

activities or the local budget, but also improve the quality of the environment.



Fig. 1 Statutory health and safety industrial areas in Tomsk



Fig. 2 The main industrial areas in St. Petersburg

Certainly, to justify the effectiveness and efficiency of the redevelopment project it is necessary to have an ecological and economic rationale for the transfer of production or other facilities to other areas. Such projects are only justified when the benefits from their realization exceed the damage to the environment. A calculation of losses from the unsustainable use of the

land and property complex can serve as the key criterion in this case. Due to the fact that apart from economic the land has an ecological and social significance, the ability to determine losses in land relations, in addition to actual damages (if there is any), and the loss of profits is essential.

4 MODEL FOR DETERMINING DAMAGE FOR LOSS OF PROFIT AND ENVIRONMENTAL DAMAGE

Russian methods of calculating damages for loss of profits are provided for by the law. They establish a procedure of calculating the loss of the municipality, based on the calculation of costs and loss of profits, which appear in case of liquidation of damages. But in this situation there are some gaps in the legislation: the concepts of "damage" and "environmental damage" in various legislative acts are defined differently or not defined at all.

As an example, we will perform the calculation of the extent of damage and losses caused by air pollution point sources. Energy complex enterprises (boilers) have an emission permit within the maximum allowable concentration of maximum admissible discharge. The inspection found a significant excess of actual emissions of sulfur oxide (SO₂) and nitrogen oxide (NO), compared with maximum admissible discharge.

1. We will determine the mass of pollutants by the formula:

$$M_i = (O\phi_i - O\text{H}B_i) \cdot T \cdot \text{ЧТЧ}0,0864, \text{ where:}$$

- M_i – the mass emission of the i-th pollutant, ton;
- $O\phi_i$ – the actual value of the i-th pollutant, defined at the time of measurement, g/sec;
- $O\text{H}B_i$ – the permissible emission standard value of the i-th pollutant, defined according to the permission for the pollutant emission of the organization (maximum admissible discharge, emission limits (temporarily approved emission limit), g/sec;
- T – the duration of emission with the increased concentration of pollutants, determined from the time of the emission detection until its elimination, days;

$$0,0864 = 3600 \times 24 / 1000000 - \text{the conversion factor of seconds per days and grams per tonnes.}$$

The maximum admissible discharge for SO₂ equals 7.73 g/sec.

The duration of pollutant emission from the time of its detection until emission elimination equals 10 days. Thus:

$$M(\text{SO}_2) = (154,8 - 7,73) \cdot 10 \cdot \text{ЧТЧ}0,0864 = 127,068 \text{ ton}$$