

UPM Fray Bentos

Environmental and Societal Responsibility 2017



UPM Fray Bentos

The pulp mill is located on the coast of the river Uruguay, 5 Km away from the city of Fray Bentos.

Construction of this state-of-the-art pulp mill began in 2005. The initial Environmental Authorization for Operation was granted by authorities on November 8th, 2007. The environmental authority in Uruguay is the Ministry of Housing, Territorial Planning and Environment (MVOTMA) through the National Direction for the Environment (DINAMA). Through the use of modern techniques high quality pulp is efficiently produced, most of it for the Asian and European markets.

The annual capacity of the mill is of 1.3 million tons of bleached eucalyptus pulp. Wood procurement is under the responsibility of UPM Forestal Oriental, which has been pioneering the development of eucalyptus plantations in Uruguay for over 25 years, since 1990. UPM has a 91% ownership in the Fray Bentos pulp mill and 100% in UPM Forestal Oriental. The UPM mill complex also accommodates the operations of four chemical plants that supply the bleaching chemicals for the process. These plants are under the responsibility of Kemira, which operates three of them (hydrogen peroxide, sodium chlorate, chlorine dioxide) while the fourth (oxygen) is operated by Praxair.

Maintenance of pulp mill operations is outsourced to Andritz, which supplied most of the production equipment for the construction of the mill.



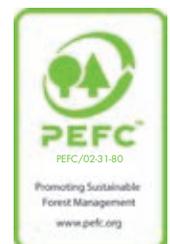
UPM Fray Bentos Environmental and Societal Responsibility 2017 is a supplement to the Corporate Environmental Statement of UPM's pulp and paper mills (available at www.upm.com) and provides mill-specific environmental performance data and trends for the year 2017. The annually updated mill supplements and the UPM Corporate Environmental Statement together form the joint EMAS Statement of UPM Corporation. The next Corporate Environmental Statement and also this supplement will be published in 2019.

UPM leads the forest-based bioindustry into a sustainable, innovation-driven, and exciting future across six business areas: UPM Biorefining, UPM Energy, UPM Raflatac, UPM Specialty Papers, UPM Paper ENA and UPM Plywood. Our products are made of renewable raw materials and are recyclable. We serve our customers worldwide. The group employs around 19,100 people and its annual sales are approximately EUR 10 billion. UPM shares are listed on NASDAQ OMX Helsinki. UPM – The Biofore Company – www.upm.com

Production capacity	1,300,000 ADt
Personnel	180
Products	UPM Euca (bleached eucalyptus kraft pulp)
By-products	Electricity
Certificates	EMAS – EU Eco-Management and Audit Scheme ISO 14001 – Environmental Management System ISO 9001 – Quality Management System ISO 50001 – Energy Management System ISO 22000 – Food Safety Management System OHSAS 18001 – Occupational Health and Safety System PEFC™ Chain of Custody – Programme for the Endorsement of Forest Certification FSC® Chain of Custody – Forest Stewardship Council®
	All certificates can be found from UPM's Certificate Finder (available at www.upm.com/responsibility)
Environmental labels	UPM pulp products have the approval for use in EU Ecolabel and Nordic Ecolabel paper products.



The mark of responsible forestry
For FSC products, visit www.fsc.org



For PEFC products, visit www.pefc.org

Review of the year 2017

Performance

The Fray Bentos pulp mill continued to achieve in 2017 a high level of capacity utilization, maintaining its reliability in pulp quality as well as a high level of environmental performance.

Two events with permit non-compliances occurred during the year.

Due to the disturbances in the effluent secondary treatment after 2016 annual shutdown, which caused exceedances of total suspended solids concentration and phosphorus load in December 2016, on January 3, 2017 the suspended solid concentration exceeded the daily permit limit of 150 mg/L (actual result was 312 mg/L).

Later in the year, there were disturbances in the effluent secondary treatment, possibly related to unplanned mill shutdowns, taking place in September 2017. Furthermore, during the same month, the phosphorus removal unit needed maintenance interventions which affected its availability, not allowing to compensate the phosphorus released in the aeration basins with more raw effluent phosphorus precipitation. The average phosphorus load exceeded the monthly average permit limit of 74 Kg/d (actual result was 81.7 Kg/d as a monthly average).

None of the non-compliant discharges posed any potential risk of damage to the environment and corrective actions were implemented at the mill in agreement with the authorities.

Emissions into the air remained at good levels and handling of malodorous gases was at very good level in 2017, in accordance with internal targets. As for the generation of odours in the equalization and safety basins of the effluent treatment plant, the situation improved in comparison to 2016 due to the operative actions taken.

At the mill's landfill the disposal of excess biosludge from the biological effluent treatment was stopped as the new biosludge dryers started up in the last quarter of the year. This investment allows the mill to avoid excessive build-

up of biosludge in the aeration basins and have a better control of the activated sludge system. The dried biosludge is used as a soil improver in the forestry plantations and could, in the future, be used as an alternative fuel.

UPM Fray Bentos pulp mill is self-sufficient in electrical consumption through the energy generated by burning black liquor.

The mill's emissions are within the ranges associated to Best Available Techniques (BAT) as established in the European Commission Implementing Decision of 26 September 2014.

Environmental monitoring

Environmental monitoring activities under the responsibility of UPM Fray Bentos and implemented by several external experts continue to show, ten years after the startup, that there is no negative impact on the environment related to the operation of the pulp mill. Updated results of the environmental monitoring activities are available in our website: www.upm.com.uy.

Transparency

The mill participated in 2017 in the session of the follow-up commission,

which includes community and national stakeholders and was established in March 2007. Material presented by the company and by the authorities in these meetings is available in DINAMA's webpage. (<http://www.mvotma.gub.uy/comision-de-seguimiento-upm.html>)

The results of monitoring activities carried out separately by the Uruguayan authorities, who also perform monthly inspections at the mill, confirm the ones obtained in the mill's monitoring program. Those results are periodically presented to the follow-up commission in Fray Bentos. Additional information on compliance with legal requirements can be found both in UPM's and DINAMA's webpages.

The environmental product declaration for Fray Bentos pulp was updated and made available to customers.

The mill has arranged a system of weekly visits to the site which is open to the general public free of charge. Since 2008, around 30,000 people from Uruguay and several other countries has visited our facilities.



Jussi Penttilä

Jussi T. Penttilä
Vice President,
UPM Uruguay Operations



Gervasio González

Gervasio González
Environmental Manager

Responsibility figures 2017

Energy



UPM Fray Bentos energy production represented practically

8%

of the country's demand.*

Water



Reduction in effluent volume per ton of pulp:

41%

Reduction in water consumption per ton of pulp:

33%

Both figures calculated comparing 2017 to 2008 performance.

Employment



USD **180** million*

Paid in salaries within the value chain.

235

outsourced companies. Involved throughout the value chain of UPM in Uruguay*

Taxes



USD **90** million*

Considers the value chain of UPM in Uruguay.

USD **25.4** million

Paid by UPM companies in Uruguay in 2017, including:

- Labor taxes
- Corporate income taxes and Free Trade Zone fees
- Property taxes

* Source: CPA Ferrere report, based on 2015 data, updated in 2017.

Safety



4 years

without Lost Time Accidents (LTA)
in own personnel.

A Lost Time Accident is an "on-the-job" accident
that results in an employee being absent from
the workplace for a minimum of one work day.

Total Recordable Injury Frequency (TRIF):

5.7 injuries

per million hours worked by own
personnel.

Waste



Decrease in waste to landfill:

35%

Calculated comparing the wet tons of
waste sent to landfill in 2017 and 2016.

Qualified spend



84%

of raw materials spend excluding wood.

Community



23 projects

promoted by UPM Foundation in 2017.
Projects' focus: 60% education;
40% community engagement.

Certified fibre



96%

of fibre used in pulp production.

Environmental monitoring



Over **3,000**

analytical environmental results from UPM Fray Bentos
pulp mill effluent, monitored annually by third parties.

Over **7,000**

water quality data gathered annually in different
points of the Uruguay river.

Air



Emissions into the air remained at very good levels, with all parameters within the conditions of the environmental permit.

Handling of malodorous gases from the production process was at good level in 2017, and in accordance with internal targets.

As for the generation of odours in the equalization and safety basins of the effluent treatment plant, the situation has improved in comparison to 2016. Several actions, including pH control in the basins and the installation of surface aerators have contributed to reduce the growth of anaerobic microorganisms responsible for the production of odorous compounds, thus reducing the frequency of odour perception outside the mill limits.

In 2017, 18 external complaints related to odour events were recorded, half of those occurred by the end of April and the first half of May. Usually the odour events during those periods had a duration of minutes with varying odour intensity.

Despite the nuisance created to people, odours originated at the pulp mill do not pose any potential risk of harm to the environment or human health.

The mill continues to proactively communicate to the community, local press, national stakeholders and members of the follow-up commission when there will be a planned activity that might cause the emission of odorous compounds to the air, as well as answering openly all related questions from stakeholders.

Ambient air quality measurements show that the operation of the pulp mill has no significant effect on the concentrations of pollutants in the air. Concentrations of all measured parameters have remained within the limits established in the environmental permit and BAT.

Water



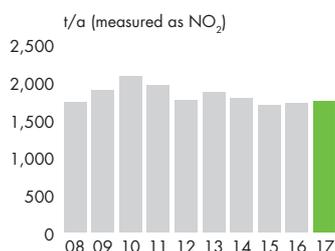
UPM Fray Bentos acquires raw water from the Uruguay River. The operations required about 0.90 m³ of water per second and generated about 0.67 m³ per second of treated effluent.

Due to the same disturbances in the effluent secondary treatment after 2016 annual shutdown, which caused exceedances of total suspended solids concentration and phosphorus load in December 2016, on January 3, 2017 the suspended solid concentration exceeded the daily permit limit of 150 mg/L (actual result was 312 mg/L).

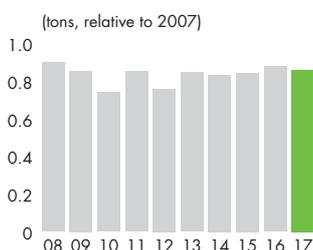
During the second half of April and May there were high concentrations of BOD₅ in the final effluent. This could have been due to the higher amount of fibres in the raw effluent as a consequence of perforations in the pulp washer plates from the Chlorine Dioxide stage of the bleaching process.

In September 2017 there were disturbances in the effluent secondary treatment, possibly related to unplanned mill shutdowns which occurred due to damage in the brick lining of the lime kiln. Furthermore, during the same month, the phosphorus removal unit needed maintenance interventions which affected its availability, not allowing to compensate the phosphorus

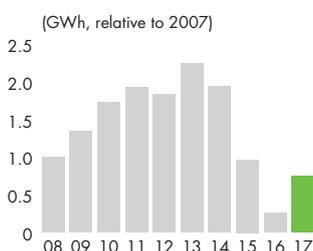
Nitrogen oxides, NO_x



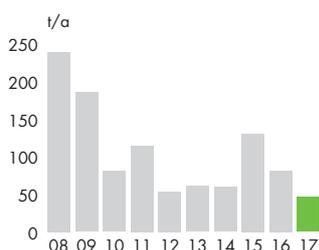
Evolution of fuel oil consumption



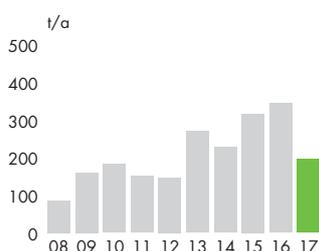
Evolution of electricity supplied to the national grid



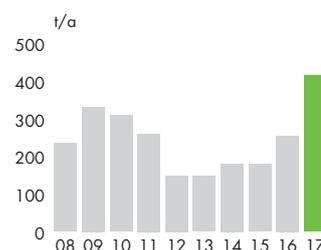
Sulphur dioxide, SO₂



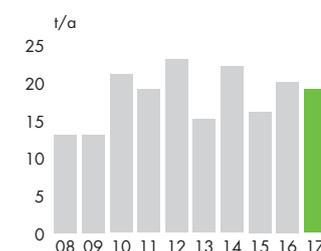
Dust



Biological oxygen demand, BOD₅



Phosphorus, P



released due to biosludge death in the aeration basins with more phosphorus precipitation from the raw effluent. The average phosphorus load exceeded the monthly average permit limit of 74 Kg/d (actual result was 81.7 Kg/d as a monthly average).

In all cases authorities were informed, corrective actions were established or are under implementation. None of the non-compliant discharges posed any potential risk of damage to the environment.

By the end of July 2017 the new drying plant for the excess sludge from biological effluent treatment, or secondary sludge, started its operations. Dry biosludge is disposed in forestry plantations and used as soil improver, and possibly, in the future it could be used as an alternative fuel.

Water quality monitoring results show that there is no significant variation between the sampling points located upstream and downstream from the mill that could be caused by its operation. Variation in time is similar in all sampling points, either reference points or near receptors of the mill's effluents.

Fish monitoring has been carried out biannually. Results continue to show



that the amount of different fish species found after the start-up of the mill is at the same level found during the baseline studies, and the situation is the same at all three study areas, either upstream or downstream from the mill. The condition of fish caught has been observed to be good without any macroscopic deformities or abnormalities. There are no differences in the general condition of fish caught from the different study areas.

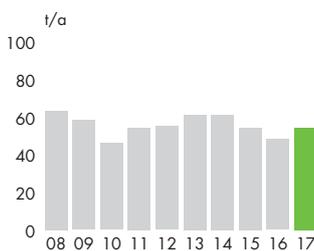
The fish bile investigations indicate that the concentrations of chlorophenolic compounds and phytosterols are within the variation limits as observed during the baseline studies and there are no indications of changes in the concentration levels caused by the effluent

discharged from the UPM pulp mill or any other sources.

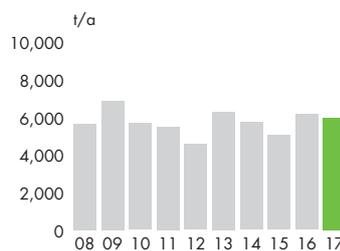
Muscle concentrations of dioxins, furans and PCBs were below the Total Daily Intake recommendations and, based on the observed concentrations and international recommendations there would be no limitations to human consumption of the studied fish.

The results indicate that the effluent discharge from the UPM Fray Bentos mill has not caused any impacts on the fish community and species diversity, or on the exposure level of fish, as compared to the situation prior to the mill operation.

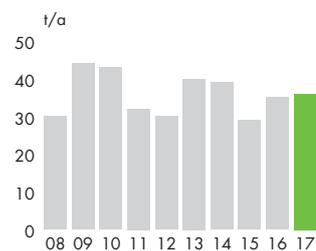
Nitrogen (inorganic), N



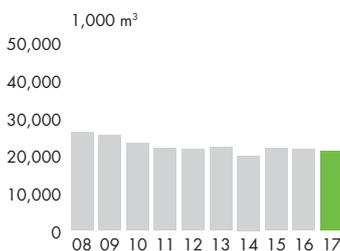
Chemical oxygen demand, COD



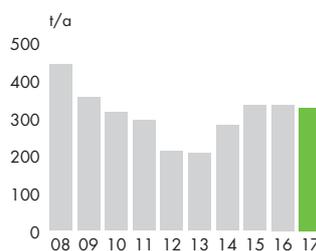
Adsorbable organic halogen compounds, AOX



Effluent flow (process wastewater)



Total suspended solids, TSS



Waste



The UPM Fray Bentos landfill site is located inside the mill complex. In 2017 the landfill received 33,600 t of waste on dry basis.

Green liquor dregs represented approximately 52% of the total dry weight of solid waste bound for the landfill site.

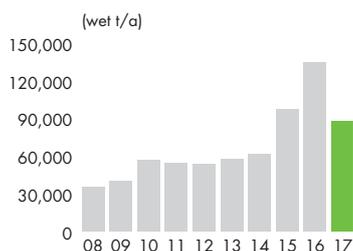
Wood waste (mainly bark and wood fines) continues to be returned to plantations for soil improvement, as well as sludge from the primary clarifier. In 2017 about 30% of the wood waste was used as a biofuel for electricity generation in external facilities.

In 2017 there was a decrease of 35% in the amount of waste disposed at the landfill site in comparison to the previous year.

Since July 2017, after biosludge dryers' start up, the disposal of biosludge (from the activated sludge system) at the landfill was stopped and dry biosludge started to be used in forestry plantations for soil improvement. A small proportion continued to be burned in the recovery boiler by mixing it with the black liquor. These actions have contributed to avoid excessive build-up of biosludge in the aeration basins.

The generation of hazardous waste in 2017 amounted to 65 t, of which more than 70% corresponded to filtration cake from the production of sodium chlorate at the chemical plant, filtering media from chemical processes, and used lubricating oils.

Solid waste to industrial landfill



Societal responsibility

First postgraduate course for teachers upcountry

Last year 19 teachers graduated from the Teaching and Evaluation degree in Fray Bentos, Uruguay. The postgraduate programme was impulsive, planned, leaded and funded by UPM Foundation. The 2017 generation was the first to graduate. In 2018, a new postgraduate edition is being held in the towns of Sarandí del Yí (Durazno) and Guichón (Paysandú), in the center and western regions of the country.

The degree was coordinated with the Ministry of Education of Uruguay and Universidad Católica del Uruguay, and it lasts about two years. The degree provides teachers with tools to evaluate in-class learnings, strengthen their teaching skills and incorporate new digital technologies in the classroom among others.

The main objective of the Curriculum and Evaluation postgraduate degree is to achieve greater equity in teaching and learning techniques within teachers in the interior of Uruguay. It is based on the idea that Education must be practised under constant updates and interdisciplinary coordination with teaching colleagues.

UPM Foundation impuleses these activities not only to strengthen smaller communities, but also to foster educational development and growth.



Graduation ceremony held in Fray Bentos, November 2017.



UPM Fray Bentos Fire Brigade Station and Safety supervisors.

UPM Fray Bentos reached **four years** without lost time accidents

UPM's Fray Bentos mill personnel reached an impressive milestone on 22 April – four years without any accidents resulting in absence.

UPM carries out a strategic annual safety plan with clear guidelines that everyone must follow in order to comply with the objectives set and the strictest safety standards. The working culture, planning and management not only apply to UPM personnel, but also to contractors, raising their standards and developing their skills while creating safer working conditions for everyone.

Regular training and safety campaigns, along with fluent communication between the different areas within the mill site, are highlighted as some of the fundamental pillars to achieve this kind of result. Between 2016 and 2017, over 4000 workers were trained in safety including hot works, shared work-

ing spaces, working at height, among others.

"The challenge is to create a culture where safety is perceived as a value that is incorporated into all our activities and our way of working," says Gerardo Galimberti, Safety Director, UPM Pulp. "Building a strong safety culture requires constant effort from each one of us."

He also adds: "Safety is a universal concept that touches all those who work in the company, from top management to every worker entering the mill every day.

"Workforce ownership, team work and commitment to safety are what make our pulp mill in Fray Bentos one of the safest mills in the industry," says Galimberti.

Environmental parameters 2017

The figures related to production as well as raw material and energy consumption are published as aggregated figures on group level in the UPM Corporate Environmental Statement.

Production capacity	Pulp	1,300,000 t
Raw materials and additives	Wood Pulping and bleaching chemicals	See UPM Corporate Environmental Statement for more information
Energy	Biomass based fuels Fossil fuels	93% 7%
Emission to air	Carbon dioxide, CO ₂ (fossil) Nitrogen oxides, NO ₂ Sulphur dioxide, SO ₂ Particulates Total reduced sulphur, TRS	139,570 t 1,733 t 46 t 194 t 8 t
Water intake	Process and cooling water	28,294,734 m ³
Discharges to water	Process wastewater Process wastewater quality indicators – Biochemical oxygen demand, BOD ₅ – Chemical oxygen demand, COD – Suspended solids, TSS – Nitrogen, N (total) – Phosphorus, P (total) – Adsorbable organic halogen compounds, AOX	21,080,999 m ³ 414 t 5,928 t 326 t 54 t 19 t 36 t
Waste	Waste to landfill Green liquor dregs Wastewater sludge Water treatment sludge Others Waste recycled Wood and bark waste Primary sludge (fiber sludge) Wastewater sludge Others Hazardous waste	17,601 t 12,322 t 1,120 t 2,651 t 62,923 t 5,788 t 2,399 t 397 t 65 t
Size of mill area		500 ha

* Dry weight



Environmental objectives

Among the objectives set for 2018, the following can be highlighted:

- Continue transparent and effective proactive communication of environmental issues to all stakeholders.
- Contribute to UPM's corporate commitment to environmental responsibility, including implementation of Clean Run campaign.
- Promote environmental awareness within the mill, its main suppliers and partners, and all subcontractors working in mill area.
- Comply with the key environmental indicators defined for 2018 (see below).

Performance against targets in 2017

	TARGET	ACHIEVEMENT
1 COD discharge to the river (annual average)	≤ 5 kg/ADt	Achieved
2 Effluent discharge to the river (annual average)	≤ 20 m ³ /ADt	Achieved
3 Total phosphorus discharge to the river (monthly average)	≤ 60 kg/d	Not achieved: over internal target in 4 months
4 Availability of strong odorous gases handling (annual average)	≥ 99.9%	Achieved
5 Availability of mild odorous gases handling (annual average)	≥ 99.5%	Achieved
6 Amount of permit exceedances	None	Not achieved: 2 incidents (see page 6)

Targets for 2018

	TARGET
1 COD discharge to the river (annual average)	≤ 5 kg/ADt
2 Effluent discharge to the river (annual average)	≤ 20 m ³ /ADt
3 Total phosphorus discharge to the river (monthly average)	≤ 60 kg/d
4 Availability of strong odorous gases handling (annual average)	≥ 99.9%
5 Availability of mild odorous gases handling (annual average)	≥ 99.5%
6 Amount of permit exceedances	None



REVALIDATION STATEMENT

As an accredited environmental verifier (FI-V-0001), Inspecta Sertifiointi Oy has examined the environmental management system and updated UPM Fray Bentos Environmental and Societal Responsibility 2017 report as well as the information concerning UPM Fray Bentos in the Updated UPM Corporate Environmental Statement 2017. On the basis of this examination, the environmental verifier has herewith confirmed on 2018-03-27 that the environmental management system, the updated UPM Fray Bentos Environmental and Societal Responsibility report and the information concerning UPM Fray Bentos in the Updated UPM Corporate Environmental Statement are in compliance with the requirements of the EMAS Regulation (EC) No 1221/2009.



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