

Damir Brlek

Croatia
environmental co-ordinator
(Zvonimir Markovac)
Lura Group
Croatia

LURA GROUP d.o.o.
ZAGREB, CROATIA
SIRELA'S COMPLETE WASTEWATER PURIFICATION SYSTEM AND
FURTHER TREATMENT OF SLUDGE BY COMPOSTING METHOD
AN ECO-EFFICIENCY CASE STUDY

BASIC INFORMATION

Company name: LURA GROUP d.d. Zagreb
Region: Croatia, CEE
Number of employees: 2.048
1998 revenue: 85,350.955 EUR

Contact: Damir Brlek, environmental co-ordinator
(Zvonimir Markovac)
Tel: ++385-1-6169-765, 6169-738
Fax: ++385-1-6169-781
E-mail: damir.brlek1@luragroup.hr, (zvonimir.markovac1@luragroup.hr)

Lura Group, the leading dairy company in Croatia founded in 1993, consists of the following joint stock companies: Dukat in Zagreb, Sirela in Bjelovar and Mljekara in Zadar. Company's success and development is based on top quality of products, strong consumer orientation, and highly developed distribution system.

The Lura Group applies innovative technologies and state-of-the-art methods of environmental protection and furthermore enhances expertise and professional development of its workers in an environment that encourages teamwork and acceptance of the highest business ethical standards. New methods, in line with modern demands for environmental protection, are aimed at protecting environment and rationalising current operating costs. In 1998 Lura Group established a central environmental department and adopted its Environmental Chart. In 1999 the company prepared and published its first environmental report, one of the first in Croatia. Operation development is being planned and adjusted according to the ISO 9000 and 14001. Environmental reviews are being introduced - annual reviews carried out by Lura Group itself and audits executed each two years by independent auditors. The development of the company Environmental Strategy 1999-2008 is in its final stage.

BACKGROUND DESCRIPTION

In 1997 Lura Group management determined the wastewater from the Sirela dairy production as Sirela's top environmental priority. Sirela's highly saturated wastewater was emitted to the main sewer in Bjelovar and mixed with the municipal wastewater. The recipient of the partly treated municipal wastewater is a local stream entering the river Cesma. The starting goal was to achieve not only a wastewater treatment in line with the legal requirements, but to develop and realise a significant and lasting contribution to the environment. In the screening stage and further on, during the project design development and inquiries on potential partnership, the opportunities of cost-savings and investment pay-back in a short period were studied and balanced. In parallel, the idea of spreading operations and earn money instead of paying disposal fee was developed and contributed to shaping an eco-efficient solution. The investment, initially based on environmental goals, got

the attributes of good business. The final project encompassed a closed circle of complete wastewater purification, sludge treatment and commercial compost production. The wastewater treatment plant started operating on 1 December 1998.

ECO-EFFICIENT SOLUTION

*Sirela's
complete wastewater
purification plant*

The plant consists of the equipment that fulfils all the requirements of the wastewater purification based on an adjusted combination of physical and chemical and biological process and thus, resulting in a completely purified wastewater.

At the entry of the plant, before purification takes place, the wastewater has the following capacity and characteristics:

- Average daily flow	900 m ³
- Maximum daily flow	1.000 m ³
- Average chemical oxygen demand	7.000 mg/l
- Average biological oxygen demand	3.800 mg/l
- Average dry suspended matter	1.500 mg/l
- Oil, fat	450 mg/l

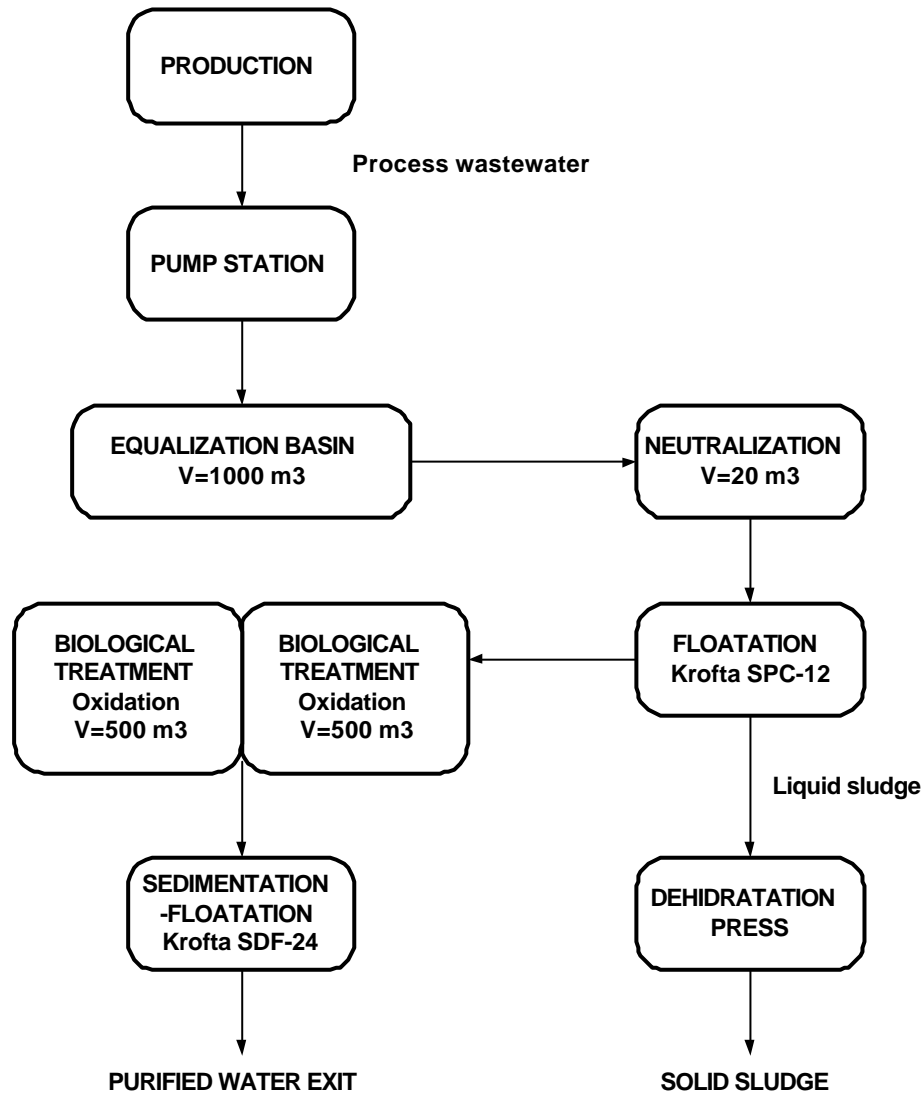
The above parameters are stated in the Agreement with the supplier of the equipment and are obliging Sirela, i.e. these parameters must not be exceeded at the entry of the plant.

According to the same Agreement, completely purified water at the exit of the plant must have the following characteristics that, according to the contract, belong to the responsibilities of the supplier of the equipment:

- Chemical oxygen demand – COD	180 mg/l
- Biological oxygen demand - BOD	40 mg/l
- Dry suspended matter – DSM	80 mg/l
- Oil, fat	8 mg/l
- pH	6,5 – 8,5

The effect of pollution removal after the wastewater treatment has been completed amounts to more than 90%. The purified water not only meets all the requirements cited in the water management permit but the obtained values are several times lower than the allowed values determined by the State Water Directorate.

SIRELA'S PLANT FOR COMPLETE WASTEWATER PURIFICATION FLOW DIAGRAM AND P&I DIAGRAM



Sludge processing

The output of the complete purification process is approximately 7 tonnes of sludge that are daily produced. At first, the sludge was disposed at the municipal disposal place of the town of Bjelovar at a daily disposal fee amounting to approximately 160 EUR. In order to avoid these expenses, Sirela invested in the production of the high quality compost on the Samarica farm. The compost is a mixture of residual sludge, unripe manure, bark of conifers from the forest area of Gorski kotar, and sawdust. Sirela signed a long-term co-operation contract with Sivicon – company from Ljubljana, Slovenia that had developed the composting technology implemented in this case.

Investment

The final price of the equipment and installation work under the Agreement with supplier:
523.669 EUR

The contracted price of building-construction work: 534.941 EUR

The final price of construction work on the compost field: 91.254 EUR

The equipment has to be completed with a loader, a conveyor belt and a mixer (the acquiring the conveyor belt and the mixer is under way) estimated at additional
25.011 EUR

The totals cost of the investment encompassing the closed circle of Sirela's wastewater purification system and further treatment of the produced sludge
1,154.735 EUR

Savings and earnings

Instead of paying rather high compensation for sludge disposal, Sirela is using this sludge in the production of high quality compost. The current average price of compost is 53 EUR per ton, so Sirela might expect net earnings of 30-33 EUR per ton of compost. Based on the yearly compost production of approximately 6.000-6.500 tonnes as planned the earnings amount to 180.000-21.450 EUR.

Expected cost savings will amount to approximately 527.000 EUR per year.

Environmental benefits

Sirela dd. Stopped emitting highly saturated wastewater to the main municipal sewer of the town of bjelovar, thus contributing to the reduction of pollution load to the environment.

The water quality parameters are basically improved and few times lower than required.

By diminishing its pollution load in such a high extent, Sirela is also contributing to a rational, simpler and less costly final solution for the municipal wastewater treatment (the municipal wastewater treatment system has not been completed yet; Sirela's contribution to the water quality might be considered as final).

Economic benefits

The significantly changed values of parameters, indicating the decrease in the wastewater saturation, result in significant reduction of the pollution fee that is paid for the wastewater emission based on the pollution degree.

Sludge, a by-product of water treatment, instead of being disposed and paid for is used in production of a new commercial good - high quality compost.

BOTTOM-LINE

The investment in the treatment of the wastewater from dairy production of Sirela d.d. Bjelovar turned out to be a good business too. The win-win effects are as follows:

- The environmental performance is significantly improved and a final solution for the environmental priority problem has been successfully developed and applied.
- The yearly savings on wastewater pollution fee are significant.

5th International Conference on Ethics and Environmental Policies
BUSINESS STYLES AND SUSTAINABLE DEVELOPMENT
Kyiv, April 2-6, 2003

- The business operations of Sirela are expanded to the compost production, thus bringing new earnings, new partnership, and new employment possibilities.

Total investment cost (1997-98)	
1,154.735 EUR	
Yearly savings (lower environmental fees)	527.000 EUR
Expected yearly net income (compost)	200.000 EUR
Expected pay-back period	2 years

LESSONS LEARNT

Sirela's wastewater purification and sludge disposal system was among the highest environmental investments in the Republic of Croatia in 1998. In June 1999 Lura Group d.d. was awarded the annual award of the State Directorate for Nature and Environment in the section of Water and Sea Protection. Main merits for this award belong to the Sirela wastewater purification system.

The significantly improved wastewater quality at the exit of Sirela's treatment plant is an important contribution to smoother functioning of the municipal wastewater treatment plant that has not been completed and fully operating yet.

The publicity given to this realisation, 1999 environmental award for water protection given to Lura Group, numerous visitors and obvious interest for sharing experience, made the management and employees of Sirela and Lura Group proud of the investment.

Both example of a short pay-back period of an environmental investment and example of spreading operation and income instead of paying fees represent valuable encouragement and good-practice-example for business in Croatia.