
RESTORATION OF THE SYSTEM FOR ENVIRONMENT PROTECTION IN SARTID AD

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SARTID a.d. Iron & Steel Industry Corporation is located 7 km north-east of Smederevo, on an area of over 350 ha between the settlements of Vranovo, Rajla and Radinac. For industrial water supply it is connected with the river Danube by 9,5 km long canal, not being used for river traffic. It discharges the waste industrial waters into the recipient, rivers Rajla, Jezava, Velika Morava, and then into the Danube.

SARTID AD has a continuous technological process going on through the production of: sinter, pig iron, steel, hot and cold rolled strips and sheets. This production is followed by the production of power sources and fluids, spare parts and maintenance. The extractive section has the greatest effect on the environment, namely, production of sinter, iron, steel, power sources and fluids, through emissions into the atmosphere, discharge of waste waters into the recipient – river Danube and solid waste depositing. The planned capacity of the extractive section is 2.000.000 t of steel / year, and dirty air and flue gases are emitted into the atmosphere at that production, burdening the environment annually with: 2.635t of dust, 59.735 t CO, 72.094 t SO₂, 31.814t NO₂ and 10t HCl, 7.691 m³/h of waste water, burdened with 231 kg/h of suspended materials, is discharged into the recipient, as well as 2 307 gr/h Fe; 77 gr/h Cu; 1538 gr/h Zn; 384 gr/h Pb; 769 gr/h of ammonia and 384 gr/h of nitrite and over 9.539 t of refractories 22000t of BF mud; 640.000t of BF slag; 360.000t of converter slag; 200t of mixer dust; 55.600t of steel scrap, etc. are deposited.

The presented data have been calculated on the basis of designed manufacturing capacities, installed equipment facilities for preventing environment pollution and measured emission values by the „1.Maj„ Institute from Niš, as well as physical – chemical analyses of waste waters carried out by the Health & Medical Services Institute from Požarevac. The given values are presented for the emission values below GVE and MDK harmful materials in waste waters.

During NATO aggression on Yugoslavia, SARTID was once attacked, and the main transformer station for electric power supply was destroyed on that occasion. Therefore, NATO aggressions on SARTID did not have a disastrous effect on the environment .

Environmental protection is one of the basic requirements of SARTID s business policy, and in compliance with this, 100 systems for air protection against pollution were built,

and wherever it was possible, systems for re-use, i. e. water recirculation. The Recycling Center was established for resolving the waste material problems, and also there exists an operating unit for used oils recovery within SARTID a.d.

The following dedusting equipment has been installed:

- battery cyclons included in total with 21%
- scrubbers included in total with 25%
- turbex included in total with 13%
- rotoclons included in total with 18%
- bag – like filters included in total with 13%
- Electric filtering station included in total with 10%

The dedusting systems are mainly equipped with facilities for solid particles separation, and two absorbers for separation of hydrogen chloride, appearing in the baths of the Pickling Plant, have been installed, as well as hydrochloric acid recovery installation in the Cold Rolling Mill.

The waste disposal areas for raw materials represent a big problem for environment protection, where, for the present, no form of preventing stirring up of fine pulverized material has been provided for, though the project for wetting one of the waste disposal areas with water has been completed.

Out of the total industrial water quantity, necessary for production of 1.000.000 t/y, with one BF (BF-2) operation, 87% is in the recirculation systems, which we divided in type »A« and type »B« dependent on the waste water quality.

The type »A« recirculation systems, in addition to cooling towers, have the systems installed for mechanical waste water cleaning to the extent enabling its re-use. The water is cleaned in Dor-s thickeners of 30 m diameter having peripheral rake drive (Sintering Plant – 23 thickeners, BF 3 thickeners, Converter Steel Plant –4 thickeners), whereby the problem of BF mud, deposited in two cassettes and partly the mud from the Converter Steel Plant, directly going into the Ralja river and representing the biggest pollution source, has not been resolved. Five horizontal precipitation vats, having dimensions 10x50 m, and 10 sand filters were built in the Hot Rolling Mill.

The primary industrial water is mainly cooled in the type »B« recirculation systems through cooling towers and returned into the process for machine and device cooling.

The facility for chemical treatment of water from the pickling process and electrolytic degreasing of metallic surfaces, with 106 m³/h capacity, was erected in the Cold Rolling Mill, besides the type »B« recirculation system.

An open system for aerobic cleaning of public utility waters was erected for sanitary waste waters.

Observing the influence of sanctions, one may say that they disabled the maintenance of the existing equipment and facilities for environment protection, as well as purchase of new equipment. Such long-lasting influence brought about the equipment malfunction, and thereby a significant effect on the surrounding agricultural land, field crops (especially vegetables) and the population nearby.

A review of the necessary financial resources for reconstruction of the stated environmental protection systems is presented in the following tables:

Table 1 - Recapitulation of necessary funds for restoration of the air protection system

Restoration mode	Project engineering (USD)	Equipment Parts (USD)	Assembly Work (USD)	Total (USD)
Scheduled maintenance	0	282 545	140 130	422 675
Reconstructions Replacement	45 056	380 147	184 590	564 737
TOTAL	45 056	662 692	324 720	987 412

Table 2- Recapitulation of necessary funds for restoration of the water protection system

Restoration mode	Project engineering (USD)	Equipment Parts (USD)	Assembly Work (USD)	Total (USD)
Scheduled maintenance	0	123 424	101 641	225 065
Reconstructions Replacement	7 788	343 458	109 571	4660 817
TOTAL:	7 788	466 882	211 212	685 882

Table 3- Required funds for installation of the continuous flow meters for waste industrial waters

Ord. no	Name of the facility	Equipment value	Assembly	Total value
1.	Collector I	7 313	1 380	8 693
2.	Collector II	13 522	460	13 982
TOTAL		20 835	1 840	22 675

All samplings, analyses preparation and measurements, relevant for data presentation and system efficiency evaluation are carried out by:

- Health & Medical Services Institute from Požarevac (for waste industrial and fecal waters);
- The “1. Maj” Institute for Working Environment and Environment Quality, Niš (for emissions).