



# SUMMARIES OF STORM WATER SPECIAL PROJECTS

## Whole Effluent Toxicity of Storm Water Discharges from an Airport

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### Acute Toxicity of Storm Water Discharges from BWI Airport

This storm water project was conducted during 1993 and investigated the acute toxicity of storm water discharges from Baltimore-Washington International (BWI) Airport in Maryland. There is a US Weather Service Climatological monitoring station to record storm events and also existing programs for storm water collection, flow analysis and chemical analysis (which are collecting additional data for planned storm water mitigation projects at the airport) that were used for this project.

The two sampling sites for this project were located at Kitten Branch which drains to the Patapsco River and Muddy Bridge Branch which drains to Curtis Bay. During the winter months, de-icing activities at the airport discharge to both of these locations. The Kitten Branch discharge point receives runoff from the main terminal area and the primary de-icing area while Muddy Bridge Branch receives discharges from the commuter flight area. Four storm events were sampled. The results of the two winter storm events are summarized below.

The first storm event sampled took place in mid-February, 1993, and included ice, snow, sleet and rain. Planes were de-iced during the morning. A sample taken at Kitten Branch was light to medium pink showing that de-icing mixture was present. The sample taken at Muddy Bridge Branch did not appear to have any color however, all the samples taken contained some ethylene glycol as indicated by refractometer readings. Bioassays were started the day after the samples were taken. Peak concentration and composite samples were tested from Kitten Branch and peak concentration samples were tested from Muddy Bridge Branch. The two species tested included the fathead minnow and daphnid.

The second storm event sampled took place in late February, 1993, and included ice and snow with very little rain. All de-icing took place at the primary de-icing area (Kitten Branch location). Planes were de-iced all day but more de-icing occurred during the morning. Peak and composite samples were collected from both sites. Kitten Branch samples appeared bright pink and refractometer readings demonstrated that the concentration of ethylene glycol was much greater in the samples from the second storm event since there was no rain during the second storm event which could dilute the de-icing mixture. The Muddy Bridge Branch sample did not appear to have any color and together with refractometer readings indicated there was only a small amount, if any, ethylene glycol in the sample. Bioassays were started the day after the second storm event samples were taken. Peak and composite samples were tested from Kitten Branch and peak samples were tested from Muddy Bridge Branch. Samples from Kitten Branch had to be diluted because the samples caused almost instant mortality in the test organisms.

Results from both storm events showed that Kitten Branch samples were toxic and that the Muddy Branch samples were only minimally toxic. The results also showed that samples from storm event 2 were much more toxic than samples from storm event 1. For storm event 1, for Kitten Branch peak samples, the 48 hour LC50 (as % effluent) was 34.3% for fathead minnows and 54.8% for Daphnids and 63.5 % for fathead minnows and 69.3% for Daphnids for composite samples. For storm event 2, the 48 hour LC50 for Kitten Branch peak samples was 1.1% for fathead minnows and 1.7% for Daphnids and for composite samples it was 1.5% for fathead minnows and 1.7% for Daphnids. The Muddy Bridge Branch peak samples for storm events 1 and 2 and the composite samples for storm event 2 were not toxic to the fathead minnow. The 48-hour LC50 for the Muddy Bridge Branch peak sample for storm event 1 was 50% for Daphnids.

Chemical analysis of the samples was performed by Maryland Environmental Services and the details are provided in a final report. For more information contact Melvin H. Knott of the Maryland Department of the Environment at (410) 631-3906.

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