I. Preliminary OP Cumulative Risk Assessment

H. Future Work

The preliminary OP cumulative risk assessment provides a detailed picture of possible exposure to 29 OPs. Details retained in the assessment are sufficient to evaluate the impact of the methods and assumptions on the results of the assessment. This process is particularly important for a cumulative OP assessment because of its complexity and much additional data compared to single-chemical assessments. It uses distributions of data in place of point estimates to the extent possible, and introduces new data sources, particularly in the residential portion of the assessment. Other changes in the assessment process also warrant significant scrutiny. OPP has used the OP cumulative risk assessment as a vehicle to introduce a number of advances in its risk assessment methodology. These changes are most evident in the hazard, drinking water and residential components, as well as in the methods used to combine the pathways to develop a total risk profile for all of the OPs together. Therefore, OPP plans to carefully analyze the results of the preliminary assessment to answer the many questions that it raises. At this point in the planning process, OPP in cooperation with USDA has developed a set of follow up analyses that will be conducted to assist in interpreting the results of the preliminary analysis, and to prepare an OP cumulative risk assessment for making regulatory decisions. These next steps and questions to be explored are listed below, categorized by the portion of the assessment that they address. Some of the activities are flagged as long term activities. These activities are not necessary for completion of the OP cumulative risk assessment, but will be pursued in the interest of improving OPP's risk assessment process.

As noted previously in this document, new information submitted during the comment period that will serve to improve the accuracy of the assessment will be incorporated into the assessment. Further risk mitigation on individual chemicals will be incorporated in the revised assessment.

1. Hazard Assessment

① Define the data that are needed to better characterize the toxicity of OP degradates and treatment byproducts in water systems. Evaluate and summarize existing data.

② Long term: Research to develop and implement physiologically based pharmacokinetic [PBPK] models, which describe the time course disposition of chemicals and their metabolites, are well suited to provide more refined estimates of relative toxic potencies and points of departure for future cumulative risk assessment. OPP is currently working with the EPA's Office of Research and Development on the development and testing of such models for common mechanism pesticides.

③ Long term: Pursue with ORD investigations on the interactions among simple mixtures of common mechanism pesticides to better understand the concept and application of dose additivity.

④ Evaluate the impact of using individual animal data on cholinesterase inhibition rather than descriptive statistics (mean and standard deviation) to derive relative toxic potencies and points of departure.

2. Food Exposure Assessment

① Conduct of a series of sensitivity analyses for input parameters to determine those most likely to impact the outcome of the assessment.

② Further evaluation of monitoring data to better account for non-detects.

③ Detailed analysis of food exposure to identify major contributors to risk, identifying specific food-pesticide combinations.

④ Completion of the analysis of the OP Market Basket and its implications for OP cumulative risk assessment.

⑤ Evaluate the tails of the food exposure distribution to determine whether unusual consumption patterns are impacting inappropriately on the results of the assessment.

⑥ Evaluate the impact of assumptions regarding residue concentrations in baby foods on the assessment.

⑦ Evaluate the CSFII consumption data for records that may be considered outliers.

3. Drinking Water Exposure Assessment

① The current assessment assumes that applications occur as pulses across the entire watershed on a given date. How does this assumption affect the results?

② Do peak concentrations of pesticides coincide in the assessment? How does this result compare to runoff events?

③ What proportion of modeled residues in the drinking water estimates are below the limit of detection in the monitoring data?

④ How do predicted patterns of co-occurrence compare to those observed in monitoring data?

⑤ What information can we obtain from the reservoir monitoring data to guide better incorporation of pesticide degradates and treatment byproducts into the assessment?

⑥ Conduct a series of sensitivity analyses for input parameters to determine those most likely to impact the outcome of the assessment. Particular focus will be centered on the impact of timing of application, application rates, and acres treated.

⑦ Long term: What aspects of the modifications to the water residue modeling process can be applied to the conduct of single chemical aggregate assessments? What differences in assumptions may be needed for implementation of that process for single chemical assessments?

4. Residential Exposure Assessment

① Verify residential use patterns for OPs.

② Conduct a series of sensitivity analyses for input parameters to determine those most likely to impact the outcome of the assessment.

③ Long term: Develop a science-based process for incorporation of spray drift and other sources of exposure into residential exposure assessment.

④ Determine how sensitive the model output is to changes in input distributions used in the residential exposure scenarios for residential exposure.

⑤ For all uses, re-evaluate exposure schedules.

⑥ Refine assumptions regarding % of population exposed to public health sprays (e.g., number of homes having lawns).

⑦ Long term: What aspects of the modifications to the residential exposure estimation process can be applied to the conduct of single chemical aggregate assessments? What differences in assumptions may be needed for implementation of that process for single chemical assessments?

⑧ Long term: Develop better data defining the hand to mouth behavior of children in a variety of settings and for active and quiet play.

5. Risk Assessment Methodology

① Evaluate NHANES III biomonitoring data for OP metabolites in urine to provide a frame of reference for the results of the current assessment.

② Evaluate other sources of biomonitoring data for comparison to model outputs.

③ Evaluate the impact of the number of iterations run on the model output in the upper percentiles of the risk assessment.

④ Identify whether pesticide products whose co-occurrence is indicated to occur in the risk assessment are likely to co-occur based upon an evaluation of pesticide use patterns.