

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

July 2016

**STUDY GW13A: PROTOCOL FOR ADDITIONAL GROUND WATER PROTECTION
LIST MONITORING FOR PENOX SULAM**

I. INTRODUCTION

Previous ground water sampling, focused on rice herbicides in the Sacramento Valley, detected residues of penoxsulam in domestic wells (Bergin, 2013). Penoxsulam is mainly applied to rice; however, it does have uses on nut crops such as almonds, pistachios, and walnuts. Sometimes a nut crop is located adjacent to a rice field, which obscures the source of penoxsulam found in ground water. This study will investigate areas of penoxsulam use outside of rice in the Sacramento Valley to see if penoxsulam has migrated to ground water in those areas.

II. STUDY OBJECTIVES

- Investigate areas of penoxsulam use outside of rice in the Sacramento Valley to determine if it has migrated to ground water as a result of legal agricultural use.
- Samples will also be analyzed for additional pesticides known to, or with the potential to, migrate to ground water.

III. PERSONNEL

The well sampling for this study will be conducted by the Environmental Monitoring Branch of DPR under the general supervision of Senior Environmental Scientist Joy Dias. Project Personnel will include:

Project Leader: Rick Bergin

Field Coordinator: Craig Nordmark

Lab Liaison: Sue Peoples (CDFA), Rick Bergin (CDFW)

Staff Chemists: California Department of Food and Agriculture (CDFA), Center for Analytical Chemistry, and California Department of Fish and Wildlife (CDFW), Water Pollution Control Laboratory.

Please direct questions regarding this study to Rick Bergin at 916-324-0827, e-mail: <Rick.Bergin@cdpr.ca.gov>.

IV. STUDY PLAN

Monitoring will be focused in sections penoxsulam use outside of rice in the Sacramento Valley. Penoxsulam in the targeted sections is mainly applied to nut crops such as almonds, pistachios, and walnuts. Also, concentrated rice use outside of the Sacramento Valley will be included for sampling. Sections with high use, Ground Water Protection Area designations, and shallow ground water depths will be prioritized. The following is a list of the selected areas:

1. Arbuckle: West of Highway 5 between Hahn Rd and the Colusa/Yolo County line. No adjacent rice use. Predominately used on almonds with several sections greater than 10 lbs penoxsulam applied.
2. Escalon: Fifteen sections of penoxsulam use on rice located between Mariposa Rd and Valley Home Rd. Several sections with 20-40 lbs of use. Most concentrated rice cluster use outside of Sacramento Valley.
3. Orland/Hamilton City: A dozen sections with use on almonds and walnuts at 20-35 lbs per section. Rice use several miles towards river to the southeast.
4. Stockton/Linden: Walnut use only. Penoxsulam use around 3-10 lbs per section (high for walnuts).
5. Madera: Many sections (20+) with use on almonds and pistachios averaging 10-20 lbs per section. Heavy cluster ~3 miles east of the city of Madera.

V. SAMPLING AND ANALYTICAL METHODS

Wells will be chosen in the designated areas following procedures described in SOP FSWA001.02 (Nordmark, 2011). Domestic wells are preferable because they usually are accessible year round and tend to be shallower than irrigation or municipal wells. During collection of ground water samples, all efforts will be taken to bypass pressure tanks, hoses, and filters to sample water directly from the aquifer.

Chemical analysis will be performed by both the CDFA Center for Analytical Chemistry and the CDFW Water Pollution Control Laboratory. CDFA will analyze for the triazine group of pesticides using method EMON-SM-62.9 (CDFA, 2009) and the multi-analyte group using method EMON-SM-05-032 (CDFA, 2013). CDFW will analyze for selected rice herbicides using method WPCL-LC-009 (CDFW, 2013).

SOP QAQC001.00 (Segawa, 1995) guidelines will be followed for analytical laboratory quality control and for collecting quality assurance samples in the field.

VI. DATA ANALYSIS

Data obtained from CDFA and CDFW will be used to determine if pesticides are migrating to ground water. Detections in the primary and surrounding areas will be used to assess regional vulnerability to ground water contamination. Detections of pesticides may trigger additional sampling or may lead to expansion of Ground Water Protection Areas.

VII. TIMETABLE

- October 2016 – February 2017: Conduct sampling
- December 2016 – April 2017: Obtain and review analytical results from CDFA laboratory
- June 2017 – Complete study report
- Communication
 - Provide notice to the County Agricultural Commissioner, DPR Enforcement Branch Regional Office, and the local Farm Bureau two weeks prior to initiating monitoring in a county. Additional notice will be provided if there is a six-month lapse in monitoring within a county.
 - Provide results to property owners within 30 days of receipt.
 - Provide results to state and local agencies when sampling is concluded and results have been reviewed and approved by the project team.

VIII. BUDGET

Budget Component	Units	Expense per Unit	Total Component Expense
Rice Herbicides	≤ 80 samples	\$484	≤ \$38,720
CDFW Overhead	≤ 80 samples	35%	≤ \$13,552
Triazine + Tebuthiuron Screen	≤ 80 samples	\$1,200	≤ \$96,000
Multi-Residue Screen-Full	≤ 80 samples	\$2,500	≤ \$200,000
Travel	≤ 160 days	\$130	≤ \$20,800
Person Years	≤ 1	\$100,000	≤ \$100,000
CDFW Subtotal			≤ \$52,272
CDFA Subtotal			≤ \$296,000
Total			≤ \$469,072

IX. REFERENCES

Bergin, R. 2013. Protocol for Ground Water Protection List Monitoring of Selected Rice Pesticides. Available at: <http://www.cdpr.ca.gov/docs/emon/pubs/protocol/studygw13protocol.pdf> (verified August 9, 2016). California Department of Pesticide Regulation, Sacramento, California.

CDFA. 2009. Determination of Atrazine, Bromacil, Cyanazine, Diuron, Hexazinone, Metribuzin, Norflurazon, Prometon, Prometryn, Simazine, Deethyl Atrazine (DEA), Deisopropyl Atrazine (ACET), Diamino Chlorotrazine (DACT), Tebuthiuron and the metabolites Tebuthiuron-104, Tebuthiuron-106, Tebuthiuron-107 and Tebuthiuron-108 in Well Water and River Water By Liquid Chromatography- Atmospheric Pressure Chemical Ionization Mass Spectrometry. Available at: http://www.cdpr.ca.gov/docs/emon/pubs/anl_methds/emon-sm-62_9.pdf (verified July 28, 2016). California Department of Pesticide Regulation, Sacramento, California.

CDFA. 2013. Determination of 44 Pesticides on Well Water by Liquid Chromatography Coupled to Linear Ion Trap Quadrupole and Gas Chromatography Coupled to Triple Quadrupole Mass Spectrometer. Available at: http://www.cdpr.ca.gov/docs/emon/pubs/anl_methds/emon-sm-05-032.pdf (verified July 28, 2016). California Department of Pesticide Regulation, Sacramento, California.

CDFW. 2013. Determination of Selected Rice Herbicides in Ground Water by (SPE) and LC/MSMS. Available at: http://www.cdpr.ca.gov/docs/emon/pubs/anl_methds/wpcl_lc_009_dpr_riceherb.pdf (verified July 28, 2016). California Department of Pesticide Regulation, Sacramento, California.

Nordmark, C. and J. M. Herrig, 2011. SOP FSWA001.02. Obtaining and Preserving Well Water Samples. Available at: <http://www.cdpr.ca.gov/docs/emon/pubs/sops/fswa00102.pdf> (verified July 28, 2016). California Department of Pesticide Regulation, Sacramento, California.

Segawa, R. 1995. SOP QAQC001.00. Chemistry Laboratory Quality Control. Available at: <http://www.cdpr.ca.gov/docs/emon/pubs/sops/qaqc001.pdf> (verified July 28, 2016). California Department of Pesticide Regulation, Sacramento, California.