# APPENDIX B.12

## Meadowbank Camp 2002 – 2004 Lake Evaporation Calculation

## LAKE EVAPORATION CALCULATION

Calculation of lake evaporation from pan evaporation is based on the procedure outlined below. This procedure is the standard one used by the Atmospheric Environment Service.

### Daily Lake Evaporation in SI Units

$$E_L = 0.7 [E_P + 0.00642 \, P \, \alpha_P \, (.37 + 0.00255 \, U_P) \, T]$$

where: 

$E_L$ = computed daily lake evaporation (mm)

$E_P$ = net daily pan loss (mm)

$E_P$ = $W_a - W_r + R$

$W_a$ = water added (mm)

$W_r$ = water removed (mm)

$R$ = rainfall for past 24 hours (mm)

$P$ = station pressure (kilopascal)

$P = 101.325 \, (1 - 0.00002257 \, Z)^{5.25}$

$Z$ = station elevation (m)

$\alpha_P$ = fraction of advected energy (Class A Pan) used for evaporation

$\alpha_P = 0.35 + 0.01044 \, T_W + 0.000559 \, U_P$ if $0 \leq U_P < 161$

$\alpha_P = 0.35 + 0.01044 \, T_W + 0.08 + 0.000249 \, (U_P - 161)$ if $161 \leq U_P < 322$

$\alpha_P = 0.35 + 0.01044 \, T_W + 0.12 + 0.000124 \, (U_P - 322)$ if $322 \leq U_P < 483$

$\alpha_P = 0.35 + 0.01044 \, T_W + 0.14 + 0.000062 \, (U_P - 483)$ if $U_P > 483$

$U_P$ = daily wind run across pan (km)

$T$ = mean water and air temperature difference function

$T = (T_W - T_a)^{.88}$ if $T_W > T_a$

$T = -[(T_a - T_w)^{.88}]$ if $T_W < T_a$

$T = 0$ if $T_W = T_a$

$TW$ = mean water temperature

$Ta$ = mean air temperature

Reference: Kohler, M.A., T.J. Nordenson, and W.E. Fox, "Evaporation from Pans and Lakes", Research Paper No. 38, U.S. Weather Bureau, 1955.