EXHIBIT I

Commonwealth of Pennsylvania

Department of Mines and Mineral Industries

MD Pollution Abatement Measures

for the Beech Creek Watershed

ASSUMPTIONS AND CALCULATIONS USED TO ESTABLISH COMBINED WATERSHED DESIGN MD VOLUMES

Design Average MD Volume

Estimated total average yearly precipitation in the watershed over the period of record (1950-1968) = 37.6 inches

Acreage contributing to MD Discharges = 11,750

Runoff coefficient

Watershed mined area = 0.10

Forty-five (45) per cent of the total precipitation on the watershed mined area assumed lost to the atmosphere by evaporation and transpiration

Precipitation on the watershed mined area contributing to MD Discharges -

Total precipitation

$$37.6 \frac{\text{inches}}{\text{year}} \times 11{,}750 \text{ acres} \times 43{,}560 \frac{\text{sq ft}}{\text{acre}} \times \frac{1 \text{ ft}}{12 \text{ in}} \times$$

$$7.48 \frac{\text{gal}}{\text{cu ft}} \times \frac{1 \text{ year}}{365 \text{ days}} = 32.9 \text{ mgd}$$

Losses

Surface water runoff direct to surface streams 0.10×32.9 mgd $= 3.3$ mgd.

Evaporation and transpiration $\frac{45}{100} \times 32.9$ mgd $= 14.8$ mgd

Contribution to MD Discharges = 14.8 mgd

Design Wet Weather MD Volume

Estimated total average precipitation in the watershed mined area from December through April over the period of record (1950-1968) = 14.27 in.

Acreage contributing to MD Discharges = 11,750

Runoff coefficients

Watershed mined area

First 3½ months = 0.02

Last 1½ months = 0.15

Forty-five (45) per cent of the total precipitation on the watershed mined area assumed lost to the atmosphere by evaporation and transpiration

Thirty-five (35 per cent of net precipitation over first 3½ months contributes to MD Discharges during last 1½ months

Precipitation on the watershed mined area contributing to MD Discharges -

Total precipitation

$$\frac{14.27 \text{ in}}{5 \text{ months}} \times 11{,}750 \text{ acres} \times 43{,}560 \frac{\text{sq ft}}{\text{acre}} \times \frac{1 \text{ ft}}{12 \text{ in}} \times 7.48 \frac{\text{gal}}{\text{cu ft}} \times$$

$$\frac{1 \text{ month}}{30 \text{ days}} = 30.3 \text{ mgd}$$

Total precipitation over first 3½ months

30.3 mgd x 105 days = 3,182 mg

Losses during first 3½ months

Surface water runoff direct to surface streams

0.02 x 3,182 mg = 63.6 mg

Evaporation and transpiration

$$\frac{45}{100} \times 3{,}182 \text{ mg} = 1{,}430 \text{ mg}$$

Balance of total precipitation over first 3½ months contributing to MD Discharges over last 1½ months

$$(3{,}182 \text{ mg} - 1{,}494 \text{ mg}) \times \frac{35}{100} = 592 \text{ mg}$$

Total precipitation over last 1½ months

30.3 mgd x 45 days = 1,364 mgd

Losses during last 1½ months

Surface water runoff direct to surface streams

0.15 x 1,364 mg = 204 mg

Evaporation and transpiration

$$\frac{45}{100} \times 1{,}364 \text{ mg} = 614 \text{ mg}$$

Contribution to MD Discharges during last 1½ months

546 mg from last 1½ months + 592 mg from first 3½ months = 1,138 mg or 25.2 mgd

Design Maximum MD Volume

Estimated total 24 hour accumulation of rainfall that will occur no more frequently than once every 10 years = 4.1 inches

Acreage contributing to MD Discharges = 11,750

Runoff coefficient

Watershed mined area = 0.15

Forty-five (45) per cent of the total rainfall on the watershed mined area assumed lost to the atmosphere by evaporation and transpiration

Rainfall on the watershed mined area contributing to MD Discharges -

Total rainfall

$$4.1 \frac{\text{inches}}{\text{day}} \times 11{,}750 \text{ acres} \times 43{,}560 \frac{\text{sq ft}}{\text{acre}} \times \frac{1 \text{ ft}}{12 \text{ in}} \times 7.48 \frac{\text{gal}}{\text{cu ft}} = 1{,}310 \text{ mgd}$$

Losses

Surface water runoff direct to surface streams

$$0.15 \times 1{,}310 \text{ mgd} = 194 \text{ mgd}$$

Evaporation and transpiration

$$\frac{45}{100} \times 1{,}310 \text{ mgd} = 590 \text{ mgd}$$

Contribution to MD Discharges = 526 mgd