н connection with a shortage of land resources in the largest cities and megapolises and against the impetuous automation of modern society, the issues of the location of existing filling stations (FS) and design of perspective residential construction, close to it, and location of designed FS at the territory of formed residential area are becoming increasingly important. They require a legislative regulation for the normalization of sanitary-and-protective zones (SPZ) for modern FS, taking into account a differentiation of their rating, a use of fuel types, types of refilling transport, an implementation of the environmental protective measures, etc. [1, 2].

An ubiquitous construction of the FS of different types and categories, extension of their functions, including the elements of the maintenance of the vehicles, drivers and passengers, use of modern filling technologies and fuel storage, and tendencies of the approaching of these objects to the residential districts of the city require a full substantiation of the hygienic requirements to their location from the point of view of the methodology of risk assessment for the health of the population for the prevention of their pos-

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Object of the work is a detection of risk indices for the health of the population from the environmental contamination with the chemicals created by the emissions of the FS of various ratings, taking into account territorial features of the residential areas.

Materials and methods. The methods of sanitary-and-hygienic examination of operating objects; sanitary-and-epidemiological examination of the SPZ designs for the FS of different ratings, risk assessment were applied in the work. Risk conception is considered as a main mechanism for development and management decisions directed on the reduction of the environmental contamination and prevention of its unfavorable effect on the health of the population. We used the Methodical Recommendations “Assessment of the Risk for the Health of the Population from the Ambient Air Pollution. MR 2.2.12-142-2007” adopted by the Ministry of Public Health of Ukraine (Order N184, 13.04.2007) [4]. Methodology of risk assessment was applied in the study for the assessment of calculation concentrations of the pollutants in ambient air of the filling stations being built or reconstructed.

Results and discussion. 50 designs of the construction /reconstruction of the FS of small, average, and large ratings were studied for the detection of sanitary-and-hygienic problems of modern planning organization of the construction of the residential areas of Ukraine on the location of new and reconstruction of existing FS by means of sanitary-epidemiological examination, using risk assessment methodology.

Specific pollutants from the operation of the FS are saturated hydrocarbons, gasoline, and kerosene, unspecific – nitrogen dioxide, hydrocarbon oxide from the operation of motor engines, and also black, sulfur dioxide, methane from the operation of boilers and diesel generators of the FS; contribution of the last ones is mostly minimum in total emissions of designed FS.

Calculated maximum concentrations of the specific pollutants in the ambient air in the area of the location of the FS of small rating and risk indices of the development of negative effects in the health of the population depending on the distance of their location are demonstrated in table 1.

Maximum concentrations of the specific pollutants (gasoline, saturated hydrocarbons, kerosene, nitrogen dioxide, and carbon monoxide) in the ambient air in the areas of the small FS at the distance of 25 m from the sources of emissions (i.e. on the industrial site of the FSs), at the standard SPZ of 50 m, and at a distance of 100 m didn’t exceed the hygienic standards according to the Sanitary Rules and Norms 4946-89.

Classification of the levels of non-carcinogenic risk is shown in table 2.

On the basis of obtained quantities of risk ratios of the chemicals (Table 2), a number of compounds can be identified as the most negatively affecting the health of the population, living in the residential construction close to the territory of the FS. A qualitative index of risk ratio by maximum gasoline concentration is rather high (>3) at all studied distances with a tendency to a sharp decrease: at 25 m – 45.8, at 40 m – 36.6, at 50 m – 19.0, and at 100 m – 10.9. The highest risk ratio is detected at the industrial site (25 m) – 45.8, 2.5 times less at the standard SPZ (50 m) – 19.0, and 4.2 times less at the distance of 100 m in comparison with the industrial site.

Calculated maximum concentrations of specific pollutants in the ambient air in the area of the location of average rating FS and the risk indices of the development of negative effects in the health of the population, depending on the remoteness of their location, are shown in table 3.

By all specific substances, expected ambient air pollution in the zone of location of average rating FS on the verge of the normative SPZ of 50 m was not observed. Even at the industrial site (at the distance of 25 m from the sources of emissions) the concentrations of gasoline, saturated hydrocarbons, nitrogen dioxide, and carbon monoxide in the ambient air made up from 0.045 up to 0.8 MAC and didn’t exceed the...
Выводы. Полученные результаты свидетельствуют, что санитарная классификация предприятий и производств требует пересмотра и нормирования дифференцированных санитарно-защитных зон (минимальная и максимальная) для АЗС с учетом мощности, внедрения эффективных природоохранных мероприятий и применения рискового подхода к санитарно-эпидемиологической оценке размещения АЗС.

Доказана необходимость внедрения на существующих и проектируемых АЗС оборудования для сдерживания канцерогенных испарений при заправках транспортных средств, что обеспечит уменьшение загрязнения прослойки воздуха рабочей зоны работников АЗС и окружающей среды прилегающей жилой застройки.

Ключевые слова: автозаправочная станция, санитарно-эпидемиологическая оценка, рисковый подход, загрязнение атмосферного воздуха.

**Conclusions**

1. Sanitary classification of enterprises and productions was proved to require the review and the normalization of differentiated sanitary-and-protective zones (minimum and maximum SPZ) for the FS, taking into account a quantity, introduction of the effective air protective measures and risk approach to sanitary-and-epidemiological assessment of the FS location.


**LITERATURE**


**REFERENCES**


**Table 4**

<table>
<thead>
<tr>
<th>Pollutants</th>
<th>Concentrations of the pollutants at different distances from the sources of emissions, m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40 mg/m³ Proportions of MAC</td>
</tr>
<tr>
<td>Gasoline</td>
<td>1.00-2.95</td>
</tr>
<tr>
<td>HQ</td>
<td>14.1-41.5</td>
</tr>
<tr>
<td>Hydrocarbons C12-C19</td>
<td>0.14-1.00</td>
</tr>
<tr>
<td>HO</td>
<td>2.0-14.1</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>0.026-0.087</td>
</tr>
<tr>
<td>HQ</td>
<td>0.65-2.18</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>0.585-1.6</td>
</tr>
<tr>
<td>HO</td>
<td>0.2-0.53</td>
</tr>
</tbody>
</table>