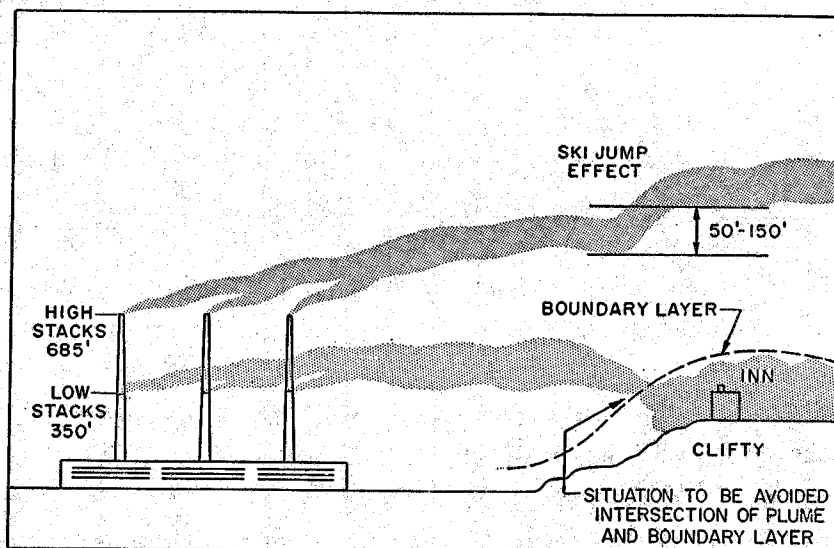




Boundary Layer Effect and Added Rise
Over the Hill

FIGURE 2

Irving A. Singer and Maynard E. Smith, Air Pollution and Meteorological Consultants, made almost all of the diffusion calculations for the stacks. These calculations were made using an exit gas velocity of 120 feet per second based on the wind tunnel results.

It was necessary to make some choice of the limiting value of SO_2 that would be acceptable at ground level. A value of 0.5 parts per million for a one hour period was chosen as being one fourth of the odor threshold, and low enough to keep instantaneous peak below 2-3 ppm. Only strong wind conditions would produce values in excess of 0.5 ppm SO_2 and such winds occur during a very small percentage of the total hours in the year. Thus, it can be seen that with regard to an entire year and to the whole terrain around the plant, the actual long-term factor of safety was very much greater than four.

After careful consideration of all the data and with considerable concern for possible adverse conditions during the breakup of the nocturnal inversion, a stack height of 683 feet was chosen.

4. KYGER CREEK STACKS

Having determined the stack heights for Clifty Creek on the basis of all the factors considered previously, it became an easier matter to select a proper height for those at the smaller Kyger Creek Plant. No aerodynamic considerations were present and since diffusion studies indicated that a height of 535 feet would provide acceptable conditions both in the valley and on the hills, this was the height chosen.

5. VERIFICATION OF CHOICE

Basic to the pioneering work on these two large plants was the decision to make the necessary effort to verify the design by testing for both SO_2 and dustfall prior to operation and for a substantial period after commissioning. Dustfall studies were discontinued three years after full load was reached when it became abundantly clear that the plants had had no significant effect on this variable.

Three Thomas Autometers were installed near each plant to obtain a continuous record of sulfur dioxide at or close to ground level. One was located in the valley, Station A, while Stations B and C were on the plateau. A careful review of the sulfur dioxide records made late in 1959, after approximately four years of operation of both OVEC plants, showed no hourly mean concentrations above