

transformation rates in urban plumes. Spicer (1979) has reported summertime values of over 20% h<sup>-1</sup>, most likely due to homogeneous reactions.

(b) Oxidants

The long range transport of oxidants and their precursors, which causes high oxidant episodes, is usually associated with the presence of high pressure systems. This report will not consider long-range oxidant transport that is discussed in the Monitoring and Interpretation Subgroup report, but instead will restrict comments to the impact of urban plumes on oxidant levels up to distances of the order of 300 km. Urban plume studies relative to oxidants have been conducted in a number of areas, including New York, Chicago, Boston, Philadelphia, Tulsa, St. Louis, the southern California urban area, and Toronto.

Ludwig et al. (1977) report that maximum oxidant levels may occur as far as 150 km from the city centre. Spicer et al. (1979), report urban plumes of 80 to 128 km in width and 180 to 280 km in length. Spicer also reported the approximate maximum contribution of various sources to the ozone concentration. Ozone generated within urban plumes contributed 150 to 200 ppb on an hourly average. Eaton et al. (1979) concluded that the net ozone formation in the Tulsa plume resulted in concentrations of 17 to 116 ppb; maximum ozone concentrations were observed to occur from 30 to 50 km downwind of the urban area. Wolff et al. (1977) reported that the maximum increase in ozone concentration associated with its generation in an urban plume was 78 ppb, observed 60 km downwind of the northeastern New Jersey-New York area. Predictions by the photochemical model of Bazzell and Peters (1981) show a net increase in ozone of approximately 70 ppb in the urban plume. Chung (1977) estimates from observations that Toronto produces up to 60 ppb in its downwind urban plume.

Ozone concentrations generated in urban plumes tend to be greater at larger distances when the plumes are transported over large bodies of water because of less diffusion, particularly in the vertical direction under relatively stable stratification. Spicer et al. (1979), Cole et al. (1977), Blumenthal (1976), Chung (1977), Lusi et al. (1976) and Westberg et al.