

during the period 1949-53 and consisted of six 112.5-megawatt units with 170-foot stacks, subsequently raised to 270 feet. Continuous monitoring for SO_2 was conducted at locations in the vicinity of the plant where maximum concentrations were expected to occur. From analyses of SO_2 records before the stacks were raised, the maximum 30-minute average concentration of SO_2 was 3.8 parts per million. After the stacks were raised, it was only 0.6 part per million.

The Paradise plant with two 704-megawatt units was placed in commercial operation in 1963. This plant has two 600-foot stacks. Despite the fact that average daily SO_2 emission is double that of the original Johnsonville plant, the maximum 30-minute average concentration of SO_2 recorded thus far by the five-autometer network around the Paradise plant has been 0.4 part per million. In terms of comparison, this represents at least a threefold improvement over the Johnsonville plant, even after the stacks had been raised to 270 feet. A comparison such as this emphasizes the importance of utilizing the best current information in evaluating air pollution potential and in planning air pollution control for large modern powerplants.

Frequency distribution of SO_2 concentrations:

While the maximum ground level concentration of SO_2 that can be expected in the vicinity of a large powerplant is essential to assessment of its air pollution potential, an almost equally important factor is the frequency of occurrence of various ground level concentrations of SO_2 in the area around the plant. Satisfactory methods for calculating frequencies from operational and meteorological data have not yet been devised. However, from analysis of the TVA monitoring data, a certain pattern of frequency distribution has been observed which affords a means for arriving at reasonably good approximations. This has provided a means in cases of limited operational experience for estimating situations beyond the range of actual data, for comparing air pollution experience at different powerplants, and for relating powerplant air pollution potential to air quality standards employing frequency criteria. It has also been useful in showing the difference between pollution patterns of powerplants and those of urban areas with multiple sources of pollution emitted at or near ground level.

The frequency of SO_2 registration at a fixed point in the vicinity of a remote power station is strikingly different from that of a single point in an urban area with multiple sources of SO_2 emitted at or near ground level. The frequency distribution of SO_2 concentrations measured by a recording instrument at a point where maximum concentrations occurred in the vicinity of one of our modern plants with 500-foot stacks was compared with similar data obtained from an air pollution study by the Public Health Service in Nashville, Tenn.

Although estimated SO_2 emissions in the urban area were only approximately half those of the powerplant, the frequency of SO_2 registrations in the urban area (for example at the 0.2 part per million, 30-minute average level) was approximately 35 times that in the powerplant area.

Pollution potential of powerplants under air stagnation conditions:

Air pollution control plans developed for the Kingston steam-plant, until recently the largest plant in the TVA system, gave special