Permissible Limits for Occupational Exposure to Toxic Agents
A Discussion on Differences in Approach between US and USSR

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Summary. The author discusses the differences in approach between US and USSR in setting permissible limits for respiratory exposure to chemical agents in industry. One should clearly distinguish between basic facts, e.g. dose-response relationships and decisions taken in regard to acceptability of certain levels. The former are determined by differences in research methods: focused on cells and organs (US) or on organism with emphasis upon central nervous control (USSR). The latter are determined by differences in interpretation of biological changes in regard to "health". It is of primordial importance to promote exchange of basic data; this would promote mutual understanding much more than trying to impose one's own choice of acceptability upon others. Ultimate agreement on decisions to be taken may only result through the way of reasoning based upon facts; it is not a matter of negotiation.

Key words: Maximum allowable concentration — Threshold limit values — Standards.

In my paper "Health and setting of standards" (Zielhuis, 1973) I elucidated the underlying principles in setting environmental quality standards. In this paper I will discuss permissible limits for occupational respiratory exposure to toxic agents, particularly in view of the sometimes wide differences between US and USSR limits.

Authorities and research workers in various countries in between US and USSR not always have the facilities (manpower, budget, large exposed groups of workers) to establish basic data themselves and accordingly to set permissible limits. They will have to choose to a great extent limits elaborated in US and USSR, even although for some agents they may set different limits according to their own national experience. In Europe even larger countries as Germany (FRG), United Kingdom and France, often may have to lean heavily upon the lists as published in US or USSR.

However, authorities can never take the limits published at their face value; they should understand the underlying way of reasoning, and the
basic approach in both countries, in order to make an adequate appraisal before introducing limits in their own countries. One should not forget: permissibility, acceptability is a matter of choice, decision.

The main objective of this paper is to compare underlying principles in setting permissible limits for occupational exposure to toxic agents in US and USSR, in order to promote understanding of the basic principles, underlying the lists published.

**The US Approach**

"Threshold limit values (TLV’s) refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect; they refer to time-weighted concentrations for a 7- or 8-hour workday and a 40-hour work week." This is the official wording of the Am. Conf. Gov. Ind. Hyg. (1972). According to a survey on legislation (ILO, 1970) TLV’s “refer to air-borne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effects. Because of wide variation in individual susceptibility, exposure of an occasional individual at or even below the threshold limit may not prevent discomfort, aggravation of a preexisting condition, or occupational illness. This TLV is not legally binding”. These definitions correspond very well with that adopted at the Prague symposium (IUPAC, 1961): “The symposium recommends that the term maximum allowable concentration for any substance shall mean that maximum average concentration in air which causes no symptoms of illness or physical impairment in any workers, except those who are hypersensitive, during their normal day-to-day working, as judged by the most sensitive internationally accepted tests.”

TLV’s not only serve to prevent classical diseases, but also functional disturbances, and nuisance effects: “Limits based upon physical irritation are no less binding than those based upon physical impairment” (ACGIH, 1972). Stokinger (1964) emphatically rejects the objections of those who state that “nuisance complaints from irritation solely are a labour relations matter”. Nuisance effects are “handwritings on the wall”, and may induce serious health effects particularly in combination with other environmental factors (microbes, other chemical agents). However, Stokinger only refers to nuisance effects as co-inducers of disease (infections, carcinomata), and not as “limitations of degrees of freedom”, as discussed in my previously mentioned paper. Recently Stokinger (1973) repeated again: “... standards protect against all degrees of hazard ranging from serious hazards to health, including death, to mild irritation and narcosis, to no health effects at all, merely nuisance.” Stokinger