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WORKSHOP ON THE SITUATION IN THE STEEL INDUSTRY IN THE NIS

**THE STATE AND PROBLEMS OF THE ENVIRONMENTAL PROTECTION
IN FERROUS METALLURGY OF RUSSIA**

Note by the Government of the Russian Federation

The Workshop will be held in Paris on 2-3 November 1999.

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THE STATE AND PROBLEMS OF THE ENVIRONMENTAL PROTECTION IN FERROUS METALLURGY OF RUSSIA

Production of ferrous metals is accompanied by great emissions of by-products frequently keeping toxic connections of harmful substances, such as lead, chlorine, chromium, manganese and others. Such substances are evolved in especially great amounts while using out-dated technologies and equipment, which is typical, unfortunately, for the Russian metallurgy. An extensive way of development of ferrous metallurgy of Russia within the period before the reforms on the basis of out-dated technologies with higher consumption of material and raw resources has resulted in a progressing ageing of fixed assets, including also those for environmental protection, and, as a consequent, in the increased level of emissions of harmful substances into the environment. Today in ferrous metallurgy 88,5% of blast furnaces, 50% of oxygen converters, 86% of rolling mills are exploited longer than their normative service life.

For a long time there has not been given due attention to objects of the environmental protection in development programs of Russian ferrous metallurgy. As a result the part of environment protection funds in fixed assets of ferrous metallurgy in Russia makes about 6%, while in Western countries it makes 15-18%. It adversely affected the equipping of metallurgical aggregates by purifying utilities and today rather many sources of emissions have no purifying facilities. Especially it relates to unorganized emissions in agglomerated, blast and open-hearth production. It is necessary to note, that not all available cleaning facilities work with projected efficiency. The main reasons for unsatisfactory performance of the facilities are imperfection of their design, disturbance of technological operational modes of metallurgical aggregates, and also undue major repairs because of lack of financial assets in companies etc. As a result, emissions of pollutants into the environment by metallurgical companies of Russia with a complete cycle of production (industrial complexes) make 5-11 kg per ton of steel, while similar firms of Western countries range from 1.5 to 2.0 kg per ton of steel. For example, the specific of dust emissions at sintering plants of Russia makes 0.5 -0.6 kg per ton of an agglomerate, while at similar sintering plants of Western countries these emissions amount to 0.12-0.13 kg per ton of an agglomerate, i.e. 3-4 times less. The situation is nearly the same concerning other metallurgical processes.

The cleaning facilities used at the moment can not fully prevent from the ingress of harmful substances into the environment. Sewage, waste gases, firm and liquid wastes pollute surface and underground waters, the soil, the atmosphere, which brings in the severe ecological situation in many areas of metallurgical plants location.

Over the last years emissions of harmful substances into the atmosphere in ferrous metallurgy had steady downward tendency, and the paces of this decrease were the greatest ones during the first years of a radical economic reform (1992-1995). It is basically attributed to the slump in the volume of iron and steel production. In 1997 metallurgical companies threw out into the atmosphere 2,379.5 thousand of tons of pollutants, which was approximately 40% lower than that in 1991. By this parameter the branch takes the 3rd place among other industries of Russia (15% of gross emissions). The main volume of pollution falls on carbon oxide (about 70%), solid substances and sulphur anhydride.

The greatest quantity of harmful substances is emitted into the atmosphere by the four largest companies in the branch: JSC "Severstal" (Cherepovets) - 410.7 thousand of tons, JSC "Novolipetsk iron&steel works" (Lipetsk) - 334.2 thousand of tons, JSC "Magnitogorsk iron&steel works"

(Magnitogorsk) - 260.8 thousand of tons, JSC "West-Siberian Steel Corporation" (Novokuznetsk) - 186.5 thousand of tons. The overall share of these plants in the volume of pollutants, emitted into the atmosphere by all steel companies of Russia makes 50.1% and in total of the whole industry of Russia it represents 7.5%.

In the field of waters protection from pollution in ferrous metallurgy the most progressive direction is accepted, which is the creation of loop systems of water usage without waste water discharge.

Now water economy in the branch at the expense of circulating water supply makes 94%. However, a number of metallurgic companies is keeping on discharging a significant amount of the polluted waste water into the surface water: JSC "Novolipetsk iron&steel works" (Lipetsk) - 114.5 mln.sq.m, JSC "Magnitogorsk iron&steel works" (Magnitogorsk) - 103 mln.sq.m, JSC "Nizhny Tagil iron&steel works" (Nizhny Tagil) - 54.4 mln.sq.m, JSC "Severstal" (Cherepovets) - 37 mln.sq.m, JSC "Kovdorsk mining-and-processing integrated works" (Kovdor) - 28.7 mln.sq.m. The total share of the listed companies in the overall discharge of polluted waste water by the branch compounded about 49% in 1998. The total discharge of such waters by all companies of ferrous metallurgy in 1998 compounded 691.8 mln.sq.m, which is 11% less, than that in 1991. By the discharge of polluted waste waters the metallurgical industry takes the 4th place among all industries of Russia (9.4% of total discharge).

Except for air and waters pollution by metallurgical companies there is one more rather difficult problem - the wastage. Owing to rather low level of waste utilisation the quantity of stored wastes is permanently growing. It results in a severe pollution of the environment, withdrawal from the circulation of large areas of land. Hundreds of hectares of land serve as warehouses of various wastes. Companies have to pay considerable funds for their accommodation. So, today a solution of the wastes utilisation problem is of great importance. There are reasonable ways of usage of blast, steel-making and ferroalloy slags and their application is constantly growing. Some companies (for instance, JSC "Novolipetsk iron&steel works") have already achieved their 100% processing. However, the utilisation of ferroalloy slags is not increasing, as their industrial usage is hindered by an existence of lead and zinc in them.

The considerable slump in metallurgical production over the years of a radical economic reform, accompanied by reduction in harmful substances emissions into the environment, has not resulted in (according to the data by environment protection bodies) noticeable improvement in ecological conditions in the regions where metallurgical companies operate. For example, in 1997 in the list of 33 cities of the Russian Federation, which are characterized by the highest level of pollution, there still remained the cities with prevailing iron and steel industry, such as Kemerovo, Lipetsk, Magnitogorsk, Nizhny Tagil and Novokuznetsk. Cherepovets and Chelyabinsk were excluded from this list. As well as in previous years, the rivers, in basins of which metallurgical companies discharge waste waters, are estimated as "polluted" (Volga, Don, Ob etc.) or as "heavily polluted" (Kama, Tom, Iset, Tura, Ural etc.). The condition of small rivers, located in areas of steel making companies, still remains bad. All this affects negatively the health of the workers and population.

In the industry today there is a firm conviction in necessity of vigorous steps towards the reduction of emissions into the environment, bringing them to the minimum safe level. The general directions of such an activity have been determined.

The first direction is the measures of technological character, the implementation of low-waste and zero-discharge processes. As a rule, they coincide with the main directions of structural reforms of the iron and steel industry. For example, the replacement of open-hearth steel production by oxygen-converter one allows to lower threefold specific emissions of harmful substances into the atmosphere.

During 1998 the share of an open-hearth steel in Russia in total amount of steel production was 27.8%, in comparison with 52.4% in 1991. Continuous steel casting, as compared to the usual process, provides 4 times reduction in emissions. The share of continuous steel casting in Russia in 1998 was 51.8%, against 24.7% in 1991. One ton of coal-dust fuel in blast-furnace smelting operation is equivalent to the economy of 99 tones of coke. While producing 0.9 tones of coke, 5.5 kg of harmful substances are emitted into atmosphere, and at blowing-in of 1 ton of dust-coal into the blast furnace emissions make only 0.6 kg, i.e. 9 times as lower. At that the application of coal-dust fuel is not accompanied by emissions of substances adherent to chemical-coke process - ammonia, phenol, naphthalene, hydrogen sulphite etc. Coal-dust utilities are most actively put into operation at JSC "Nizhny Tagil iron&steel works".

The second direction is the implementation of energy-saving technologies, such as the usage of heat of agglomerated gases, usage of energy of charge gas of blast furnaces in turbogenerators after its preliminary clearing, dry coke quenching, usage of waste gas heat etc.

The third direction is the measures on avoidance of localisation of emissions: hermetic sealing and sheltering of production equipment (converters, electric furnaces, coke-oven plants etc.), sheltering of places of overloads of loose materials, avoidance of dust emissions from ore materials and concentrates, final shale storage, slag storage etc.

The fourth direction is the application of high-performance and up-to-date ways and devices for gas clearing. Here the preference is given to dry purification methods using electric filters, fabric filters etc., which are widespread at metallurgical companies of Western countries.

In the field of water basins protection the preference is given to continuation of activities on implementation of systems of water re-circulation, creation of the self-contained schemes of water facilities of companies. The implementation of such schemes allows to work in internal-drainage regime of water usage.

In Russia during last years there has been adopted a program-target method of tackling ecological problems. In ferrous metallurgy the solution of these problems is also stipulated by a number of federal, regional, local target ecological programs. So, for example, for a number of cities and regions, which are characterised by unfavourable ecological conditions, special programs were adopted, such as "The sanitation of the environment and population of Cherepovets for 1997-2000", "The sanitation of the environment and population of Nizhny Tagil in Sverdlovsk region by 2000", "Environmental sanitation of ecological conditions and population of Orenburg region in 1996-2000", "Processing of man-caused formations of Sverdlovsk region" etc.

The fundamental solution of ecological problems in ferrous metallurgy is stipulated on the basis of implementation of the Federal purpose-oriented program "Structural reorganisation of metallurgy of Russia by 2005", the project of which is now being completed. This program includes full compliance of Russian ferrous metallurgical production with the ecological norms and standards.

In practice, federal and regional programs are generally implemented at the expense of companies' own funds and partly at the expense of funds of territorial executive bodies (from local ecological funds). The participation of the state in these programs is insignificant, and the funds provided for by the programs, as a rule, are not given. So, to finance the program "The sanitation of environment and population of Cherepovets" for 1999 it is scheduled only 8 mln. rubles, while in 1998 JSC "Severstal" used on environment protection activities 650 mln. rubles, including 206 mln. rubles on capital construction.

In this regard due to the unstable financial situation at many companies of the branch the fulfillment of the program is expected to be done considerably behind the schedule.