FIGURES

Fig. 3.1 $\sigma_y$ and $\sigma_z$ curves for BNL turbulence types (Singer and Smith, 1966). BNL stability types are given in Table 3.1.

Fig. 3.2 Curves of $\sigma_y$ and $\sigma_z$ for Pasquill's turbulence types based on Pasquill (1961). (after Gifford, 1961)

Fig. 3.3 Curves of $\sigma_y$ and $\sigma_z$ for TVA data (after Carpenter et al., 1971). Average potential temperature gradients with height refer to plume height.

Fig. 3.4 Curves of $\sigma_y$ and $\sigma_z$ based on interpolation formulas (Briggs 1974) for flow over open country. (after Hosker, 1974)

Fig. 3.5 An estimation scheme of the vertical dispersion of a plume from a source near ground level. (after Smith, 1973)

Fig. 3.6 Curves by Golder (1972) showing Pasquill's turbulence types as a function of the Monin-Obukhov stability length and the aerodynamic roughness length.

Fig. 4.1 Simplified topography around the Brush Creek study area.

Fig. 4.2 Brush Creek valley showing the tracer release site ■, surface sampling arcs (1, 2, and 3), tethersonde stations▲ and vertical tracer concentration profilers △

Fig. 4.3 Temperature profiles at different periods in the Brush Creek Valley, ASCOT-1984.
(a) WPL site, 09/26/84; (b) PNL-Valley site, 09/26/84;

Fig. 4.4 Temperature profiles at different periods in the Brush Creek Valley, ASCOT-1984.
(a) WPL site, 09/30/84; (b) PNL-Valley site, 09/30/84

Fig. 4.5 Wind profiles at different periods in the Brush Creek Valley, ASCOT-1984.
(a) WPL site, 09/26/84; (b) PNL-Valley site, 09/26/84;

Fig. 4.6 Wind profiles at different periods in the Brush Creek Valley, ASCOT-1984.
(a) WPL site, 09/30/84; (b) PNL-Valley site, 09/30/84

Fig. 4.7 Medians of the mean values of $\sigma_0$. a) sodar data, b) tower data.

Fig. 4.8 Medians of the mean values of $\sigma_0$. a) sodar data, b) tower data.
Fig. 4.9 Tracer concentration patterns for Ground release (PP2 tracer), Experiment 2, September 26, 1984 at (a) first arc cross-section, and (b) along valley axis. (i) 0100 MST, (ii) 0230 MST, (iii) 0400 MST, (iv) 0530 MST, (v) 0700 MST, (vi) 0830 MST, and (vii) 1000 MST.

Fig. 4.10 Tracer concentration patterns for Elevated release (PP3 tracer), Experiment 4, September 30, 1984 at (a) first arc cross-section, and (b) along valley axis. (i) 0100 MST, (ii) 0230 MST, (iii) 0400 MST, (iv) 0530 MST, (v) 0700 MST, (vi) 0830 MST, and (vii) 1000 MST.

Fig. 4.11 Temporal variation of observed peak tracer concentrations at each sampling arc. (a) ground releases, and (b) elevated releases.

Fig. 5.1 Brush Creek valley showing the tracer release site (S) and sampling arcs (1), (2), and (3). Valley-axis samplers are denoted by ●, and tether-balloon sites by ▲. The arc samplers are indicated by O-O-O.

Fig. 5.2 Modeling region and meteorological grids used in the tracer data simulations, showing the source (S) and Tethersonde sites (▲). The puff (p) and its reflections (I₁ and I₂) in the two sidewalls are shown for the scheme used to account for restricted lateral dispersion in a valley.

Fig. 5.3 Mean cross-valley structure of wind speed at 10 elevations from ground to about 360 m obtained by the Doppler lidar in Brush Creek valley. (a) wind speed u plotted as a function of cross-valley position, y; (b) the data of fig (a) is normalized by the maximum wind speed uₘ in each cross-valley profile and valley half-width, H, at the height of the profile. Solid curve is the least-squares fit.

Fig. 5.4 Wind field and the corresponding puff trajectories, Surface release simulation.

Fig. 5.5 Wind field and the corresponding puff trajectories, Elevated release.

Fig. 5.6 Comparison of predicted and observed hourly PP2 tracer (Experiment 2, Ground release) concentrations, averaged over the samplers, for the simulation period 00-11 hours (MST). The times shown in the figure denote the ending of each hourly sampling period. (a) for all 51 samplers, (b) for arc 1 samplers only, and (c) for arc 2 samplers only.
Fig. 5.7 Comparison of predicted and observed hourly PP3 tracer (Experiment 4, Elevated release) concentrations, averaged over the samplers, for the simulation period 00-11 hours (MST). The times shown in the figure denote the ending of each hourly sampling period. (a) for all 51 samplers, (b) for arc 1 samplers only, and (c) for arc 2 samplers only.

Fig. 5.8 Comparison of peak observed and peak predicted hourly concentrations averaged over the three arcs (irrespective of location) for the simulation period 00-11 hours (MST). The times shown in the figure denote the ending of each hourly sampling period. (a) for Experiment 2, ground release, and (b) for Experiment 4, elevated release.

Fig. 5.9 Cumulative frequency distribution of the ratio (F) of observed to modeled tracer concentrations. Solid line is for Experiment 2, Ground release, and Dashed line is for Experiment 4, Elevated release.

Fig. 6.1 Locator map of Singrauli and its vicinity. Thermal power stations and other important industries are given in numbers. △ denote the air quality stations.

Fig. 6.2 Wind-roses at three surface meteorological stations (AQ1, AQ2, and AQ3) for post-monsoon day.

Fig. 6.3 Wind-roses at three surface meteorological stations (AQ1, AQ2, and AQ3) for winter day.

Fig. 6.4 A schematic of the various quantities used in the wind interpolation and complex terrain adjustments in TRIAD model.

Fig. 6.5 Comparison of predicted and observed SO2 concentrations for day-time of a post-monsoon (October) day. Dashed line is observed while the solid line is the predicted concentrations averaged over all three samplers.

Fig. 6.6 Comparison of predicted and observed SO2 concentrations for day-time of a winter (February) day. Dashed line is observed while the solid line is the predicted concentrations averaged over all three samplers.

Fig. 6.7 Cumulative frequency distribution of F (ratio of Observed over Predicted concentration). Solid line represents October day-time period and the dashed line is for February day-time period.