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December 1-3, 2009: Arlington, Virginia

FIFRA Scientific Advisory Panel Meeting

FIELD VOLATLIZATION OF CONVENTIONAL PESTICDES

Scientific Panel Members

<u>18 Members including:</u>

- James Seiber, UC Davis
- Michael Majewski, USGS
- Myself
- William Popendorf, Utah State University (Lead for Risk Assessment Sub-Panel)

<u>Format</u>

- 3 days
- Open to the Public
- 14 written comments from citizens, farmers, advocacy groups (e.g., PANNA, CRLA) industry.

Minutes

- After meeting, panel members were responsible for reviewing and editing minutes and providing additional documentation.
- Final minutes are a 90 page document which is available on US EPA’s website
- The rest of my slides are mostly quotes from the final minutes.

Overall Issue

SOPs are “a set of standard instructions for estimating indirect residential exposures”

However, “Methodologies for assessing indirect exposures are not currently included in Residential SOPs” including:

- indirect exposures resulting from “Field volatilization of conventional pesticides”
- panel was not charged to address :
  - fumigants (previous panel addressed)
  - Aerosols or particulate drift

Three Topics Areas

A. Exposure Assessment
B. Toxicological Assessment
C. Risk Assessment

Panel members were assigned to a topic area. (myself to exposure assessment)

U.S. EPA had prepared a “Background Document” with a proposed approach to each topic area. Panel members were commenting on the proposed approach.

Background Document not available on the EPA’s website

TOPIC A: EXPOSURE ASSESSMENT

Topic A. Exposure Assessment

EPA proposed a tiered screening air modeling approach,

Tier 1: **"the use of vapor pressure alone to arrive at a saturated air concentration**."

Panel Response: "has only a limited connection with how a pesticide is used in the real world e.g., as a formulation"

Tier 2A**: "the use of physical-chemical properties including application rate, vapor pressure, solubility and Koc to estimate flux rates" which could then be used to "calculate a maximum air conc over 24 hours"**

Panel Response: "use the Woodrow et al (1997) correlation approach to estimate a maximum 24-hour flux value"

But, "update with all the latest studies and other relevant factors to increase its accuracy"

A. Exposure Assessment (cont, Tier IIB)

Tier II B: **"a refined process that utilizes fate and transport models to predict flux rates of applied pesticides that off-gas from treated fields."**

Panel Response: "coupling a fate and transport model, such as PRZM or PEARL to predict fluxes, with a model, such as the Pesticide Exposure Risk Model for Fumigants Model (PERFUM) to estimate air concentrations at different distances from the field is a sound Tier II approach"

However:

"while dispersion models, such as PERFUM have been validated for fumigants, they have not been validated for predicting semi-volatile pesticide volatilization from soil or crops."

"such models should be validated with direct field measurements of flux under different cropping patterns, application techniques, rates and frequency, and in different geographic regions."

TOPIC B: TOXICOLOGICAL ASSESSMENT

Topic B: Toxicological Assessment

Question 1: Route-to-route (oral to inhalation) extrapolation?

Panel response: "only scientifically justifiable if…."

- 7 things, e.g., "the absorption efficiency for oral and inhalation must either be identical or known."
- "even when the above criteria may be met, the Panel recommended an additional Uncertainty Factor of 10."

Question 2: Interim approaches to assess inhalation hazard?

Panel response: "conduct additional inhalation studies"

Question 3: "Predictive capabilities of aerosol studies to identify…exposures to vapors"?

Panel response: "the ability to predict toxicity of vapors from aerosol studies is fairly limited."

Recommended US EPA develop "protocols for new inhalation studies"

TOPIC C: RISK ASSESSMENT

Topic C: Risk Assessment

Question: "Please comment on the strengths and limitations of the Agency's use of the empirical and modeled air concentrations in the provided risk assessment case study"

Panel response(s):

1) *Air Modeling:* "The strengths of the modeled air concentrations are that they can account for dynamic changes in post-application conditions."

"Their weaknesses are the limited knowledge that users have of the internal components of these models."

Topic C: Risk Assessment (Cont, 2)

2) Exposure Duration and Toxicological Studies Match?

Panel response: "The panel agreed that the case study appropriately matched the duration of exposure with the proper toxicological endpoint"

However, "The models did not estimate intermediate and long-term exposures…The panel recommended the Agency consider adding longer term exposures of more than 30 days."

Topic C: Risk Assessment (Cont, 3)

3) "Conclusions and Characterizations regarding estimated Risks presented in the Case Study"?

Panel response:

"The panel agreed that the case study included all or most of the important elements to conduct a case study"

However, "The panel had a range of recommendations for how this model and the risk assessment process could be improved"

ADDITIONAL RECOMMENDATIONS

(from “body” of Minutes)

Additional Recommendations

- “The Panel expressed concern that the uncertainty associated with physicochemical properties, such as the Kow, soil half-life, a photodegradation, are not incorporated.”
- “Downwind concentration data should also be collected during the field validations of the flux model.”
- “Models should include enough terms to make the predictions act as reasonable surrogates of the measured concentrations.”
- “Models should include scenarios with temperature inversions.”
- “The Panel recommended that the Agency gain a better understanding of the physics of the models they are proposing.”

Additional Recommendations (cont)

- “The Panel suggested that the Agency consider developing a model of multiple applications events in the same region.”

- “The Panel suggested that the impact of crop management practices such as irrigation, tilling, mulching, and burning of fields may have a potential to increase volatilization. These practices and their effects on pesticide volatilization should also be considered.”

Additional Recommendations (cont)

- “The Panel suggested a more careful evaluation of the literature on ambient air monitoring in agricultural communities.”

- “The Panel recommended expanded pesticide use reporting and a national air monitoring network for pesticides to more accurately assess community exposures.”

For more read the minutes on US EPA's website:

http://www.epa.gov/scipoly/sap/meetings/2009/120109meeting.htm