

# ENVIRONMENTAL PERFORMANCE IN 2010

## UPM, Fray Bentos





## UPM, Fray Bentos

The pulp mill is located on the coast of the Uruguay River, 5 kilometres from the city of Fray Bentos, in a site of near 500 ha of which 80 ha are occupied by the mill's infrastructure.

Construction of this greenfield pulp mill began in 2005 and the total investment was USD 1.2 billion. The mill started production in November 2007 and made a record-breaking start-up by sustaining its nominal capacity for 30 days within the first 145 days of operation.

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 1.1 million tonnes of eucalyptus pulp, for which the mill uses around 3.5 million cubic metres of wood. Wood procurement comes under the responsibility of UPM Forestal Oriental, which has been pioneering the development of eucalyptus plantations in Uruguay since 1990.

On 8 December 2009, UPM, Metsäliitto, M-real, and Botnia closed the transaction according to which Metsäliitto's and Botnia's share of the Fray Bentos pulp mill and the eucalyptus plantation company Forestal Oriental in Uruguay were transferred to UPM. 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 which 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.



This Environmental Performance 2010 report of UPM Fray Bentos is the mill supplement of the UPM Corporate Environmental Statement 2010, which is available at [www.upm.com](http://www.upm.com). The next Environmental Performance statement for Fray Bentos will be published in the first quarter of 2012.

### UPM, Fray Bentos

- **Production capacity**  
1,100,000 ADt
- **Personnel**  
180
- **Products**  
BEKP
- **By-products**  
electricity

# State-of-the-art Pulp Mill

At the end of 2008 UPM redefined itself with the help of a new vision and business strategy as a bio-forest industrial company, creating the term "Biofore Company". As one of the most modern pulp mills in the world, UPM Fray Bentos contributes to the Biofore concept by continuously improving its environmental performance and communicating transparently with all stakeholders. Designed with the most recent technologies available, the mill operates in compliance with the strict standards set by Uruguayan legislation.

The use of the Best Available Techniques (IPPC-BAT) allows the mill to achieve a minimum environmental impact, with low consumption levels of water, energy and chemicals.

Biomass is used for clean energy generation, with an electricity surplus that is used both for production of bleaching chemicals and supply of the national public electricity grid. The electricity production of the mill amounts to near 10% of the national demand.

## Environmental responsibilities

UPM's Code of Conduct sets the minimum standards for environmental practices.

All employees at Fray Bentos must know the environmental aspects of their work and recognise their obligations to improve environmental performance.

UPM is responsible for the environmental performance of the whole Fray Bentos complex; coordinating and general monitoring of environmental matters are handled by the UPM Fray Bentos Environmental Manager.

## Environmental Monitoring

Monitoring of the environment in the mill's area of influence includes several components:

- River Uruguay:
  - Water quality – since April 2005.
  - River biology (plankton, benthos, fish) – since April 2005.
- Air quality – since June 2006.
- Noise – since December 2007.
- Groundwater – since April 2005.
- Soil – since August 2006.
- Honey production – since November 2006.
- Flora – since August 2006.
- Socio-economic – since July 2005.

All these monitoring activities were implemented at least one year before the start-up of the mill, in order to build a baseline to be compared with the data gathered during operation of the mill.

Environmental aspects of the operation, including air emissions, effluent quality and waste generation, are also monitored according to an extensive plan approved by the authorities.

## • Certificates

- Quality Management System (ISO 9001:2008)
- Environmental Management System (ISO 14001:2004)
- Occupational Health and Safety Management System (OHSAS 18001:2007)
- Product Safety Management System (ISO 22000:2005)
- Energy Efficiency Management System (EN 16001:2009)
- Forest Stewardship Council Chain of Custody (FSC-STD-30-005)



The mark of  
responsible forestry

# Attainment of environmental goals in 2010

In 2010 the mill achieved the targets set for production availability and pulp quality, with periods of very stable operation that allowed a very good level of environmental performance, with just a few exceedences in the year, all of them without any potential risk of damage to the environment.

The mill exceeded its monthly discharge permit for total phosphorus from February to April. Corrective actions were taken and the root cause detected to be the leaching of phosphorus from lime mud accumulated in the safety basin during the 2009 annual shutdown. The basin was cleaned and the discharge load went back to normal levels.

The effluent discharge limit for temperature (30°C) was also exceeded during some days in the hottest months of the year, by no more than 1 or 2°C, so no effect on the receiving body was possible. Based on the mill's EIA and additional modelling presented in December 2010, authorities increased the discharge limit from 30°C to 37°C in April 2011.

A few exceedences in the content of thermotolerant coliforms in the treated effluent were originated in low dissolved oxygen values during peaks of organic load to the effluent treatment plant. As a corrective action, aeration capacity was increased during the second quarter of 2011.

Emissions into the air remained at acceptable levels, with all parameters within the conditions of the permit limit. Loads of SO<sub>2</sub> and TRS to the air were on lower levels than in 2009, while NO<sub>x</sub> and dust were on similar levels to 2009.

The carbon footprint calculated for the eucalyptus bleached kraft pulp in 2010 was 230 kg CO<sub>2</sub>/ADT.

Handling of malodorous gases was at a good level in 2010, and in accordance with internal targets. There were 17 complaints about odours in nearby areas, of which only four were related to the operation of the mill. All these four complaints related to the operation of the mill corresponded to short duration events of light or mild intensity, without any potential risk of harm to the environment or human health.

No complaints were received during 2010 about disturbances related to noise or any other emissions from the mill.

Operation control at the mill's landfill was improved by adding new instrumentation and automation devices.

Landfilled waste is compacting more than forecasted in the original project, so the lifetime of the open stage will be higher; design of the second stage will be reviewed during 2012, as construction will not be required to start before 2013.

Green liquor dregs constitute near 90% of the total amount of solid waste bound for the landfill site.

Towards the end of the year cooperation was started with Project MAS Rio Negro by sending recyclable mill waste to the group of classifiers that has moved out of the municipal landfill and is now working in healthier and better conditions, not to mention the improved social inclusion achieved. Support to this group will continue in the future.

In order to ensure a transparent and effective communication with the community and national stakeholders, the mill participated in 2010 in the two sessions of the follow-up commission established in March 2007. Material presented by the company and by the authorities in these meetings is available in the webpage of DINAMA ([www.dinama.gub.uy](http://www.dinama.gub.uy)).

UPM Fray Bentos pulp mill is self-sufficient in electrical consumption through the energy generated by burning black liquor. About 25% of this biomass-based energy generated at the mill is sold to the national grid. Review of environmental risks assessment was started in 2010 and will be completed in 2011.

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





## Emissions into the air

Emissions into the air remained at acceptable levels, with all parameters within the conditions of the environmental permit. Loads of SO<sub>2</sub> and TRS to the air were on lower levels than in 2009, while NO<sub>x</sub> and dust were on similar levels to 2009.

The carbon footprint calculated for the eucalyptus bleached kraft pulp in 2010 was 230 kg CO<sub>2</sub>/ADT.

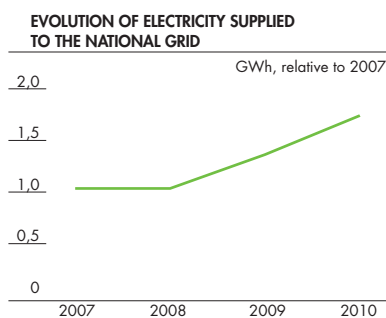
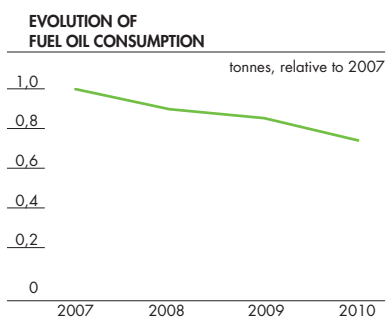
Handling of malodorous gases was at a good level in 2010, and in accordance with internal targets. During the year there were 17 complaints about odours in nearby areas, of which only four were related to the operation of the mill. All these four complaints related to the operation of the mill corresponded to short duration

events of light or mild intensity, without any potential risk of harm to the environment or human health.

In 2010 the mill certified its Energy Efficiency Management System according to EN 16001:2009 and joined UPM's global energy efficiency commitment by participating in internal energy audits for pulp mills and in campaigns to obtain project funding. As a result, three energy saving projects were implemented during the year and two more were implemented during the 2011 annual shutdown.

### EMISSIONS INTO THE AIR IN 2010

	Total amount
Dust, t/a	182
Sulphur dioxide, t SO <sub>2</sub> /a	80
TRS, t S/a	3.7
Nitrogen oxides, t NO <sub>2</sub> /a	2,069



# Waste

The UPM Fray Bentos landfill site is located inside the mill complex. Operation control at the mill's landfill was improved by adding new instrumentation and automation devices.

Landfilled waste is compacting more than forecasted in the original project, so the lifetime of the open stage will be higher; design of the second stage will be reviewed during 2012, as construction will not start before 2013. Green liquor dregs constitute near 90% of the total amount of solid waste bound for the landfill site.

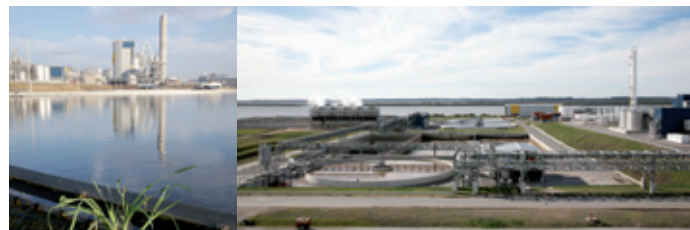
Wood waste (mainly bark and wood fines) continues to be returned to plantations for soil improvement as well as sludge from the primary clarifier.

Secondary sludge, i.e. excess biosludge from the activated sludge system, is burned in the recovery boiler by mixing it with the black liquor.

Towards the end of the year cooperation was started with Project MAS Rio Negro by sending recyclable mill waste to the group of classifiers that has moved out of the municipal landfill and is now working in healthier and better conditions, not to mention the improved social inclusion achieved. Support to this group will continue in the future.

The generation of hazardous waste in 2010 amounted to 54 tonnes, of which more than 60% consisted of used lubricating oils and greases and related maintenance waste.

Call centre number available for inquiries  
or comments: call (+598) 4562 7710.



# Water

UPM Fray Bentos acquires fresh water from the Uruguay River. The operations require about 1 m<sup>3</sup> of water per second and generate about 0.8 m<sup>3</sup> per second of treated effluent.

In 2010 the mill exceeded its monthly discharge permit for total phosphorus from February to April. Corrective actions were taken and the root cause detected to be the leaching of phosphorus from lime mud accumulated in the safety basin during the 2009 annual shutdown. The basin was cleaned and the discharge load went back to normal levels.

The effluent discharge limit for temperature (30°C) was also exceeded during some days in the hottest months of

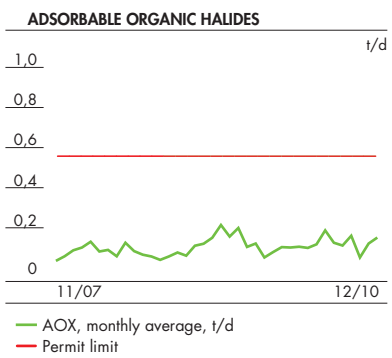
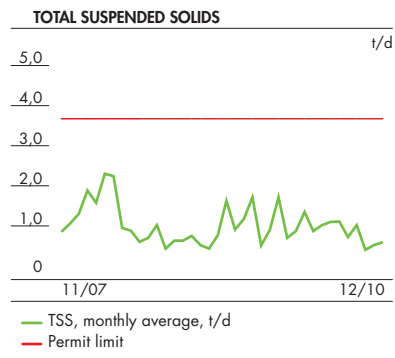
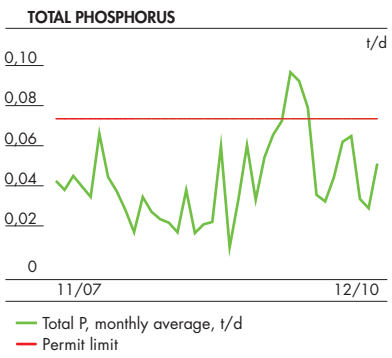
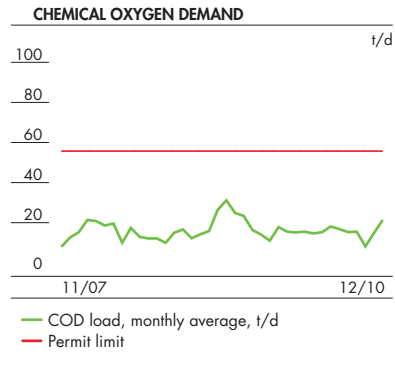
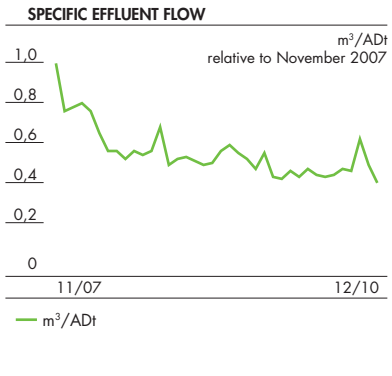
the year, by no more than 1 or 2°C, so no effect on the receiving body was possible. Based on the mill's EIA and additional modelling presented in December 2010, authorities increased the discharge limit from 30°C to 37°C in April 2011.

A few exceedences in the content of thermotolerant coliforms in the treated effluent were originated in low dissolved oxygen values during peaks of organic load to the effluent treatment plant. As a corrective action, aeration capacity was increased during the second quarter of 2011.

## WASTEWATER FIGURES 2010

	Annual average
COD	33%
BOD <sub>5</sub>	39%
Total N	20%
Total P	95%
AOX	25%
TSS	28%

The main results of the mill's environmental monitoring and performance are available at [www.upm.com.uy](http://www.upm.com.uy) and at UPM's office in Fray Bentos (25 de Mayo 3339).





## Environmental parameters 2010

UPM is producing mass products, thus operating on a highly competitive market. Due to that the disclosure of figures which can be used for financial information has been restricted. This means that the total amounts of production, raw materials and energy as well as all

the specific indicators per tonne of paper or pulp are published as aggregated figures. The information can be found in the common part of UPM's environmental statement.

Production capacity	Bleached eucalyptus kraft pulp	1,100,000 ADT
Raw materials and additives	Wood Pulping and bleaching chemicals Other	Not disclosed individually by mills
Energy	Biogenic fuels Net power purchase	94% -16,8 GWh (supplied to grid)
Emissions to the air	Dust Sulphur dioxide, as SO <sub>2</sub> TRS, as S Nitrogen oxides, as NO <sub>2</sub>	183 t/a 88 t/a 3.7 t/a 2,067 t/a
Water intake	Process and cooling water	82,000 m <sup>3</sup> /d
Discharges to water	Effluent volume BOD <sub>5</sub> COD <sub>Cr</sub> TSS Total Phosphorus, as P Total Nitrogen, as N AOX	63,700 m <sup>3</sup> /d 0.85 t/d 15.5 t/d 0.86 t/d 58 kg/d 125 kg/d 0,12 t/d
Waste to industrial landfill	Green liquor dregs Water treatment sludge Other	48,603 t wet 5,107 t wet 2,992 t wet
Waste recycled	Wood and bark waste Primary sludge	86,442 t wet 30,674 t wet
Hazardous waste		54 t
Mill area size		500 ha

# Environmental situation

Environmental monitoring activities under the responsibility of UPM Fray Bentos and implemented by several external experts continue to show that there is no negative impact on the environment related to the operation of the pulp mill.

Water quality monitoring results show that there is no significant spatial variation between the sampling points located upstream and downstream for 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 results show that the amount of different fish species was at the same level during the December 2010 test fishing period as compared to the previous baseline and monitoring studies, and the situation was the same at all three study areas, either upstream or downstream from the mill. The best catches were caught at the Yaguareté estuary, in the near recipient area of the mill and the catch was clearly higher as compared to the reference site outside Nuevo Berlin. The species diversity and the fish community structure were the same at all study areas. As already observed during the baseline studies and previous monitoring studies, the highest catches come from Yaguarete Bay indicating favourable conditions for different fish species. The condition of fish caught was observed to be good without any macroscopic deformities or abnormalities. There were 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 new UPM pulp mill or any other sources. The resin acid concentrations

analysed from the fish bile during the December 2010 study period continued to be low, as previously observed within the baseline and monitoring studies.

The measured dioxin, furan and PCB concentrations in river water were all at very low level. 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. Mercury and lead concentrations in fish muscle samples collected from the study areas were below the recommended levels. The results indicate no impacts at the areas receiving the effluent from the UPM pulp mill in Fray Bentos. The results indicate that the effluent discharges from the UPM Fray Bentos mill have not caused any impacts on the fish community and species diversity or to the exposure level of fish, as compared to the situation prior to the mill operation.

Air quality monitoring results 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.

These and the other monitoring activities (soil, honey production, flora, etc) support the conclusions originally stated in the Environmental Impact Study, showing that no environmental harm is to be expected from the operation of the mill.

Monitoring results carried out separately by the Uruguayan authorities confirm the results obtained in the mill's monitoring programme; those results are periodically presented to the follow-up commission in Fray Bentos and available from DINAMA's webpage.



[www.upm.com](http://www.upm.com)

**Fray Bentos Mill**

Ruta Puente Puerto Km. 307  
65.000 Fray Bentos  
Tel. +598 456 20100

**Further information**

Gervasio González  
Environmental Manager  
Tel. +598 99 789 400  
[gervasio.gonzalez@upm.com](mailto:gervasio.gonzalez@upm.com)

Matías Martínez  
Communications Manager  
Tel. +598 99 371 339  
[matias.martinez@upm.com](mailto:matias.martinez@upm.com)