested in year 1 using ANOVA and General Linear Means statistical procedures using SAS software. Mitigation practices that provide significant reduction in OP pesticide load will be used in the combined practice trial conducted during the subsequent year. UC Davis will also determine the appropriate scaling of the mitigation practices to eliminate aquatic toxicity in run-off from OP pesticides and the potential costs of these practices. Additionally, UC Davis will evaluate the integrated effect of mitigation practices together on chlorpyrifos concentration and toxicity in irrigation run-off, and determine the costs associated with these component practices.

**EXHIBIT A
 STANDARD AGREEMENT**

10. Timeline

Task Description	Start Date	Completion Date
Task 1. Conduct field trials evaluating the efficacy of the separate practices for mitigating chlorpyrifos in irrigation run-off.	Oct-2013	Jul-2014
Subtask 1a. Conduct simulated run-off trials comparing mitigation treatments.	Oct-2013	Jan-2014
Subtask 1b. Analyze water samples for chlorpyrifos, nutrients, TSS, and aquatic toxicity.	Nov-2013	May-2014
Subtask 1c. Summarize and report results of trials.	Feb-2014	Jul-2014
Task 2. Conduct field trials evaluating the efficacy of combined practices for mitigating chlorpyrifos in irrigation run-off.	Sep-2013	Oct-2013
Subtask 2a. Conduct simulated run-off trials comparing mitigation treatments.	Sep-2013	Dec-2014
Subtask 2b. Analyze water samples for chlorpyrifos, nutrients, TSS, and aquatic toxicity.	Nov-2014	May-2015
Subtask 2c. Summarize and report results of trials.	Feb-2014	Jun-2015
Task 3. Present results through presentations at conferences, technical report, and journal article, and extension publications.	Oct-2014	Dec-2015

EXHIBIT B
Standard Agreement

BUDGET DETAIL AND PAYMENT PROVISIONS

1. Invoicing

- A. For services rendered in accordance with the Scope of Work, Exhibit A of this Agreement and upon receipt and approval of invoices by the Contract Manager, DPR agrees to compensate Contractor, in arrears, for actual allowable costs incurred as specified herein and in accordance with the rates specified herein or attached hereto. Incomplete or disputed invoices shall be returned to Contractor, unpaid, for correction.
- B. Invoices shall include the Agreement Number and shall be submitted in triplicate, not more frequently than monthly or less than quarterly in arrears, to:

Department of Pesticide Regulation
Attn: Accounts Payable
P.O. Box 4015, MS-4A
Sacramento, CA 95812-4015

2. Budget Contingency Clause

- A. It is mutually agreed that if the Budget Act of the current year and/or any subsequent years covered under this Agreement does not appropriate sufficient funds for the program, this Agreement shall be of no further force and effect. In this event, DPR shall have no liability to pay any funds whatsoever to Contractor or to furnish any other considerations under this Agreement and Contractor shall not be obligated to perform any provisions of this Agreement.
- B. If funding for any fiscal year is reduced or deleted by the Budget Act for purposes of this program, DPR shall have the option to either cancel this Agreement with no liability occurring to DPR, or offer an Agreement Amendment to Contractor to reflect the reduced amount.

3. Payment

- A. Costs for this Agreement shall be computed in accordance with State Administrative Manual (SAM) Sections 8752 and 8752.1.
- B. Nothing herein contained shall preclude advance payments pursuant to Article 1, Chapter 3, Part 1, Division 3, Title 2 of the California Government Code, Sections 11256 and 11257.

**EXHIBIT B
Standard Agreement**

- C. Transportation and subsistence costs shall not exceed rates authorized to be paid UC system non-represented employees traveling within California.
- D. Contractor will be reimbursed for direct costs, other than salary costs, that are identified in the Contractor's rates.
- E. Contractor will bill in arrears for costs incurred during the billing period. If applicable, salary costs will be itemized and billed by position. Documentation supporting specific salary costs will be presented if requested by DPR. Non-wage costs will be billed, in summary, according to general expense categories. A detailed report of transactions will support the billing. Individual expenditures exceeding \$500.00 will be supported by a photocopy of the original documentation. Documentation in support of expenditures less than \$500.00 will be presented if requested by DPR.
- F. Contractor shall not commence performance of work or services until this contract has been approved by the State. No payment will be made prior to approval nor for any work performed prior to approval of this Agreement.
- G. Ten percent (10%) of each invoice amount shall be withheld by DPR until services have been rendered in accordance with the Scope of Work, Exhibit A of this Agreement.
4. **Rates**
Rates for these services are as follows:

Table I - Details Budget

Year 1 2013 - 2014	
Personnel	
Salaries and Wages	
UC Davis Specialist V (0.22 FTE @ \$5468/month x 12 months)	\$14,436
UC Davis Specialist III (0.22 FTE @ \$4233/month x 12 months)	\$11,175
UC Davis Jr. Specialist I (0.30 FTE @ \$1734/month x 12 months)	\$6,242
UC Davis Jr. Specialist I (0.30 FTE @ \$1734/month x 12 months)	\$6,242
UCCE Monterey County SRA III 0.31 FTE @ \$4867/month x 12 months)	\$18,464
Benefits	
UC Davis Specialist V (0.22 FTE @ \$5468/month x 12 months)	\$4,374
UC Davis Specialist III (0.22 FTE @ \$4233/month x 12 months)	\$3,387
UC Davis Jr. Specialist I (0.30 FTE @ \$1734/month x 12 months)	\$1,890
UC Davis Jr. Specialist I (0.30 FTE @ \$1734/month x 12 months)	\$1,890
UCCE Monterey County SRA III 0.31 FTE @ \$4867/month x 12 months)	\$9,232
Year 1 2013 - 2014 Total Personnel Costs	\$77,333

**EXHIBIT B
Standard Agreement**

Travel UC Davis [Ⓞ]	\$1,000
Supplies UC Davis [Ⓞ]	\$9,500
Supplies UCCE [Ⓞ]	\$984
Equipment UCCE [Ⓞ]	\$1,500
Contractual (USDA-ARS farming services)	\$4,500
Year 1 2013 - 2014 Total Direct Costs	\$94,817
Indirect costs (25%) UCCE Monterey [Ⓞ]	\$8,670
Indirect costs (15%) UC Davis [Ⓞ]	\$9,021
Year 1 2013 - 2014 Total Costs	\$112,508

Year 2 2014 - 2015

Personnel

Salaries and Wages

UC Davis Specialist V (0.22 FTE @ \$5468/month x 12 months)	\$14,436
UC Davis Specialist III (0.22 FTE @ \$4233/month x 12 months)	\$11,175
UC Davis Jr. Specialist I (0.30 FTE @ \$1734/months x 12 months)	\$6,242
UC Davis Jr. Specialist I (0.30 FTE @ \$1734/month x 12 months)	\$6,242
UCCE Monterey County SRA III 0.31 FTE @ \$4867/month x 12 months)	\$18,464

Benefits[Ⓞ]

UC Davis Specialist V (0.22 FTE @ \$5468/month x 12 months)	\$4,374
UC Davis Specialist III (0.22 FTE @ \$4233/month x 12 months)	\$3,387
UC Davis Jr. Specialist I (0.30 FTE @ \$1734/month x 12 months)	\$1,890
UC Davis Jr. Specialist I (0.30 FTE @ \$1734/month x 12 months)	\$1,890
UCCE Monterey County SRA III 0.31 FTE @ \$4867/month x 12 months)	\$9,232

Year 2 2014 - 2015 Total Personnel Costs **\$77,333**

Travel UC Davis [Ⓞ]	\$1,000
Supplies UC Davis [Ⓞ]	\$9,500
Supplies UCCE [Ⓞ]	\$984
Equipment UCCE [Ⓞ]	\$1,500
Contractual (USDA-ARS farming services)	\$4,500

Year 2 2014 - 2015 Total Direct Costs **\$94,817**

Indirect costs (25% of \$34,679) UCCE Monterey [Ⓞ]	\$8,670
Indirect costs (15% of \$60,138) UC Davis [Ⓞ]	\$9,021

Year 2 2014 - 2015 Total Costs **\$112,508**

Grand Total of Estimated Agreement Costs **\$225,016**

[Ⓞ]Benefits include: Worker's Compensation and other benefits appropriate for title

[Ⓞ]Travel includes: Invoice for payments on travel shall be based on current University of California rates and guidelines.

[Ⓞ]Supplies include: Field testing and office supplies. This line item does not include any unit acquisition of \$5,000 or more.

[Ⓞ]Minor Equipment: Line item does not include any equipment with a unit acquisition of \$5,000 or more.

[Ⓞ]Indirect Cost: 15% indirect cost rate for UC Davis Campus' portion of direct costs, 25% indirect rate for UCCE Monterey's portion of costs direct includes: Depreciation of buildings and equipment, utility consumption, operations and maintenance costs, and administrative services provided at the departmental and central level.

EXHIBIT B
Standard Agreement

5. Cost Limitation

- A. The total amount of this Agreement shall not exceed \$225,016.00.
- B. It is understood and agreed that this total is an estimate and that DPR will pay for only those services actually rendered as authorized by the DPR Contract Manager or his/her designee.

EXHIBIT D
Standard Agreement

SPECIAL TERMS AND CONDITIONS

1. Termination

- A. Either Party reserves the right to terminate this agreement without cause upon 30 days written notice to the other Party, or immediately in the event of a material breach. In the event of termination, Contractor shall be paid for all allowable costs incurred up to the date of termination, including any non-cancelable obligations.
- B. In the event that the total Agreement amount is expended prior to the expiration date, DPR may, at its sole discretion, terminate this Agreement with 30 days notice to contractor.

2. Subcontracting

- A. Contractor shall perform the work contemplated with resources available within its own organization and no portion of the work shall be subcontracted unless the subcontract(s) is identified in this Agreement.
- B. Any subcontract in excess of \$25,000, entered into as a result of this Agreement, shall contain all the provisions stipulated in this Agreement to be applicable to Subcontractors.
- C. Any substitution of subcontractors must be approved in writing by the DPR Contract Manager in advance of assigning work to a substitute subcontractor.

3. Dispute Resolution

- A. DPR reserves the right to issue an order to stop work in the event that a dispute should arise, or in the event that DPR gives the performing agency a notice that this Agreement will be terminated. If DPR exercises this right, the stop-work order will be in effect until the dispute has been resolved or this Agreement has been terminated.
- B. Any dispute concerning a question of fact arising under the terms of this Agreement which is not disposed of within a reasonable period of time by agency employees normally responsible for the administration of this agreement, shall be brought to the attention of the Executive Officer or designated representative of each agency for joint resolution.
- C. The Contractor shall continue to perform all its responsibilities under this agreement during any dispute until notified to stop work or expiration of this Agreement.

EXHIBIT D
Standard Agreement

4. Harassment Free Workplace

The Department of Pesticide Regulation (DPR) is committed to providing a safe, secure environment, free from sexual misconduct. It is policy of the Department that employees have the right to work in an environment that is free from all forms of discrimination, including sexual harassment. This policy specifically speaks to freedom from a sexually harassing act that results in the creation of an intimidating, hostile or offensive work environment or that otherwise interferes with an individual's employment or work performance. As a Contractor with DPR, you and your staff are expected to comply with a standard of conduct that is respectful and courteous to DPR employees and all other persons contacted during the performance of this Agreement. Sexual harassment is unacceptable, will not be tolerated; and may be cause for prohibiting some or all of the Contractor's staff from performing work under this Agreement.

EXHIBIT E
Standard Agreement

ADDITIONAL PROVISIONS

1. Disposition of Work Product

DPR retains use and non-commercial governmental distribution rights to all deliverables identified in Exhibit A of this Agreement.

2. Contractor Evaluation

The Contractor is hereby notified that its performance under this Agreement shall be evaluated within 30 calendar days following the Expiration of this Agreement. The evaluation may include statements on the adequacy of the service or the product, whether the service was satisfactory, whether the service or the product was provided or completed within the time limitations, reasons for time or cost overruns, whether the product is operational or being utilized by the State, and/or the State plans for implementation, and the State's general impression as to the competency of the Contractor and its staff. The evaluation shall be filed in the State's official Contractor Evaluation File.

3. Consulting Services

- A. The Contractor is hereby advised of its duties, obligations and rights under Public Contract Code § 10335.5.
- B. The Contractor's key personnel assigned to perform work under this Agreement and their level of responsibility shall be mutually acceptable to the State and the Contractor.

EXHIBIT F
Standard Agreement

MICHAEL D. CAHN

Water Resources and Irrigation Advisor
University of California, Cooperative Extension
1432 Abbott St
Salinas, CA 93901
831-759-7377, mdcahn@ucdavis.edu

EXPERIENCE

1995-present University of California, Cooperative Extension, Farm Advisor

1991-1995 University of Illinois, Agricultural Engineering Department
Post-Doctoral Research Associate

EDUCATION

B.S. Soil and Water Science, University of California, Davis, 1985

M.S. Agronomy-Soil Science, Cornell University, 1988

Ph.D. Agronomy-Soil Science, Cornell University, 1991

Areas of Specialization

Irrigation management of vegetables and row crops, water quality protection, salinity management, drip irrigation, fertility management of vegetables, microbial food safety.

Recent Peer-Reviewed Publications

M. LeStrange, Cahn M.D., Koike, S.T. Smith R.F, Daugovish, O., Fennimore, S.A., Natwick, E.T., Dara, S. K., Takale, E. , Cantwell, M. 2011. Broccoli production in California. Vegetable Production Series. ANR Publication 7211.
<http://anrcatalog.ucdavis.edu/pdf/7211.pdf>

Turini, T., M. Cahn, M. Cantwell, L. Jackson, S. Koike, E. Natwick, R.F. Smith, K. Subbarao and E. Takele. 2011. Iceberg lettuce production in California. ANR Publication 7215. Revision. <http://anrcatalog.ucdavis.edu/pdf/7215.pdf>

Moyne, A.-I., M. R. Sudarshana, T. Blessington, S. T. Koike, M. D. Cahn, L. J. Harris. 2011 Fate of Escherichia coli O157:H7 in field-inoculated lettuce. Food Microbiology 28: 1417-1425.

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Cahn M. D. and E. M. Miyao 2010. Water management and impacts on water quality. In Cover cropping for vegetable production: A grower's handbook, Editors: R.F., R. Bugg, O Daugovish, M. Gaskell and M. VanHorn. DANR publication.

M.M. Hoque, H. Ajwa, M. Othman, R. Smith, M. Cahn 2010. Yield and Postharvest Quality of Lettuce in Response to Nitrogen, Phosphorus, and Potassium Fertilizers. Hortscience 45: 1539-1544.

Cahn M. D. 2009. Irrigation of head and romaine lettuce. UC IPM Pest Management Guidelines: Lettuce. UC ANR Publication 3450.
<http://www.ipm.ucdavis.edu/PMG/r441311511.html#IRRIGATION>

Cahn M. D. 2009. Measures to minimize water quality impairments to surface and ground water. UC IPM Pest Management Guidelines: Lettuce. UC ANR Publication 3450. <http://www.ipm.ucdavis.edu/PMG/r441311611.html>

D. P. Weston, R. D. Lentz, M. D. Cahn, R. S. Ogle, A. K. Rother, and M. J. Lydy 2009. Toxicity of anionic polyacrylamide formulations when used for erosion control in agriculture. Journal of Environmental Quality 38: 238-247.

C. Daugovish, O., Cahn, M. Koike, S., Natwick, E., Cantwell, M., and Takele, E. 2008. Cabbage production in California. Vegetable Production Series. ANR Publication 7208. <http://anrcatalog.ucdavis.edu/pdf/7208.pdf>

R. Smith, L. Bettiga, M. Cahn, K Baumgartner, L. E. Jackson, T. Bensen. 2008. Vineyard floor management affects soil, plant nutrition, and grape yield and quality. California Agriculture 62(4):184-190.

Hartz, T.K., P.R. Johnstone, R.F. Smith and M.D. Cahn. 2007 Soil calcium status unrelated to tipburn of romaine lettuce. HortScience 42:1681-1684

C.C. Shock, A.B. Pereira, B.R. Hanson, and M.D. Cahn. 2007. Vegetable irrigation. Eds. R.J. Lanscano and R.E. Sojka. Irrigation of agricultural crops, 2nd Edition. ASA CSSA-SSSA Madison WI. pp. 535-606.

Recent Abstracts presented at Professional Meetings

Cahn, M., M.J. English, T. Hartz. 2011. Irrigation and nitrogen management web-based software for lettuce production. 19th annual CDFA Fertilizer Research and Education Program Conference Proceedings. Tulare, CA. pp. 19-21.

Cahn, M., B. Farrara, T. Bottoms, T. Hartz, M. Bolda. 2011. Irrigation management and water use of California strawberries. 2011 ASHS annual conference Sept. 25-28, 2011, Waikaloa HI., HortSci. 46(9) S116.

EXHIBIT F
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Cahn, M. R. Smith, A. Heinrich, B. Farrara. 2010. Evaluation of best management practices for reducing nitrate leaching in commercial lettuce fields. ASA-CSSA-SSSA 2010 International meetings, Long Beach CA. Oct 31- Nov. 4. 2010. <http://a-c-s.confex.com/crops/2010am/webprogram/Paper58930.html>

M. Cahn and B. F. Farrara 2010. Evaluation of mitigation practices for reducing chlorpyrifos in irrigation run-off from vegetable fields. 239th American Chemical Society National Meeting and Exposition. San Francisco, CA March 21-25, 2010. www.acs.org.

CURRICULUM VITAE (abbreviated) - Brian S. Anderson

Education

1982. B.S., Biological Sciences, Oregon State University (emphasis in marine ecology).

1987. M.A., Marine Biology, San Jose State University, Moss Landing Marine Laboratories (emphasis in phycology, marine ecology).

Selected Research Experience

2011 – ongoing. Co-lead researcher on the efficacy of LID practices for reduction of storm water contamination and toxicity in the City of Salinas. DWR Proposition 84 grant research. 2010 – 2011. Co-lead researcher on the use of integrated vegetative treatment systems for treating agriculture runoff in the Salinas Valley. Grant research for the US Department of Agriculture and the California Department of Pesticide Regulation.

2008 – ongoing. Co-lead researcher on long-term trend monitoring of sediment contamination and toxicity in California watersheds; Surface Water Ambient Monitoring Program/Stream Pollution Trends monitoring project.

2008 – 2010. Co-lead researcher on sources and causes of water and sediment toxicity in the Santa Maria River watershed. Grant Research for the Central Coast Regional Water Quality Control Board.

2007 – 2009. Co-Lead researcher on the effects of agriculture pesticides on three central California estuaries. Grant research for the California State Water Resources Control Board

2005 – on-going. Lead researcher on investigations of the efficacy of vegetated treatment systems and constructed wetlands for reducing toxicity associated with pesticide runoff. Grant research for the State Water Resources Control Board and the Central Coast Regional Water Quality Control Board, in cooperation with the Monterey County Resource Conservation District, and the Monterey County Agriculture Commissioners Office.

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Lead researcher on monitoring studies of pesticide runoff associated with ambient toxicity in the Salinas River and associated drainages. Grant research for California State Water Resources Control Board
1994 – 1996: Lead researcher on monitoring studies of pesticide runoff associated with ambient toxicity in the Pajaro River and associated drainage. Grant research for California State Water Resources Control Board.

Selected Publications (of 77 total)

73. Phillips, B.M., **Anderson, B.S.**, Hunt, J.W., Siegler, K., Voorhees, J.P., Tjeerdema, R.S., McNeil, K. 2012. Pyrethroid and organophosphate pesticide-associated toxicity in two coastal watersheds (California, USA). *Environ Toxicol Chem.*
72. **Anderson, B.S.** 2011. Treatment of agriculture runoff with enzyme and vegetation removes pesticides and associated toxicity. *Outlooks on Pest Management* 22: 223-225.
70. **Anderson, BS**, Phillips, BM, Hunt, JW, Largay, B, Shihadeh, R, Berretti, M, Tjeerdema, RS. 2011. Pesticide and toxicity reduction using an integrated vegetated treatment system. *Environ Toxicol Chem.* 30:1036-1043.
62. Hunt, JW, **Anderson, BS**, Phillips, BM, Tjeerdema, RS, Largay, B, Hanson, E, Beretti, M, Bern, A. 2008. Use of toxicity identification evaluations in determining the pesticide mitigation effectiveness of on-farm vegetated treatment systems. *Environ Poll.* 156: 348-358.
59. Wheelock, CE, Phillips, BM, **Anderson, BS**, Miller, JL, Miller, M, Hammock, B. 2008. Applications of carboxylesterase activity in Toxicity Identification Evaluations (TIEs) and environmental monitoring. *Rev Environ Contam Toxicol* 195: 117 -178.
58. **Anderson, BS**, Phillips, BM, Hunt, JW, Voorhees, J, Clark, S, Tjeerdema, RS. 2008. Recent advances in sediment toxicity identification evaluation methods emphasizing pyrethroid pesticides. In: Gan, J-G, Hendley, P, Spurlock, F, Weston, D. (eds.), *Synthetic Pyrethroids: Occurrence and Behavior in Aquatic Environments*. American Chemical Society Books, Washington, DC (invited). 481 pp.
54. Hunt, JW, **Anderson, BS**, Phillips, BM, Tjeerdema, RS, Richard, N, Connor, N, Worcester, K, Angelo, M, Bern, A, Fulfrost, B, Mulvaney, D. 2006. Spatial relationships between water quality and pesticide applications in agricultural watersheds. *Environ Monit Assess.* 121:245-262.
53. Phillips, BM, **Anderson, BS**, Hunt, JW, Huntley, S, Tjeerdema, RS, Kapellas, N, Worcester, K. 2006. Solid-phase sediment toxicity identification evaluation in an agricultural stream. *Environ Toxicol Chem.* 25: 1671-1676.

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- 52. Anderson, BS**, Phillips, BM, Hunt, JW, Richard, N, Connor, V., Tjeerdema, RS. 2006. Evidence of pesticide impacts in the Santa Maria River watershed (California, USA). *Environ. Toxicol. Chem* 25:1160 – 1170.
- 51. Anderson, BS**, Phillips, BM, Hunt, JW, Richard, N, Connor, V., Tjeerdema, RS. 2006. Identifying primary stressors impacting macroinvertebrates in the Salinas River (California, USA): relative effects of pesticides and suspended particles. *Environmental Poll.* 141: 402-408.
- 47. Phillips, BM, Anderson, B.S.**, Hunt, J.W., Nicely, PA, Kosaka, R, de Vlaming, V, Connor, V, Richard, N, Tjeerdema, RS. 2004. *In situ* water and sediment toxicity in an agricultural watershed. *Environ. Toxicol. Chem.* 23: 435-442.
- 44. Anderson, B.S.**, Hunt, J.W., Phillips, B.M., Nicely, PA, de Vlaming, V, Connor, V, Richard, N, Tjeerdema, RS. 2003. Integrated assessment of the impacts of agricultural drainwater in the Salinas River (California, USA). *Environ. Pollution* 124: 523-532.
- 43. Anderson, B.S.**, Hunt, J.W., Phillips, B.M., Nicely, PA, Gilbert, KD, de Vlaming, V, Connor, V, Richard, N, Tjeerdema, RS. 2003. Ecotoxicologic impacts of agriculture drainwater in the Salinas River (California, USA). *Environ. Toxicol. Chem.* 22: 2375-2384
- 41. Hunt, JW, Anderson, BS**, Phillips, BM, Nicely, PA, Tjeerdema, Puckett, HM, Stephenson, M, Worcester, K, deVlaming, V. 2003. Ambient toxicity due to chlorpyrifos and diazinon in a Central California Watershed. *Environ Monit Assess.* 82: 83-112.

Selected Reports

Phillips, B.M., **Anderson, B.S.**, Siegler, C., Voorhees, J.P., Tjeerdema, R.S. 2012. Optimization of an Integrated Vegetated Treatment System Incorporating Landguard A900 Enzyme: Reduction of Water Toxicity Caused by Organophosphate and Pyrethroid Pesticides. Final Technical Report. Resource Conservation District Monterey County, U.S. Department of Agriculture, California Department of Pesticide Regulation. 32pp.

Anderson, BS, Hunt, JW, Markiewicz, D, Larson, K. 2011. Summary of toxicity in California surface waters – 2001 – 2010. Final technical report, California State Water Resources Control Board, Sacramento, California. 33pp.

Anderson, BS, Phillips, BM, Hunt, JW, Siegler, CS, Voorhees, J, Kuivila, K, Smalling, K, Adams, M. 2010. Watershed-scale Evaluation of Agricultural BMP Effectiveness in Protecting Critical Coastal Habitats: Final Report on the Status of Three Central California Estuaries. Central California Regional Water Quality Control Board.

Phillips, BM, **Anderson, BS**, Hunt, JW, Siegler, CS, Voorhees, J, McNeill, K. 2010. Santa Maria River Watershed and Oso Flaco Creek watershed TMDL monitoring study.

EXHIBIT F
Standard Agreement

Final Report to the Central Coast Regional Water Quality Control Board, San Luis Obispo, CA.

Anderson, BS, Phillips, BM, Hunt, JW, Largay, B, Shihadeh, R, Berretti, M. 2008. Pesticide and toxicity reduction using vegetated treatment systems and Landguard OP-A. Final technical report to Monterey County Resource Conservation District and Central Coast-Regional Water Quality Control Board. 70 pp.

Largay BG, Los Huertos M, Shihadeh R, Robins P, Beretti M, **Anderson BS**, Phillips BM, Hunt JW. 2008. Vegetated Treatment Systems at the Edge of Working Farms: A Tool to Reduce the Yield of Nutrients, Pesticides and Sediment, Monterey County, California. Central Coast Regional Water Quality Control Board, San Luis Obispo, CA. 153 pp.

CURRICULUM VITAE - Bryn M. Phillips

Specialist - Marine Pollution Studies Laboratory
Department of Environmental Toxicology - University of California Davis
34500 Highway One, Monterey, CA 93940
bmphillips@ucdavis.edu

Education

1989 B.S. Zoological Sciences, California State University, Long Beach

1995 M.S. Marine Sciences, San Jose State University, Moss Landing Marine Laboratories

Current Position

Assist in designing and conducting research projects to assess ambient water and sediment quality in marine, estuarine, and freshwater environments. Identify sources and causes of toxicity through watershed assessments and toxicity identification evaluations. Integrate and interpret synoptic data from chemical and toxicological analyses conducted at cooperating laboratories. Develop toxicity assessment techniques. Evaluate acute and chronic effects of pollutants. Coordinate and conduct aquatic and sediment toxicity tests and research projects, manage data, and administer quality control.

Applicable Research Experience

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2005 – Present. Research the efficacy of vegetated treatment systems and constructed wetlands for reducing toxicity associated with pesticide runoff. Grant research for the State Water Resources Control Board and the Central Coast Regional Water Quality Control Board, in cooperation with the Monterey County Resource Conservation District.

2011 – 2012 - Research the effects of spray applications of vector control chemicals on local water bodies. Grant research for the State Water Resources Control Board

2007 – 2009. Research the effects of agriculture pesticides on three central California estuaries. Grant research for the California State Water Resources Control Board

1998 – 2005. Monitoring studies of pesticide runoff associated with ambient toxicity in the Salinas River and associated drainages. Grant research for California State Water Resources Control Board.

2006 – 2008. Investigation of the presence and effects of pyrethroid pesticides in sediments deposited in urban drainages. Grant research for California State Water Resources Control Board.

2006 – Present. Development of whole sediment and interstitial water sediment TIE methods for pyrethroid pesticides. Grant research for California State Water Resources Control Board.

Selected Peer-Reviewed Publications

8. 1999 Hunt JW, Anderson BS, **Phillips BM**, de Vlaming V. Patterns of aquatic toxicity in an agriculturally dominated coastal watershed of California. *Agricul. Ecosyst. Environ.* 75: 75-91.

19. 2003 Hunt JW, Anderson BS, **BM Phillips**, Nicely PA, Tjeerdema RS, Puckett HM, Stephenson M, Worcester K, de Vlaming V. 2003. Ambient toxicity due to chlorpyrifos and diazinon in a central California coastal watershed. *Environ Monitor Assess* 82: 83-112.

22. 2003 Anderson BS, Hunt JW, **Phillips BM**, Nicely PA, de Vlaming V, Connor V, Richard N, Tjeerdema R. Ecotoxicologic impacts of agriculture drainwater in the Salinas River (California, USA). *Environ Toxicol Chem* 22: 2375-2384.

25. 2004 **Phillips BM**, Anderson BS, Hunt JW, Nicely PA, Kosaka RA, Tjeerdema R. In situ water and sediment toxicity in an agricultural watershed. *Environ Toxicol Chem* 23: 435-442.

31. 2005 Anderson BS, **Phillips BM**, Hunt JW, Huntley SA, Worcester K, Richard N, Tjeerdema RS. Evidence of pesticide impacts in the Santa Maria River watershed (California, USA). *Environ Toxicol Chem* 25: 1160-1170.

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32. 2005 Wheelock C, Miller JL, Miller MJ, **Phillips BM**, Huntley SA, Gee SJ, Tjeerdema RS, Hammock BD. Use of carboxylesterase activity to remove pyrethroid-associated toxicity to *Ceriodaphnia dubia* and *Hyalella azteca* in toxicity identification evaluations (TIEs). *Environ Toxicol Chem* 25: 973-984.
33. 2006 Anderson BA, **Phillips-BM**, Hunt JW, Connor V, Richard N, Tjeerdema RS. Dose Response Identifying primary stressors impacting macroinvertebrates in the Salinas River (California, USA): relative effects of pesticides and suspended particles. *Environ Poll* 141: 402-408.
34. 2006 Hunt JW, Anderson BS, **Phillips BM**, Tjeerdema RS, Richard N, Connor V, Worcester K, Angelo M, Bern A, Fulfroost B, Mulvaney D. Spatial relationships between water quality and pesticide applications in agricultural watersheds. *Environ Monit Assess*
35. 2006 **Phillips BM**, Anderson BS, Hunt JW, Huntley SA, Tjeerdema RS, Richard N, Worcester K. Solid-phase Sediment Toxicity Identification Evaluation in an Agricultural Stream. *Environ Toxicol Chem* 25: 1671-1676.
37. 2007 **Phillips BM**, Anderson BS, Hunt JW, Tjeerdema RS, Carpio-Obeso M, Connor V. Causes of Water Column Toxicity to *Hyalella azteca* in the New River, California (USA). *Environ Toxicol Chem* 26: 1074-1079.
39. 2008 Anderson BS, **Phillips BM**, Hunt JW, Voorhees J, Clark S, Tjeerdema RS. 2008. Recent advances in sediment toxicity identification evaluation methods emphasizing pyrethroid pesticides. In: Gan J-G, Hendley P, Spurlock F, Weston D. (eds), *Synthetic Pyrethroids: Occurrence and Behavior in Aquatic Environments*. American Chemical Society Books, Washington, DC (invited).
42. 2008 Hunt JW, Anderson BS, **Phillips BM**, Tjeerdema RS, Largay B, Hanson E, Beretti M, Bern A. Use of toxicity identification evaluations in determining the pesticide mitigation effectiveness of on-farm vegetated treatment systems. *Environ Poll*. 156: 348-358.
43. 2008 Holmes RW, Anderson BS, **Phillips BM**, Hunt JW, Crane DB, Mekebri A, Blondina G, Nguyen L, Connor V. Statewide Investigation of the Role of Pyrethroid Pesticides in Sediment Toxicity in California's Urban Waterways. *Environ Sci Technol*. 42: 7003-7009.
49. 2010 **Phillips BM**, Anderson BS, Voorhees JP, Hunt JW, Holmes RW, Mekebri A, Connor V, Tjeerdema RS. The contribution of pyrethroid pesticides to sediment toxicity in four urban creeks in California, USA. *Journal of Pesticide Science*. 35: 302-309.

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50. 2011 Anderson BS, **Phillips BM**, Hunt JW, Largay B, Shihadeh R, Tjeerdema RS. Pesticide and toxicity reduction using an integrated vegetated treatment system. *Environ Toxicol Chem.* 30: 1036-1043.

52. 2012 **Phillips BM**, Anderson BS, Hunt JW, Sigler K, Voorhees JP, Tjeerdema RS, McNeill K. Pyrethroid and Organophosphate Pesticide-Associated Toxicity in Two Coastal Watersheds (California, USA). *Environ Toxicol Chem.* 31: 1595-1603.

Selected Reports

25. 2008 Anderson BS, **Phillips BM**, Hunt JW, Largay B, Shihadeh R. Effectiveness of vegetated treatment systems at reducing concentrations of pesticides associated with toxicity to aquatic organisms. Data Summary and Final Report. Central Coast Regional Water Quality Control Board, San Luis Obispo, CA.

27. 2008 Largay BG, Los Huertos M, Shihadeh R, Robins P, Beretti M, Anderson BS, **Phillips BM**, Hunt JW. Vegetated Treatment Systems at the Edge of Working Farms: A Tool to Reduce the Yield of Nutrients, Pesticides and Sediment, Monterey County, California. Central Coast Regional Water Quality Control Board, San Luis Obispo, CA.

31. 2010. Anderson BS, **Phillips BM**, Hunt JW, Siegler K, Voorhees JP, Smalling K, Kuivila K, Adams M. Watershed-Scale Evaluation of Agricultural BMP Effectiveness in Protecting Critical Coastal Habitats: Final Report on the Status of Three Central California Coastal Estuaries. California State Water Resources Control Board, Sacramento CA.

34. 2011. **Phillips BM**, Anderson BS, Siegler K, Voorhees JP, Tjeerdema RS. Optimization of an Integrated Vegetated Treatment System Incorporating Landguard A900 Enzyme: Reduction of Water Toxicity Caused by Organophosphate and Pyrethroid Pesticides. Final Report. Resource Conservation District of Monterey County and the United States Department of Agriculture Natural Resources Conservation Service and the California Department of Pesticide Regulation.

37. 2012 Anderson BS, **Phillips BM**, Siegler K, Lamerdin C, Sigala M, Fairey R, Swenson S, Ichikawa G, Bonnema A, Crane D. 2012. Connections between Land Use, Chemical Contamination and Toxicity in California Watersheds. Stream Pollution Trends (SPoT) Monitoring Program Second Report - Field Years 2009-2010. California State Water Resources Control Board, Sacramento, CA.

38. 2012 **Phillips BM**, Anderson BS, Voorhees JP, Siegler K, Jennings L, Peterson M, Larsen K, Isorena P, Tjeerdema RS. General Pesticide Permit Toxicity Study. Final Report. State Water Resources Control Board.

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
5800 S. UNIVERSITY AVENUE
CHICAGO, ILLINOIS 60637

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