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SUBJECT: STUDY GW06–SUMMARY OF RESULTS FOR FISCAL YEAR 2005─2006 GROUND WATER PROTECTION LIST MONITORING FOR ALDICARB

## SUMMARY

Aldicarb was chosen for monitoring from the active ingredients (AIs) on the Ground Water Protection List (GWPL). Forty-seven wells were sampled in eight counties during February through May 2006. No residues of aldicarb or its degradates, aldicarb sulfone, and aldicarb sulfoxide, were detected in any of the wells.

## BACKGROUND

The Department of Pesticide Regulation's (DPR's) 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 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 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 1100 wells for 81 pesticides and pesticide breakdown products as part of GWPL monitoring (CDPR, 2007a). The systemic insecticide aldicarb was selected for monitoring during fiscal year 2005─2006, based on procedures described in Troiano (1997). These herbicides were selected based on the availability of a combined laboratory analysis method and trends in reported use.

## METHODS

DPR chose study sections based on soil vulnerability and the pounds of AI applied as reported in the Pesticide Use Reports (CDPR, 2007b). These sections were further prioritized based on the presence of wells in the area according to our well inventory database (CDPR, 2007a). Areas with clusters of high use sections, based on use for reporting years 1992–2003, were considered first (Table 1). DPR has classified many sections within the state as ground water protection areas (GWPAs) because they are more vulnerable to pesticide contamination of the ground water based on either (1) soil conditions and the depth to ground water less than 70 feet or (2) the presence of verified pesticide residues in the ground water of the section (Troiano et al., 2000). For this study, the majority of the sections with a high use of aldicarb were located outside of these GWPAs. As a result, areas of high aldicarb use and with ground water depths that were less than 100 feet and a record of available wells were given highest priority. The sampled sections were located in Colusa, Fresno, Glenn, Kings, Madera, Merced, Tulare, and Yolo counties (Table 2).

Table 1. Counties with the highest use of aldicarb for reporting years 1992–2003 (CDPR, 2007b).

| Aldicarb | |
|---|---|
| **County** | **Pounds AI** |
| Fresno* | 1,099,779 |
| Kings* | 974,679 |
| Kern | 796,321 |
| Tulare* | 516,447 |
| Merced* | 323,205 |
| Madera* | 143,089 |
| Imperial | 59,903 |
| Yolo* | 48,155 |
| Colusa* | 28,839 |
| Solano | 18,559 |
| San Joaquin | 15,605 |
| Riverside | 9,761 |
| Modoc | 9,623 |
| Sutter | 8,703 |
| Sacramento | 7,839 |
| Glenn* | 4,171 |
| Siskiyou | 4,132 |
| Butte | 3,509 |
| Monterey | 3,291 |
| Santa Clara | 1,704 |

* Sampled counties

Table 2. Sections containing wells sampled during 2005─2006 GWPL monitoring. Pounds of aldicarb applied in each section and the total for the 9-section area (sampled section and the surrounding 8 sections) are given for reporting years 1992─2003 (DPR, 2007b). Depth to ground water values are from Troiano et al. (2000).

| County | Section | Depth to ground water (ft) | Pounds of aldicarb applied | |
|---|---|---|---|---|
| | | | In section | In 9-section |
| Colusa | 06M13N01W08** | 22 | 427 | 685 |
| | 06M14N02W23 | 32 | 522 | 1,639 |
| | 06M14N03W01 | 36 | 552 | 2,066 |
| | 06M15N04W14 | 7 | 224 | 1,490 |
| Fresno | 10M13S17E31 | 88 | 0 | 9,097 |
| | 10M14S17E05 | 80 | 2,348 | 9,242 |
| | 10M14S17E11 | 93 | 2,744 | 6,020 |
| | 10M15S16E11** | 46 | 1,443 | 5,647 |
| | 10M15S17E30 | 75 | 2,432 | 17,967 |
| | 10M17S19E34** | 104 | 1,849 | 9,322 |
| | 10M17S20E23** | 68 | 1,726 | 2,815 |
| Glenn | 11M18N04W13** | 12 | 1,158 | 1,293 |
| Kings | 16M17S22E29 | 52 | 3,850 | 17,807 |
| | 16M17S22E32 | 59 | 3,678 | 18,388 |
| | 16M18S20E28 | 59 | 2,678 | 26,829 |
| | 16M18S20E36 | 25 | 1,883 | 15,868 |
| | 16M18S21E14 | 71 | 1,986 | 14,940 |
| | 16M18S21E21 | 46 | 2,360 | 12,641 |
| | 16M18S22E13** | 73 | 5,762 | 28,264 |
| | 16M18S22E28 | 86 | 2,360 | 13,675 |
| | 16M18S22E29 | 90 | 4,258 | 11,022 |
| | 16M19S22E07 | 88 | 2,981 | 11,169 |
| | 16M19S22E14 | 84 | 6,243 | 18,853 |
| | 16M19S22E30 | 90 | 3,380 | 16,449 |
| Madera | 20M10S15E22 | 91 | 2,072 | 5,848 |
| | 20M10S16E07 | 107 | 1,760 | 4,125 |
| | 20M11S17E31 | 81 | 1,399 | 1,399 |
| | 20M11S17E36 | 85 | 1,607 | 1,607 |
| Merced | 24M08S13E16** | 22 | 3,058 | 6,430 |
| | 24M08S13E21 | 30 | 1,987 | 10,043 |
| | 24M10S10E04 | 10 | 357 | 9,756 |
| | 24M10S10E10 | 10 | 1,528 | 3,883 |
| | 24M10S10E24 | 10 | 1,319 | 8,506 |
| | 24M10S10E27 | 10 | 2,738 | 10,090 |
| | 24M11S10E01 | 10 | 2,002 | 6,904 |
| | 24M11S10E23 | 48 | 5,159 | 20,270 |
| Tulare | 54M18S25E26 | 44 | 1,843 | 3,798 |
| | 54M18S26E11* | 23 | 2,879 | 2,879 |
| | 54M18S27E07* | 26 | 5,566 | 8,601 |

| County | Section | Depth to ground water (ft) | Pounds of aldicarb applied | |
|---|---|---|---|---|
| | | | In section | In 9-section |
| Tulare | 54M19S25E15 | 47 | 1,965 | 4,858 |
| | 54M20S24E30 | 67 | 2,702 | 12,780 |
| | 54M21S26E01* | 25 | 637 | 10,575 |
| | 54M21S27E07* | 27 | 4,410 | 10,692 |
| Yolo | 57M09N01E19 | 9 | 1,136 | 3,853 |
| | 57M10N01W04 | 28 | 759 | 4,543 |
| | 57M10N01W05 | 35 | 1,058 | 3,789 |
| | 57M10N01W15** | 26 | 1,090 | 3,419 |

*Section is a GWPA. **Section is adjacent to a GWPA.

DPR selected domestic wells for sampling according to procedures in SOP FSWA006.00 (Marade, 1998), with the goal of sampling at least one well in each selected section. If no suitable well could be located within a target section, a well within 0.2 miles of the target section could be sampled. Samples were collected using the methods described in SOP FSWA001.00 (Marade, 1996). DPR obtained information regarding the well construction and depth from the well owner. When possible, the sampling crew measured the depth to water using a Slope Water Level Indicator model WLI#51690030 meter.

The California Department of Food and Agriculture's Center for Analytical Chemistry analyzed one primary sample from each well for aldicarb, aldicarb sulfone and aldicarb sulfoxide. Samples containing known amounts of these compounds and disguised as actual samples (blind spikes) were prepared and analyzed in accordance with SOP QAQC001.00 (Segawa, 1995). Samples containing deionized water (field blanks) were collected at the same time as the field samples and would have been analyzed to confirm the validity of positive results. The reporting limit for all analytes was 0.05 parts per billion. The reporting limit is the smallest amount that can be reliably detected and is set by the testing laboratory for each compound.

## RESULTS

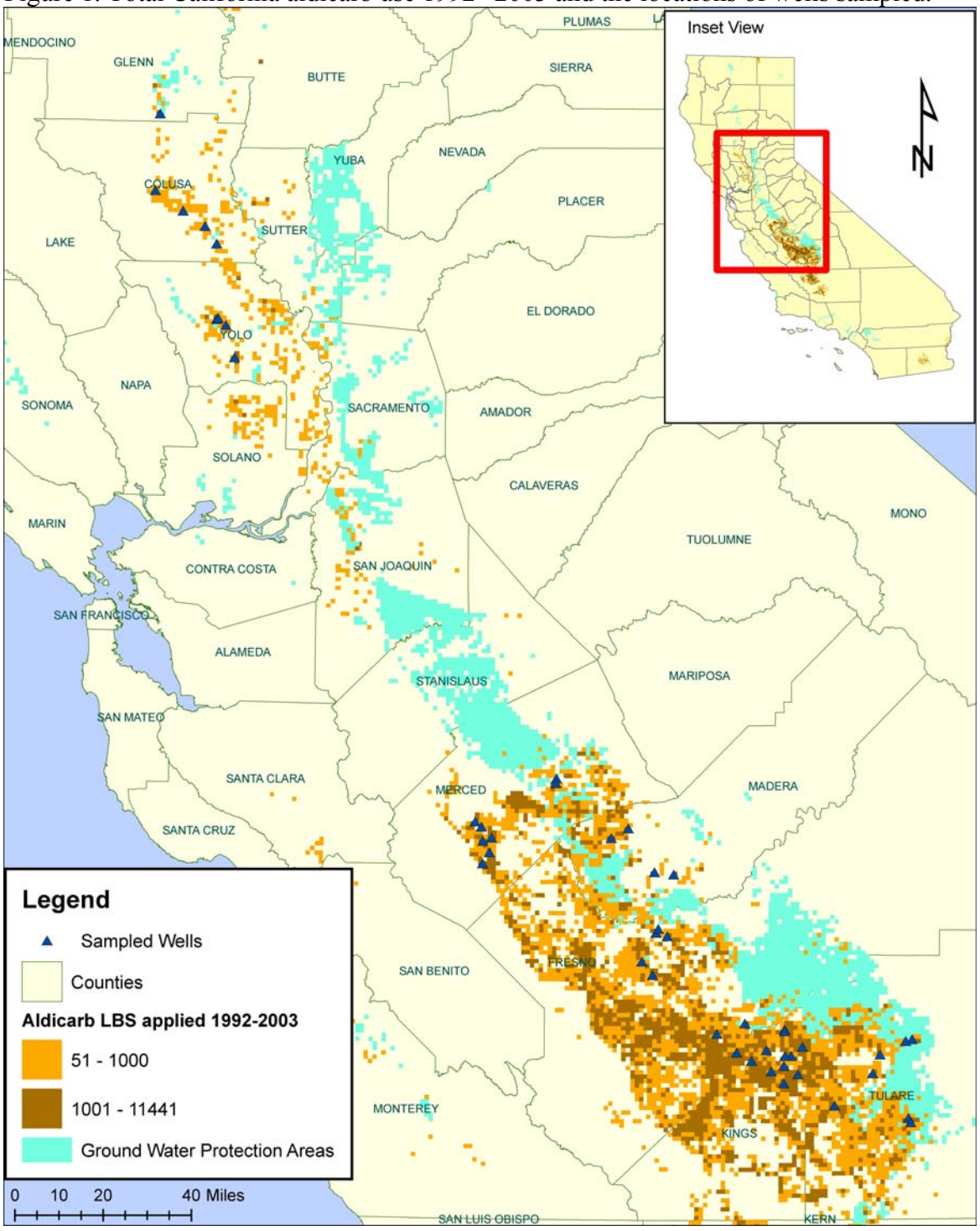
A total of 47 wells in 47 sections were sampled in 8 counties, with no reported detections of aldicarb, aldicarb sulfoxide, or aldicarb sulfone. Aldicarb use for the years 1992─2003, GWPAs and the locations of wells sampled for this study are shown in figure 1.

## DISCUSSION

Aldicarb is a soil applied insecticide, nematicide, and miticide. In California, it is primarily (95%) used on cotton although there are 25 other crops that have reported some use for the period 1992─2003.

None of the 47 sampled wells tested positive for either aldicarb, or its degradates, despite being located in high-use sections with shallow depths-to ground water. The results of this monitoring study indicates that aldicarb, at current use levels and practices, has a low potential for contaminating California ground water due to legal agricultural use in vulnerable areas. If aldicarb use levels increase or practices change in the future, DPR may conduct further studies.

Figure 1. Total California aldicarb use 1992─2003 and the locations of wells sampled.



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