STATE OF CALIFORNIA
DEPARTMENT OF PESTICIDE REGULATION
DPR-017 (Rev. 2/11) PAGE 1 OF 2

REQUEST FOR CONTRACT ACTION

Completed form with original signature must be submitted for processing.
Detailed instructions on reverse side.

IF AMENDING, INCLUDE CONTRACT #		CONTRACT OFFICE USE ONLY	
CONTRACT/SOLICITATION NO.	AMEND. NO.	DATE RECEIVED	CONTRACT ANALYST
14-C0102	A-	2015 MAR -6 PM 4:06	TH

DEPT. OF PESTICIDE REGULATION
CONTRACTS & PROCUREMENT

SECTION A – REQUESTING OFFICE/BRANCH INFORMATION

1. OFFICE/BRANCH	2. NAME OF PROGRAM	3. DGS BILLING CODE
Environmental Monitoring	Surface Water	11039

4. CONTRACT MANAGER *(will also be identified in the contract)*	PHONE NO.	FAX NO.
Michael Ensminger	916-324-4186	916-324-4088

SECTION B – CONTRACTOR INFORMATION / SOLICITATION YES NO

1. CONTRACTOR'S LEGAL NAME / TO BE DETERMINED	2. FEDERAL I.D. NO. (OR SSN #)	
The Reagents of the University of California, on behalf of its Riverside campus	95-6006142	
3. CONTRACTOR'S STREET ADDRESS, CITY, STATE, ZIP	PHONE NO.	FAX NO.
200 University Office Building, Riverside, CA 92521-0217	951-827-5535	951-827-4483
4. NAME AND TITLE OF AUTHORIZED PERSON TO SIGN AGREEMENT	5. E-MAIL ADDRESS(S)	
Robert Chan, Sr. Contract & Grant Officer	robert.chan@ucr.eud	
6. NAME AND TITLE OF CONTACT PERSON	PHONE NO.	FAX NO.
Dr. Les Greenberg, Specialist IV	951-827-3217	951-827-3086

SECTION C – NEW CONTRACT REQUEST INFORMATION

1. REQUESTED CONTRACT TERM: *If term is longer than 12 months attach a brief justification why.*
START DATE: 5/1/2015 "or upon final approval which ever occurs later, through" END DATE: 4/15/2017

2. DOES A CURRENT OR PREVIOUS CONTRACT EXIST FOR THIS/THESE SERVICE(S)?
☒ No ☐ Yes- If yes, provide contractor's name and contract number:

3. TYPE OF CONTRACT? ☒ INTERAGENCY AGREEMENT ☐ CONTRACT WITH LOCAL GOVERNMENT ☐ REIMBURSEMENT CONTRACT ☐ SERVICE
☐ MEMORANDUM OF UNDERSTANDING (zero dollars) ☐ FEDERAL GRANT AGREEMENT ☐ SERVICE ORDER ☐ PRINTING (submit with completed STD 67)
☐ SUBVENTION/LOCAL ASSISTANCE - Site Regulation: _____

4. IF WORK ISN'T BEING PERFORMED BY STATE EMPLOYEE (CIVIL SERVENT), ATTACH COMPLETED DPR-076 JUSTIFICATON WORKSHEET SHOWING JUSTIFICATION FOR CONTRACTING OUTSIDE OF STATE CIVIL SERVICE (GC 19130).

5. IS THIS A NON-COMPETITIVE BID (NCB) REQUEST? If so, attach the completed NCB request form along with all supporting documentation. (see instructions)
No

6. BRIEF DESCRIPTION OF CONTRACT SERVICES. *Attach a copy of the scope of work, how the price was determined to be reasonable, budget, milestones, and other exhibits, as needed.*
Effect of application spray method (pin stream, crack and crevice) on fipronil runoff and ant efficacy

SECTION D – AMENDMENT REQUEST INFORMATION

1. AMENDMENT ACTION: ☐ EXTEND CONTRACT TERM THROUGH _____ ☐ SCOPE OF WORK REVISION ☐ MILESTONE REVISION
☐ BUDGET REALIGNMENT ☐ INCREASE AMOUNT: _____ ☐ DECREASE AMOUNT: _____

2. REASON FOR AMENDMENT: *Explain **WHY** the amendment is needed and attach revised scope of work, milestones, budget and other exhibits, as applicable.*

SECTION E – PAYMENT TERMS AND PROJECTED EXPENDITURES

1. PAYMENT TERMS – *More than one may apply:* ☐ MONTHLY FLAT RATE ☒ QUARTERLY ☐ ONE-TIME PAYMENT ☐ PROGRESS PAYMENT *(by task)*
☐ LUMP-SUM PAYMENT *(used for IA's with other state agency's only)* ☒ ITEMIZED INVOICE ☐ REIMBURSE/REVENUE
☒ 10% WITHHOLD (10% OF EACH INVOICE) ☐ ADVANCED PAYMENT– statutory authority required ☐ FEDERALLY FUNDED – attach copy of federal agreement.

2. PROJECTED EXPENDITURES – *If multi-year term, identify FY budget breakdown. Attach additional sheet, if necessary.*

FY	INDEX	PCA	OBJECT	AMOUNT
14/15	1901	70000	382.01	~~$149,919~~ 149,991
				$0
				$0

3. OPTIONAL USE	4. ESTIMATED AGREEMENT AMOUNT:	~~$149,919~~ 149,991

SECTION F – SIGNATURE APPROVALS

1. CONTRACT MANAGER	DATE	2. AA INITIALS	3. BRANCH CHIEF	DATE
Michael Ensminger	3/6/2015	JM	[signature]	3-6-15

SECTION G – CONTRACT AWARD INFORMATION – *CONTRACT OFFICE Use Only*

1. AWARD DATE	2. AWARDEE	3. FEDERAL ID NO.
4. CONTACT PERSON	5. ADDRESS	PHONE NO.

6. **ACTUAL** AWARD AMOUNT $	7. CONTRACT OFFICER	DATE
8. BUDGET OFFICE [signature]	DATE 04.22.15	9. PERSONNEL OFFICE (If Applicable)	DATE

INSTRUCTIONS FOR REQUEST FOR CONTRACT ACTION (DPR-017)

SECTION A - REQUESTING OFFICE/DIVISION INFORMATION

1. **OFFICE/BRANCH:** The name of the office or branch requesting the contract (e.g., Enforcement Branch or Executive Office).

2. **NAME OF PROGRAM:** Program name for which the services will be performed (e.g., Compliance and Investigation or Office of Legal Affairs).

3. **DGS BILLING CODE (Required):** The five-digit Department of General Services Billing Code of the Office requesting the contract. If unsure, review coding manual or contact the Budget Office.

4. **CONTRACT MANAGER, PHONE NO. AND FAX NO.:** The name and numbers of the person who will be identified in the contract as the contact person on behalf of the state. This person should be able to respond to inquiries from the contract office regarding the requested DPR-017 and any supporting documentation. Person is responsible for managing the contract, communicating with the Contractor, approving all invoices and closing the contract in a timely manner.

SECTION B - CONTRACTOR INFORMATION

1. **CONTRACTOR'S LEGAL NAME:** Provide the full LEGAL business name of the Contractor. If this is a solicitation, circle "SOLICITATION" and leave the remainder of Section B blank.
2. **FEDERAL I.D. NO. (OR SOCIAL SECURITY NUMBER [SSN]):** The Contractor's federal identification number is required for tax purposes. If the Contractor does not have a federal identification number, a social security number must be entered.
3. **Contractor's Mailing Address, City, State, Zip:** THE ADDRESS MUST BE THE ACTUAL business address for delivery of correspondence. A P.O. Box can be used as an alternative address.
4. **NAME AND TITLE OF AUTHORIZED PERSON TO SIGN AGREEMENT:** Provide accurate information of person identified and designated by the Contractor.
5. **E-MAIL ADDRESS:** Provide e-mail address of person authorized to sign the agreement.
6. **NAME AND TITLE OF CONTACT PERSON & PHONE & FAX NUMBERS:** The contact person should be able to respond to inquiries on behalf of the Contractor, unless specified otherwise.

SECTION C – NEW CONTRACT REQUEST INFORMATION

1. **REQUESTED CONTRACT TERM:** Enter the requested start and end dates of the contract. Department policy dictates no contract shall be effective until final approval is obtained; therefore, the start date identified here is an **anticipated** start date only. For all contracts (regardless of contract type) approximately **6-8 weeks** must be allowed for development, processing and final approval. The Scope of Work, Budget, Milestones, and all other required contract information must be submitted with this form when submitted to the contracts office for processing. **NOTE**: If the term exceeds 12 months, provide a brief justification identifying the business reason for a longer term.
2. **DOES A CURRENT OR PREVIOUS CONTRACT EXIST FOR THIS SERVICE?** If the requested contract action is to replace an existing contract upon its expiration, include the contract name, number, address, and previous contract number.
3. **TYPE OF CONTRACT:** Check the appropriate box. • **Interagency Agreement** - a contract between two or more state agencies and are exempt from bidding per SCM 5.80 (CG § 14825 et seq.; PCC § 13040 – attach reasonableness of rate justification. • **Contract with Local Government** - a contract with public entity i.e. a county, city, district, or other local public body, state board, state commission, federal agency or joint powers authority • **Reimbursement** – a contract between the state and a public entity, in which the state is providing services and receiving payment for the services. • **Memorandum of Understanding** - a non-financial form of contract to deliver program services or for an administrative mechanism binding one or more parties. • **Service Order** - is used to request a one time service of $5,000 or less. • **Subvention** - an agreement that is financed from the local assistance portion of the budget, including those agreements providing assistance to local governments and aid to the public directly through an intermediary. • **Service** - contractor is providing a service or performing a task including a service contract of an advisory nature that provides a recommended course of action or personal expertise and possesses no authority with respect to any Agency decision beyond the rendition of information, advice, recommendation or counsel. Note: Consultant type contracts must provide a current resume for each contract participant with a major administrative, policy or consultant role. • **Printing Services** – these services must be procured through the Office of State Publishing (OSP). Request should be submitted with a completed Std 67 Publishing Order form and submit with any other supporting documentation.
4. **GC § 19130:** Requires contracting to be limited to those services that cannot be performed by civil service employees. Each and every contract entered into unless exempt by statute must be justified under GC 19130(a) or (b) justification worksheet (DPR076 CG 19130 worksheet justification form) and must be submitted with this form. For a copy of the worksheet go to: http://admin/docs/forms/formslib.htm

5. **NCB REQUEST: A Non-Competitively Bid Justification Request** - is required when it's been determined there is only one source that can provide the desired services. Attach a completed NCB justification form to the DPR-017B for initial review and approval. The contract office will prepare the Std. 821 and forward to DGS PD for final approval. For a copy of the worksheet go to: http://www.documents.dgs.ca.gov/pd/poliproc/ncbcj122007.doc

SECTION C - CONTRACT INFORMATION (continued)

6. **BRIEF DESCRIPTION OF CONTRACT SERVICES:** Describe the purpose of the contract and the work to be performed.

SECTION D – AMENDMENT REQUEST INFORMATION

1. **AMENDMENT ACTION:** Check the appropriate box.

2. **REASON FOR AMENDMENT:** Give a brief explanation as to why contract is being amended. Attach revised exhibits/contract information and submit with the DPR-17.

SECTION E - PAYMENT TERMS AND PROJECTED EXPENDITURES

1. **PAYMENT TERMS:** Check the appropriate box. Payment term selected will be identified in the contract and will detail payment method for services.

2. **PROJECTED EXPENDITURES:** Identify the contract funding information in the designated boxes. If the contract term covers multiple fiscal years, identify funding for each FY. The Branch Chief signing the DPR-017 (Section F-4) is responsible for ensuring accurate coding is used. To view DPR's Coding Manual go to: http://admin/docs/accounting/coding_manual.htm
   FUND TITLE: Represents a specific program/project used within DPR. If various funding is used see 3 below for optional use.
   ITEM: Example 3930-001- 0106 (0106 represents Pesticide Regulation Fund and 0890 represents Federally funded contracts.)
   FY - Fiscal Year(s): Enter the fiscal year(s) from which the funding will be encumbered.
   INDEX: Represents a DPR program.
   PCA: The Program Cost Accounts code is used to track expenditures against applicable program's budgeted authority.
   OBJECT CODE: Enter the object code that represents the type of services we are receiving under the requested contract action.
   AMOUNT: Indicate total amount(s) per line.

3. **OPTIONAL USE**: FY funding may be divided among various funding sources. Enter the fiscal year, agency code, reference number, fund number, and dollar amount (i.e., 07/08-3930-001-0106 - $25,000 & 08/09-3930-001-0106 $23,000). If needed attach an additional spreadsheet to show cost breakdowns. Note if Various funding is used – state: "Funding for this project will be based on the use of various PCA codes – invoices received will be charged to the appropriate individual programs within the department."

4. **ESTIMATED AGREEMENT AMOUNT:** Enter the total amount of the agreement, if known. If a solicitation will be conducted, enter the **estimated** agreement amount.

NOTE: Fiscal Year Expenditure Codes are distributed annually (approximately September/October) to all Managers and Supervisors. Accuracy of contract funding information is imperative. Consult the Budget Office and, if necessary, the Accounting Office for assistance.

SECTION F – SIGNATURE APPROVALS: If appropriate signatures are not obtained, this request will be returned for completion.

1. **CONTRACT MANAGER & DATE:** Contract manager's signature represents approval to enter into the contract and that all information on the DPR-017 is accurate and in accordance with current program policy.

2. **AA INITIALS:** The administrative assistant's (AA) initials indicate that the AA has verified, at the branch level, that the funds are available for this contract request.

3. **BRANCH CHIEF'S SIGNATURE & DATE:** The Branch Chief's signature signifies his/her approval to enter into the contract.

SECTION G – TO BE COMPLETED BY CONTRACT OFFICE ONLY

ROUTING INSTRUCTIONS

Step 1 - PROGRAM:	Step 2 - CONTRACT OFFICE:
1 – Contract Manager	5 – Business Services Manager
2 – AA	6 – Contract Analyst
3 – Branch Chief	7 – Budget Office
4 – Business Services Office	8 – Personnel Office, if applicable

EXHIBIT A
STANDARD AGREEMENT

SCOPE OF WORK

1. This Agreement is between the Regents of the University of California, UC Riverside (UCR) through Drs. Les Greenberg (PI), Michael K. Rust (co-PI), and Dong-Hwan Choe (co-PI), Department of Entomology, and Dr. Jay Gan (co-PI), Department of Environmental Sciences, hereinafter referred to as Contractor, and the Department of Pesticide Regulation (DPR), hereinafter referred to as DPR.

2. This Agreement will commence on the start date May 01, 2015 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 the approval of the Agreement and before receipt of notice to proceed by the Contract Manager. This agreement shall expire on April 15, 2017. 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, **Michael Ensminger,** Ph.D., or designee at:

   Department of Pesticide Regulation
   Environmental Monitoring Branch, MS 3-B
   1001 I Street
   P.O. Box 4015
   Sacramento, CA 95812-4015
   Phone 916-324-4186; Fax (916) 324-4405
   Email address: mensminger@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. Les Greenberg** or designee at:

   Dr. Les Greenberg
   Department of Entomology, UC Riverside, CA 92521
   Phone: 951-827-3217; Fax: (951) 827-3086
   Email: Les.greenberg@ucr.edu

EXHIBIT A
STANDARD AGREEMENT

D. All fiscal communications from DPR to Contractor shall be directed to:

Mark Carr, Extramural Funds Supervisor
Regents of the University of California,
Riverside Accounting Office - 002 Riverside, CA 92521
Phone: (951) 827-3303; Fax: (951) 827-3314
Email Address: mark.carr@ucr.edu

E. 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. Contractors Responsibilities:

A. Background and Goals

Recent monitoring has shown that California urban creeks are commonly contaminated with numerous urban-use pesticides. Creeks may become contaminated during irrigation or storm water runoff. Insecticides in these waters are a concern due to their high level of potential toxicity to aquatic organisms. As chlorpyrifos and diazinon urban use, and corresponding detections in urban surface waters have decreased, an increase in pyrethroids, fipronil, and imidacloprid use and detections in urban surface waters has occurred. Fipronil has become increasingly scrutinized as more and more research has shown that fipronil, and fipronil degradates, are frequently detected in urban surface waters at concentrations that are potentially toxic to sensitive aquatic organisms. Mechanisms by which fipronil enter urban waters are not well understood; management practices aimed at reducing fipronil runoff via reducing use and subsequent effect on bioefficacy are also not well understood. Some recent work has shown that fipronil runoff from urban homes may be mitigated by restricting where it is applied (e.g., limiting foundation applications at the garage door/driveway interface) or by altering how it is applied (using pin stream or crack and crevice applications), but data is limited due to difficulties in obtaining large sample sizes with *in situ* (on-site) home studies and/or producing replicated studies.

Additional research on fipronil urban runoff (how it occurs, best management practices to reduce or prevent runoff, and effect of these best management practices on ant [and other insect pest] bioefficacy) is needed. Especially important is obtaining sufficient sample size or conducting research studies under controlled conditions with replicated data to allow for statistical analysis with sufficient power to make results meaningful. The goals of this work are to further characterize various mitigation methods aimed at reducing the total amount of fipronil that runs off urban homes into urban waters. For mitigation methods that reduce or alter the amount of fipronil applied, a corresponding effect on control will also be investigated.

EXHIBIT A
STANDARD AGREEMENT

B. Work to Be Performed

Overview: The Contractor will perform research to evaluate fipronil runoff in two different trial settings, with the goal of determining application methods to reduce fipronil runoff into surface waters while maintaining bioefficacy. The contractor will conduct two different types of trials:

1. Initial or "screening" trials. The contractor will evaluate fipronil runoff from a constructed wall with an abutting sloping cement pad ("fabricated wall"). The wall and pad are designed to simulate a house and adjacent concrete driveway which would normally carry runoff to the street. The contractor will evaluate numerous methods to reduce fipronil runoff. (Task 1)
2. Secondary or "on-site" trials. From the two most likely or promising screening trials (at a minimum), the contractor will conduct research at individual homes in the Riverside area. Fipronil runoff and ant bioefficacy will be determined. (Task 2)

Task 1. Field Trials on Fabricated Wall

Using the fabricated wall constructed under contract 11-C0086, the contractor will conduct replicated trials to characterize the runoff of fipronil using different application methods. The trials will meet the following guidelines. The contractor will:

1) Use experimental application methods described below (see Application methods);
2) Use irrigation practices typical of urban homes in the Riverside area to generate runoff;
3) Collect runoff at the end of the concrete pad;
4) Quantify the amount and/or concentration of fipronil and fipronil breakdown products (sulfone, sulfide, amide, desulfinyl) in the runoff water;
5) Compare experimental applications to the standard California labelled application method (application to foundations 12 inches up [horizontal] and 12 inches out [vertical]); and
6) Perform sufficient replication to allow for statistical analysis with sufficient power to make results meaningful.

Application methods

To reduce fipronil runoff, specifically, the contractor will use the following reduced application methods:

1) Pin stream application (spray swath 1 inch or less);
2) Crack and crevice application (application of small amounts of insecticide directly into cracks and crevices in which insects hide or through which they may enter the building);
3) No/reduced applications to the garage door/driveway interface (will also include crack and crevice application); and

EXHIBIT A
STANDARD AGREEMENT

4) Other management tools and strategies to reduce the amount of fipronil runoff (as spot treatments [not to exceed 2 square feet], chemical baits, natural products, botanicals, or other practices to reduce the total mass of fipronil applied). Other management strategies cannot include the use of pyrethroid or organophosphate insecticides as an alternative insecticide. Any insecticide products used in conjunction with fipronil sprays (to reduce the amount of fipronil applied) have to be California registered products for use in or around urban homes.

For definitions of application methods, the contractor will use Title 3, California Code of Regulations and the DPR Enforcement Compendium found at http://www.cdpr.ca.gov/docs/enforce/compend.htm, http://www.cdpr.ca.gov/docs/enforce/compend/vol_8/pestlaw.htm), http://www.cdpr.ca.gov/docs/legbills/calcode/010101.htm#a6000 and http://www.cdpr.ca.gov/docs/legbills/calcode/040501.htm#a6970.

Fipronil application reductions
Based on the California label for fipronil, for application of Terrmidor® SC Termiticide/Insecticide or Taurus® SC Termiticide/Insecticide (referred to as "formulated fipronil") to kill and provide residual control of ants along foundation perimeters, a 0.06% solution of formulated fipronil is made by adding 0.8 fluid ounces (fl oz.) into 1 gallon of water. One gallon of water can treat up to 320 linear feet, one foot up and one foot out from where the ground meets the foundation.

Application methods utilizing pin stream or crack and crevice applications would generally be thought to reduce the total mass of fipronil applied in an area. Using the same application pressure and walking pace as per the current California label, for 320 linear feet, a professional applicator would apply 1 gallon of formulated fipronil containing 0.8 fl oz. of formulated fipronil. Using a 2 inch pin stream application (1 inch up and 1 inch out) for 320 linear feet, a professional applicator would only apply 1/12 of a gallon (10.7 oz.). However, a professional applicator could also apply the current labelled rate (1 gallon of 0.06% formulated fipronil) using a pin stream or crack and crevice application to 320 linear feet by increasing spray pressure, reducing the walking pace, or repeatedly spraying the area. Therefore, especially for pin stream applications in this contract as indicated in Application methods above, the contractor will use both methods (reduced fipronil mass, same [or similar] fipronil mass applied as allowed under the current label). The contractor will be limited to using a 0.06% spray dilution per the California label; higher concentrations that are not labelled for California will not be used in these studies.

EXHIBIT A
STANDARD AGREEMENT

Task 2. Riverside on-site home study

Based on the results of the screening trials in Task 1, the contractor will conduct on-site research trials at homes in the Riverside area to determine how changing application methods affect fipronil/degradate runoff and ant bioefficacy. Specifically, the contractor will:

1) Select a minimum of two promising application methods to reduce fipronil runoff from the experimental trials conducted in Task 1;
2) Attempt to generate runoff under two different event types:
    a. Mimic rain events, by using water from a hose to generate runoff;
    b. Mimic dry-season runoff, by using the home's irrigation system;
3) Collect runoff water in the street coming from each individual home;
4) Analyze the runoff water for fipronil and degradates; and
5) Determine what affect the application method has on ant control.

Task 3. Reporting

The contractor will:

1. Compare the concentration of fipronil and fipronil degradates (where they exist) in the runoff water to US EPA Aquatic Life Benchmarks and to a sensitive aquatic species (as *Chironomus dilutus* EC_{50} values);
2. Provide two annual update reports at year end (Dec 2015, Dec 2016);
3. Present one seminar to DPR, nearer to the end of the study. The seminar can be presented at DPR in Sacramento, CA or at a DPR-sponsored conference (agreed upon by the Contractor and by the DPR Contract Manager);
4. Submit a final report of the study results to DPR 15 days before completion of the contract.

TIMELINE and TASKS (Table 1)

1. Summer 2015 – Summer 2016. Conduct replicated, field insecticide runoff trials on fabricated wall;
2. Spring 2016 – Fall 2016. Riverside home trials. Conduct trials at homes in Riverside area;
3. Year-end reports. Fall 2015; Fall 2016
4. Seminar and Final Report. Winter, spring 2017

EXHIBIT A
STANDARD AGREEMENT

Table I - Task list.

	FY 2014/ 15	FY 2015-2016				FY 2016-2017			
Year:	2015			2016				2017	
Activities/Tasks	Spring	Sum-mer	Fall	Win-ter	Spring	Sum-mer	Fall	Win-ter	Spring
1.Runoff characterization – field trials with constructed wall[1]		X	X	X	X	X			
2. Riverside home-sites trials					X	X	X		
3. Reporting									
3a. Year-end status reports			X				X		
3b. Seminar to DPR								X	X
3c. Final report									X

5. DPR's Responsibility:

A. Provide review and approval of study report within 30 days of submission.

B. Arrange a room for a seminar given at DPR in Sacramento, CA

EXHIBIT B
STANDARD AGREEMENT

Estimated Costs

A. Estimated Costs for these services are as follows:

Table I - Expenditures by Budget Line Item

BUDGET ITEM	TOTAL CONTRACT BUDGET
Salaries & Wages	$76,067
Direct Benefits	$37,426
Travel	$5,000
Supplies & Materials[1]	$1,442
Subtotal	$119,935
Indirect Costs, 25%	$29,984
Total Cost	**$149,919**

[1]Includes cost for solvents, chemicals, pesticides, glassware, safety items (per pesticide label)

Table II - Details on Personnel Costs

Researcher	Time	Cost
Les Greenberg, PI	Total: 8.4 months	$65,035
Fringe Benefits		$31,868
Post-doctoral fellow	Total: 2 months	$8,032
Fringe benefits		$4,658
Assistant/Technician	Total: various	$3,000
Fringe Benefits		$900
Total Personnel		**$113,493**

EXHIBIT B
STANDARD AGREEMENT

Table III - Details by Fiscal Year.

ITEM	2014/15 FY	2015/16 FY		2016/2017 FY	TOTAL
Personnel	5/1/15-6/30/15 (2 months)	7/1/15-6/30/16 (12 months)		7/1/16-4/15/17 (9.5 months)	
PI or co-PI					
Monthly salary	$ 7,784	$ 7,784		$ 7,784	
Effort	25%	25%	55%	29%	
Months	2	5	7	9.5	
Total Effort (months)	0.5	1.25	3.85	2.76	8.36
Salary	$ 3,892	$ 9,730	$29,968	$ 21,445	$ 65,035
Benefits @ 49%	$ 1,907	$ 4,768	$14,685	$ 10,508	$ 31,868
Post-doctoral fellow					
Monthly salary	$ 4,016	$ 4,016		$ 4,016	
Effort	0%	100%		0%	
Months/Total Effort	0	2		0	2
Salary	$ 0	$ 8,032		$ 0	$ 8,032
Benefits @ 58%	$ 0	$ 4,658		$ 0	$ 4,658
Assistant/Technician					
Salary	$ 0	$ 3,000		$ 0	$ 3,000
Benefits @ 30%	$ 0	$ 900		$ 0	$ 900
TOTAL Personnel	**$ 5,799**	**$ 75,741**		**$ 31,953**	**$ 113,493**
Materials and Supplies[1]	$ 500	$ 500		$ 442	$ 1,442
Travel	$ 500	$ 4,000		$ 500	$ 5,000
SUBTOTAL	$ 6,799	$ 80,241		$ 32,895	$ 119,935
Indirect Costs @ 25%	$ 1,700	$ 20,060		$ 8,224	$ 29,984
TOTALS	**$ 8,499**	**$ 100,301**		**$ 41,119**	**$ 149,919**

[1]Includes cost for solvents, chemicals, pesticides, glassware, safety items (per pesticide label).

EXHIBIT F
STANDARD AGREEMENT

Les Greenberg
Specialist IV
Entomology

Department of Entomology
College of Natural and Agricultural Sciences
University of California
Riverside, CA 92521
951.827.3217
les.greenberg@ucr.edu

Education

PhD Entomology 1981, University of Kansas

MA Biology 1975, City College, NY

BS Biology 1967, Brooklyn College

Research Area

Red imported fire ant research and extension program for UC Riverside since the arrival of the pest in California in 1988. Control of Argentine ants and red imported fire ants in urban and agricultural environments. Research in methods to improve monitoring for fire ants and to find replacements for organophosphates and other pesticides that are contaminating runoff water as well as the use of liquid sugar water baits in bait stations. Evaluation of newer pesticides and biocontrol agents that are not yet available in California. Other research involves studying flight behavior of the red imported fire ant in California, both in the laboratory and the field. Recent projects included studying the Sex pheromone of the slave making ant, *Polyergus breviceps*.

Selected Publications

Greenberg, L., Tollerup, K., and Rust, M. K. In press 2013. Control of Argentine ants (Hymenoptera: Formicidae) in citrus using methoprene and imidacloprid delivered in liquid bait stations. Florida Entomologist.

Greenberg, L., M. K. Rust, J. H. Klotz, D. Haver, J.N. Kabashima, S. Bondarenko, and J. Gan. Impact of ant control technologies on insecticide runoff and efficacy. 2010. Pesticide Science. DOI 10.1002/ps.1970.

Costa, H.S., L. Greenberg, J.H. Klotz, and M.K. Rust. 2005. Response of Argentine ants and red imported fire ants to permethrin-impregnated plastic strips: foraging rates, colonization of potted soil, and differential mortality. J. Econ. Entomol. 98(6): 2089-2094

Greenberg, L., A. Aliabadi, S. McElfresh, H. Topoff and J. Millar. 2004. Sex pheromone of the slave-making ant, *Polyergus breviceps*. J. Chem. Ecol. 30(6): 1297-1303.

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Klotz, J.H., M.K. Rust, D. Gonzalez, L. Greenberg, H. Costa, P. Phillips, C. Gispert, D.A. Reierson and K. Kido. 2003. Directed sprays and liquid baits to manage ants in vineyards and citrus groves. J. Urban and Agricultural Entomology. 20: 31-40.

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Klotz, J.H., K. Jetter, L. Greenberg, J. Hamilton, John Kabashima and D.F. Williams. 2003. An insect pest of agricultural, urban and wildlife areas: The red imported fire ant. *In:* Exotic Pests and Diseases: Biology and Economics for Biosecurity. Daniel A. Sumner, editor. Iowa State Press, pp. 151-166.

Costa, H., L. Greenberg, J. Klotz, and M.K. Rust. 2001. Monitoring the effects of granular insecticides for argentine ant control in nursery settings. J. Urban and Agricultural Entomology. 18: 13-22.

Klotz, J.H., L. Greenberg, C. Amrhein and M.K. Rust. 2000. Toxicity and repellency of borate-sucrose water baits to Argentine ants (Hymenoptera: Formicidae). J. Economic Entomol. 93: 1256-1258.

Klotz, J.H., L. Greenberg and G. Venn. 2000. Evaluation of two hydramethylnon granular baits for control of Argentine ants (Hymenoptera: Formicidae). Sociobiology 36: 201-107.

Greenberg, L. and J.H. Klotz. 2000. Argentine ant trail pheromone enhances consumption of liquid sucrose solution (Hymenoptera: Formicidae). J. Economic Entomol. 93: 119-122.

Greenberg, L., J. Kabashima, J.H. Klotz and C. Wilen. 1999. The red imported fire ant in California. Pacific Coast Nurseryman. 58: 69-73.

Klotz, J.H., L. Greenberg, B.L. Reid and L. Davis, Jr. 1998. Spatial distribution of colonies in three carpenter ants, *Camponotus pennsylvanicus*, *C. flordanus*, and *C. laevigatus* (Hympenoptera: Formicidae). Sociobiology. 32: 51-62.

Klotz, J.H., L. Greenberg and E.C. Venn. 1998. Liquid boric acid bait for control of argentinue ants (Hymenoptera: Formicidae). J. Economic Entomol. 91: 910-914.

Klotz, J.H., L. Greenberg, H.H. Shorey and D.F. Williams. 1997. Alternative control strategies for ants around homes. J. Agric. Entomol. 14: 249-257.

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Professor of Entomology

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Education

PhD Entomology 1975 University of Kansas

M MA Entomology 1973 University of Kansas

BA Biology 1970 Hiram College, Ohio

Research Area

Urban entomology is the study of insects and arthropods associated with people in cities. At UC Riverside, the goals are to explore the basic biology of pests that attack stored foods, museum objects, fiber, structures, and pets and to develop integrated pest management strategies. Students conduct research on the biology and control of ants, cockroaches, fleas, yellowjackets, and termites, which represent the major economic pests in urban settings worldwide. In recent years, there has been an increasing awareness and

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interest in the use of alternative pest control technologies that reduce the amount of insecticide used. Ongoing projects include the use of baits to control ants in urban and agricultural areas, baiting and soil treatments to control subterranean termites, nutrient dynamics and food flow in subterranean termite and ant colonies, and the development of IPM programs to control yellowjackets. Recent studies conducted by our students include the response of ants to barrier treatments, nutrient and bait dynamics in ant and termite colonies, physiological ecology of drywood termites, insecticide resistance in cat flea populations, and interactions between ants and dead nestmates (necrophoresis). Our approach to urban pest management has always emphasized innovative and creative research. Student research topics balance both basic and applied aspects, ensuring maximum exposure and training to the field of urban entomology. We explore conventional as well as novel methods of pest management emphasizing the reduction in the use of pesticides. Little is known about the biology and ecology of most major urban insect pests. The urban pest management practices of the future have yet to be exploited.

Awards

2010 Entomological Society of America, Pacific Branch, Integrated Pest Management Team Award

2008 - Entomological Society of America Recognition Award in Entomology, Pacific Branch

2007 - Pest Control Hall of Fame

2002 - PCT/Zeneca Leadership Award

2002 - PCT/Syngenta Leadership Award

2002 Fellow of the American Association for the Advancement of Science

2000 - Pest Control Technology's 25 Most Influential People in the Industry

2000 - Mallis Recognition Award, National Conference on Urban Entomology

1999-2000 - UC Presidential Scholar in Entomology

1999-2001 - Presidential Chair in Entomology

1995 - Book of Professional Services Award Pi Chi Omega

1995 - Excellence in Entomology Award -California Association, American Registry of Professional Entomologists

1994 W. W. Woodworth Award, Pacific Branch, Entomological Society of America

1993 Distinguished Achievement Award in Urban Entomology, Entomological Society of America

1990, 1995, 1997 - Orkin Research Award

1990, 1991, 1993 - Outstanding Urban Entomologist Award, Pacific Branch, Entomological Society of America

Publications

Greenberg, L., M. K. Rust, J. H. Klotz, D. Haver, J.N. Kabashima, S. Bondarenko, and J. Gan. Impact of ant control technologies on insecticide runoff and efficacy. 2010. Pesticide Science. DOI 10.1002/ps.1970.

Choe, D-H., Rust, M.K. 2008, Horizontal transfer of insecticides in the laboratory colonies of the Argentine ant (Hymenoptera). J. Econ. Entomol. 101: 1397-1405.

Rust, M.K., Saran, R.K. 2008. The toxicity, repellency, and effects of acetamiprid on the western subterranean termite (Isoptera: Rhinotermitidae). J. Econ. Entomol. 101: 1360-1366

Saran, R.K., Rust, M.K. 2008. Phagostimulatory sugars enhance uptake and horizontal transfer of hexaflumuron in the western subterranean termite (Isoptera: Rhinotermitidae). J. Econ. Entomol. Vol. 101: p.873-879.

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Kabashima, J.N., Greenberg, L., Rust, M.K., Paine, T.D. 2007. Aggressive interactions between *Solenopsis invicta* and *Linepithema humile* (Hymenoptera: Formicidae) under laboratory conditions. J. Econ. Entomol. Vol. 100: p.148-154

Saran, R.J., J.G. Millar, and M K. Rust. 2007. Role of (3Z,6Z,8E) – Dodecatrien-1-ol in trail following, feeding, and mating behavior. J. Chem. Ecol. 33: 369-389.

Choe, D.-H. and M.K. Rust. 2007. Use of plant resin by a bee assassin bug *Apiomerus flaviventris* (Hemiptera:Reduviidae). Ann. Entomol. Soc. Am.100: 320-326.

Choe, D.-H, and M. K. Rust. 2006. Agonistic behavior of Argentine ants to scales and scale parasitoids and their cuticular extracts. Sociobiology 48: 799-818.

Choe, D.-H. and M.K. Rust. 2006. Homopteran chemical signatures reduce aggression of tending ants. Chemoecology 16: 175-178.

Saran, R.J. and M.K. Rust. 2005. Feeding, uptake, and utilization of carbohydrates by the western subterranean termite (Isoptera: Rhinotermitidae). J. Econ. Entomol. 98: 1284-129
aagsma, K. and M. K. Rust. 2005. Effect of hexaflumerun on mortality of thewestern subterranean termite (Isoptera: Rhinotermitidae) during and following exposure and movement of hexaflumeron in termite colonies. Pest Manage. Sci. 61: 517-531.

Soeprono, A. M. and M. K. Rust. 2004. The effect of delayed toxicity of chemical barriers to control Argentine ants (Hymenoptera: Formicidae). J. Econ. Entomol. 97: 2021-2028.

Soeprono, A. M. and M. K. Rust. 2004. Effect of horizontal transfer of barrier insecticides to control Argentine ants (Hymenoptera: Formicidae). J. Econ. Entomol. 97: 1675-1681.

Hooper-Bui, L. M., M. K. Rust, and D. A. Reierson. 2004. Predation of endangered California least tern, *Sterna antillarum browni* by southern fire ant, *Solenopsis xyloni* (Hymenoptera: Formicidae). Sociobiology 43: 1-18.

Vega, S. Y., and M. K. Rust. 2003. Determining the foraging range and origin of resurgence after treatment of Argentine ant (Hymenoptera: Formicidae). J. Econ. Entomol. 96: 844-849.

Fernandez, N. and M. K. Rust. 2003. Site fidelity in foraging Argentine ants. Sociobiology 41: 625-632.

Metzger, M.E. and M. K. Rust. 2001. Laboratory evaluation of fipronil and imidacloprid topical insecticides for control of plague vector *Oropsylla montanta* (Baker) (Siphonaptera: Certophyllidae and Pulicidae) of California ground squirrels (Rodentia: Sciuridae) using a novel nest box. J. Med. Entomol. 38: 465-470.

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Education:

Bachelor of Agriculture, Korea University, Seoul, Korea, 2002
Master of Science in Entomology, University of California, Riverside, USA, 2005
PhD in Entomology, University of California, Riverside, USA, 2009

Professional Experience

Assistant Cooperative Extension Specialist / Assistant Professor, 2011-current
Department of Entomology
University of California, Riverside

Post-doctoral Researcher, 2009-2011
Department of Environmental Sciences, Policy, and Management
University of California, Berkeley (Advisor – Dr. Neil Tsutsui)

Awards and Honors

1. Excellence prize in the student research (Metamorphosis of a Cicada, *Cryptotympana atrata* - Given Priority to the Emergence) (1986)
2. Departmental prize for high scholarship (Department of Agricultural Biology, University of Korea, Seoul, Korea) (2000)
3. Dean's Fellowship Award (University of California, 2003 - 2005)
4. Annual photography competition of National Wildlife Federation (2004)
5. Carl Strom / Western Exterminator Company Scholarship (2004 - 2009)
6. Anza-Borrego Institute Student Entomology Award (2006)
7. Temecula Valley Wine Society Scholarship (Nancy Johnston Memorial Scholarship) (2006)
8. Pi Chi Omega Scholarship (2007)
9. Best PhD Poster in annual entomology student seminar day (2007)
10. Selected as one of the "40 Under 40" future leaders of the pest management industry by Pest Management Professional Magazine (2008)
11. Bayer Young Scientist of the Year Competition (2nd place winner, sponsored by Bayer Environmental Science) (2008)
12. 1st place in Korean Young Entomologist (KYE) annual symposium student competition (as a part of ESA meeting in Reno, NV, November 2008)

Professional Organizations and Memberships:

Entomological Society of America (ESA)
Asia-Pacific Association of Chemical Ecologists (APACE)
Pi Chi Omega (The National Professional Pest Control Fraternity)

Selected Recent Refereed Scientific Journal Articles

(10 most recent publications selected)

1. Choe, D.-H., S. R. Ramírez, N. D. Tsutsui. 2012. A silica gel based method for extracting insect surface hydrocarbons. J. Chem. Ecol. 38: 176-187.
2. van Wilgenburg, E., A. Felden, D.-H. Choe, R. Sulc, J. Luo, K. J. Shea, M. A. Elgar, N. D. Tsutsui. 2012. Learning and discrimination of cuticular hydrocarbons in a social insect. Biol. Lett. 8: 17-20.
3. Forero, D., D.-H. Choe, C. Weirauch. 2011. Resin gathering in Neotropical resin bugs (Insecta: Hemiptera: Reduviidae): functional and comparative morphology. J. Morphol. 272: 204-229.
4. Choe, D.-H., R. S. Vetter, M. K. Rust. 2010. Development of virtual bait stations to control Argentine ants (Hymenoptera: Formicidae) in environmentally sensitive habitats. J. Econ. Entomol. 103: 1761-1769.
5. Choe, D.-H., J. G. Millar, M. K. Rust. 2009. Chemical signals associated with life inhibit necrophoresis in Argentine ants. Proceedings of the National Academy of Sciences USA. 106: 8251-8255.

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6. Choe, D.-H., M. K. Rust. 2009. Dead ant walking. Pest Control Technology. 37: 48-55, 128.
7. Choe, D.-H., M. K. Rust. 2008. Horizontal transfer of insecticides in laboratory colonies of the Argentine ant (Hymenoptera: Formicidae). J. Econ. Entomol. 101: 1397-1405.
8. Choe, D.-H., M. K. Rust. 2007. Use of plant resin by a bee assassin bug, Apiomerus flaviventris (Hemiptera: Reduviidae). Ann. Entomol. Soc. Am. 100: 320-326.
9. Choe, D.-H., M. K. Rust. 2006. Agonistic behavior of Argentine ants to scales and scale parasitoids and their cuticular extracts. Sociobiology. 48: 799-818.
10. Choe, D.-H., M. K. Rust. 2006. Homopteran chemical signatures reduce aggression of tending ants. Chemoecology. 16: 175-178

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WATER QUALITY SPECIALIST

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ACADEMIC DEGREES:

- Ph.D., Zhejiang University, China, 1988

SPECIALIZATION:

- Environmental fate, risk assessment and regulation of pesticides and emerging contaminants.
- Processes of organic contaminants in ecosystems, including biotic and abiotic degradation, adsorption, bioavailability, aquatic bioaccumulation, and ecotoxicity.
- Detoxification and remediation of organic contaminants.
- Evaluation and development of best management practices.
- Method development for trace contaminant analysis.

REPRESENTATIVE PUBLICATIONS:

- **Books**
  - Gan, J., P. Zhu, S.D. Aust, and A.T. Lemley. Pesticide Decontamination and Detoxification. American Chemical Society Symposium Series 863, American Chemical Society: Washington, DC, 2003.
  - Gan, J., F. Spurlock, P. Hendley, and D. Weston. *Synthetic Pyrethroids: Occurrence and Effects in Aquatic Environments*. American Chemical Society Symposium Series 991, American Chemical Society: Washington, DC, 2003.
- **Journal Articles (selected from 150+)**
  - Gan, J., Q. Wang, S.R. Yates, W.C. Koskinen and W.A. Jury. 2002. Dechlorination of chloroacetanilide herbicides by thiosulfate salts. *PNAS (USA)* 99: 5189-5194.
  - Liu, W.P., J. Gan, D. Schlenk and W.A. Jury. 2005. Enantioselectivity in environmental safety of current chiral insecticides. *PNAS (USA)* 103: 701-706.
  - Yang, W.C., F. Spurlock, W.P. Liu, and J. Gan. 2006. Inhibition of aquatic toxicity of synthetic pyrethroids by suspended sediment. *Environ. Toxicol. Chem.* 25: 1913-1919.
  - Xu, Y.P., F. Spurlock, Z.J. Wang, and J. Gan. 2007. Comparison of five methods for measuring sediment toxicity of hydrophobic contaminants. *Environ. Sci. Technol.* 41: 8394-8399.
  - Hunter, W., Y. Yang, F. Reichenberg, P. Mayer, and J. Gan. 2009. Measuring pyrethroids in sediment porewater using matrix-solid phase microextraction. *Environ. Toxicol. Chem.* 28: 36-43.
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- Budd, R., A. O'Geen, K. Goh, S. Bondarenko, and J. Gan. 2009. Efficacy of constructed wetlands in pesticide removal from tailwaters in the Central Valley, California. *Environ. Sci. Technol.* 43: 2925-2930.
- Bondarenko, S., and J. Gan. 2009. Simultaneous determination of free and total concentrations of hydrophobic compounds. *Environ. Sci. Technol.* 43: 3772-3777.
- Yang, Y., W. Hunter, S. Tao, and J. Gan. 2009. Microbial availability of different forms of phenanthrene in soils. *Environ. Sci. Technol.* 43: 1852-1857.
- Lin, K.D., W.P. Liu, and J. Gan. 2009. Oxidative removal of bisphenol-A with manganese dioxide: Kinetics, products, and pathways. *Environ. Sci. Technol.* 43: 3860-3864.
- Cui, X.Y., W. Hunter, Y. Yang, Y.X. Chen, and J. Gan. 2010. Bioavailability of sorbed phenanthrene and permethrin in sediments to *Chironomus tentans*. *Aquatic Toxicol.* 98: 83-90

COURSES TAUGHT:

- ENSC 127 - Fate and Transport of Contaminants in Soil (upper division)
- SWSC 204 - Environmental Organic Chemistry (graduate)

GRADUATE PROGRAM AFFILIATIONS AND RESEARCH FOCUS AREAS:

- **Research Focus Areas**
  - Environmental Chemistry and Ecotoxicology
  - Soil and Water Sciences