Monsanto INDUSTRIAL CHEMICALS CO.

FROM (NAME & LOCATION) E. S. Tucker - South Second Street

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SUBJECT : PCB METHODOLOGY - ACCURACY AND PRECISION

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Accompanying this memo are two Statistics special studies which are intended to give to all concerned a feeling for the precision and accuracy of the "estimated PCB levels" currently being reported by both internal and external analytical laboratories.

The first special study, #72-5, illustrates the accuracy and precision attainable by two experienced Monsanto laboratories analyzing the simplest matrix (pure water) encountered via equivalent methods under conditions eliminating any potential sampling problems.

Analysis of the laboratory data indicates that on the average, two experienced laboratories analyzing any equivalent individual sample containing a relatively high PCB level (500 ppb) would report 87.5% of the level really present and that 95% of the time the value reported could be expected to fall in the range of 32.3-142.7% of the actual level present.

It should be anticipated that if these standard samples had been spiked at say the 1 ppb level that the precision and accuracy would be poorer.

The data also illustrates that it is 10 times more difficult to identify the specific Aroclor present than it is to estimate the total PCB level in the sample, especially if the laboratory personnel involved are not highly experienced in interpreting electron capture chromatograms. Because of this fact we have, for some time now, recommended that the analytical results be reported as the "estimated total PCB level", referencing the appropriate Aroclor or Aroclors used as the standard or standards.

It also should be pointed out that all laboratories doing PCB analysis have a definite reagent or laboratory background of apparent PCB's. As such, if the level found in any sample is not at least twice the blank level calculated on the basis of the sample size in question, it is unrealistic to report a positive PCB level. Instead it should be reported as none detected, less than twice the apparent background or blank concentration calculated on the basis of the sample size used.

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The second special study, #72-6, illustrates that when one is dealing with the analysis of a more complex matrix by different laboratories with varying levels of experience, each using similar but different analytical methods, that the precision and accuracy become poorer, pointing out our urgent need for standardization of the methods currently being used to analyze environmental samples for PCB's.

E. S. Tucker

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attachments

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