



Department of Pesticide Regulation



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MEMORANDUM

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TO: Randy Segawa
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Original signed by

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SUBJECT: RESPONSE TO STAKEHOLDER COMMENTS ON PROJECT REPORTS:
ESTIMATING PESTICIDE PRODUCT VOLATILE ORGANIC COMPOUND
EMISSION SPECIATION AND REACTIVITY BASED ON PRODUCT
COMPOSITION

INTRODUCTION

The Department of Pesticide Regulation (DPR) invited stakeholder comment on two documents:

ESTIMATING PESTICIDE PRODUCT VOLATILE ORGANIC COMPOUND OZONE REACTIVITY. Part 1: Speciating VOC Emissions using Confidential Statements of Formula, September 15, 2010 DRAFT, D. Oros and F. Spurlock

ESTIMATING PESTICIDE PRODUCT VOLATILE ORGANIC COMPOUND REACTIVITY. Part 2: Reactivity-weighted emissions, September 15, 2010 DRAFT, D. Oros and F. Spurlock

These two reports summarize the results of a pilot DPR research project to evaluate scientific issues, uncertainties, and potential approaches for incorporating ozone reactivity into DPR's inventory of volatile organic compound (VOC) emissions. The initial project proposal (Oros, 2009) stated "DPR emphasizes that this is a proposal for an investigation to identify scientific questions and answers, as opposed to a proposal to implement new regulations at this time." In previous responses to stakeholders (Spurlock and Oros, 2009), DPR stated that "DPR does not propose to promulgate regulations or otherwise implement reactivity concepts into the VOC inventory at this time." In inviting comments on part 1. and part 2 memorandum above, DPR asked stakeholders:

- to focus their comments on the scientific/technical aspects of the documents, and
- that comments on policy issues or impacts on the state implementation plan (SIP) were not relevant.

Comments were submitted by the U.S. Environmental Protection Agency, (U.S. EPA), Region IX, Dow Agrosciences (DAS), the Western Plant Health Association (WPHA) and Exxon Mobil



Chemical Company (EMCO). This memorandum summarizes DPR's responses to submitted comments.

A. Department of Pesticide Regulation general response to all stakeholders

A1. Relevance. Several people provided comments that were not relevant to the scientific and technical evaluation of the two reactivity pilot project documents listed above. These included, among others, extensive discussion of the suitability of the currently accepted thermogravimetric analysis (TGA) method for determining pesticide product emission potential (EP), applicability of TGA to field conditions, the concept of "atmospheric availability," the putative need for NO_x controls in conjunction with VOC controls to reduce ozone in certain geographic areas, and the need for development of nonfumigant emission adjustment factors to account for environmental fate processes that may mitigate nonfumigant VOC emissions. DPR has previously responded to these comments in letters to the WPHA dated October 20, 2008, and May 2, 2007, and in a 2009 memorandum (Spurlock and Oros, 2009). In this document, DPR does not respond to any comments that are not directly relevant to the scientific/technical content of the two reactivity pilot project documents listed above.

B. U.S. Environmental Protection Agency comments

B1. General Issue - Handling Confidential Business Information

"The Clean Air Act (CAA) contains specific requirements which give the public access to any records, reports or information obtained by EPA except in cases where trade secrets are involved." The comment goes on to describe potential conflict between confidential product composition information and CAA/SIP requirements that emissions data are public information.

DPR's Response

This comment is outside the specific scientific/technical scope of the two documents.

B2. Thermogravimetric Analysis

"The TGA method, along with precision and bias data, should be submitted for approval if it will be used to determine compliance with a SIP approved rule."

DPR's Response

This comment on SIP requirements is outside the specific scientific/technical scope of the two documents.

B3. Reactivity-based regulation

"EPA has only allowed in very limited cases, the use of low vapor pressure as a condition to exclude a compound from a VOC limit. However, under a reactivity-based regulation, all VOCs should be counted as they all contribute to ozone formation, although at different rates."

DPR's Response

This comment is outside the specific scientific/technical scope of the two documents.

B4. Referring to the Part 1. document

Page 11 concludes there is evidence that DPR's basic assumption that "the composition of all products that share the same primary EPA registration number are substantially the same" may not always be true. DPR concludes this may be problematic for estimating emissions. Can DPR estimate how large or small this issue may be?

DPR's Response

We are not sure whether, or how important, this putative issue might be. We anticipate the further analyses of product CSFs, as recommended in the Part 1 and Part 2 reports, may provide more information by allowing us to compare CSFs and TGA data of more products that share a common EPA registration number.

B5. Referring to Document 2

"To estimate the ozone forming potential of the unspiciated nonfumigant products, DPR "assumes that the overall reactivity of unspiciated mass emissions is equivalent to the mean reactivity of the spiciated product emissions". It is not clear why using the "mean reactivity" of the spiciated emissions, which represent 32 and 34% of the SJV nonfumigant ozone season emissions, is an appropriate and conservative assumption to scale up the unspiciated nonfumigant fraction. "

DPR's response

The Part 2 report provides an illustrative example of estimating pesticide product VOC reactivity across the entire inventory. Given the limited scope of this pilot project, only a relatively small number of product CSFs were analyzed to provide product speciation data. If DPR decides to transition to a reactivity-based inventory, DPR recognizes that a larger set of products would have to be analyzed. On the other hand, there will always be at least some products for which data will not be available so that speciation would have to be estimated. This would be analogous to defining default emission potentials as is currently done for certain products.

Change to DPR documents in response to comment B5, new text added in *italics*

The conclusion of Document 2 states that the two reports "provide the outline of a scientifically defensible method to incorporate reactivity into DPR's current mass-based VOC inventory." Additional work remains, including more accurate characterization of certain component reactivities [e.g. aromatics (Carter, 2009a; selected semi-volatile active ingredients; Table 2), *additional analysis of pesticide product CSFs and TGA data to explicitly speciate a larger portion of the inventory*, and additional analysis to refine the current vapor pressure cutoff (0.05 Pa) used to discriminate between volatile and nonvolatile product components.

C. Western Plant Health Association comments

C1

WPHA expressed concern over maintaining confidentiality of product formulation data used to speciate emissions.

DPR's Response

This comment is outside the specific scientific/technical scope of the two documents.

C2. WPHA states

“We also continue to urge the DPR to include application factors for nonfumigant products as they've done with fumigants. The easiest way to begin, as a first step, would be to include a factor for soil incorporated herbicides and insecticides.”

DPR's Response

This comment is outside the specific scientific/technical scope of the two documents.

C3. WPHA states

“WPHA is concerned with the new definition for VOCs that establishes a cutoff of 0.05 Pa. This proposed standard is inconsistent with other VOC definitions in the industry and other regulatory authorities.”

DPR's response

DPR did not propose a new definition for VOCs in the two documents. The vapor pressure cutoff was determined to identify which product components volatilize under TGA conditions. The regression analysis indicates that 0.05 Pa is an *approximate* vapor pressure dividing line for discriminating between chemicals that are volatile under TGA conditions and those that are not.

C4. WPHA states

“WPHA provides several comments and extensive discussion of the current TGA emission potential determination procedure, concluding: “As a consequence of a VOC limit of 0.05 Pa, products previously dismissed (<20% EP) would be brought back into the pesticide VOC inventory.”

DPR's response

See General Comment A1.

C5. WPHA states

“WPHA recommends the DPR evaluate whether current VOC regulations and reformulation requirements are working.”

DPR's Response

This comment refers to policy, so is outside the specific scientific/technical scope of the two documents.

C6

“WPHA recommends the DPR keep TGA as the primary initial screen for estimating emission potential, permit use of the CSF as the alternative method to estimate emissions potential where TGA data are not available, but also include the ability for further refinements based on atmospheric availability. There is no scientific or regulatory need to set such a low VOC standard as the proposed 0.05 Pa value.”

DPR's response:

See General Comment A1.

C7

“WPHA is concerned DPR would use the most conservative MIR over EBIR. Further, we question if even the EBIR is adequate, given fluctuations in NOx levels. Is there an opportunity to consider another method even better than the EBIR that would represent ambient NOx levels, such as an “ambient air incremental reactivity?”

DPR's response

DPR has not committed to using MIR, EBIR or any other particular reactivity scale at this time.

C8

“Use of reactivity factors has gained some attention in California due to successful ozone level reductions in urban areas where VOC levels are the limiting factor. However, reductions in rural areas where NOx is the limiting factor have not proven so successful. Application of incremental reactivity does not fully account for ambient atmospheric conditions in rural or agricultural areas where the available NOx level is low, or even depleted due to the underlying high VOC levels.”

DPR's response

See General Comment A1.

C9

“WPHA would like to have a better understanding of how the DPR would use reactivity for estimating SOFP (Specific Ozone Formation Potential). Which method would be used, which incremental reactivity factor(s) would be applied to the San Joaquin Valley air shed (Non-Attainment Area 5), how would reactivity factors be applied, and how would this change in procedures impact the State Implementation Plan (SIP) for pesticides?” . . . “It is also unclear how new data would be included in the inventory. Would the inventory be adjusted or recalculated? Use of reactivity would significantly impact the estimated inventory baseline and

any resultant obligations to reduce baselines” “The lack of clear direction of how reactivity would be used still does not get to the heart of the matter, which is the reaction-limiting NO_x levels present in rural or agricultural air sheds. . . .”

DPR’s Response:

As DPR noted to stakeholders, stakeholder comments on policy issues or impacts on the SIP were not relevant. The WPHA comment is outside the specific scientific/technical scope of the two documents.

C10

“The determination of unspeciated VOCs based on Equation 3, using average speciation reactivity factors, raises some concern.”

DPR’s response

See response to comment B.5.

C11

“Incorporating reactivity would not be consistent with how “consumer products” pesticides are evaluated.”

DPR’s Response

This comment is outside the specific scientific/technical scope of the two documents.

C12

“WPHA believes it is premature to discuss further changes to the existing inventory method if there is no need to do so.”

DPR’s Response

This comment is outside the specific scientific/technical scope of the two documents.

D. Dow Agrosiences comments

D1

“. the proposed approaches for inserting reactivity into the current mass-based VOC emission regulations and a new more stringent definition of VOC raise some concerns” “Dow AgroSciences also reformulated other products to reduce their estimated VOC emissions potential.”

DPR’s Response

This comment is outside the specific scientific/technical scope of the two documents.

D2

“Speciation to Predict Estimated VOC Emissions”. . . . “we do not believe speciation should be a method initiated by DPR for existing registered products.”

DPR’s Response

DPR plans to retain TGA as the primary method for determining EPs. However DPR also plans to use CSF analysis on a case-by-case basis to estimate EPs when TGA data are unavailable or to troubleshoot questionable TGA-based EPs.

Change to DPR document 1, Conclusion section in response to comment, new text added in *italics*

“DPR plans to retain TGA as the primary method for estimating product emission potentials. In spite of the small bias, these data support the use of CSF analysis in both review of TGA data and for speciating TGA emissions. Detailed CSF analysis should be viewed as complementary to the TGA EP determination method . . . Use of both TGA and CSF data to determine EPs will improve the accuracy of the inventory.”

D3

“III. Proposed new VOC Standard’ . . . “The proposed new VOC cut-off of 0.05 Pascals appears to be a new definition for a VOC.”

DPR’s Response

The 0.05 Pa cutoff is not a definition for a VOC. See response to comment C3.

D4

“IV. Reactivity proposal further overestimates VOC emissions”. . . . “We acknowledge the Department’s inclusion of Equal Benefit Incremental Reactivity (EBIR) to more closely approximate rural air sheds. However, the proposal stops short of defining when MIRs vs. EBIRs would be appropriate. This would be critical to a registrant’s understanding to accomplish “real” reductions. We respectfully recommend the research proposal should clearly detail what specific circumstances it proposes to employ MIRs vs. EBIRs.”

DPR’s response

DPR has not committed to using MIR, EBIR, or any other particular reactivity scale at this time.

E. Exxon Mobil Chemical Company Comments

**** EMCO Comments on report #1 ****

E1

“VOC reductions, on any basis (mass or reactivity), will only be effective in reducing ozone in an area that is VOC-limited or that is transitional between VOC and NOx limited. Negligible changes to improve air quality would be expected in NOx-limited areas”

DPR's Response

This comment is outside the specific scientific/technical scope of the two documents.

E2

“ExxonMobil believes that, as a first step, air quality modeling (such as the Comprehensive Qir Quality Model with Extensions, Community Multi-Scale air QualityModel) should be conducted to understand the parameters that impact air quality in California’s agricultural air sheds.”

DPR's Response

This comment is outside the specific scientific/technical scope of the two documents.

E3

“Environmental fate, atmospheric availability and product life cycle considerations are critical to understanding and assessing overall impacts on VOC emissions and ozone (O3) formation potential from pesticide products.”

DPR's response

See General Comment A1.

E4

“The creation of a CDPR VP cut-off results in another, new definition for a VOC.”

DPR's Response

The 0.05 Pa cutoff is not a definition for a VOC. See response to comment C3.

E5.

“CDPR’s initial calculation of a vapor pressure (VP) cut-off is based on a limited dataset, thus it is premature determine a VP cut-off of 0.05 Pa.” . . . “ExxonMobil agrees with CDPR that more data points are needed to determine a VP cut-off, and that multiple cut-off values should be evaluated with appropriate statistical analyses before concluding on a defined VP VOC cut-off.”

DPR's Response

DPR and EMCO are in agreement that the 0.05 VP cutoff is approximate and that more data are needed. No response is necessary.

E6

“CDPR should document their assumptions that the use of the short-term, high temperature TGA emissions potential (EP) data can be used to extrapolate field conditions where temperatures do not approach the 115C/80 minute maximum test TGA test regimen.”

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DPR's response
See General Comment A1.

E7

“Current approach proposed by CDPR assumes 100% EP for non-fumigants, whereas, certain liquid formulations may have physical-chemical characteristics that retard emission rates and are recognized to absorb/absorb to soil, further limiting potential emissions.”

DPR's response
See General Comment A1.

E8

“CDPR should correct VP values presented in Table 2 and ensure that the values they are using are in their calculations are relevant for the products under evaluation.”

DPR's response
The vapor pressure values in Table 2 were changed. This has no effect on the final results.

**** EMCO Comments on report #2 ****

E9

“EMCO has concerns with three assumptions: 100% of the estimated VOC is volatilized, whereas there are methodologies to estimate adsorption/absorption of VOC components,” . . . “100% of the estimated VOC content reacts to form O₃, thus ignoring alternate environmental fates and atmospheric availability” . . . “a single application method adjustment factor of 1.0 is sufficient for all non-fumigant products.”

DPR's response
See General Comment A1.

E10

“CDPR should determine and apply the most appropriate reactivity metric for the agricultural air sheds.”

DPR's response: DPR has not committed to using MIR, EBIR or any other particular reactivity scale at this time.

E11

“CDPR should take into account and incorporate environmental fate and atmospheric availability concepts into the product adjustment factors.”

DPR's response
See General Comment A1.

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E12

“CDPR should evaluate and document the basis for their assumption that non-speciated mass emissions can be based on the average value of speciated emissions.”

DPRs Response
See Response to Comment B5.

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REFERENCES

Oros, D. 2009. Pilot project proposal: Estimating pesticide product volatile organic compound emission speciation and reactivity based on product composition. August 17, 2009 memorandum to Randy Segawa, Environmental Monitoring Branch. Available on-line at:
<http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/2160_segawa.pdf>.

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