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

AGREEMENT NUMBER
14-C0012
REGISTRATION NUMBER
1363017

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: July 1, 2014 or upon final approval by the State, whichever occurs later, through December 31, 2015

3. The maximum amount of this Agreement is: **$49,973.00**
Forty-nine thousand nine hundred seventy-three 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	5 Pages
Exhibit B – Budget Detail and Payment Provisions	3 Pages
Exhibit C* – General Terms and Conditions (GIA 610)	
Exhibit D - Special Terms and Conditions	3 Pages
Exhibit E – Additional Terms and Conditions	1 Page
Exhibit F – Resume for Dr. Tjeerdema	11 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		California Department of General Services Use Only
CONTRACTOR'S NAME *(if other than an individual, state whether a corporation, partnership, etc.)* **The Regents of the University of California**		
BY *(Authorized Signature)* Randi Jenkins	DATE SIGNED *(Do not type)* 6.24.2014	
PRINTED NAME AND TITLE OF PERSON SIGNING Randi Jenkins, J.D. Associate Director, Sponsored Programs		
ADDRESS 1850 Research Park Drive, Suite 300 Davis, CA 95618-6153		
STATE OF CALIFORNIA		
AGENCY NAME **Department of Pesticide Regulation**		
BY *(Authorized Signature)* Samantha Lewis	DATE SIGNED *(Do not type)* 7.2.14	
PRINTED NAME AND TITLE OF PERSON SIGNING Samantha Lewis, Business Services Office Manager		☒ Exempt per: Delegation Letter 74.5
ADDRESS 1001 I Street, Sacramento, CA 95814		

EXHIBIT A
STANDARD AGREEMENT

SCOPE OF WORK

1. This Agreement is between The Regents of the University of California, hereinafter referred to as UCD or Contractor, and the Department of Pesticide Regulation, hereinafter referred to as DPR.

2. This Agreement will commence on the start date July 1, 2014 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: Robert.Budd@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. Ron Tjeerdema** at:

   Department of Environmental Toxicology
   One Shields Ave
   UC Davis, CA 95616

   Phone: (530) 754-5192 Fax: (530) 752-3394
   Email: rstjeerdema@ucdavis.edu

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

Victoria Sissac
University of California, Davis
Sponsored Programs
1850 Research Park Drive Suite 300
Davis, CA 95618-6153

Telephone: (530) 754-8094
Email Address: vsissac@ucdavis.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

Recent research has demonstrated that integrated vegetative treatment systems are effective at reducing pesticide loads in agriculture tailwater runoff (Anderson et al., 2011). Current research funded by the California Department of Pesticide Regulation (DPR) has demonstrated that vegetated treatment systems are effective at reducing the organophosphate pesticide chlorpyrifos in simulated runoff, and that the addition of activated carbon in integrated treatment systems is likely to achieve regulatory criteria for this pesticide (UC Davis/UC Cooperative Extension, unpublished data). An on-going issue constraining widespread implementation of vegetated treatment systems has been the perception that vegetated drainage ditches provide habitat for organisms that may contain pathogens. These species could serve as pathogen vectors to adjacent fields. While the magnitude of this threat is the subject of on-going research (e.g., Gorski et al., 2011; see R. Atwill publications - Western Institute for Food Safety and Security - http://testing.wifss.ucdavis.edu/personnel/atwill.php), the perception among produce buyers and farm auditors is that food safety takes precedence over surface water quality. Until conclusive evidence dispels the threat of pathogen vectors in vegetated ditches, widespread use of vegetated treatment systems may be limited. Alternative practices may be required to reduce pesticide loading and achieve regulatory goals.

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One alternative may be the use of plastics as a replacement for aquatic vegetation. Because of their sorptive capacity for organic chemicals, a variety of plastic materials are used in environmental monitoring research, including various passive sampling devices, such as semi-permeable membranes. These are now being investigated as a monitoring tool by DPR. Research has also shown that organic chemicals preferentially bind to discarded plastic waste in the environment (e.g., Rochman et al., 2012). These characteristics suggest that certain plastics may present useful alternatives to vegetation in runoff treatment systems as they are unlikely to provide the same habitat refugia as plant systems. This project is designed as a pilot project to evaluate the effectiveness and practicality of using plastic as an alternative to traditional vegetation in an on-farm treatment system.

The project is designed to be completed in one year. A series of laboratory trials will be conducted with each of two types of recycled plastic: shredded polyethylene and polyethylene plastic pellets. Plastic materials will be supplied by Encore Plastics, an agriculture plastics recycling company based in Salinas, California. Preliminary tests will determine whether the recycled plastics release toxic chemicals into the water. This will be confirmed using toxicity tests with the cladoceran *Ceriodaphnia dubia* and the amphipod *Hyalella azteca*. The sorptive capacity of each type of plastic will then be assessed with spiked chlorpyrifos and bifenthrin in mixture. Pesticide mixtures will be pumped through columns loosely packed with each type of plastic and removal rates will be determined using enzyme-linked immunosorbent assays (ELISA - chlorpyrifos) and confirmed with gas chromatograph (GC)/ mass spectroscopy (MS) (bifenthrin and chlorpyrifos).

Depending on the outcome of the laboratory trials, a series of three replicate field trials will compare the relative effectiveness of vegetated and plastic treatment systems to reduce pesticide loading. The trials will be conducted on the USDA farm being used for the current DPR project evaluating integrated treatment systems (Combined On-Farm Practices to Reduce Chlorpyrifos in Agricultural Runoff - DPR project 13-C0027). Three replicate trials will be conducted on a ditch treated with either shredded high density polyethylene plastic or pellets, and dosed with chlorpyrifos. This type of plastic has been shown to have a high sorption capacity for organic molecules (Rochman et al., 2012) and Encore Plastics has been confirmed as a source for the field trial materials (http://encore-recycling.com/company/).

The plastic treated ditch trials will be compared to three replicate trials of an adjacent grass-lined ditch , which was used in the current study. All trials will be conducted with the same chlorpyrifos dosing system used in the current project Chlorpyrifos will be used as a model pesticide because near real-time analyses of trial samples can be conducted using ELISA. ELISA results will be corroborated with GC/MS analyses of selected samples. Toxicity tests will be conducted during all field trials to verify that runoff meets regulatory criteria.

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An additional aspect of this evaluation will be to determine costs associated with using recycled plastic for this application. This will include availability of appropriate HDPE plastic materials, initial construction costs, disposal costs (if any), and durability of the plastic. Conversations with representatives from Encore Plastics Recycling should provide information about the feasibility of using recycled materials for this application.

5. Objectives

A. Compare the capacity of two types of high density polyethylene (HDPE) plastic to reduce pesticide concentrations in water using laboratory bench-top experiments. The results of these experiments will be used to identify a candidate plastic material for scalable field trials.

B. Evaluate the capacity of polyethylene plastic to reduce pesticide concentrations in simulated run-off under field conditions. Compare pesticide load reductions using plastic to pesticide load reductions using vegetation.

C. Determine costs associated with using recycled plastic for on-farm treatment of agriculture run-off.

6. Work to Be Performed

A. Task 1

1) Laboratory Trials - Conduct replicate experiments to determine the capacity of shredded recycled HDPE to remove bifenthrin and chlorpyrifos in solution in mixture experiments. Conduct replicate experiments to determine the capacity of pelletized recycled HDPE to remove bifenthrin and chlorpyrifos from solution in mixture experiments. Conduct toxicity tests to verify that leachates of shredded and pelletized plastic are non-toxic to freshwater test species. Identify the most appropriate HDPE material for field trials.

2) Field Trials - Conduct 3 replicate experiments to evaluate the capacity of HDPE to remove chlorpyrifos in simulated agriculture runoff. Compare the relative chlorpyrifos load reduction capacity of HDPE to that of vegetation. Field trials will be conducted on the USDA Spence Road experimental farm in conjunction with ongoing field trials as part of a separate DPR project with UC Davis UCCE.

B. Task 2

1) HDPE Costs - Determine costs associated with using recycled HDPE for on-farm treatment of pesticides in runoff. Costs to be considered include the cost of

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bulk HDPE for use in pesticide load reduction, the cost of constructing treatment systems with HDPE, and the cost of disposing of HDPE.

2) Final Report - Produce a final technical report evaluating the feasibility of using recycled HDPE as an on-farm treatment option for removing pesticides from agriculture irrigation runoff. The report will also consider the effectiveness of HDPE relative to the effectiveness of vegetation, and will discuss these two treatment options in the context of food safety concerns.

7. Project Timeline

Task	Task Description	Period
1.1	Laboratory assessment of shredded vs. pellet plastic	July-August 2014
1.2	Field assessment of HDPE	September-November 2014
2.1	Cost analysis of HDPE	December 2014-June 2015
2.2	Final Report	December 2015

EXHIBIT B
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BUDGET DETAIL AND PAYMENT PROVISIONS

1. Invoicing

A. Upon receipt and approval of invoices by the Contract Manager for services performed according to the attached Scope of Work and the terms of this Agreement, 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.

A. Invoices will include the Agreement Number, and will be itemized in accordance with the Rates in this Exhibit, and will 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.

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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 shall be withheld by DPR until the satisfactory completion of this Agreement

4. Rates

Rates for these services are as follows:

Table I – Cost Totals

	Year 1 (FY 14-15)	Year 2 (FY 15-16)
1. Salaries and Wages	$17,296	$3,166
2. Benefits	$7,379	$1,213
3. Travel	$200	$0
4. Supplies	$4,200	$0
5. Contractual[1]	$10,000	$0
6. Indirect Costs @ 15%	$5,861	$657
Total Amount	**$44,937**	**$5,036**

[1] UCCE Monterey Co SRA III salary and benefits have been included in the contractual line item.

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Table II - Personnel Costs Detail

Year 1 (FY 14-15)	Monthly Salary	Number of Months	Percent Time	Total
Personnel				
UC Davis Specialist III	$7,196	4	0.22	$6,332
UC Davis SRA III	$4,733	4	0.33	$6,248
UC Davis Junior Specialist	$3,144	5	0.30	$4,716
UCCE Monterey County SRA III①	$4,867	2	0.66	$6,424
Total Personnel				**$23,720**
Benefits				
UC Davis Specialist III	$2,756	4	0.22	$2,425
UC Davis Specialist III	$2,385	4	0.33	$3,148
UC Davis Junior Specialist	$1,204	5	0.30	$1,806
UCCE Monterey County SRA III①	$2,548	2	0.66	$3,363
Total Benefits				**$10,743**
Total Personnel and Benefits				**$34,463**

Year 2 (FY 15-16)	Monthly Salary	Number of Months	Percent Time	Total
Personnel				
UC Davis Specialist III	$7,196	2	0.22	$3,166
Benefits				
UC Davis Specialist III	$2,756	2	0.22	$1,213
Total Personnel and Benefits				**$4,379**

① UCCE Monterey Co SRA III salary and benefits have been included in the contractual line item.

5. Cost Limitation

A. The total amount of this Agreement shall not exceed $49,973.00.

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
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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. State-Owned Data - Integrity and Security

A. Contractor shall comply with the following requirements to ensure the preservation, security, and integrity of State-owned data on portable computing devices and portable electronic storage media:

1) Encrypt all State-owned data stored on portable computing devices and portable electronic storage media using government-certified Advanced Encryption Standard (AES) cipher algorithm with a 256-bit or 128-bit encryption key to protect DPR data stored on every sector of a hard drive, including temp files, cached data, hibernation files, and even unused disk space.

2) Data encryption shall use cryptographic technology that has been tested and approved against exacting standards, such as FIPS 140-2 Security Requirements for Cryptographic Modules.

3) Encrypt, as described above, all State-owned data transmitted from one computing device or storage medium to another.

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4) Maintain confidentiality of all State-owned data by limiting data sharing to those individuals contracted to provide services on behalf of the State, and limit use of State information assets for State purposes only.

5) Install and maintain current anti-virus software, security patches, and upgrades on all computing devices used during the course of the Agreement.

6) Notify the Contract Manager immediately of any actual or attempted violations of security of State-owned data, including lost or stolen computing devices, files, or portable electronic storage media containing State-owned data.

7) Advise the owner of the State-owned data, the agency Information Security Officer, and the agency Chief Information Officer of vulnerabilities that may present a threat to the security of State-owned data and of specific means of protecting that State-owned data.

B. Contractor shall use the State-owned data only for State purposes under this Agreement.

C. Contractor shall not transfer State-owned data to any computing system, mobile device, or desktop computer without first establishing the specifications for information integrity and security as established for the original data file(s).

5. 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.

6. 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

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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.

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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 will be evaluated within thirty (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.

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Ronald Scott Tjeerdema

Professional Preparation

Humboldt State University, Arcata, CA 1980	Wildlife Management	BS
Humboldt State University, Arcata, CA 1980	Natural Resource Planning & Interpretation	BS
University of California, Santa Barbara 1983	Pharmacology & Toxicology	MA
University of California, Davis 1987	Pharmacology & Toxicology	PhD

Appointments

2003–present	Chair, Department of Environmental Toxicology, UC Davis
1999–present	Professor, Department of Environmental Toxicology, UC Davis
1999–present	Environmental Chemist, Agricultural Experiment Station, UC Davis
1998–99	Professor, Department of Chemistry & Biochemistry, UC Santa Cruz
1994–98	Associate Professor, Department of Chemistry & Biochemistry, UC Santa Cruz
1992–94	Assistant Professor, Department of Chemistry & Biochemistry, UC Santa Cruz

Professional Certification

1994–present	Diplomate in General Toxicology, American Board of Toxicology (DABT)

Peer-Reviewed Publications

1. **Tjeerdema, R. S.**, 1987. The pyrolysis of cannabinoids. *Rev. Environ. Contam. Toxicol.* 99, 61–81 (invited).
2. **Tjeerdema, R. S.** and D. G. Crosby, 1987. The biotransformation of molinate (Ordram) in the striped bass (*Morone saxatilis*). *Aquat. Toxicol.* 9, 305–317.
3. **Tjeerdema, R. S.** and R. S. Jacobs, 1987. Elimination of 2,4,5,2',4',5'-hexachlorobiphenyl by the purple sea urchin, *Strongylocentrotus purpuratus*, following single exposure. *Bull. Environ. Contam. Toxicol.* 38, 1029–1036.
4. **Tjeerdema, R. S.** and D. G. Crosby, 1988. Comparative biotransformation of molinate (Ordram) in the white sturgeon (*Acipenser transmontanus*) and common carp (*Cyprinus carpio*). *Xenobiotica* 18, 831–838.
5. **Tjeerdema, R. S.** and D. G. Crosby, 1988. Disposition, biotransformation, and detoxication of molinate (Ordram) in whole blood of the common carp (*Cyprinus carpio*). *Pestic. Biochem. Physiol.* 31, 24–35.
6. **Tjeerdema, R. S.**, G. E. Croston, L. M. Swall and M. Martin, 1989. *Petroleum Fate and Cleanup Agent Toxicology*. National Technical Information Service PB89-134589-AS, US Department of Commerce, Springfield, VA, 120 pp.
7. Croston, G. E. and **R. S. Tjeerdema**, 1990. Hydrolysis of a model surfactant as measured using acyl coenzyme A synthetase. *Toxicol. Environ. Chem.* 28, 245–256.
8. Singer, M. M., D. L. Smalheer and **R. S. Tjeerdema**, 1990. A simple continuous-flow toxicity test system for microscopic life stages of aquatic organisms. *Wat. Res.* 24, 899–903.
9. Singer, M. M., D. L. Smalheer, **R. S. Tjeerdema** and M. Martin, 1990. Toxicity of an oil dispersant to the early life stages of four California marine species. *Environ. Toxicol. Chem.* 9, 1387–1395.
10. **Tjeerdema, R. S.** and R. S. Jacobs, 1990. Partitioning of 2,4,5,2',4',5'-hexachlorobiphenyl between seawater and air. *Bull. Environ. Contam. Toxicol.* 44, 572–578.
11. **Tjeerdema, R. S.**, M. M. Singer, G. M. Scelfo, D. L. Smalheer, L. M. Swall, G. E. Croston, D. M. Fry and M. Martin, 1990. *The Toxicology of Oil Spill Cleanup Agents*. National Technical Information Service PB90-250267-AS, US Department of Commerce, Springfield, VA, 175 pp.
12. Scelfo, G. M. and **R. S. Tjeerdema**, 1991. A simple method for determination of Corexit 9527 in natural waters. *Mar. Environ. Res.* 31, 69–78.

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13. Singer, M. M., D. L. Smalheer, R. S. Tjeerdema and M. Martin, 1991. Effects of spiked exposure to an oil dispersant on the early life stages of four marine species. *Environ. Toxicol. Chem.* 10, 1367–1374.
14. Swali, L. M. and R. S. Tjeerdema, 1991. Tissue distribution and temperature dependence of xenobiotic hydrolysis in the dungeness crab (*Cancer magister*). *Aquat. Toxicol.* 20, 1–11.
15. Tjeerdema, R. S., T. W.-M. Fan, R. M. Higashi and D. G. Crosby, 1991. Sublethal effects of pentachlorophenol in the abalone (*Haliotis rufescens*) as measured by in vivo ^{31}P NMR spectroscopy. *J. Biochem. Toxicol.* 6, 45–56.
16. Tjeerdema, R. S., R. J. Kauten and D. G. Crosby, 1991. Interactive effects of pentachlorophenol and hypoxia in the abalone (*Haliotis rufescens*) as measured by in vivo ^{31}P NMR spectroscopy. *Aquat. Toxicol.* 21, 279–294.
17. Tjeerdema, R. S., R. J. Kauten and D. G. Crosby, 1991. Sublethal effects of hypoxia in the abalone (*Haliotis rufescens*) as measured by in vivo ^{31}P NMR spectroscopy. *Comp. Biochem. Physiol.* 100B, 653–659.
18. Tjeerdema, R. S. and M. M. Singer, 1991. Closed flow-through aquatic toxicity testing and microscopic organisms: Not necessarily incompatible. *Mar. Pollut. Bull.* 22, 59–61.
19. Tjeerdema, R. S., M. M. Singer and D. L. Smalheer, 1991. Continuous-flow toxicity tests using the microscopic life stages of various marine organisms. *Can. Tech. Rep. Fish. Aquat. Sci.* 1774, 348–354.
20. Singer, M. M., R. S. Tjeerdema and D. L. Smalheer, 1992. Evaluation of the toxicological effects of oil dispersants by modeled-exposure toxicity testing. *Can. Tech. Rep. Fish. Aquat. Sci.* 1863, 175–182.
21. Smalheer, D. L., S. Jacobson and R. S. Tjeerdema, 1992. *Oil Spill Cleanup Agent Efficacy, Toxicity, and Biodegradation.* National Technical Information Service PB92-183623-AS, US Department of Commerce, Springfield, VA, 51 pp.
22. Tjeerdema, R. S. and D. G. Crosby, 1992. Disposition and biotransformation of pentachlorophenol in the red abalone (*Haliotis rufescens*). *Xenobiotica* 22, 681–690.
23. Benner, D. B. and R. S. Tjeerdema, 1993. Toxicokinetics and biotransformation of pentachlorophenol in the topsmelt (*Atherinops affinis*). *J. Biochem. Toxicol.* 8, 111–117.
24. Gates, V. L. and R. S. Tjeerdema, 1993. Disposition and biotransformation of pentachlorophenol in the striped bass (*Morone saxatilis*). *Pestic. Biochem. Physiol.* 46, 161–170.
25. Shofer, S. L. and R. S. Tjeerdema, 1993. Comparative disposition and biotransformation of pentachlorophenol in the oyster (*Crassostrea gigas*) and abalone (*Haliotis fulgens*). *Pestic. Biochem. Physiol.* 46, 85–95.
26. Singer, M. M., S. George, D. Benner, S. Jacobson, R. S. Tjeerdema and M. L. Sowby, 1993. Comparative toxicity of two oil dispersants to the early life stages of two marine species. *Environ. Toxicol. Chem.* 12, 1855–1863.
27. Singer, M. M. and R. S. Tjeerdema, 1993. Fate and effects of the surfactant sodium dodecyl sulfate. *Rev. Environ. Contam. Toxicol.* 133, 95–149 (invited).
28. Tjeerdema, R. S., R. J. Kauten and D. G. Crosby, 1993. Interactive effects of pentachlorophenol and temperature in the abalone (*Haliotis rufescens*) as measured by in vivo ^{31}P NMR spectroscopy. *Aquat. Toxicol.* 26, 117–132.
29. Singer, M. M., S. George, S. Jacobson, I. Lee, R. S. Tjeerdema and M. L. Sowby, 1994. Comparative effects of oil dispersants to the early life stages of topsmelt (*Atherinops affinis*) and kelp (*Macrocystis pyrifera*). *Environ. Toxicol. Chem.* 13, 649–655.
30. Singer, M. M., S. George, S. Jacobson, I. Lee, R. S. Tjeerdema and M. L. Sowby, 1994. Comparative toxicity of Corexit 7664 to the early life stages of four marine species. *Arch. Environ. Contam. Toxicol.* 27, 130–136.
31. Singer, M. M. and R. S. Tjeerdema, 1994. *Dispersed Oil and Dispersant Fate and Effects Research: California Program Results for 1993–1994.* Marine Spill Response Corporation, Research and Development Program, Technical Report Series 94-010, Washington, DC, 46 pp.
32. Tjeerdema, R. S., K. L. Lukrich and E. M. Stevens, 1994. Toxicokinetics and biotransformation of pentachlorophenol in the sea urchin (*Strongylocentrotus purpuratus*). *Xenobiotica* 24, 749–757.

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