APPENDIX F: FATE AND TRANSPORT PROPERTIES OF DDVP

A brief summary of relevant physical and chemical properties for DDVP (naled toxic degradate of concern) is presented here. Although DDVP use is not explicitly addressed in this assessment, some of the fate and transport parameters of DDVP are used in estimating naled exposure, as it can represent a significant proportion (≤ 20%) of parent naled and may be more persistent under certain conditions. For a more comprehensive overview of DDVP properties, see the 2006 DDVP (dichlorvos) RED.

Metabolic transformation is the major mode of dissipation of dichlorvos (DDVP) under field conditions. Acceptable laboratory and field studies also indicate rapid dissipation through volatilization. Hydrolysis is pH dependent, where the half-life is 11.65 days at pH 5, 5.19 days at pH 7, and 0.88 days (21.12 hours) for pH 9, at 25° C (MRID 41723101). Acceptable lab and field studies indicate that the major modes of dissipation of DDVP are volatilization and microbial degradation in aerobic soil. DDVP appears to have low persistence in the environment.

Aqueous photolysis tests established that DDVP dissipated with half-lives 10.2 days in the irradiated samples and 8.9 days in the dark control samples (MRID 43326601). A soil photolysis study showed that DDVP photodegraded with a half-life of 15.5 hours on a sandy loam soil surface (pH 7). DDVP had a half life of 16.5 hours when incubated in darkness under similar conditions. After 72 hours of irradiation, 97% of the applied DDVP had dissipated from the soil by a combination of degradation and volatilization (MRID 43642501).

DDVP metabolized with a half-life of 10.18 hours in a sandy loam soil (pH 6.2) incubated in the dark under aerobic conditions (MRID 41723102). DDVP metabolized with a half-life of 6.3 days in sandy loam soil (pH 6.8) that was incubated in the dark under anaerobic conditions (flooding plus nitrogen atmosphere) at 25° C for up to 60 days (MRID 43835701).

Terrestrial field dissipation studies showed that DDVP dissipated too rapidly within the time necessary to perform the sampling process to obtain meaningful results (MRIDs 44297701 and 44386701).

Leaching/adsorption/desorption study indicated that because of the rapid degradation of DDVP, an equilibration time for DDVP between the soil and solution phases could not be established. The high water solubility and low K_{OC} for DDVP indicate a high potential for leaching. (The K_{OC} calculation was based on K_d values reported in an acceptable soil study – MRID 41354105.) DDVP is not, however, persistent enough in sand to trigger any studies to assess its potential for leaching to ground water; it is assumed there is no groundwater concern for DDVP. Under field conditions, dichlorvos dissipated rapidly through volatilization; thus, DDVP is not likely to contaminate groundwater by leaching (MRID 41723103, 40034904, 41354105).