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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

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SUBJECT: Pentachloronitrobenzene: Accumulation in Fish - Review of additional information. Submitted by AMVAC Chemical Corporation to upgrade a previously reviewed PCNB Accumulation in Fish study (MRID 412000-01/419517-01). Letter from Amvac dated February 10, 1993.

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Amvac's response to EFGWB's review of the Accumulation in Fish study does not adequately address the specified study deficiencies. EFGWB concluded in the May 26, 1992 review that the study design was flawed because PCNB comprised an average of only 22% of the ^{14}C-residues in the test water sampled on days 21, 28 and 35 of the exposure portion of the experiment (the only days for which residue identification was given). A reliable bioconcentration factor cannot be calculated because, for much of the study, the concentration of PCNB in the test water is unknown and likely erratic. In addition, the fish were exposed to high levels of degradates which could have had an impact on the fish such that the bioaccumulation and metabolism of PCNB was affected. This study cannot be repaired with addition data. Because the objectives of the data requirement were not met, a new study is required.

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DISCUSSION

It is Amvac's opinion that the study was not flawed and that a new study would generate the same results. The author of the original study proposed that the low concentration of PCNB was the result of rapid uptake and conversion by the fish. EFGWB suggested that contamination or inappropriate storage conditions also could have contributed to the low PCNB concentrations and high degradate levels.

In the present response, Amvac states that they believe that since 72% of the radioactivity in the Day 0 sample was due to PCNB, the lack of PCNB in the Day 1 to Day 35 samples was not due to degradation during storage. EFGWB is not convinced that there is sufficient information presented to draw this conclusion since neither storage stability data nor PCNB concentrations at each sampling interval were provided. Amvac also believes that contamination of the diluter was not likely, but that a combination of photodegradation and microbial degradation led to the low levels of PCNB in the test water. Although a recently submitted photodegradation in water study is still undergoing review, preliminary data suggest that PCNB does photodegrade. However, the degradation that occurred in the fish accumulation study cannot be conclusively attributed to photodegradation because there was no identification of the degradates and no dark control. As for microbial degradation, the registrant refers to microbial degradation of PCNB in a flooded soil with rapid conversion to pentachloroaniline. EFGWB does not believe that a comparison of degradation in the presence of anaerobic soil with degradation that occurred in the fish accumulation system is valid because of the very different conditions under which the two studies were conducted. In addition to the presence of soil in the metabolism study, it has been shown that PCNB degrades faster under anaerobic conditions than under aerobic conditions.

The fish accumulation study must be repeated. Valid data on PCNB's bioconcentration potential and the nature of the accumulated residues is extremely important given the information presented thus far which points towards a tendency for bluegill sunfish to bioconcentrate PCNB with relatively slow depuration. This study must be designed using a flow-through system that will accurately maintain a constant concentration of ^{14}C-PCNB in the test tank while keeping degradate levels to a minimum. Identification of the ^{14}C-residues in the test tank must be made at each sampling interval. If tissue and water samples will be held prior to analysis, storage stability data will be required.