

**Department of Pesticide Regulation
Environmental Monitoring Branch
1001 I Street
Sacramento, California 95814
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**Study GW07: Protocol For Conducting Ground Water Protection List Monitoring For
Fiscal Year 2006/07**

I. INTRODUCTION

The Department of Pesticide Regulation's (DPR's) Ground Water Protection List (GWPL) is a list of pesticides having the potential to pollute ground water. Pursuant to California Food and Agricultural Code (FAC) section 13143, companies seeking to register an agricultural use pesticide containing a new active ingredient (AI) must send DPR certain chemical and environmental fate data. If these data exceed certain key values and the pesticide label specifies certain application methods, FAC section 13144 requires DPR to add the pesticide to GWPL. GWPL is contained in the Title 3, California Code of Regulations (3CCR) section 6800. FAC section 13148 requires DPR to monitor pesticides on GWPL to "more accurately determine the mobility and persistence of the pesticides" and "determine if these pesticides have migrated to groundwaters of the state." Since 1990, DPR has sampled approximately 1200 wells for 81 pesticides and pesticide breakdown products as part of GWPL monitoring.

II. OBJECTIVE

The purpose of this study is to determine whether oryzalin and napropamide have contaminated ground water in areas of California with high agricultural use and vulnerable soils.

III. PERSONNEL

GWPL well sampling will be conducted by Environmental Monitoring Branch. Project personnel include:

Project Supervisor: Lisa Quagliaroli
Research Scientist III: John Troiano
Project Team: Matt Fossen, Joe Marade, Craig Nordmark, and Aron Lindgren
Lab Liaison/Quality Control: Carissa Ganapathy
Agency and Public Contact: Mark Pepple

All questions concerning this protocol should be directed to Mark Pepple at (916) 324-4086, e-mail at: <mpepple@cdpr.ca.gov>.

IV. STUDY PLAN

- a. **Active Ingredient Selection.** DPR chose pesticide AIs for monitoring based on guidelines outlined in Troiano (1997): for fiscal year 2006/07, oryzalin (3,5-dinitro-N4,N4-dipropylsulfanilamide) and napropamide ((R,S)-N,N-diethyl-2-(1-naphthoxy) propionamide) were selected. DPR sampled for both AIs in a previous study (Weaver, 1999), with no detections reported. Data obtained from DPR's pesticide use reports (PURs) indicated a peak in oryzalin use in several counties in 1998, with a trend of increasing use after 2001 (Figure 1); this led us to determine that this was an appropriate AI to resample (CDPR, 2007). The presence of a combined analytical method for oryzalin and napropamide added to the desirability of sampling for both AIs.

We will also sample the selected wells for the presence of known ground water contaminants (3CCR section 6800[a]), hexazinone, and several important degradates of these parent AIs. DPR can use this information in the creation of new ground water protection areas (GWPA) or as a comparison in investigations for the presence of new AIs in established GWPA.

- b. **Study Area Selection.** Potential study sections were chosen based on soil vulnerability and pounds of active ingredient applied as reported in PUR. All selected sections were in the 80th percentile or higher for total pounds of target pesticide applied for reporting years 1992–2003. Additionally, most sections had a depth to ground water of 70 feet or less, with soil types classified as vulnerable (Troiano et al., 2000). The selected sections are located in Butte, Colusa, Fresno, Merced, San Joaquin, Santa Clara, Stanislaus, Tulare, and Yolo counties: a list of potential study sections and their properties can be found in Table 1. A study goal of 80 sampled wells was set: 40 to be sampled for triazines and oryzalin, and 40 for triazines and napropamide.

V. SAMPLING AND ANALYTICAL METHODS

Domestic wells will be selected according to procedures in SOP FSWA006.00 (Marade, 1998). Samples will be collected using the methods described in SOP FSWA001.00 (Marade, 1996). The California Department of Food and Agriculture's (CDFA's) Center for Analytical Chemistry will analyze primary samples for oryzalin/napropamide and triazines. Samples containing known amounts of oryzalin and napropamide and disguised as actual samples (blind spikes) will be prepared and analyzed in accordance with SOP QAQC001.00 (Segawa, 1995). Samples containing deionized water (field blanks) will be collected at the same time as field samples and analyzed to confirm the validity of positive results. The reporting limit for all analytes is 0.05 parts per billion (ppb). The reporting limit is the smallest amount that can be reliably detected and is set by the testing laboratory for each compound.

VI. DATA ANALYSIS

Detection data obtained from CDFA laboratory will be used to notify participating property owners of the sampling results for their respective wells. These data will also be used to generate a study memorandum detailing the analysis findings.

VII. TIMETABLE

- March-May 2007: Conduct well sampling for oryzalin, napropamide, and triazines.
- August 2007: Obtain analysis results from CDFA laboratory, mail results to property owners.
- November 2007: Write study memorandum.

VIII. BUDGET

| Budget Component | Units | Expense per Unit | Total Component Expense |
|---------------------------|--------------|-------------------------|--------------------------------|
| Pesticide sample analysis | 100 | \$1420 | \$142000 |
| Travel | 1 | \$8320 | \$8320 |
| PY | 0.3 | \$100000 | \$30000 |
| Total | | | \$180320 |

VI. REFERENCES

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<http://www.cdpr.ca.gov/docs/emon/pubs/ehapreps/eh0005.pdf>. (verified 11 December 2007). California Department of Pesticide Regulation, Sacramento, California.
- Weaver, D. and J. Marade. 1999. Memorandum to K. Goh: Summary of Results for FY 1998/99 Ground Water Protection List Monitoring. Available at:
http://www.cdpr.ca.gov/docs/emon/grndwtr/rpts/gwpl_9899.pdf. California Department of Pesticide Regulation, Sacramento, California.

X. TABLES AND FIGURES

Table 1. Potential study sections grouped by county. Total pounds of applied AI are for reporting years 1992-2003 (CDPR, 2007).

| COMTRS | Depth to Water | AI | Total Pounds Applied |
|---------------|-----------------------|-------------|-----------------------------|
| 04M21N01E01* | 51 | Oryzalin | 4072 |
| 04M21N01E04 | 25 | Oryzalin | 1879 |
| 04M21N01E12 | 52 | Oryzalin | 1985 |
| 04M21N01E16 | 19 | Oryzalin | 2489 |
| 04M21N01E21 | 21 | Oryzalin | 2279 |
| 04M21N01E24 | 35 | Oryzalin | 1713 |
| 04M21N01E26 | 30 | Oryzalin | 5681 |
| 04M21N01E28 | 20 | Oryzalin | 2162 |
| 04M21N01E34 | 20 | Oryzalin | 2074 |
| 06M14N02W08 | 34 | Napropamide | 1284 |
| 06M14N02W14 | 22 | Napropamide | 957 |
| 06M14N02W16 | 34 | Napropamide | 1484 |
| 06M14N02W20 | 75 | Napropamide | 911 |
| 06M14N02W21 | 43 | Napropamide | 1302 |
| 06M14N02W23 | 32 | Napropamide | 1142 |
| 06M14N02W28 | 54 | Napropamide | 1545 |
| 06M15N02W06 | 21 | Napropamide | 1719 |
| 06M15N02W31 | 13 | Napropamide | 930 |
| 06M15N02W34 | 10 | Napropamide | 1086 |
| 06M15N03W01 | 36 | Napropamide | 971 |
| 06M15N03W02 | 59 | Napropamide | 1047 |
| 06M15N03W05 | 3 | Napropamide | 1291 |
| 06M15N03W06 | 3 | Napropamide | 910 |
| 06M15N03W07 | 3 | Napropamide | 1097 |
| 06M15N03W19 | 9 | Napropamide | 1922 |
| 06M15N03W25 | 17 | Napropamide | 1286 |
| 06M15N03W27 | 25 | Napropamide | 925 |
| 06M15N03W28 | 13 | Napropamide | 1586 |
| 06M15N03W29 | 13 | Napropamide | 1483 |
| 06M15N03W30 | 15 | Napropamide | 1128 |
| 06M15N03W34 | 45 | Napropamide | 1445 |
| 06M15N03W35 | 40 | Napropamide | 1414 |
| 06M15N04W11 | 5 | Napropamide | 980 |
| 06M15N04W26 | 15 | Napropamide | 965 |
| 10M14S23E21* | 52 | Oryzalin | 4120 |
| 10M14S23E22* | 57 | Oryzalin | 3063 |
| 10M14S23E26* | 54 | Oryzalin | 1707 |
| 10M14S23E27* | 49 | Oryzalin | 7702 |
| 10M14S23E28* | 44 | Oryzalin | 4390 |
| 10M14S23E32* | 39 | Oryzalin | 2436 |
| 10M14S23E33* | 36 | Oryzalin | 7110 |
| 10M15S23E13* | 66 | Oryzalin | 2840 |
| 10M15S23E18* | 40 | Oryzalin | 2117 |
| 10M15S23E24* | 67 | Oryzalin | 3177 |
| 10M15S24E07* | 60 | Oryzalin | 3240 |
| 10M15S24E09* | 46 | Oryzalin | 2050 |
| 10M16S15E25* | 10 | Napropamide | 4277 |
| 10M16S15E26* | 13 | Napropamide | 2630 |
| 10M16S16E29* | 33 | Napropamide | 2560 |

| COMTRS | Depth to Water | AI | Total Pounds Applied |
|---------------|-----------------------|-------------|-----------------------------|
| 10M16S16E30* | 14 | Napropamide | 3355 |
| 10M16S16E31* | 9 | Napropamide | 3730 |
| 24M04S10E11* | 60 | Oryzalin | 1682 |
| 24M04S10E12* | 64 | Oryzalin | 1845 |
| 24M05S11E33* | 41 | Oryzalin | 2364 |
| 24M05S13E20* | 109 | Oryzalin | 2825 |
| 24M05S13E21* | 115 | Oryzalin | 4970 |
| 24M05S13E28* | 104 | Oryzalin | 2079 |
| 24M05S13E29* | 92 | Oryzalin | 4416 |
| 24M05S13E33* | 93 | Oryzalin | 5132 |
| 24M06S10E25* | 20 | Oryzalin | 1787 |
| 24M06S10E35* | 14 | Oryzalin | 1742 |
| 24M06S10E36* | 17 | Oryzalin | 3816 |
| 24M06S11E04* | 35 | Oryzalin | 1683 |
| 24M06S11E20* | 31 | Oryzalin | 2328 |
| 24M06S11E31* | 25 | Oryzalin | 3655 |
| 24M06S11E32* | 34 | Oryzalin | 2600 |
| 24M07S10E03* | 12 | Oryzalin | 2092 |
| 39M02S07E01* | 26 | Oryzalin | 3032 |
| 39M02S07E02* | 21 | Oryzalin | 2124 |
| 39M02S07E10* | 20 | Oryzalin | 1779 |
| 39M02S07E12* | 20 | Oryzalin | 1973 |
| 39M02S07E13* | 18 | Oryzalin | 3077 |
| 39M02S07E15* | 15 | Oryzalin | 2095 |
| 39M02S07E16* | 14 | Oryzalin | 3925 |
| 39M02S07E17* | 9 | Oryzalin | 2799 |
| 39M02S07E20* | 8 | Oryzalin | 1987 |
| 39M02S07E21* | 12 | Oryzalin | 4128 |
| 39M02S07E22* | 12 | Oryzalin | 4256 |
| 39M02S07E23* | 14 | Oryzalin | 1980 |
| 39M02S07E24* | 18 | Oryzalin | 3009 |
| 39M02S07E27* | 12 | Oryzalin | 1808 |
| 39M02S07E35* | 15 | Oryzalin | 1927 |
| 39M02S08E01* | 53 | Oryzalin | 2090 |
| 39M02S08E02* | 49 | Oryzalin | 7805 |
| 39M02S08E03* | 46 | Oryzalin | 2435 |
| 39M02S08E04* | 44 | Oryzalin | 1876 |
| 39M02S08E07* | 28 | Oryzalin | 3217 |
| 39M02S08E09* | 34 | Oryzalin | 5184 |
| 39M02S08E11* | 37 | Oryzalin | 3254 |
| 39M02S08E12* | 43 | Oryzalin | 2275 |
| 39M02S08E13* | 35 | Oryzalin | 2861 |
| 39M02S08E14* | 33 | Oryzalin | 2437 |
| 39M02S08E15* | 30 | Oryzalin | 5670 |
| 39M02S08E16* | 29 | Oryzalin | 2217 |
| 39M02S08E17* | 28 | Oryzalin | 4467 |
| 39M02S08E18* | 24 | Oryzalin | 4487 |
| 39M02S08E24* | 32 | Oryzalin | 2462 |
| 39M02S08E27* | 28 | Oryzalin | 2674 |
| 39M02S08E32* | 21 | Oryzalin | 2003 |
| 39M02S09E05* | 57 | Oryzalin | 2079 |
| 39M02S09E06* | 56 | Oryzalin | 2708 |
| 39M02S09E07* | 48 | Oryzalin | 2263 |
| 39M02S09E08* | 52 | Oryzalin | 1709 |
| 39M02S09E09* | 56 | Oryzalin | 2567 |

| COMTRS | Depth to Water | AI | Total Pounds Applied |
|---------------|-----------------------|-------------|-----------------------------|
| 39M02S09E16* | 51 | Oryzalin | 1807 |
| 39M02S09E17* | 46 | Oryzalin | 2711 |
| 39M02S09E19* | 36 | Oryzalin | 2059 |
| 43M10S04E29* | 48 | Napropamide | 1444 |
| 43M10S04E33* | 42 | Napropamide | 5853 |
| 43M11S04E04* | 29 | Napropamide | 2391 |
| 43M11S04E10* | 19 | Napropamide | 5557 |
| 43M11S04E21* | 15 | Napropamide | 3854 |
| 43M11S04E22* | 10 | Napropamide | 1814 |
| 50M03S08E33* | 19 | Napropamide | 2294 |
| 50M04S08E03* | 22 | Napropamide | 300 |
| 50M04S08E10* | 20 | Napropamide | 337 |
| 50M04S08E14* | 19 | Napropamide | 1111 |
| 50M04S08E23* | 16 | Napropamide | 2892 |
| 50M04S08E27* | 13 | Napropamide | 850 |
| 54M19S26E13* | 44 | Oryzalin | 1580 |
| 54M19S26E16* | 39 | Oryzalin | 2295 |
| 54M19S26E17* | 38 | Oryzalin | 4178 |
| 54M19S26E21* | 39 | Oryzalin | 2993 |
| 54M19S26E24* | 34 | Oryzalin | 2065 |
| 54M19S27E19* | 37 | Oryzalin | 1662 |
| 57M10N01W15* | 26 | Napropamide | 1980 |
| 57M10N01W20* | 27 | Napropamide | 973 |
| 57M10N01W21* | 27 | Napropamide | 995 |
| 57M10N01W08* | 35 | Napropamide | 877 |
| 57M10N02E01* | 14 | Napropamide | 1169 |
| 57M10N02E02* | 17 | Napropamide | 950 |
| 57M10N02E04* | 24 | Napropamide | 981 |
| 57M10N02E25* | 8 | Napropamide | 889 |
| 57M10N03E07* | 13 | Napropamide | 970 |
| 57M12N01E03* | 12 | Napropamide | 1200 |
| 57M12N01E14* | 10 | Napropamide | 1491 |
| 57M12N01E17* | 14 | Napropamide | 1415 |
| 57M12N01E21* | 13 | Napropamide | 1509 |
| 57M13N01E34* | 13 | Napropamide | 1267 |
| 57M10N01W03* | 21 | Napropamide | 891 |

* Section is a GWPA

Figure 1. Oryzalin use in nine counties for reporting years 1992-2003 (CDPR, 2007).

