



Mary-Ann Warmerdam
Director

MEMORANDUM

Arnold Schwarzenegger
Governor

TO: John S. Sanders, Ph.D.
Environmental Program Manager II
Environmental Monitoring Branch

FROM: Bruce Johnson, Ph.D.
Research Scientist III
Environmental Monitoring Branch
916-324-4106

Original signed by

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SUBJECT: PRELIMINARY EVALUATION OF DOW AGROSCIENCES PROPOSED UPDATE
TO THE CALIFORNIA MANAGEMENT PLAN: 1,3-DICHLOROPROPENE
(JULY 15, 2008)

Introduction

I received from you on August 4, 2008, the Dow AgroSciences (DAS) proposed update to the California Management Plan (CMP) plan for 2008. You asked me to evaluate it with particular reference to the following questions:

1. Do I have the information necessary to evaluate their proposal?
2. What information, if any, do I need?
3. How much time do I need to evaluate their proposal?

As an explanatory note, the current default township cap is 90,250 adjusted (adj) lbs/township/year. Proposed increases can be expressed in actual adj lbs/township/year or equivalently in terms of the current default as a multiplicative factor. For example, 180,500 adj lbs/township/year is 2X ($2 \times 90,250 = 180,500$).

Their plan proposes three areas of modification:

1. Increase default statewide township cap to 135,375 adj lbs (1.5X).
2. Assuming the increase proposed above is granted (my comment), allow single year 1,3-dichloropropene (1,3-d) use up to 370,000 adj lbs or 4X (as long as average use since 1995 below 135,375 adj lbs).
3. Increase the default township caps for various townships.
 - a. Increase township allocations to 270,750 adj lbs (3X) for several specific townships in high use areas.
 - b. Increase township cap to 180,500 adj lbs (2X) for several specified townships.



Clarification of three areas

Before addressing the particular questions, three areas need some clarification:

- The definition of **default (or baseline) township cap**.
- The understanding between the Department of Pesticide Regulation (DPR) and DAS regarding the **use of the SOFEA model** to analyze special scenarios and associated requests to increase or modify township levels beyond the default cap.
- The issue of **30 versus 70 year exposure**.

Default township cap

For perhaps ten years the so-called township cap has been set at 90,250 adj lbs/township/year of 1,3-d. The intent of this level of 1,3-d use was to be a level of use which DPR agreed was within acceptable risk parameters and would *require no additional justification*. Even a cluster of contiguous townships all at 90,250 lbs would not require additional justification because the risk levels were within limits.

The CMP for 1,3-d began in February of 2002 (DPR 2002). Basically the CMP provided a rationalization for increasing use beyond 90,250 adj lbs/township/year by regulating on the basis of an average level of use since 1995. In effect, townships with low use in the late 90s, could exceed the 90,250 as long as the average level of use was below 90,250. Staff disagreed with the concept. But it was a risk management decision.

The concept has been portrayed as a bank account, with yearly levels of use below 90,250, in a sense contributing to the allowance for greater use in the future. For example, if zero use occurred from 1995 through 2000, then $6 \times 90,250 = 541,500$ lbs would be available to use above the 90,250 lb yearly limit in subsequent years (though there are limitations on how much more can be used in any particular year). Thus, an increase to the default township cap has large implications for the available additional use in this scheme. If default township cap (i.e. baseline use) were increased to 135,375, then in the example given, $6 \times 135,375 = 812,250$ lbs would be available for use above a year permissible *135,375 lbs*.

DAS has evidently argued that there will never be a group (say 9 to 25) of contiguous townships at the capping use level of 90,250. However, that is not the point. The point is that the township cap represents a level of use which for which DPR requires *no additional justification*. Given DAS's desire to increase sales of their product, and the current pressures on fumigants, it is obviously compelling for them to ask DPR to increase the default township cap because such an increase would cause *both* an increase in the 'bank account' and yearly allowable baseline increase. This would be a double whammy of increases.

Simulation work conducted using a version of the DAS-produced model called SOFEA indicated that the risk associated with 90,250 lbs/township/year ranged from 99% to 120% of the 1×10^{-5} guideline (Johnson 2006) and therefore, the default currently township cap could not be increased without increasing risk beyond the officially promulgated level of 1×10^{-5} (Gosselin 2001).

The Department of Pesticide Regulation and Dow AgroSciences understanding regarding the use of SOFEA and analysis of special situations

Over the last seven to eight years the understanding between DPR and DAS has been that DAS would develop a computer simulation model capable of analyzing multi-year 1,3-d applications and enable estimates of exposure and risk. In fact, it has been a twisty road, but DAS has developed such a model and it is called SOFEA. Bruce Johnson has been the primary reviewer in DPR and overseer of the development of this model by Steve Cryer of DAS. Sally Powell contributed much. Currently, and briefly, there are actually two models: SOFEA and HEE5CB. The first model, built by DAS and reviewed by Bruce, produces multi-year concentration distributions which reflect use intensity, season of use, kind of use (drip versus shank), and other features of 1,3-d use for which we have information. The second model, HEE5CB, was built by Jim Sanborn and Sally Powell, and it takes as input the concentration distribution(s) produced by SOFEA, and provides exposure estimates.

The models are used in tandem to estimate risk associated with various 1,3-d use scenarios, such as increasing the township cap.

The understanding between DPR and DAS for the last several years has always been that SOFEA would be used to analyze specific high use scenarios to determine if they resulted in excessive risk. DAS has pointed out, for example, that high use townships may be located next to low use townships. The result may be that the high use townships can go above 95, 250 lbs/township/year without excessive risk because the neighboring low use townships do not contribute to the atmospheric presence of 1,3-d. This understanding is well documented and discussed in many meetings. For example, Jones (2003) in a letter to Bryan Stuart and Brian Bret described a time-line which emphasized the centrality of the modeling in analyzing high use scenarios.

DAS has provided estimates of risk using various prior versions of the SOFEA model (van Wesenbeeck 2004, 2005).

In proposed modifications to the CMP Bret (2005, page 1) stated:

“The opportunity for updates to the existing CMP result from advancements in the air-dispersion modeling tools and technologies that were used to support the creation of the original

CMP. These technical advancements permit a more refined assessment for exposure potential and risk associated with the uses of 1,3-D in California.”

And (Bret 2005 page 5):

“Consideration for modification of the existing township-allocation level will include a region-specific evaluation which may include air dispersion modeling and other region-specific information to support a localized change in the township-allocation level.”

Thus, the long term DPR and DAS understanding is that the agreed upon process for analyzing high use scenarios includes use of the SOFEA modeling tool.

The 70 versus 30 year exposure scenario

In an elegant study utilizing available information on mobility, Powell (2006) summarized: “Others might judge differently, but I would conclude that the 70-year residence scenario does exist and that it is reasonable for DPR to seek to ensure the safety of anyone who may live 70 years within one township.” Any decision to change the exposure period to 30 years has large implications for the risk assessment of 1,3-d and probably for the risk assessment of other pesticides where chronic effects are significant.

Three questions

Do I have the information necessary to evaluate their proposal? No

What information, if any, do I need?

1. Clarification of DPR policy on 70 versus 30 year exposure.
2. Subsequent information needs are highly dependent on number 1. For example, changing the policy to 30 years would require the Worker Health and Safety Branch (WHS) to examine and modify the HEE5CB model to reflect the 30 year exposure policy. All simulation work that I have conducted to date would have to be reevaluated using the modified HEE5CB model. It is unknown to me how long it would take the WHS to modify the HEE5CB program.
3. If DPR stays with the 70 year policy, then some issues could probably be resolved quickly. For example, increasing the default township caps would be dubious since the current cap gives risk estimates close to the acceptable level of 1×10^{-5} . Other requests for exceedances in specific township would require modeling in accordance with the existing DPR and DAS understanding about using SOFEA and HEE5CB to analyze such situations.
4. Regardless of the decisions of 30 versus 70, additional modeling would be conducted by DAS and reviewed by Bruce Johnson for each of the specific high use scenarios requested by

DAS. I counted about ten high-use scenarios that DAS is proposing. For these ten high-use scenarios, there would be requirements on any modeling conducted by DAS. For example, modeling must use the version of SOFEA which has been reviewed and approved by Bruce Johnson. Subsequent exposure analysis must use the HEE5CB tool. The use data distributions should be up-to-date and negotiations may be required over which meteorological data to use. There would be documentation requirements in terms of each scenario modeled. For example, DAS would have to provide all model files, a summary write up of each modeling exercise providing details such as the basis of the probability distributions used in the Monte Carlo portions of the model. In addition, each modeling scenario would require a series of ten, one-year runs with the lower and upper bound concentrations distributions being constructed from the runs, as outlined in Johnson and Powell (2005). Other issues which would require specification include section weights, number of years of use to incorporate into probability distributions.

How much time do I need to evaluate their proposal?

There are several elements of uncertainty in trying to estimate the time it would take to evaluate the DAS proposal. A key element is the impact of a change to the 70 year exposure policy. WHS would have to modify the HEE5CB model and I cannot estimate how long this would take. I would have to utilize the modified HEE5CB to recalculate risk levels for several scenarios that I have modeled.

DAS should submit SOFEA modeling studies for each of the high-use situations that they have requested. It is difficult to quantify how much time it would take for DAS to conduct such modeling and for Bruce Johnson to review it. Most likely it would take many months.

John S. Sanders, Ph.D.
January 29, 2009
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References

Bret, Brian. 2005. Proposed update to the California Management Plan for Telone and Inline soil fumigants. Letter to Tobi L. Jones, Ph.D., dated January 20, 2005.

DPR. 2002. California Management Plan: 1,3-dichloropropene dated January 30, 2002.
Available at: <<http://www.cdpr.ca.gov/docs/emon/methbrom/telone/mgmtplan.pdf>>.

Gosselin, Paul. 2001. Memorandum to Tobi L. Jones, Ph.D., Ron Oshima and Doug Okumura on Managing 1,3-dichloropropene (Telone) chronic risks dated April 9, 2001

Johnson, Bruce and Sally Powell. 2005. Memorandum to Tobi L. Jones, Ph.D., on Interim Statewide Caps Analysis for 1,3-Dichloropropene dated December 28, 2005.

Johnson, Bruce. 2006. Memorandum to Tobi L. Jones, Ph.D., on Interim statewide caps risk analysis for 1,3-dichloropropene with Soil Fumigant Exposure Assessment System computer code corrected for proper buffer zone calculations dated March 10, 2006.

Jones, Tobi L. Ph.D. 2003. Letter to Bryan Stuart and Bruce Houtman dated August 27, 2003.

Powell, Sally. 2006. Memorandum to Joseph Frank on “Estimating residential mobility for the assessment of lifetime exposure to 1,3-dichloropropene” dated December 31, 2006.

van Wesenbeeck, Ian. 2004. Results of township cap simulations in 25 (5x5) contiguous Merced townships all treated with 90,250 or 180,250 adjusted pounds of 1,3-D. Letter dated February 16, 2004.

van Wesenbeeck, Ian. 2005. Letter to Dr. Bruce Johnson dated January 17, 2005 RE: Results of township cap simulations in 25 (5x5) contiguous [sic] Merced and Ventura townships.