

STATE OF CALIFORNIA  
**STANDARD AGREEMENT**  
 STD 213 (Rev 06/03)

AGREEMENT NUMBER <b>09-C0079</b>
REGISTRATION NUMBER

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

STATE AGENCY'S NAME

**Department of Pesticide Regulation (DPR)**

CONTRACTOR'S NAME

**The Regents of the University of California, Davis**

2. The term of this Agreement is: December 15, 2009 or upon final approval by the State, whichever occurs later through October 31, 2011

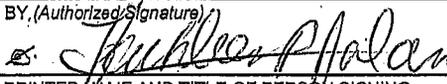
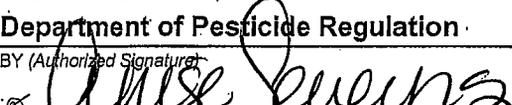
3. The maximum amount of this Agreement is: **\$50,000.00**  
**Fifty thousand dollars and no cents**

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.

<b>Exhibit A – Scope of Work</b>	6 Pages
<b>Exhibit B – Budget Detail and Payment Provisions</b>	4 Pages
<b>Exhibit C* – General Terms and Conditions (GIA 101)</b>	
<b>Exhibit D - Special Terms and Conditions</b>	1 Page

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		California Department of General Services Use Only
CONTRACTOR'S NAME (If other than an individual, state whether a corporation, partnership, etc.) <b>The Regents of the University of California, Davis</b>		
BY (Authorized Signature) 	DATE SIGNED (Do not type) <b>12-11-09</b>	
PRINTED NAME AND TITLE OF PERSON SIGNING Kathleen P. Nolan Associate Director, Sponsored Programs		
ADDRESS 1850 Research Park Drive, Suite 300 Davis, CA 95618		
STATE OF CALIFORNIA		
AGENCY NAME <b>Department of Pesticide Regulation</b>		
BY (Authorized Signature) 	DATE SIGNED (Do not type) <b>12-22-09</b>	
PRINTED NAME AND TITLE OF PERSON SIGNING Anise Severns, Fiscal Services and Business Operations Branch Chief		
ADDRESS 1001 I Street, Sacramento, CA 95814		
		<input checked="" type="checkbox"/> Exempt per: Delegation Letter 74.4

**EXHIBIT A**  
**STANDARD AGREEMENT**

**SCOPE OF WORK**

1. The Regents of the University of California, Davis, herein after referred to as Contractor, will perform sampling for in "Adaptation of innovative vegetated treatment systems and pesticide breakdown technologies to improve water quality in runoff from irrigated vegetable production" in fiscal years 2009-10 through 2011-12.
2. This Agreement will commence on the start date December 15, 2009 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 October 31, 2011.
3. The project representatives during the term of this Agreement will be:
  - A. **Kean S. Goh** shall be DPR's Contract Manager for this Agreement.
  - B. All official communications from the Contractor to DPR, shall be directed to the attention of the Contract Manager or designee at the following address and phone/fax numbers:

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

Phone (916) 324-4072; Fax (916) 324-4088

Email address: [kgoh@cdpr.ca.gov](mailto:kgoh@cdpr.ca.gov)

- C. All programmatic communications from DPR to the Contractor shall be directed to the attention of **Dr. Ron Tjeerdema** or designee at the following address and phone/fax numbers:

Dr. Ron Tjeerdema  
Department of Environmental Toxicology  
One Shields Ave  
UC Davis, CA 95616

Phone: 530-754-5192; Fax: 530-752-3394

E-mail: [rstjeerdema@ucdavis.edu](mailto:rstjeerdema@ucdavis.edu)

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- D. All administrative communications from DPR to Contractor shall be directed to the attention of **Kathleen P. Nolan, Associate Director**, at the following address:

Office of Research, Sponsored Programs  
1850 Research Park Dr., Ste. 300  
Davis, CA 95618

Phone: 530-754-8323; FAX: 530-754-8229

E-mail: [knolan@ucdavis.edu](mailto:knolan@ucdavis.edu)

- E. The project representatives during the term of this Agreement may be changed by mutual written agreement of the parties without the necessity of an amendment to the Agreement.

4. Project Background and Goals

- A. Pesticides in runoff from irrigated vegetable production have been shown to cause a range of adverse impacts to aquatic ecosystems. These include acute toxicity to aquatic organisms (Hunt et al. 2003, Phillips et al. 2004, Schulz 2004), ecological impacts to invertebrate communities (Anderson et al. 2003, 2006, Liess et al. 2005), adverse impacts on salmonids (e.g. Scholz et al. 2000), and food web magnification in fish and wildlife (e.g., Pereira et al. 1996). While water quality would be improved by eliminating use of toxic compounds, pesticides continue to be applied on most irrigated vegetable production acreage. Developing effective systems for tailwater treatment remains necessary for protecting aquatic habitats.
- B. The proposed project will develop technical specifications for conservation practices that reduce pesticide and nutrient concentrations in tailwater runoff. Two complimentary components are proposed: (1) adapting vegetated treatment systems (VTS) for use in drainage ditches to treat runoff from vegetable operations; and (2) optimizing applications of the amendment Landguard OP-A (Landguard), which breaks down organophosphate (OP) pesticides, such as diazinon and chlorpyrifos, that are difficult to remove through vegetated treatment.
- C. The first component will refine VTS design, manipulate residence times, measure pesticides, nutrients, and toxicity, and provide specifications to optimize conservation practices for grassed waterways and constructed wetlands. The second project component will develop technical guidelines for applying Landguard to break down pesticides such as diazinon and chlorpyrifos which have a low sorptive capacity and are difficult to treat in vegetated systems (Moore et al. 2008, Watanabe et al. 2001, Hunt et al. 2008). These two pesticides have been implicated as the causes of toxicity in tailwater and in aquatic habitats receiving farm runoff (Anderson et al. 2002, Hunt et al. 2003). Landguard is a soil-derived,

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freeze-dried enzyme developed in Australia and registered by the USEPA (Orica Watercare 2007).

- D. The field trials will be conducted in California's intensively cultivated Salinas Valley, but project results will be transferable to many areas of the US where water quality problems exist downstream of vegetable production. The integrated procedures for using VTS and Landguard will provide technical advisors and producers with practical, cost-effective tools for treating pesticides of greatest concern in tailwater runoff:
- E. There are three specific project objectives:
- 1) Develop specifications for grassed waterway and constructed wetland conservation practices to optimize treatment of tailwater runoff, and derive quantitative information from field trials to show the percentage reduction in pesticide and nutrient concentrations and tailwater toxicity under different runoff and hydraulic retention time scenarios.
  - 2) Develop specifications for optimal performance of Landguard to hydrolyze environmentally-relevant concentrations of diazinon and chlorpyrifos, and produce quantitative information on dosages and mixing times. Conduct field trials to verify Landguard effectiveness in drainage systems with different flow rates and pesticide concentrations.
  - 3) Transfer the resulting specifications and information in an interpretive report, at least one peer-reviewed journal article (to be published after the contract period), and presentations at producer and industry group workshops.

5. Contractor's Responsibility

A. Task 1. Optimizing Vegetated Treatment Systems and Residence Times

- 1) An on-farm vegetated ditch used in a previous study will be manipulated with low weirs and risers to create three ditch configurations having different hydraulic residence times. Measurements of pesticides, nutrients, and toxicity will be made during two (2) runoff events with each configuration. Since the real-world runoff events will produce variable flow rates, we expect six (6) total trials to result in a range of residence times, which can be plotted against pesticide reduction levels to indicate optimal system design.
- 2) For this task an existing weir will be upgraded, and a second weir installed. During each of the six (6) trials, the following measurements will be made at each of three separate stations in the system: turbidity, suspended sediment (TSS), nitrate, phosphate, chlorpyrifos and diazinon (using enzyme-linked immunosorbent assays [ELISA]), and water toxicity using the *Ceriodaphnia dubia* toxicity test, which is a standard test used to monitor water quality. During

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four (4) of the six (6) trials, pyrethroid, organophosphate (OP), and organochlorine pesticides will be measured using gas chromatograph / mass spectroscopy (GC/MS). During one (1) trial, sediments will be measured at the VTS inlet and outlet for concentrations of pyrethroid, OP, and organochlorine pesticides and toxicity, using the *Hyalella azteca* standard 10-day amphipod test. The GC/MS analyses will be performed by the Department of Pesticide Regulation and will total \$50,000.00 of in kind matching contribution towards the Department's obligations under United States Department of Agriculture Grant Agreement Number 68-9104-9-117.

**B. Task 2. Laboratory Trials to Optimize use of the Amendment Landguard OP-A**

This task is designed to determine the lowest concentration of Landguard OP-A necessary to treat the range of diazinon and chlorpyrifos concentrations characteristic of vegetable crop tailwaters. The treatment efficiency of three (3) Landguard dosages (1, 10 and 100 µg/L) will be evaluated on each of three (3) concentrations of chlorpyrifos (0.05, 0.5, and 5.0 µg/L) and diazinon (0.1, 1.0, and 10.0 µg/L) to determine the lowest dose necessary to completely hydrolyze these pesticides. These trials will be replicated three (3) times. ELISAs will be used to confirm the dosed chemical concentration and the post-treatment concentration in all trials. The third replicate trial will be accompanied by 96-hour *C. dubia* toxicity tests on the initial pesticide solutions and the treated mixtures, to confirm the elimination of toxic concentrations of both pesticides. In this trial, initial and Landguard-treated pesticide solutions will also be analyzed for diazinon and chlorpyrifos by GC/MS to confirm ELISA measurements. All of these trials will be conducted at two (2) different Landguard mixing times of one (1) and three (3) hours. The GC/MS analyses will be performed by the Department of Pesticide Regulation and will total \$50,000.00 of in kind matching contribution towards the Department's obligations under United States Department of Agriculture Grant Agreement Number 68-9104-9-117.

**C. Task 3. Verifying Effectiveness of Landguard Application Rates in Field Trials**

The optimal concentration of Landguard determined in the laboratory trials will be verified in field trials conducted at two (2) locations with different flow regimes. These will include the on-farm vegetated ditch used in the VTS evaluations described above, and one (1) larger ditch with higher flows that receive runoff from a number of large commercial operations. A Landguard dosing unit will be deployed at a station in each ditch where rating curves are established to determine discharge. Landguard application rates will be calculated to achieve the specified dose for the ambient flow, and samples will be collected from each ditch upstream of the treatment station and at a point downstream selected based on mixing time calculations. Mixing times will vary in the one (1) VTS ditch, as Landguard will be applied at the ditch inlet, and pesticide reduction will be measured after passage

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through the vegetated reach, thus providing a measurement of the combined effectiveness of an integrated VTS/Landguard system. Five (5) trials will be conducted for the large ditch, and three (3) trials for the VTS ditch, for which previous data are available. Diazinon and chlorpyrifos will be measured in each trial by ELISA and in two (2) trials by GC/MS. Water toxicity will be measured in two (2) trials. The GC/MS analyses will be performed by the Department of Pesticide Regulation and will total \$50,000.00 of in-kind matching contribution towards the Department's obligations under United States Department of Agriculture Grant Agreement Number 68-9104-9-117.

**D. Task 4. Management, Coordination, Interpretation, Reporting, Outreach**

UCD will coordinate with DPR and the Resource Conservation District (RCD) of Monterey County to manage the project, including coordination with producers, contracting, invoicing, and submitting quarterly and final reports. The project will also produce an interpretive report of all project results and at least one (1) scientific journal article (published after the contract period). Results will be presented at a minimum of four (4) meetings or workshops planned in conjunction with the agriculture industry, potentially including the Farm Bureau, the County Water Resources Agency, and the University Cooperative Extension. Members of the project team will regularly interact with representatives of agricultural industry groups.

**6. Project Timeline**

<b>Task 1</b>	<b>Vegetated Treatment System Residence Times</b>	
1.1	Install weirs, flumes, vegetation	11/09 - 02/10
1.2	Residence time trials over multiple runoff events	02/10 - 10/11
1.3	Toxicity testing and chemical analysis	02/10 - 10/11
<b>Task 2</b>	<b>Laboratory Landguard Trials</b>	
2.1	Toxicity testing and chemical analysis	11/09 - 06/10
<b>Task 3</b>	<b>Landguard Field Verification Trials</b>	
3.1	Model hydrology of ditches	12/09 - 03/10
3.2	Treatment trials of ditches	02/10 - 07/11
3.3	Toxicity testing and chemical analysis	02/10 - 07/11
<b>Task 4</b>	<b>Management, Coordination, Reporting, Outreach</b>	
4.1	Outreach presentations	07/11 - 10/11
5.1	Draft Report	09/11
5.2	Final Report	10/11

**EXHIBIT A**  
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7. DPR Responsibility

DPR will review and approve of study protocol and reports within 30 days of submission.

**EXHIBIT B**  
**Standard Agreement**

**BUDGET DETAIL AND PAYMENT PROVISIONS**

**1. Invoicing**

- A. Upon receipt and approval of invoices by the Contract Manager for services rendered, DPR agrees to compensate Contractor, in arrears, for actual allowable costs incurred. Incomplete or disputed invoices shall be returned to Contractor, unpaid, for correction.
- B. Each invoice shall be submitted in arrears, in triplicate, on the Contractor's printed letterhead identified by the Contractor's invoice control number, shall be consistent with the budget line item amounts contained in Item 4 of this Exhibit, and shall contain the following information:
  - 1) The Agreement number (09-C0079);
  - 2) The dates or time period during which the invoiced costs were incurred;
  - 3) Expenditures for the current invoice and cumulative expenditures to date; and,
  - 4) The signature of an authorized representative of the Contractor.
- C. Invoices shall be submitted to:

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

- D. The invoice containing the final costs to be paid by DPR shall be identified as the "final invoice." The final invoice shall be delivered to DPR not more than thirty (30) calendar days following the expiration of this Agreement. Payment of the final invoice shall be based upon completion of the following:
  - 1) Satisfactory completion of this Agreement;
  - 2) Compliance with Contractor's Responsibilities and milestones as detailed in Exhibit A of this Agreement; and,
  - 3) Submittal to the Contract Manager of all reports and documentation required in this Agreement.

**EXHIBIT B**  
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**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.
- 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 \$1,000.00 will be supported by a photocopy of the original documentation. Documentation in support of expenditures less than \$1,000.00 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 the satisfactory completion of this Agreement.

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**4. Rates**

Rates for services in this Agreement are as follows:

**Table I – Budget Line Items**

	Total Amount
1. Salaries & Wages	\$ 22,138
2. Benefits ① 44%	\$ 9,740
3. Travel ②	\$ 350
4. Supplies③	\$ 11,250
5. Contractual	\$ 0
6. Minor Equipment④ or Equipment	\$ 0
7. Indirect Costs⑤ 15%	\$6,522
<b>Total Amount</b>	<b>\$50,000</b>

① Benefits include: Worker's Compensation and other benefits appropriate for title

(NOTE: Student Interns are non-personnel employees with no benefits and shall be excluded from the percentage calculation of this line item.)

② Travel includes: Invoice for payments on travel shall be based on current University of California rates and guidelines.

③ Supplies include: copying service, field sampling supplies, lab supplies and reagents.

④ Minor Equipment: line item does not include any equipment with a unit acquisition of \$5,000 or more. If over 5,000 then line item must be identified as "Equipment" line item and Exhibit E will require special language.

⑤ Indirect Costs: includes depreciation of buildings and equipment, utility consumption, operations and maintenance costs, administrative services provided at the departmental and central level, and library costs.

Note: GC/MS analyses will be performed by the Department of Pesticide Regulation and will total \$50,000.00 of in kind matching contribution towards the Department's obligations under United States Department of Agriculture Grant Agreement Number 68-9104-9-117.

**EXHIBIT B**  
**Standard Agreement**

**Table II - Personnel Services Cost Detail**

Personnel	Monthly Salary	Number of Months	Percentage Of Time	Total Amount
Brian Anderson (Specialist)	\$9,211	10	12.795%	\$11,786
Bryn Phillips (Specialist)	\$8,138	9	14.134%	\$10,352
<b>Total Personnel</b>				<b>\$22,138</b>
<b>Benefits</b>				
Brian Anderson (Specialist) 44%				\$5,185
Bryn Phillips (Specialist) 44%				\$4,555
<b>Total Benefits</b>				<b>\$ 9,740</b>
<b>Total Personnel and Benefits</b>				<b>\$31,878</b>

**5. Cost Limitation**

- A. The total amount of this Agreement shall not exceed \$50,000.00.
- 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 thirty (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 the 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.