

ENVIRONMENTAL IMPACT STUDY (EIA)

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LD Celulose S.A.

**DISSOLVING PULP MILL, IN INDIANÓPOLIS AND ARAGUARI - MINAS GERAIS
STATE**

VOLUME I – PROJECT CHARACTERIZATION

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1 INTRODUCTION

This document presents the Environmental Impact Study and its Environmental Impact Report (EIA/RIMA) regarding the implementation of the LD Celulose Dissolving Pulp Mill in the municipality of Indianópolis and Araguari, State of Minas Gerais.

The Environmental Impact Study has the purpose of instructing the Preliminary Permit (LP) requesting process, and also guiding and providing subsidies to the technicians of environmental agency, to evaluate this document.

The development and content of this Environmental Impact Study follow the legal bases determined according to the Federative Republic of 1988 Brazil Constitution, according to article 225, paragraph 1, item IV, which determines the EIA/RIMA realization for projects that may cause significant environmental impacts. In addition to the constitutional determination, the infraconstitucional devices present in the guidelines of CONAMA Resolutions No. 01/86 and CONAMA No. 237/97 as well as Term of Reference of FEAM/MG.

Thus, the present Environmental Impact Study and respective Environmental Impact Report (EIA/RIMA) was carried out based on the "*Term of Reference to elaboration Environmental Impact Study (EIA) and Environmental Impact Report (RIMA) – EIA/RIMA - GER001*", defined by the State Environment Foundation (FEAM), with some adjustments, as well as based on CONAMA Resolution 01/1986 and CONAMA Resolution No. 237/1997.

The structure of the EIA/RIMA is as follows:

- Volume I – Project Characterization
- Volume II – Environmental Diagnosis
 - Number I – Physical Environment Diagnosis
 - Number II – Biotic Environment Diagnosis
 - Number III – Socioeconomic Environment Diagnosis
- Volume III – Environmental Impacts Assessment
- Volume IV – Specific Studies
- Volume V – Quality Analysis Reports
- PBA – Basic Environmental Programs
- RIMA – Environmental Impact Report.

The first volume of the study presents the project characterization, with general information of the mill. In this chapter, an analysis of the project technical characteristics is present within the area of influence; the implementation and operation activities are also discussed, with the main steps description.

The second volume presents the physical, biotic and socioeconomic environmental diagnoses of the region. The diagnosis objective is to know the region socioenvironmental conditions, and its biotic and abiotic aspects. This is important, since it allows the evaluation of possible and eventual impacts to be introduced by the project, and cause changes in the analyzed environmental.

With the information about the project characterization and the environmental diagnosis, it is possible to carry out the next step of the study, where the possible impacts resulting from the of project implantation and operation phases are pointed out; and mitigation measures and monitoring programs are also proposed for those impacts considered most significant (third volume).

The fourth volume presents the Specific Studies such as Effluent Dispersion, River Autodepuration, Atmospheric Dispersion, Risk Analysis and Noise Propagation.

The Quality Analyses Reports of the physical environment (surface and rain waters, groundwater, soil, air quality and noise), carried out in specific campaigns for this Study, are presented in the fifth volume; and the sixth volume presents the Basic Environmental Plans (PBAs), and in the seventh volume the RIMA.

The main objective of an Environmental Impact Study is to attest to the project environmental viability, through the project characterization, current situation knowledge and analysis of the areas susceptible to change due to its implementation and operation, called influence areas, for the subsequent comparative study between the current and the future situation. This analysis is carried out through the potential environmental impacts identification and evaluation, resulting from the project implementation and operation. This evaluation considers the proposition of impacts management actions, that aim to minimize and / or eliminate the negative changes, and to increase the benefits brought by the project implementation.

The technical team elaborated the present work in order to provide subsidies for the environmental agency to analyze the application for a Preliminary Permit and to conduct the environmental licensing process and define the necessary conditions for the project implementation and, finally, to operate it according to the sustainability assumptions.

2 GENERAL INFORMATION

2.1 Permitting Object

The permitting object consists of the implementation of a dissolving pulp mill, with a capacity of 540,000 t/year, located mainly in the municipality of Indianópolis (industrial site) and Araguari (water intake and effluent disposal), in the State of Minas Gerais. Dissolving pulp will be exported and used as feedstock for manufacture of viscose yarns and others.

Dissolving Pulp

Dissolving pulp is similarly obtained to common pulp (for paper production), however with a higher content of pulp (> 92%). It is a high purity pulp and lower level of contaminants, used for four large product groups: viscose (cut rayon, textile and industrial filaments, cellophanes, etc.), acetates (filters for cigarettes, filaments and acetate films), ethers (binders, detergents, glues, food, pharmaceuticals) and nitrates (explosives, varnishes and celluloid).

The pulp has this name because it is dissolved in a caustic solution to forming the viscose, and then extruded into a baffle to form filaments of rayon.

The dissolving pulp has found a lot of market due to the fall of the cotton production, and consequently the price increase of this type of fiber.

The process of production of dissolving pulp is quite similar to the kraft process (for the production of paper pulp), but important modifications in cooking, since there is a pre-hydrolysis of the chips, for removal of hemicelluloses from wood chips. Hemicellulose needs to be removed, as it may precipitate through the seals, clogging them. The snags convert pulp into small threads, much like those of cotton.

2.2 Project Identification

The total capacity of the plant will be 540.000 t/year of dissolving pulp. The project includes the pulp production (wood preparation, fiber processing, drying and baling), chemical recovery (evaporation, recovery boiler, causticizing / lime kiln) and utilities (biomass boiler, water treatment plant, boiler feed water treatment plant and effluent treatment plant), fuel oil system, effluent emissary, water intake, waste treatment plant, administrative areas (first aid post, laboratory, restaurant).

It will be implemented a chemicals area which includes the unloading, handling and storage of sodium hydroxide, hydrogen peroxide, sulfuric acid and magnesium sulphate, as well as dedicated plant to sulphur dioxide preparation and plants production of oxygen and ozone.

A new cogeneration unit with a nominal capacity of 132 MW will be installed and 63.5 MW will be consumed in the pulp mill. There will therefore be a surplus, which will be arranged for sale.

It should be noted that in relation to environmental control systems, the implementation of the industrial plant will adopt the Best Available Technologies (BAT), aiming at reducing, controlling and monitoring liquid effluent emissions, atmospheric emissions and solid waste generated.

2.3 Project General Information

Company name	LD Celulose S.A.
State Enrollment and CNPJ	29.627.430/0001-10
Address for correspondence	Avenida Bernardino de Campos, 98, 7º andar, sala 54, Paraíso, São Paulo – SP
Zip code	CEP 04004-040
Phone	(11) 3472-6955
Legal Representative	Luis Antonio Künzel
Contact Person and Technical Manager	Cosimo Giovanni Rettl

2.4 Company Responsible for the preparation of the EIA/RIMA Identification

Company name	PÖYRY Tecnologia Ltda.
State Enrollment and CNPJ	50.648.468/0001-65
Address for correspondence	Av. Alfredo Egídio de Souza Aranha, 100 – Bloco B – 5º Andar – Chácara Santo Antônio – São Paulo – SP

Zip code	04726-170
Phone	(11) 3472-6955
Legal Representative	Fábio Fonseca
Contact Person and Technical Manager	Romualdo Hirata romualdo.hirata@poyry.com
CTF Register	1590635 (indicando categoria “Gerenciador de Projeto” e Consultor Técnico Ambiental – Classe 5.0).

2.5

Work Team

The technical team responsible for preparing the EIA / RIMA is presented below.

Pöyry Technology Team - EIA General

- Chemical Engineer Romualdo Hirata
General coordinator
CREA 0600332092 SP / IBAMA 1590635
- Chemical Engineer Celso Tomio Tsutsumi
Technical coordinator
CREA 5060443241/D SP / IBAMA 1590847
- Lawyer MSc Pedro Fernandes de Toledo Piza
Legal Analysis / Government Programs
OAB/SP 221.092 / IBAMA 1590877
- Chemical Engineer Cristina Maria Colella
Impact Assessment / Basic Environmental Programs
CREA 5061787977 SP / IBAMA 5012415
- Environmental Engineer Rafael Lourenço Thomaz Favery
Specific studies
CREA 5062655712 SP / IBAMA 2765347
- Chemical Engineer Karen Harumy Freitas
Project characterization / RIMA
CREA 5063578289 SP / IBAMA 5185593

Environmental Diagnosis

Physical Team

- Geologist Domingos Fernandes Pimenta Neto
CREA 210875647-7 / IBAMA 4116583

Biotic Team

- Fábio Maffei (coordinator)
- Guilherme Sementilli Cardoso (birds)

- Lucas Arruda (reptiles)
- Danilo da Costa Santos (mammals)
- Frederico Fregolente Faracco Mazziero (Flora)

Socioeconomic Team

- Chemical Engineer Cristina Maria Colella
- Support: Sociologist Lidianne Oliveira and Deborah Goldemberg

Specific Studies

Atmospheric Dispersion Study

- Engineer M.Sc. Dr. C. George Lentz

Water Dispersion Study

- Engineer Rafael Lourenço Thomaz Favery

Autodepuration Study

- Engineer Hélio Correia da Silva Jhuniór

Risk Analysis Study

- Engineer Carmen Lídía Vazquez Mesquita
- Engineer Henrique Augusto de Paiva
- Engineer Fernando Queiroga
- Chemical Elifas Alves

Noise Propagation Study

- Engineer Rafael Lourenço Thomaz Favery

Quality Analyses Reports

Noise report

- Engineer Rafael Lourenço Thomaz Favery

Surface Water and Rain Water Report

- Engineer Karen Harumy Freitas

Underground Water and Soil Report

- Geophysicist Wanderson Piantamar

Air Quality Report

- Eng. M.Sc. Dr. C. George Lentz

2.6 Note of Technical Responsibility (ART)

The Technical Responsibility Notes (ART) of the team presented in the previous item are included in ANNEX I of this document.

3 KNOWING THE COMPANY

LD Celulose S/A was recently formed by two large groups: Lenzing AG (Austrian) and Duratex S/A (national).

3.1 Lenzing Group

The Lenzing Group has an international reach that produces fibers from renewable raw materials (wood from planted forests). These fibers form the basis for a wide range of textile and nonwoven applications.

Lenzing has 80 years of experience, having been founded in Austria, where currently its headquarters are located.

Lenzing has 2 dissolving pulp mills, one in Austria and one in Czech Republic, with a total production capacity of 570,000 t/year.

It has 7 mills for the production of fibers for diverse applications, with total of more than 1,000,000 t/year, which are located in Austria, USA, UK, China and Indonesia. In addition to the factories, it maintains offices in Turkey, India, Thailand, Singapore and South Korea.

It employs more than 6,300 employees worldwide, and its products are marketed under the following brands: TENCEL® for textile applications, VEOCEL® for non-woven fabrics and LENZING® for special fiber in other areas and other products.

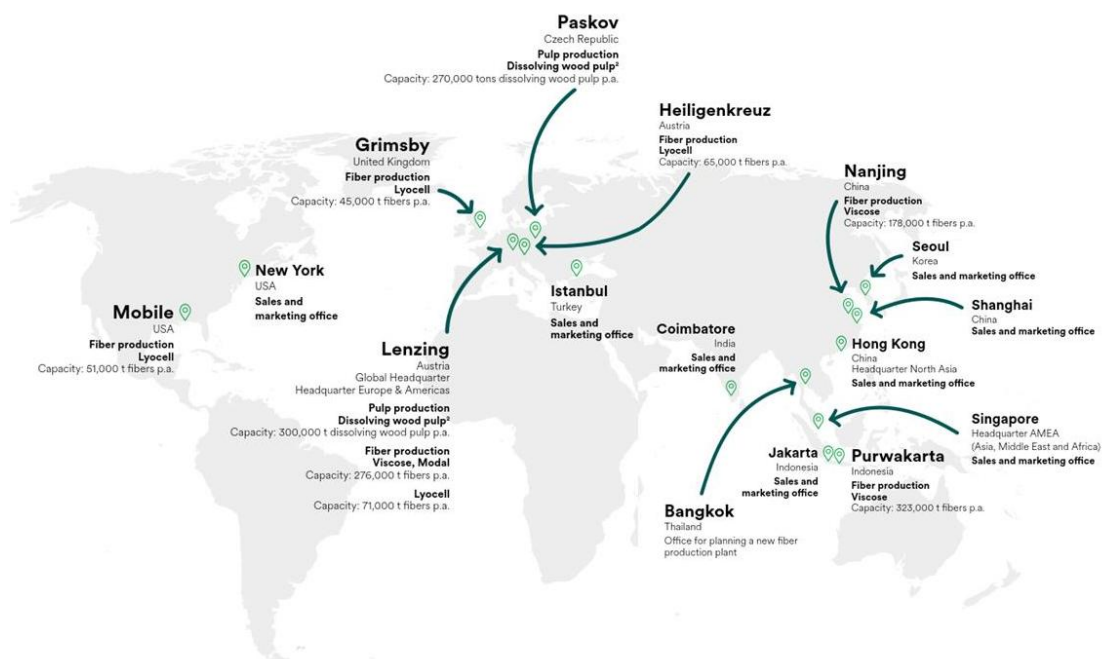


Figure 1 – Geographical distribution of the Lenzing Group around the world.
Source: Lenzing 2017 Sustainability Report



Figure 2 – Brands of the Lenzing Group. Source: Lenzing 2017 Sustainability Report

The Lenzing Group's sustainability strategy is to be "naturally positive". It focuses on sustainability areas where Lenzing has the greatest impact on creating a more sustainable world and is the basis for Lenzing's approach to contributing to the United Nations Sustainable Development Goals.

The Lenzing Group balances the needs of society, the environment and the economy and is the leader in sustainability in its sector. As leader, seek to be change agents and collaborate with suppliers and value chain partners to catalyze improvements. They actively contribute to improving environmental performance in all value chains and, consequently, in end products.

Lenzing assumes that pulp is at the heart of its business model. Dissolving pulp, which is the raw material for Lenzing fibers, along with its unique manufacturing technology, contributes to a smart and truly sustainable circular solution. At the end of their life cycle, the fibers biodegrade and return to nature.

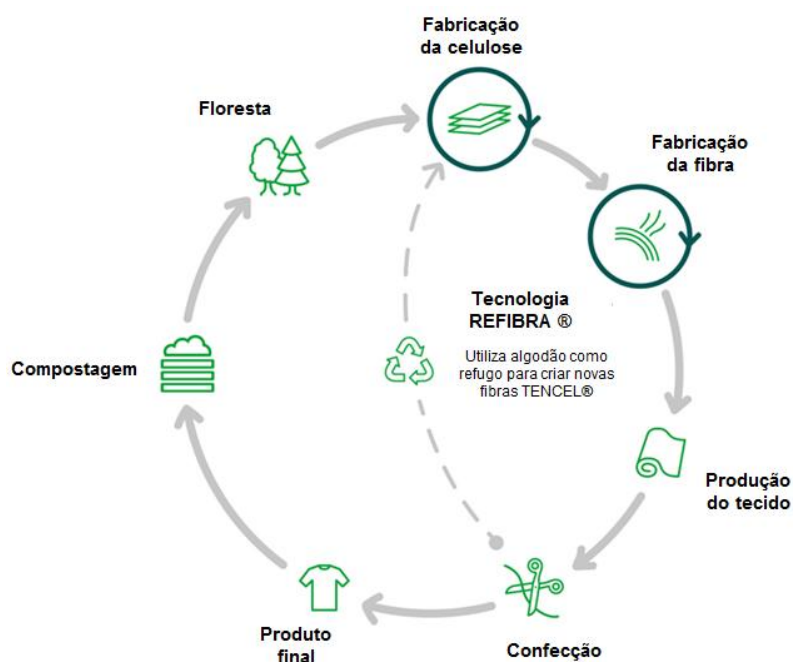


Figure 3 – Life cycle example of Lenzing products. Source: Adapted from the Lenzing 2017 Sustainability Report

3.2 Duratex

Duratex is a Brazilian company, controlled by Itaúsa - Investimentos Itaú S.A and by Companhia Ligna de Investimentos.

It has been in the market for 67 years under the Deca, Hydra, Duratex, Durafloor and Ceusa brands. It is considered one of the 10 largest companies in the world in the sectors in which it operates and the largest producer of industrialized wood panels and laminate flooring, of the Southern Hemisphere.

Duratex's headquarter is located in São Paulo, with 7 forest units in the states of Minas Gerais, São Paulo and Rio Grande do Sul and 17 industrial units in Brazil (Pernambuco, Paraíba, Sergipe, Minas Gerais, Rio de Janeiro, Santa Catarina and Rio Grande do Sul) and 3 factories in Colombia.

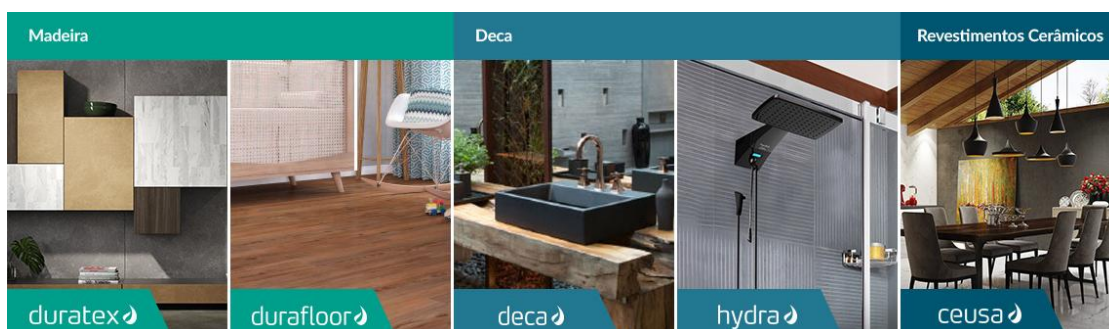


Figure 4 – Duratex products and brands. Source: www.duratex.com.br

Duratex has as its premise to act in favor of conservation of the environment, and thus constantly invests in eco-efficiency to reduce the use of natural resources in its production processes.

In this way, Duratex adopts as an objective of its sustainability policy: "to establish and share with all employees and society our commitments to sustainable development and our aspirations for each of the pillars we consider to be strategic for our business and for the generation of value to our stakeholders and shareholders". In line with this policy, following are some actions that Duratex has promoted throughout its history.

Sustainability Education Program

The company makes its employees aware of the importance of incorporating sustainability into their day-to-day activities - both professional and personal - through its Sustainability Education Program. As a consequence, the theme is increasingly present in the daily life of the company.

Accession to the GHG Protocol Program

Always acting with transparency and ethics is one of the premises of corporate governance of Duratex, which since 2012 has the Gold Seal of the Brazilian GHG Protocol Program to report information on greenhouse gas emissions.

The recognition is granted to companies from all over Brazil that, committed to transparency, voluntarily publish their complete inventory, with verification of an independent company, in the Public Register of Emissions, online platform of the GHG Protocol for the subject.



Figure 5 – GHG Protocol Program. Source: www.duratex.com.br

Espaço Arvorar

Espaço Arvorar was inaugurated in October 2017 by Duratex, through the Law of Incentive to Culture of the State of São Paulo, and is a project that proposes a creative approach on the history of wood, which stimulates the awakening of the senses, such as looking, touch, hearing and speech, with elements that contribute to a greater fixation of knowledge and to the awakening of a new look on wood.

It is a cultural and educational space that complements the learning, both of the student who attends the place and the general public, offering an interactivity between the visitor and the objects exhibited.

Among the activities offered in the place, with the support of monitors, it is possible to know the texture of typical trees of the Atlantic Forest biome, such as Araucaria, listen to the sounds of a tropical forest and know the processes of cultivation, management and sustainable extraction of the wood, as well as its protagonism in the history of the humanity, as in the time of the construction of the pyramids of Egypt.



Figure 6 – Espaço Arvorar. Source: www.duratex.com.br

Solutions for Better Living

"Solutions for Better Living" is the purpose that drives all Duratex businesses. As a result of the reflection of Duratex's leadership, it reflects the group's raison of existing and what the company proposes to do for its customers and consumers. It aims to direct investments, projects and efforts to understand people's needs and offer more than quality products, seeking to deliver innovative solutions that improve the quality of life and the well-being of people.

Duratex Sustainability Strategy

There are 45 goals to be achieved by the year 2025 that reinforce the company's commitment to doing business from the anticipation of the future needs of society, based on its perennial values.

The strategy was elaborated through a long review process that included all the corporate and business areas of the company, as well as interviews with opinion formers and benchmarking surveys with national and foreign companies from strategic sectors.

The new Strategy is structured in four pillars of action: people, processes, products and services and new business models.

4 PROJECT JUSTIFICATION

4.1 Location Justifications

Brazil has been a privileged place in the world, in relation to the agribusiness sector, due to its competitive advantage to cultivate renewable and self-sustaining forests. As such, Brazil is considered as the future major supplier of the world market for hardwood pulp, taking into account factors such as climate and good productivity of forests, which results in a very competitive cost.

The state of Minas Gerais presents, in addition to the aforementioned, other competitive advantages, such as:

- Qualified workforce and population commitment; and,
- Good conditions of railway and road.

Four basic premises were established for the study of macrolocalization of areas for the installation of a dissolving pulp mill, as follow:

- Close existence of a forest park capable of meeting the needs of wood for the dissolving pulp mill;
- Existence of appropriate regional characteristics to enable the development of an economically viable project;
- Socioeconomic situation that can be improved and enhanced through project development;
- Environmental characteristics favorable to the project and in compliance with environmental legislation.

Thus, defining the region of interest for the implantation of the dissolving pulp mill, LD Celulose started the macro-localization study in the state of Minas Gerais.

At the outset, 3 potential regions were selected in the State for implantation of the dissolving pulp mill, as shown in the following figure.

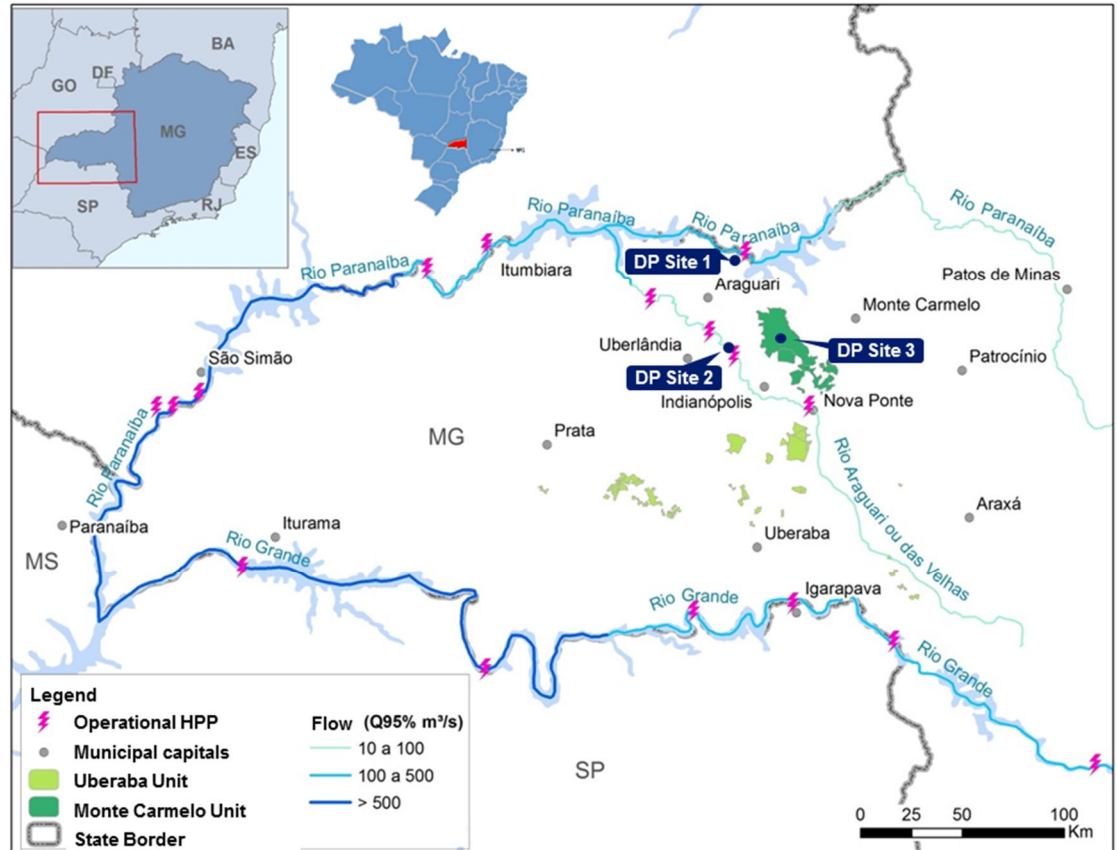


Figure 7 – Macrolocalization study (DP Site 1, DP Site 2, DP Site3). Source: Google Earth, 2018

The DP Site 1 region is located near the Paranaíba River, DP Site 2 is located near the Araguari River and DP Site 3 is located near the forests.

For these 3 regions, some aspects were evaluated, such as: proximity to logistic infrastructure (road and railway), water body, forest and transmission line.

It was observed that the Site DP 1 is located near the river Parnaíba and road, but away from the forests; DP Site 2 is near the Araguari river and road, but away from the transmission line, railway and forest; and DP Site 3 is close to the forest, road, railway and transmission line, however, further away from the river.

Thus, in a first macrolocalization evaluation, the Site 1 of the Parnaíba River was discarded as a function of the distance from the forest base, and in addition, it is also a hilly region and the Parnaíba river in this area has large rapids, which would difficult the raw water intake and treated effluents disposal.

Thus, based on the aspects surveyed, the studies were concentrated in several locational alternatives between DP 2 and DP 3, along the BR-365 road axis.

In this stage, further 14 sites were surveyed and evaluated, and in addition to the established basic premises, some aspects were also considered and analyzed, such as:

- Water availability for water supply and treated effluent disposal;

- Distance from forest to wood supply;
- Road access to the mill;
- Distance from the railway to outbound logistics of pulp;
- Distance from transmission line for connection with the electric power distribution network;
- Legal issues and socioeconomic configuration;
- Social infrastructure;
- Existence of Permanent Preservation Area (APP) and Conservation Areas (UC);
- Existence of indigenous and quilombolas community.

Based on these aspects, the field visits were made, and thus, four (4) sites were selected, which were compared to each other. The four finalists were:

- Site BR 365 - 10 / Road;
- Site BR 365 - 11 / Boomerang;
- Site BR 365 - 12/4 Owners;
- Site BR 365 - 13 / NMC.

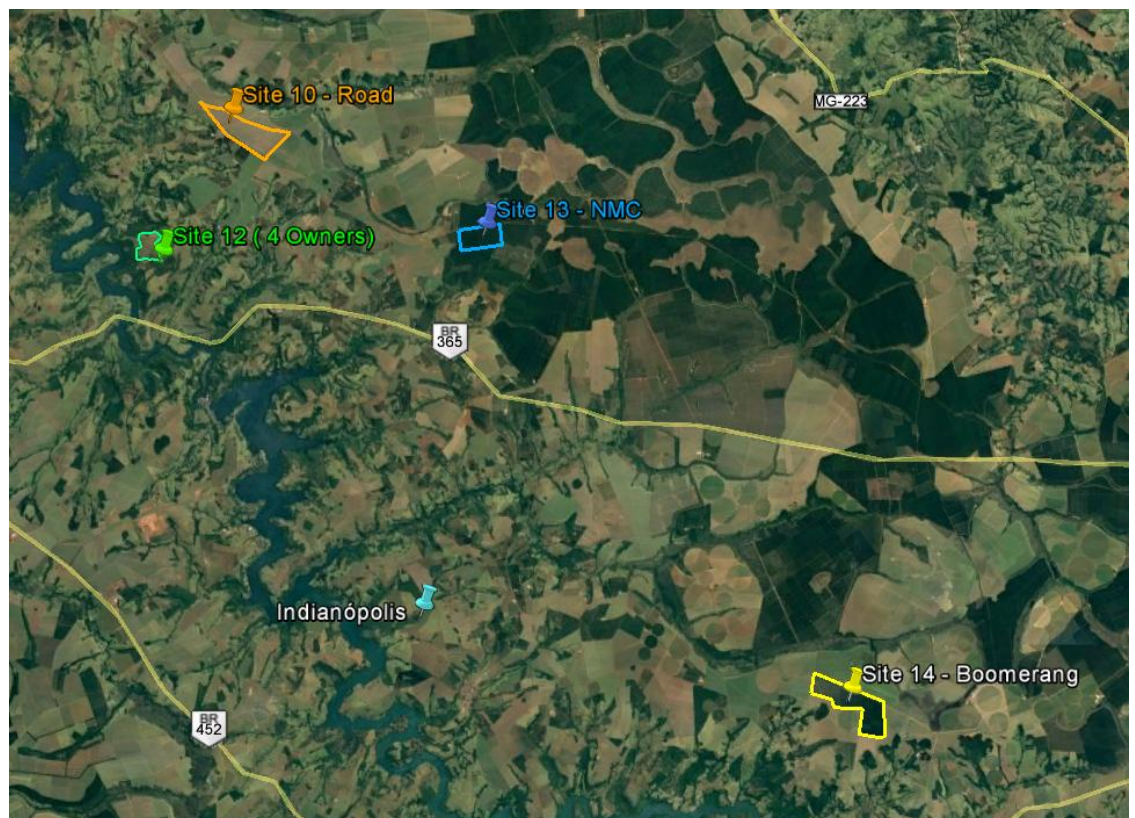


Figure 8 – 04 finalist sites. Source: Google Earth, 2018

Site BR 365 - 10 / Road

Site 10 is located in the municipality of Araguari/MG, has an area of approximately 420 hectares, on flat land. In terms of infrastructure, the site is between the FCA railway and the MG-748 road; and the Capim Branco reservoir 1 is considered for water intake and effluent disposal which is about 11 km away.



Figure 9 – Site 10 - Road. Source: Google Earth, 2018

Site BR 365 – 11 / Boomerang

Site 11 is located in the municipality of Indianópolis and Nova Ponte / MG, has an area of approximately 470 hectares, on flat land. Regarding to the infrastructure, the site is very distant for connection with the road and railway; and the reservoir of the Miranda plant is considered for water intake and effluent disposal.



Figure 10 – Site 11 - Boomerang. Source: Google Earth, 2018

Site BR 365 – 12 / 4 Owners

Site 12 is located in the municipality of Araguari / MG, has an area of approximately 250 hectares, but only 100 hectares on flat land. In terms of infrastructure, the site is far from the MG-348 and FCA railway; and the Capim Branco I reservoir is

considered for water intake and effluent disposal, which is very near. As far as wood logistics is concerned, it is a long way from the forest base.

It should also be noted that this site is located very close to a residential condominium.



Figure 11 – Site 12 – Four Owners. Source: Google Earth, 2018

Site BR 365 – 13 / NMC

Site 13 is located in the municipality of Araguari and Indianópolis / MG, has an area of approximately 200 hectares on flat land. Regarding the infrastructure, the site is close to the MG-748 road and next to the FCA railway; and it is considered the reservoir of the Miranda Plant for water intake and effluent disposal, which is about 25 km. Regarding the logistic of wood, it is located within the forest base of the company.



Figure 12 – Site 13 – NMC. Source: Google Earth, 2018

The following table shows a comparison of the selected alternatives.

Table 1 – Comparative Framework between sites

Site	Positive points	Negative points
Site 10 - Road	<ul style="list-style-type: none"> - Flat area; - Beside road and railway; - Land negotiation; - Lower investment in infrastructure; - Raw water and effluent pipeline along municipal road. 	<ul style="list-style-type: none"> - Investment in wood access road; - Wood transport.
Site 11 – Boomerang	<ul style="list-style-type: none"> - Flat area; 	<ul style="list-style-type: none"> - Far from railway and road; - Lands registration not identified; - Highest investment in infrastructure; - Wood transport; - Highest distance from Uberlândia.
Site 12 – Four owners	<ul style="list-style-type: none"> - Close to water intake and effluent disposal; - Land negotiation. 	<ul style="list-style-type: none"> - Far from railway and road; - Far from forest; - Hilly area; - Proximity to gated community.
Site 13 - NMC	<ul style="list-style-type: none"> - Flat area; - Close to railway; - Located within the forest base; - Lower operational cost; - Land negotiation. 	<ul style="list-style-type: none"> - Higher route for water intake and effluent disposal.

Through the comparative analysis of the positives and negatives points of the sites, sites 11 and 12 were discarded from the study.

The evaluation of the aspects surveyed showed that sites 10 and 13 are more favorable, especially in relation to the proximity to the road and railway,

In addition, the following environmental factors also favor sites 10 and 13 in comparison with the others:

- Water availability in the region for water supply and disposal of treated liquid effluents;
- The conditions for atmospheric dispersion are favorable.

However, site 13 stands out because it is located inside the plantation area, and therefore has the best logistics of wood.

In this way, Site 13 - NMC was chosen because it presents the most favorable characteristics for implantation of the pulp mill of LD Celulose.

4.2 Technical and Environmental Justifications

The production of the dissolving pulp will be carried out through the kraft process, which is similar to the papermaking pulp process, with a difference in the cooking process, which will be detailed below.

However, the demand and consequently the production of dissolving pulp in Brazil as well as in the whole world is much smaller when compared to the production of pulp for paper. In Brazil, there is only one dissolving pulp mill, located in the State of Bahia.

On the other hand, as already mentioned, the technology for dissolving pulp or paper pulp is similar, which is the kraft process, which in turn is largely throughout the world, including Brazil.

This technology is fully dominated not only by pulp-producing industries, but also by engineering, equipment and consulting firms. In addition, it presents additional advantages in relation to the ability to obtain high standards of whiteness and fiber quality required by the world pulp market, together with the capacity for energy self-sufficiency.

From the environmental point of view, the process to be used, in comparison to others, has a great advantage, as it allows the recovery of the chemicals used in cooking the wood, by evaporating and burning the cooking liquor in the recovery boiler, which also provides the reduction of the organic load for the treatment of liquid effluents.

In addition, according to state-of-the-art standards in industries of this type, a number of high-tech items were incorporated into the manufacturing process, which are aimed at improving the production process as well as reducing emissions to the environment (liquid, atmospheric and solid), such as:

- Dry debarking adoption, instead of wet route, to reduce the pollution load of the liquid effluents from this operation;
- Adoption of batch type cooking, which is the most used and known for the production of dissolving pulp;
- Use of closed-loop depuration that minimizes the generation of liquid pollutant load;
- Pre-bleaching unit installation that will consist of delignification with oxygen, aiming at a substantial reduction of the organic charge generation and color in the effluent;

- Use of TCF Process, using hydrogen peroxide and ozone, without the use of chlorine compounds;
- Contaminated condensates depuration through the installation of a gas / liquid separation column, in order to recover the condensate;
- Collection and burning systems of concentrated and diluted non-condensable gas;
- Installation of systems to recover and control losses in the production process;
- Atmospheric emission control equipment installation, such as electrostatic precipitators and scrubbers for the purpose of eliminating or minimizing emissions;
- Installation of treatment system and control of high efficiency liquid effluents such as activated sludge system;
- Installation of treated effluent disposal system in the water body, through terrestrial and underwater pipelines provided with background diffusers that will ensure the adequate dispersion of treated effluents at the disposal point;
- Installation of treatment and disposal system for industrial solid waste through composting and / or industrial landfill;
- Generation of excess electricity and its availability in the electrical net.

It is worth mentioning that LD Celulose is strongly committed to the adoption of Best Available Technologies (BAT) in order to reduce, control and monitor atmospheric emissions, liquid effluents and solid waste generated.

Main Differences in the Production Process of Dissolving Pulp and Pulp for Paper

Depending on its application, it will be destined to manufacture TENCEL® for textile applications, VEOCEL® for non-woven fabrics and LENZING® for special fiber in other areas and other products, dissolving pulp of LD Celulose needs to have high purity and lower level of contaminants. In order to achieve quality, it will be necessary to remove the hemicellulose from the pulp.

The removal of hemicellulose will occur in the cooking of the wood and thus, the main differences between the two processes are in the cooking process.

The hemicellulose will be removed by pre-hydrolysis of the chips by adding steam in the digester. The digester will then be kept for a period of time until the hydrolysis reactions have occurred. After the hydrolysis step is complete, the contents of the digester will be neutralized with a mixture of white liquor and brown pulp washing tank, which will also adjust the temperature.

As a result of the removal of the hemicellulose from the pulp, there is an increase in the chemical recovery circuit of the dissolving pulp mill, which is about 60% higher when compared to the pulp mill for paper.

Another important point is that the cooking process of LD Celulose will be of the batch, through the VISCBC process (Viscose Continuous Batch Cooking), once the production of dissolving pulp, this batch technology is patent of the Lenzing, being then largely dominated. Contrary to what happens with

process pulp for paper, in which the predominant technology is the continuous type.

Bleaching Process

Bleaching is necessary to produce a dissolving pulp of suitable quality for the production of viscose, modal and lyocell fibers. Most dissolving pulp manufacturers use ECF (elemental chlorine free) bleaching, and a fraction uses the TCF (total chlorine free) process.

It is worth noting that Lenzing was a pioneer in the industry in the use of the TCF process, since 1992, its pulp mill in Austria has been producing pulp with TCF bleaching, and in this way, the plant complies with the best available technology standards (BAT - Best Available Technologies) of the European Union.

As its factory in Austria, the bleaching process chosen for the pulp mill of LD Celulose was TCF (Total Chlorine Free), that is, totally free of elemental chlorine.

As mentioned above, the two most commonly used dissolving pulp bleaching processes are TCF and ECF, and the main differences between them are presented below.

ECF bleaching means that the chlorine element has been totally replaced by chlorine dioxide. The main chemicals used in this type of bleaching are chlorine dioxide, oxygen and hydrogen peroxide. Ozone is also used, but cases are rare. In alkaline stages, caustic soda is used for the extraction of dissolved lignin and also for pH correction. Sulfuric acid is usually used in the acidic stages for pH correction.

TCF process does not use any type of compound or chlorine derivative in its bleaching sequence. The products generally used are hydrogen peroxide, oxygen and ozone. Soda, as in ECF, is used for extraction of dissolved lignin and pH correction and sulfuric acid is used in the acid stage. In peroxide-using sequences, chelating agents (such as EDTA and DTPA) serve to control and remove metal ions, which break down the peroxide.

It can be seen from the above that the main point of the bleaching process turns around the use of chemicals, especially with regard to the use of chlorinated compounds. Therefore, below a brief description of the evolution of bleaching process in relation to the use of chlorinated compounds.

The evolution of the bleaching process

Historically, the bleaching process has developed from a single stage treatment with hypochlorite (ClO^-) to multi-stage sequences, using mainly molecular chlorine (Cl_2), chlorine dioxide (ClO_2), oxygen (O_2), ozone (O_3) and hydrogen peroxide (H_2O_2) as oxidizing agents, and caustic soda (NaOH).

Chlorine, as relatively inexpensive and highly effective chemical for delignification, was extensively used from approximately 1900 until the 1990s. Chlorine dioxide began to be used gradually from the 1960s, as it was observed that both the brightness and the mechanical strength of the fibers were improved. Since the 1970s, the use of chlorine dioxide has become more expressive.

Since the 1990s, the use of chlorine in bleaching began to decline rapidly after it was discovered in 1985 that the reactions of chlorine with lignin resulted in the generation

of organochlorine compounds. The main concern in the use of chlorine was in relation to the existence of environmentally resistant components, dioxins and furans. Given this scenario, the pulp mills have begun, on a large scale, to eliminate the use of chlorine in their bleaching processes. The first mill to be built that employed the ECF method in its process was Alberta-Pacific in Canada.

TCF sequences were developed shortly after the ECF technologies. TCF technology was developed because there would be much lower emission levels of organochlorine compounds compared to ECF technologies. As previously mentioned, Lenzing was one of the pioneers in the use of the TCF process at its pulp mill in Austria in 1992.

Environmental Aspects - Liquid Effluents

The main environmental aspect of the bleaching process is related to the formation of organochlorine compounds in liquid effluents.

The Stockholm Convention can be considered as the world's largest reference and requirement for studies on persistent organic pollutants (POPs), which include organochlorine compounds.

According to the Stockholm Convention, only two congeners 2,3,7,8 TCDD and 2,3,7,8 TCDF were identified as potential in the production of pulp with chlorine (Cl_2).

Still according to Convention data, the minimization of these can be achieved by reducing the chlorine element (Cl_2), increasing the use of chloro dioxide (ClO_2), which is the basis of the ECF process, or even elimination without the use of any chlorinated compound, which is the basis of the TCF process, which is the process to be used by LD Celulose in Brazil.

Security Issues

Another aspect addressed is with regard to security issues.

The TCF pulp mills do not store any chlorine compounds, so there is no risk of inadvertent leakage / spillage of these compounds.

4.3 Economic Justifications

The justification for the implementation of the project is based on the assumption of the current pulp market expansion in Brazil and abroad. This can be observed through the expansion projects of several industries of the branch, with consequent expansion of its forest bases.

Brazil has been a privileged place in the world, in relation to the agribusiness sector, due to its competitive advantage to cultivate renewable and sustainable forests. Therefore, Brazil is considered the future major supplier of the world market for hardwood pulp, taking into account factors such as climate and good productivity of forests, which results in a very competitive cost.

Market Evolution and Consumption

The pulp sector has been developing in a very competitive way, presenting growth in recent years, according to data presented in Figure below.

In addition, there is an expectation of growth in the world demand for dissolving pulp of 5% per year.

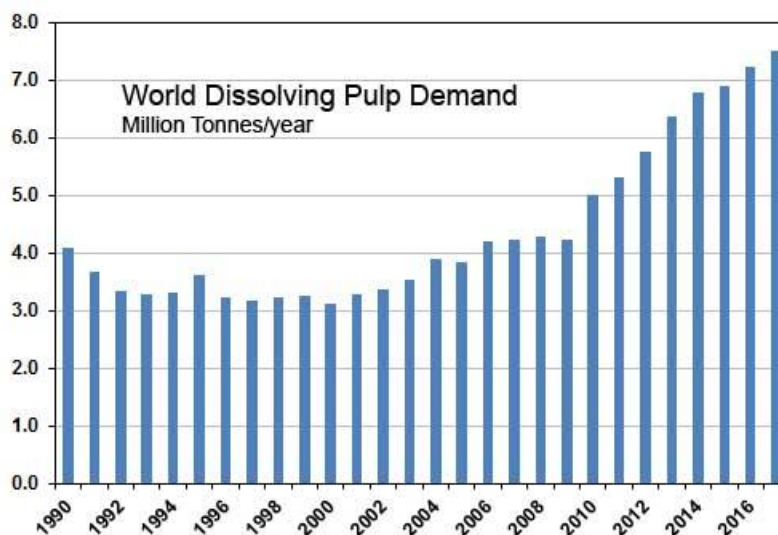


Figure 13 – World demand for dissolving pulp. Source: RISI (2018)

4.4 Social Justifications

The implementation of the dissolving pulp mill will promote economic development and increase the infrastructure of the region. The direct and indirect salaries will promote an increase in the collection of taxes, which will allow the association of the government and other agencies to incremental investment in the development of social and economic programs. This process is called as multiplier effect and is based on economic theories.

The development of this project will bring benefits not only to the company's business, but also to the region of the municipalities of Indianópolis, Araguari, Uberlândia, Estrela do Sul, Nova Ponte and Romaria, and also to the state of Minas Gerais and to Brazil.

The total estimated investment is of the order of R\$ 3.6 billion. During the construction phase, both the entrepreneur and its suppliers and employees will generate tax revenues at the municipal, state and federal levels.

The expectation of job creation is in the following order:

- Jobs generated in the construction phase = around 6,500 (in the phase of highest contracting); and,
- Jobs generated in the phase of operation = 500 employees.

5 PROJECT CHARACTERIZATION

5.1 Activity

The enterprise is characterized as an industrial activity, belonging to the industrial production activities of Pulp and Paper, classified according to the CNAE-IBGE (Classification of Economic Activities - Brazilian Institute of Geography and Statistics), 17.10-9 - MANUFACTURE OF PULP AND OTHER PULPS FOR THE MANUFACTURE OF PAPER.

5.2 Location

The dissolving pulp mill will be located in the municipality of Indianópolis – MG (industrial site) and Araguari – MG (water intake and effluent disposal), along Road BR 365, 35 km away from Uberlândia.

The following figure shows the location of the project.

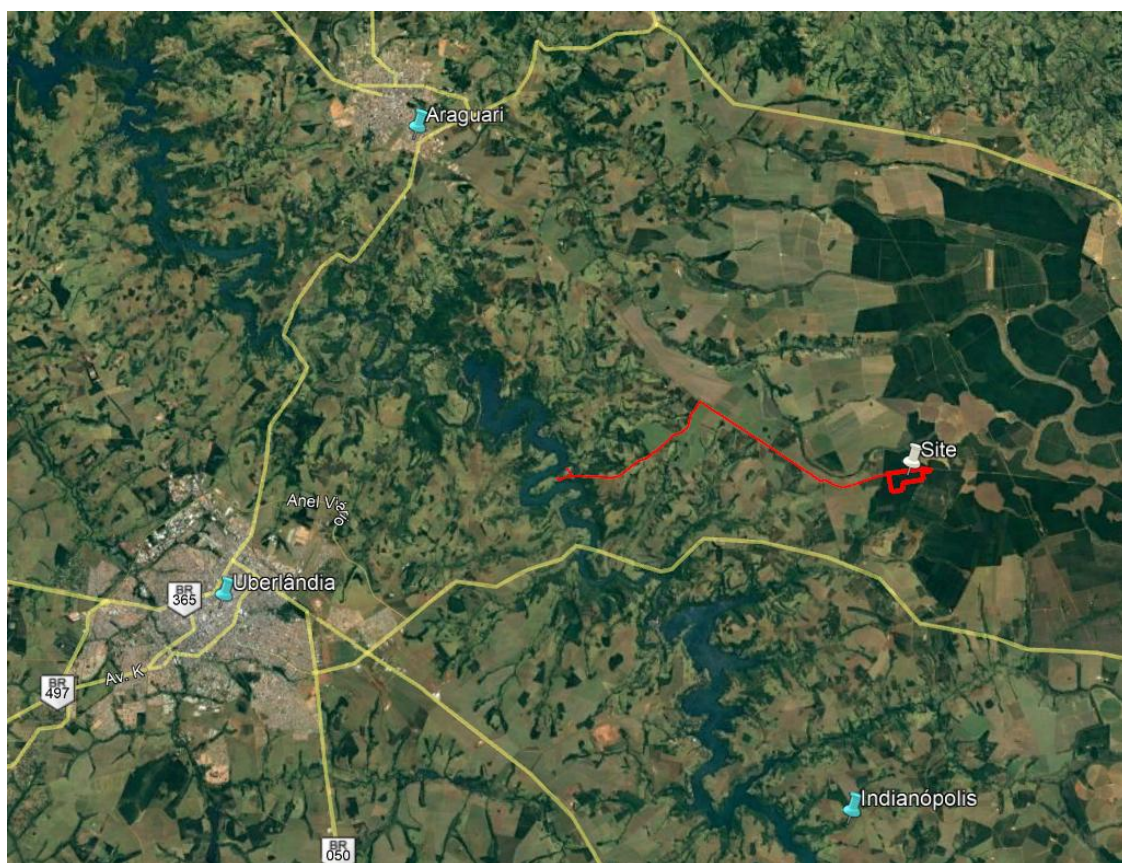


Figure 14 – Mill location. Source: Google Earth, 2018

5.3 Access

The mill will be accessed through a 5-kilometer road that will be connected to the MG-748 state road.

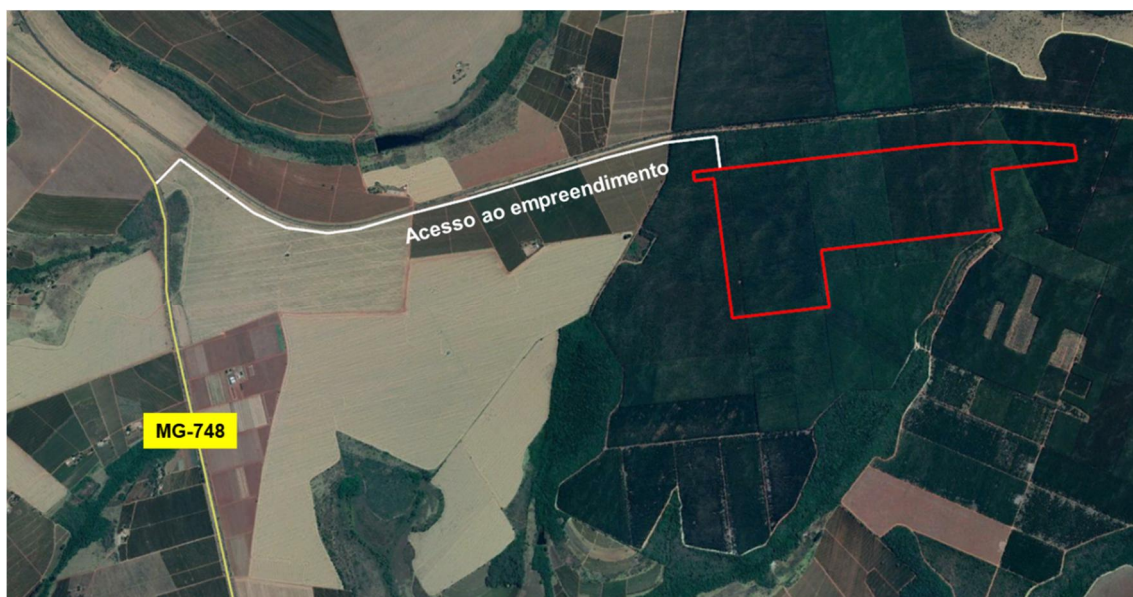


Figure 15 – Mill access. Source: Google Earth, 2018

5.4 Layout

The layout of the dissolving pulp mill is presented in the following figure and is also included in ANNEX II.

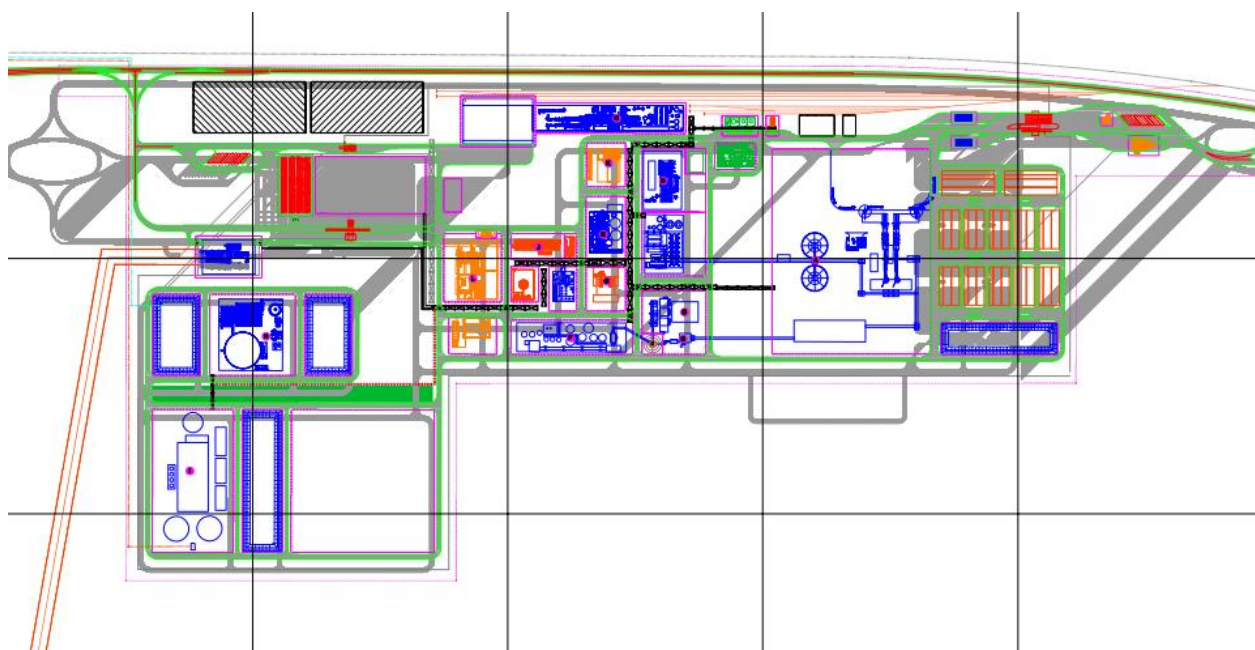


Figure 16 – Mill Layout Source: Pöyry Tecnologia, 2018

5.5 Project Areas

The expected areas of the LD Celulose mill are presented in the following Table.

Table 2 – Expected areas of LD Celulose dissolving pulp mill.

Type	Expected area (m ²)
Ground area	1,500,000
Useful area	1,500,000
Building area	720,000

Source: Pöyry Tecnologia (2018).

5.6 Employees

The operating regime of the dissolving pulp mill will be 24 hours a day, 7 days a week and 12 months a year. The production period will be approximately 352 days, considering the annual general maintenance stoppage of the equipment.

The total workforce, considering own employees and third parties, necessary for the dissolving pulp mill construction will be around 6,500 people.

The working day of the employees of the industrial area will take place in 3 work shifts of 8 hours each. In the administrative area the working day will be 8 hours and will take place during business hours.

5.7 Productive Capacity

The main activity of the plant is the production of dissolving pulp of LD Celulose in the state of Minas Gerais, which forecasts a production of 540,000 tons per year of dissolving eucalyptus pulp.

5.8 Dissolving Pulp Mill Description

5.8.1 Raw Materials, Inputs and Chemicals

5.8.1.1 Wood

Considering the full capacity of pulp production (540,000 t/year) and the ratio of 6.5 m³/ton of pulp, the total demand of eucalyptus logs will be approximately 3,512,000 m³/year.

The transportation of this raw material must have origins in the municipalities around, within a radius of approximately 20 km.

The transport of wood will be carried out mostly by internal roads to Fazenda Nova Monte Carmelo, and also by federal, state or municipal roads and be carried out by transport compositions within the rules of traffic. These compositions will be known as "Bitrem" (mechanical horse pulling 2 semi-trailers) and/or "Romeo and Juliet" (platform truck pulling 1 trailer), as shown in the following figure. On the routes where it is possible the transit of compositions of greater weight and length, mainly on the internal roads to Fazenda Nova Monte Carmelo, "Tritrem" type compositions

(mechanical horse pulling 3 semi-trailers) or "Treminhão" (platform truck pulling two trailers) may be used. The wood will be transported in round logs, ranging in length from 6 meters to 7.5 meters.



Figure 17 – Transport type “Romeu e Julieta”

5.8.1.2 Inputs and Chemicals

For the operating phase, considering production capacity of 540,000 t/year, the estimates indicate the distribution of this demand through the Table below.

Table 3 – Estimated consumption of the main chemical inputs

Inputs	Total consumption (ton/year)
Sodium hydroxide	11,300
Sodium hypochlorite	90
Sodium sulphate	13,000
Sulphuric acid	9,200
Sulfur dioxide	1,100
Oxygen	37,400
Ozone	2,700
Hydrogen peroxide	3,800
Magnesium sulphate	1,800
Lime	5,400
Urea	600
Aluminum sulfate	600

Source: PÖYRY, 2018.

5.8.2 Production Destination

The outbound of pulp production will be 100% carried out by railway, which will be destined to the Port of Espírito Santo or Port of Santos/SP.

5.8.3 Industrial Process Description

5.8.3.1 Process Brief Description

The un-barked logs will be transported to the debarking, washing and chipping lines, which will chip the logs into chips. The chips will be stored in silos and then transported to the cooking plant.

The chips will have controlled dimensions, which will allow the penetration of the chemical products during cooking, which will facilitate the softening of the wood and the separation of the fibers, separating them from the lignin, producing the “brown pulp”.

Next, a pre-bleaching of the pulp will be carried out, through a physical-chemical process, using as main reagent the oxygen. The objective is to reduce the consumption of chemical reagents in the bleaching and to generate less organic load for the effluent.

Bleaching is a purification process that aims to remove most of the undissolved residual lignin. The goal is to obtain high degree of whiteness. For this, more selective chemical reagents and milder working conditions will be used.

The bleached pulp then will be transported to the drying and baling section, where sheet formation will occur, to ensure greater homogeneity and to avoid machine breakdowns or product irregularities. The pressing aims to remove the water by mechanical action, to consolidate position of the fibers and to give greater resistance for the wet sheet to pass through the drying. In drying, water will be removed by evaporation through the application of heat to the pulp sheet. At the exit of the dryer, the sheets will be cut, weighed and baling.

Chemical Recovery

The kraft pulp mill, in which the production of dissolving pulp is included, has a system that allows the recovery of the chemicals used to obtain the pulp.

Recovery begins with evaporation of the black liquor, raising the dry solids content from 15% to about 80%.

After evaporation, the liquor will be sent for incineration in the recovery boiler. In the boiler, the organic matter present in the liquor will be incinerated, leaving a melt, formed by the inorganic compounds that will be sent to the causticizing.

In the causticizing, the clarification of the green liquor will occur, and later the white liquor will be obtained.

5.8.3.2 Process Detailed Description

The flowcharts of the production process with the steps of producing the dissolving pulp mill are given in ANNEX IV.

Table 4 –Process Area Capacities

Equipment	Unit	Capacity
Debarking	m ³ s sob/h	2 x 300
Chipping		2 x 260
Cooking Plant	ADt/d	1,830
Fiber line	ADtB/d	1,710
Pulp drying	ADtB/d	1,800
Evaporation	t H ₂ O/h	1,000
Recovery Boiler	tSS/d	4,440
Causticizing	m ³ LB/d	10,800
Lime Kiln	t cal/d	840
Turbo generators	MW	2 x 66
Biomass Boiler	t/h	120
Water Treatment Plant (ETA)	m ³ /h	2,600
Effluent Treatment Plant (ETE)	m ³ /h	2,200
Oxygen Plant	t/d	80
Ozone Plant	t/d	10

Source: PÖYRY, 2018.

5.8.3.2.1 Wood handling

The un-barked eucalyptus logs will be transported to the mill by truck where it will received according to the mill quality control procedure, weighed over the mill weighbridge, and sent either directly to the process or stored at the log storage area.



Figure 18 – Unloading of eucalyptus logs on the wood yard. Source: Pöyry, 2018

The logs storage capacity in the mill will be equivalent to the average consumption of 15 days.

Wood will be loaded into an infeed conveyor feeding the debarking drums using mobile log vehicles. There will be two debarking and chipping lines. After the debarking drum the logs will enter a roller conveyor with a stone trap, bark separation section, a high pressure washing section, and then a metal detector.

The logs will be chipped, and the chips will be transported throughout a belt conveyor feeding two chip silos, each of 20,000 m³.



Figure 19 – Chip silo. Source: Pöyry, 2018

Falling bark and residues will be collected and shredded and then fed to a covered biomass storage which will have a buffer time of 5 days.

Fines from chip screening will also conveyed to the biomass storage. From the biomass storage, the biomass will be conveyed to the biomass boiler.

Overs from chip screening will be re-chipped and recovered for exploitation of fibers for pulp production, or optionally used as biomass to be burnt in the biomass boiler. The accept chips will be fed via belt conveyor to the chip silo for cooking.

Log washing water will be recirculated, thus only a small amount of make-up water is needed. Effluent from the wood yard will be sent to the effluent treatment plant.

5.8.3.2.2 Fiber line

Cooking Plant

The cooking purpose is to separate the fibers and other anatomical constituents of the wood chips by using a chemical reaction.



Figure 20 – Cooking Plant. Source: Pöyry, 2018

Cooking is an alkaline chemical process, it uses the power of the chemical reagents sodium hydroxide (NaOH) and sodium sulfide (Na_2S), the main constituents of the white liquor, to promote the dissolution of the components that cement the fibers to the others, under favorable and optimized conditions of pressure and temperature in the digesters.

The cooking process will be batch by the VISCBC process (Viscose Continuous Batch Cooking), where the basic concept is to have the process related conditions, such as temperatures and alkali concentrations, already prepared and adjusted in the tank using various tank to tank circulations.

The total number of digesters will be 14, in 2 parallel lines, 7 in each line.

The chips from the storage silo will be distributed into batch digesters by the conveyor system. The heating up phase actually starts by adding steam to the digester bottom. The digester will be then held for a period of time until the hydrolysis reactions have occurred.

After the hydrolysis phase is completed, the contents of the digester will be neutralized with a mixture of white liquor and filtrate from the brown stock washing tank which will also adjust the temperature.

The weak black liquor extracted from the digester during the washing will be sent to the evaporation plant to be flashed.

The pulp will be sent to one of the two discharge tanks and then to the knots separation and brown stock screening system.

The pulp will be sent to brown stock washing and oxygen delignification.

Oxygen delignification

Oxygen delignification is one of the stages before bleaching, in which an additional delignification takes place through the reactions of the pulp with oxidizing agent in an alkaline media. The objective is to minimize the consumption of chemical reagents in the later stages of bleaching, to recover the maximum amount of alkali applied and to minimize the generation of organic load for the effluent.

Oxygen delignification will be performed in a conventional two stage reactor system followed by stages of post oxygen washing (wash presses in series).

Bleaching

Bleaching is a purification process that aims to remove elements that would avoid complete bleaching of the pulp, such as resins and the undissolved residual lignin in the foregoing operations.

The objective is to obtain TCF pulp (total chlorine-free) with a high degree of whiteness and stable, without physico-mechanical characteristics losses. This required high brightness in the process is achieved through the use of appropriate multi-stage chemical reagents, each with specific operating conditions.

The bleach plant is based on a 3-stage Totally Chlorine-Free (TCF) sequence A Z P with the following meaning:

- A = Acid stage
- Z = Ozone stage
- P = Peroxide stage

The bleached pulp will be sent to the storage towers, where it will be stored at medium consistency and fed to the drying machine.

5.8.3.2.3 Pulp Machine Dryer, Cutter and Baling

From the bleached pulp storage tower, the pulp will be mixed with broke from re-pulped pulp bales, purified and have its consistency accurately regulated.

Before being sent to the drying machine, the pulp will be pumped to a filtration and cleaning system, whose function is to remove small impurity particles, both light and heavier impurities. The cleanliness requirements for dissolving pulp are significantly higher than paper grade pulp.

Then will be submitted to a drying machine in which the fiber suspension with water will be sent to the dewatering process, forming the sheet.

The pulp dryer is the type of floating sheet that will dry the sheet while holding onto a steam-heated hot air mattress.

Then, the sheet will be sent to a cooler, at which outlet the sheet will be drawn through a press and directed to the cutter, where it will be cut and stacked through the conveyor. Stack size of the sheet will be monitored by the total weight of the conveyor or the sheet count.

The cut sheets in the programmed size will be stacked, enclosed in bales, wrapped and identified. The bales will be also stacked and unitized, moving to the warehouse.



Figure 21 – Drying Machine. Source: Pöyry, 2018

5.8.3.2.4 Evaporation Plant

The purpose of the evaporation is to concentrate the black liquor from the cooking from the initial concentration of 14.0 – 16.0% to the final concentration of 80% solids.

The evaporation plant will be a multi-effects plant using low pressure steam. The final concentration of the liquor will be achieved in a six effect evaporation plant. The concentrated liquor produced will be stored for later burning in the recovery boiler.

The condensates of evaporation plant will be segregated in different quality grades. Segregation is therefore important to ensure sufficient quality in the condensates that will be used in other areas of the plant.

The condensate treatment plant and methanol rectification will be integrated into the evaporation plant.

The contaminated condensate collected from the process will be treated and used later in the process.

The stripper column gases from the condensate treatment will be sent to the rectifier column for extraction of methanol. The produced methanol will be used as auxiliary

fuel in the recovery boiler. If it is impossible at the recovery boiler, the methanol can be incinerated in the biomass boiler, or in the lime kiln, or even in the flare.



Figure 22 – Evaporation Plant. Source: Pöyry, 2018

5.8.3.2.5 Recovery Boiler

The purpose of the recovery boiler is to:

- Recover the chemicals used in cooking;
- Reduce sodium sulfate added to sulfide;
- Generate steam using the energy resulting from the burning of the organic matter extracted from the wood.

Concentrated black liquor from the evaporators will be burnt in the recovery boiler, generating flue gases at the top and smelt of chemicals at the bottom. The smelt, containing mainly sodium sulphide (Na_2S) and sodium carbonate (Na_2CO_3), will be removed from the bottom and dissolved in the dissolving tank to generate green liquor.

The boiler will be high efficiency and low odor type with multilevel type air system for burning of liquor 80% (no ash).

The steam generated in high pressure will be sent to the turbogenerators for electricity generation.

The combustion air will be introduced into the furnace in at least three levels with forced draft fans to allow optimum combustion control, NO_x and TRS emission reduction and smelt reduction.

Exhaust gases from combustion shall pass through an electrostatic precipitator, the expected efficiency of which shall be greater than 99.7%. The ash (from precipitator) treatment system will be integrated into the recovery boiler or the evaporation plant.

The concentrated and diluted non-condensable gases and methanol will be incinerated in the recovery boiler.

Fuel oil will be used as fuel for starting and stabilizing the production process.

5.8.3.2.6 Causticizing and Lime Kiln

Causticizing

In causticizing, the green liquor from the dissolving tank will be transformed into white liquor, which will later be used in the chip cooking.

This transformation consists in the reaction of the sodium carbonate of the green liquor with the lime (calcium oxide), obtaining sodium hydroxide and calcium carbonate, which will be separated by filtration.

Before contact with lime (calcium oxide and inerts), the green liquor will be filtered for the removal of impurities (dregs). The dregs will be washed and filtered in a filter or centrifuge, specific equipment for this application.

Secondary condensate from evaporation plant or warm water will be used for washing the dregs. The filtrate from the lime mud filter will be pumped into the weak liquor tank.

The lime residues (the grits) will also be washed and, like the dregs, will be sent to the solid waste center for the generation of soil correctives.

After the reaction of the green liquor with lime, the white liquor will be obtained by filtration of the mixture sodium hydroxide (white liquor) and calcium carbonate (lime slurry) through a pressurized disk filter.

The white liquor will be sent for cooking and the lime mud will be washed and dewatered in a vacuum disc filter before being sent to the lime kiln.

It is expected to collect and recover all effluent from this area as well as the closing of the cooling water circuit.

Lime Kiln

Calcination has the purpose of transforming the calcium carbonate, obtained in causticizing, into calcium oxide ($\text{CaO} + \text{inerts}$) to be used in the reaction with the green liquor.

Calcination will be carried out in a rotary kiln, internally coated with refractory and insulating bricks and heated by the combustion of fuel oil or in the future other alternative fuel (natural gas, biomass gas, etc.).

As auxiliary fuel, the lime kiln may burn methanol.

The lime kiln will be equipped with an external drier for lime mud and with chilled lime coolers for the burnt lime.

Through electrostatic precipitator the dust will be removed from the flue gases and may return to the lime kiln or be discarded (lime mud purge).

The flue gases will be sent to the chimney, from where they are released into the atmosphere.

5.8.3.2.7 Handling, Preparation and Storage of Chemicals

The description of this area corresponds to different systems in order to meet the requirements of supplying chemical to the mill. All chemical storage tanks shall contain containment basins with a volume at least equivalent to the maximum storage volume.

The chemicals area will include, mainly:

- Caustic Handling
- Hydrogen Peroxide Handling
- Sulphuric Acid Handling
- Magnesium Sulphate Handling
- Oxygen Preparation Plant
- Ozone Preparation Plant
- Sulphur Dioxide Plant

Storage Volumes

The chemical storage tanks volumes are shown in the Table below.

Table 5 – Chemical storage tanks

Chemical	Volume (m ³)
Caustic soda, 50%	960
Sulphuric Acid, 98%	270
Hydrogen peroxide, 50%	400
Sodium sulfate	360
Magnesium Sulphate	100

Source: Poyry, 2018.

Chemicals Transportation System

The main chemicals transportation, in liquid form, will be carried out in a bulk through tank trucks.

The transport companies should have a specific training of drivers and operators regarding traffic management, education and safety, in order to reduce the risk of accidents.

Control and Operational Safety System of the Chemical Plant

The Chemical Plant shall be provided with the following equipment and structures for storage, containment, control and safety:

- Chemical unloading platforms, fitted with restraints through spines or walls;

- Storage of liquid products in metal tanks, made of carbon steel, stainless steel or fiberglass (the material will depend on the type of chemical being stocked);
- Concrete containment dikes for chemical storage tanks;
- Containment channels in production areas and in the storage of chemicals;
- Process monitoring instruments (level, pressure, temperature, among others) operated remotely, in order to minimize the need for operators in the area of production or storage of chemicals. Remote operation can be performed by dedicated remote control systems;
- Atmospheric discharges protection systems (also known as SPDA), provided with grounding;
- A highlight of the chemicals in the LD Celulose pulp mill is that the transfer system from the Chemical Plant to the points of use will be carried out by aerial pipelines (also known as pipe rack), which avoids the handling operators and greatly minimizes the risk of accidents.

Chemical Plant Processes Description

Caustic Handling

Caustic soda will be delivered as a 50% solution and unloaded from trucks by the unloading pump to the caustic tank. From there the 50% solution will be diluted to 15 % using soft water.

Most of this solution will be transferred for use in the liqueur systems, delignification and pulp bleaching. Other areas of the mill will also utilize sodium hydroxide, such as: industrial water treatment, boiler water treatment and effluent treatment.

Hydrogen Peroxide Handling

Hydrogen peroxide is delivered to the mill as a 50% solution and is off-loaded to the 50% peroxide storage tank before being pumped to a smaller peroxide holding tank located in the bleach plant.

Sulphuric Acid Handling

Sulphuric acid at 98% concentration will be delivered to the mill by truck and off-loaded to the mill sulphuric acid storage tank. From there the acid is distributed to the various consumers, mainly the bleach plant, water and effluent treatment and to the boiler feed water treatment plant.

Magnesium Sulphate Handling

Magnesium sulphate is received as bulk powder into a storage silo. It is mixed with soft water to make about 20 % solution, which is pumped to bleach plant P-stage.

Oxygen Preparation Plant

The oxygen production will be performed through a dedicated plant to meet the needs of delignification, bleaching and white liquor oxidation.

The oxygen generation can be done by purifying the atmospheric air by the adsorption process (VSA - Vacuum Swing Adsorber) through molecular sieves.

At the beginning of the process, the atmospheric air will pass through a filtration system, where solid particles will be removed.

Thereafter the air will be sucked in order to be subjected to a vacuum regime, sufficient only to allow the flow of air into the purification system.

The air purification system consists mainly of adsorbent vessels, which operate in cycles. Through passage through a molecular sieve bed, moisture, CO₂ and air nitrogen will be removed from the main stream.

Purified air, rich in oxygen, will exit the purification system and then proceed to the oxygen compressor, which will compress it to the conditions necessary for its use. The waste gas will be vented to the atmosphere through the muffler.

Ozone Preparation Plant

The feed gas for the ozone plant comes from the VSA oxygen plant or from the liquid oxygen back-up storage system.

Ozone will be produced in an electrical discharge by the high electric field in the annular spaces. Some of the energy will be transformed into heat and is removed by cooling water passing through the vessel. Ozone will be compressed (10 bar(g)) and delivered to the bleach plant.

The system will also include an off-gas catalytic destruction system which removes non-dissolved ozone gas and converts any remaining ozone to oxygen, so that concentration will be not higher than 0.1 ppm.

Since approximately only 10 to 12 % of the oxygen passing through the ozone generator will be converted to ozone, the off-gas from the ozone bleach stage will be recycled after the ozone destruction unit so that the unused oxygen can be used in the oxygen delignification and white liquor oxidation departments.

Sulphur Dioxide Plant

The sulphur dioxide plant utilises will purchase liquid SO₂ in 1 ton cylinders to produce dilute gaseous sulphur dioxide.

The liquid SO₂ will be released as a SO₂ gas stream via a hot water vaporiser into a packed bed SO₂ absorption tower where it is contacted with chilled water, which will be produced in the ozone plant.

The resulting 7 g/l SO₂ solution will be then pumped by the SO₂ solution transfer pump to storage.

5.8.3.2.8 Utilities

Industrial Water Supply and Treatment

There will be a Water Treatment Plant (ETA) in order to meet the consumption needs of LD Celulose pulp mill.

The raw water will be taken from the Araguari River, through a surface system, consisting It is planned to build a Water Treatment Plant (ETA) in order to meet the consumption needs of the LD Celulose mill.

The water will be collected from the river Araguari, through a system of surface abstraction consisting of channel and railing.

It is worth mentioning that the catchment will be of the type water, that is, a dam system will not be built.

Four (one reserve) pumps will be installed, totaling a total flow of 3,000 m³/h to supply the plant.

A brine water pipe, diameter 800 mm will be installed, which will feed a raw water lagoon, capacity 48,000 m³.

The raw water, arriving in ETA, will suffer the addition of aluminum sulfate, sodium hydroxide and sodium hypochlorite, the latter used to promote the removal of iron, besides oxidizing the organic matter present. After the coagulation process, polyelectrolyte will be added to promote flocculation.

Then, by gravity, the flocculated water will proceed to the solids removal unit through a dissolved air flotation system or the like. The formed sludge will be discharged periodically and automatically into the central discharge channel. The collected sludge will be densified and drained and then sent to final disposal.

By gravity, the clarified water will be conducted through channels to the gravity filters. After filtration, the treated water will be stored in the treated water reservoir which will supply the various points of consumption of the plant, including water for firefighting and drinking water.

The total capacity of treated water will be 2,600 m³/h.

Basic Sizing

Water intake

- Raw water source		Araguari river
- Water intake type		water line
- Flow	m ³ /h	3,000
- Railing		Bars, carbon steel
- Pumps		
. Quantity	unit	04 (03 + 01)
. Type		centrifugal
- Piping		800 mm

Water Treatment Plant (WTP)

- **Capacity (treated water)** m^3/h 2,600

- **Parshall flume**

. Quantity unit 01

- **Flotation**

. Quantity unit 02

. Type dissolved air flotation

. Application rate $\text{m}^3/\text{m}^2 \cdot \text{h}$ 9.0

. Total area m^2 288

. Sludge pumps

.. Quantity unit 02 (01+01) x 10 m^3/h

.. Type horizontal centrifuge

- **Sand Filters**

. Quantity unit 06

. Application rate $\text{m}^3/\text{m}^2/\text{h}$ 9.0

. Total area m^2 290

Sand filter backwash system

. Backwash water pumps

.. Quantity unit 02 (01 + 01)

.. Unit capacity m^3/h 500

. Air blowers

.. Quantity unit 02 (01 + 01)

.. Capacity Nm^3/h 2,200

. Backwash dirty water collection tank

.. Quantity unit 01

.. Volume m^3 100

. Conveying pumps for dirty backwash water (for WTP input)

.. Quantity unit 02 (01 + 01)

.. Capacity m^3/h 50

- Industrial Water Reservoir

. Quantity	unit	01
. Total Volume	m ³	21,000
. Detention time	h	8,0

- Industrial Water Pumps

. Quantity	unit	05 (04 + 01)
. Unit capacity	m ³ /h	650
.. Type		horizontal centrifuge

- Pumps for firefighting

. Main pump (electric)		01 x 570 m ³ /h
. Diesel pump		01 x 570 m ³ /h
. Jockey pump		01 x 60 m ³ /h
. Fire-fighting water tank		
.. Quantity	unit	01
.. Capacity	m ³	3,000

- Sludge dewatering system

. Solid load	tSS/day	4,0
. Thickening		by gravity
. Dewatering		mechanical, by centrifuges

- Chemical dosing systems

Storage and dosing of sodium hypochlorite

- Tank		01 x 150 m ³
- Metering Pumps		02 (01 + 01) x 400 L/h

Storage and dosage of aluminum sulphate

- Tank		01 x 150 m ³
- Metering Pumps		02 (01 + 01) x 200 L/h

Storage and dosing of caustic soda

- Tank		01 x 50 m ³
- Metering Pumps		02 (01 + 01) x 100 L/h

Preparation and dosing of polyelectrolyte (powder)

- Capacity 01 system of 5 kg/h

Treated Water Quality

The treated industrial water quality should be in accordance with the parameters presented below:

<u>Parameter</u>	<u>Unit</u>	<u>Value</u>
- pH	--	6,0 a 8,0
- Color	PtCo APHA	< 5,0
- Turbidity	NTU	< 1,0
- Residual chlorine	mg/L	0,5 – 1,0
- Others	--	Seaweed free

Demineralized Water and Soft Water

Demineralized water will be required for the water supply system in the boiler for steam production. Soft water will be required for bleaching and drying of pulp due to the stringent quality requirements of the dissolving pulp.

The concept for obtaining this water is based on the ion exchange technology, through the use of cationic and anionic resins.

Fire Water System

Fire water will be supplied from the 3,000 m³ firewater tank, which will be supplied with treated water.

There will be two firewater pumps, 570 m³/h, one electric and one diesel. The fire water system will be maintained under a pressure of 12 bar (g) with a jockey pump of 60 m³/h of 13 bar (g). The system will power hydrants and sprinklers in the mill.

Cooling towers

The cooling water system will be closed-loop, and countercurrent type towers with exhaust fan at the top are being considered to serve the following mill consumers.

The large consumers like turbine condenser, evaporator surface condenser and ozone generator will have dedicated cooling water pumps.

The water lost by evaporation and blow down is made up with treated fresh water.



Figure 23 – Cooling Towers. Source: Poyry, 2018

Compressed Air

Both the service air and the instrument air will be treated in a dryer to remove moisture, however there will be 2 independent air nets, one for service air and one for air of instruments.

Both systems will be treated in two dryers to remove moisture. The system consists of three oil-free centrifugal compressors, one for instrument air, one for process air and one as a reserve. The operating pressure shall be 7 bar (g).

5.8.3.2.9 Biomass Boiler

The biomass boiler will supplement the steam generated in the recovery boiler for power generation, through the use of waste wood handling.

Wood handling and brown pulp waste will be mixed and stored in covered biomass pile from where they will be sent to the boiler silos.

The steam produced by the biomass boiler will be mixed with steam from the recovery boiler and sent to the turbogenerators.

An electrostatic precipitator will be installed to control atmospheric emissions.

The biomass boiler could burn methanol as an auxiliary fuel, thus acting as a reserve burning system for recovery boiler. Biomass boiler may also burn the concentrated and diluted non-condensable gases when it can not be incinerated in the recovery boiler.

The ash from the bottom and precipitator will be collected in dedicated silos for later final disposal.

Fuel oil will be used as fuel for starting, stabilizing the production process and eventually for oxidation of non-condensable gases when diverted to the biomass boiler.

5.8.3.2.10 Electric Power Cogeneration (Turbogenerators)

In general terms, it can be said that the cogeneration system starts in the production of high pressure steam that will be carried out by the Recovery Boiler and the Biomass Boiler.

The high pressure steam will expand in the turbine vanes and will be extracted at different pressure levels for use in the pulp process.

The turbogenerators will have the purpose of transforming the thermal energy of the high pressure steam into mechanical energy to drive the electric power generators.

The steam feed to the turbogenerators will be based on balance, plus contingency. The contingency is considered to absorb any variations in the production of steam in the recovery boiler due to variations in the production of the solids contained in the liquor or even in the calorific value.

A new cogeneration unit with a nominal capacity of 132 MW (02 x 66 MW) will be installed and 63.5 MW will be consumed in the pulp mill. There will therefore be a surplus, which will be arranged for sale.

Steam and Energy Balance

The following steam balance shows the steam generated for turbogenerators and other uses.

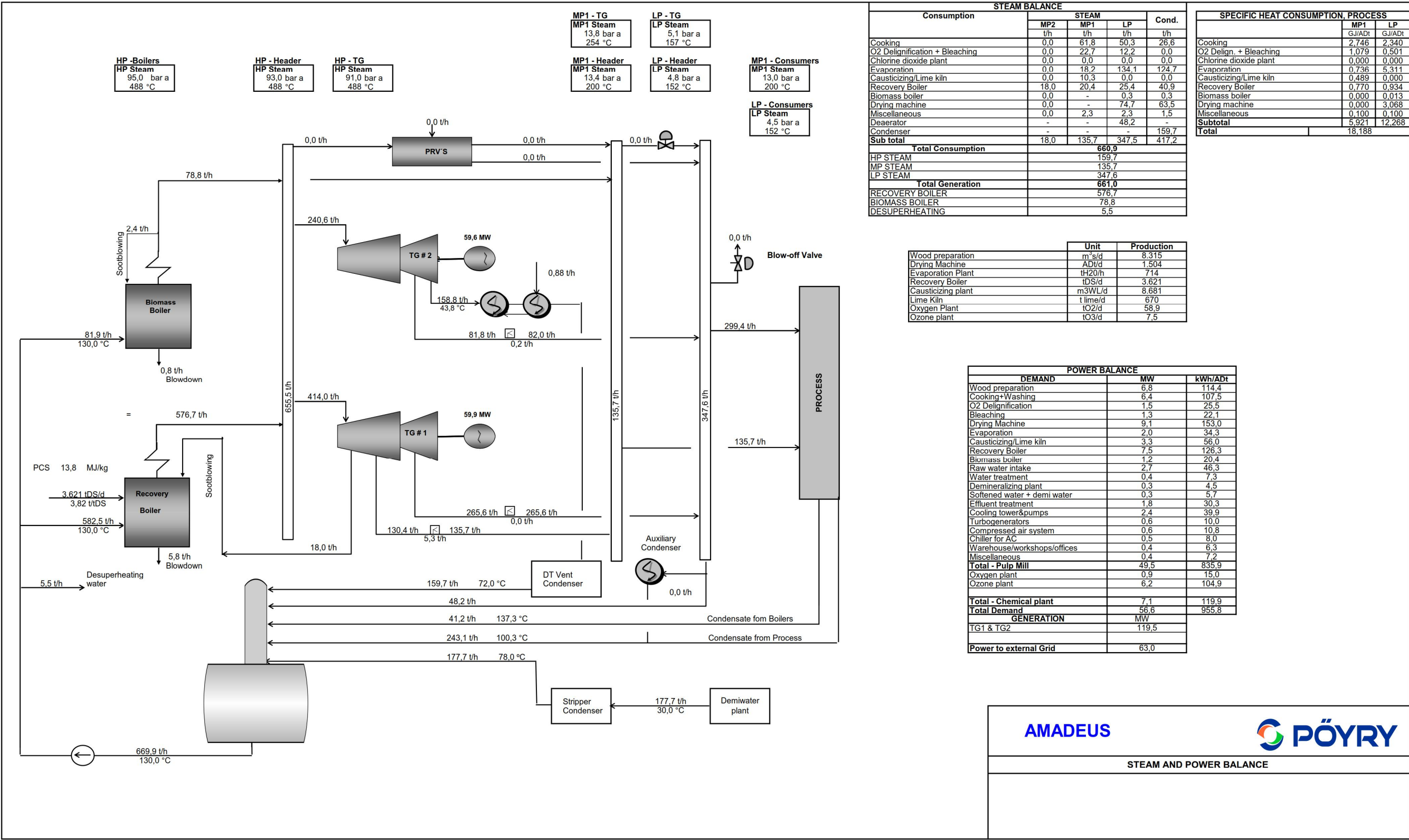


Figure 24 – Steam balance and power demand. Source: Poyry, 2018.

5.8.3.2.11 Fire Fighting System

The dissolving pulp mill will be equipped with dedicated fire prevention and control systems.

The internal network of hydrants of the areas will be distributed in ring form that will be fed by the main network of hydrants.

Hydraulic and lubrication units, depending on the volume, can be protected by an automatic sprinkler system controlled by an independent valve and alarm. In addition, each hydraulic and lubrication unit shall be installed within a containment dam with sufficient volume to maintain the full volume of oil in the unit.

Portable fire extinguishers shall be installed at the required locations as required by the Fire Department.

Fire Department regulations also require the installation of signage boards in the area reserved for fire extinguishers.

For the firefighting system of the fuel storage area, fire hydrants will be installed at suitable locations to provide cooling of the tanks, as well as foam lines to combat occasional tank spills.

All hydrants around the tanks will be provided with foam supply accessories and adjustable nozzles for water mist generation.

Potential oil leakage points, such as flanges, threaded connections, etc., depending on the pressure, may be shielded to prevent fire occurrence in the form of spray.

5.9 Administrative and Operational Support Facilities

Concierge

The mill will have two concierges, one to control access of people and vehicles and one another to control access of raw material and pulp destination.

Administrative building

The administrative building will consist of rooms, toilets, restaurant and first aid post.

Parking for Vehicles and Trucks

The mill will have parking for touring vehicles for employees and visitors. In addition, there will be truck parking.

Balance

Road balances will be installed to control entry and exit of inputs to the mill.

Warehouse

Next to the administrative building there will be a warehouse for storage of materials in general.

Workshop

The workshop will be used for maintenance of equipment, vehicle and machines of the mill and will be composed of reinforced concrete floor, waterproofed by walls of masonry to contain any spills.

The wastewater generated in the workshop will be collected and directed to a water / oil separator tank. The oil collected will be destined for refining, by specialized and licensed company.

Railway Composition Maneuvering Yard

A maneuvering yard will be implanted to receive the railway composition, for destination of the dissolving pulp production.

The maneuvering yard will be implanted inside the site of the LD Celulose and will have an approximate length of 1,500 meters, being connected to the FCA railway.

FLE type wagons with a useful length of 15 to 16 meters will be used, as shown in the following figure.



Figure 25 – FLE type wagon

5.10 Enviromenmental Control

5.10.1 Liquid Effluent

5.10.1.1 Generation Sources

Basically, the liquid effluents generation sources, that will correspond to the activities of the pulp mill process and other support activities, are listed below:

- Effluents from wood handling area;
- Effluents from cooking area and brown pulp washing area;
- Filtered alkaline and filtered acid form bleaching;
- Effluents from drying machine;
- Effluent from evaporation and recovery;
- Effluents from recausticizing area and lime kiln;
- Contaminated condensate;
- Sanitary sewer;
- Contaminated rainwater; and,
- Others (spills, leaks, areas cleaning etc.).

5.10.1.2 Spill Control System

The spills collecting and handling system has been designed in such a way that accidental discharges can be collected as close to the source as possible, and recycled directly to its own process stage.

The main approaches are:

- Impoundment with containment walls around tanks and equipment where there are black or white liquors and chemicals. An accidental spill/leak will be collected and returned directly to the process;
- Tanks and equipment systems that will enable to drive properly the remains of liqueurs when needed emptying for maintenance. Process liquors will be taken to a spill tank and return directly to the process rather than being discharged into the effluent net;
- In areas with potential for leakage there will be interconnection channels from the floor with pumping wells, where the liquids will return to the process;
- Emergency lagoon in effluent treatment, to where there can be directed also the main effluents in the case of spills that were not contained with the previously provided ways;

- Appropriate instrumentation for on-line effluent monitoring, and a good supervisor system to support operators to detect accidental discharge and to take the appropriate corrective measures; and,
- Operators training, process managers and informational systems, where environmental issues and accidental discharges require continuous attention.

5.10.1.2.1 Cooking and Brown Pulp Line

The accidental discharges in this area may have black liquor and fibers, and must be recovered.

It will be installed a tank of spills.

As much as possible, overflowed and drains from process equipment should be connected directly to the spill tank, or alternatively, for the prior feed tank of the equipment.

Possible additional spills will be collected in channels at the floor and will be driven to a well, from where will be pumped into the spill tank.

5.10.1.2.2 Bleaching

Overflow and spills in this area may contain fibers, filtered and chemicals such as caustic soda and sulfuric acid. Accidental losses of fibers will be sent to the effluent treatment plant and separated in the primary treatment. The chemicals will be neutralized before being sent to the effluent treatment plant.

5.10.1.2.3 Drying machine

Overflow and spills in this area contain fibers, but not a significant amount of dissolved elements. If not collected in the area, fiber losses will be sent to the effluent treatment station and will be separated in the primary treatment.

5.10.1.2.4 Evaporation

Accidental discharges from these areas have high black liquor content, and should be recovered. The basic treatment is similar to that of the cooking area and brown pulp line.

Spills from this area will be directed to the liquor spill tank, from where will be sent to the weak liquor tank, with the feed made proportionally. The liquor from the evaporation washing water will also be collected to this tank, as well as any excess contaminated condensate in case of problems with condensate polishing.

Part of condensate “A” produced will be reused in the brown mass wash and part will be reused in the causticizing area.

The floor channels will be connected to a collection well, from where the spills will be returned to the liquor spill tank. The tank will be installed inside containment basin.

5.10.1.2.5 Recovery Boiler

Accidental discharges from this area have high black liquor content, and should be recovered. The basic treatment is similar to that of the cooking area and brown pulp line.

Spills from the upper floors will be collected and sent to a dump tank, then to the collection well, which will also receive spills on the ground floor. These spills will be pumped into a spill tank at the evaporation plant where they will be recovered.

5.10.1.2.6 Causticizing and Lime Kiln

In this area, the spills will be collected and sent to collection wells, which will have agitation system, conductivity measurement and pumps. If the spill is within a certain range of conductivity, it will be sent to the clarifier for recovery.

A lime sludge recovery system is provided at non-scheduled lime kiln stopping occasions. The temporary storage of the sludge will be carried out in a paved place with walls, thus avoiding its loss and subsequent recovery.

5.10.1.2.7 Other areas

The chemical handling area will be surrounded by retaining walls in its surroundings. In addition, chemical tanks will also be contained by dikes. If there is any spill in the area, they will be sent to tanks and then will be sent to the effluent treatment plant.

Fuel oil storage will also be contained by retaining walls with a well. In case of spill, a pump will be installed that will send the oil to a tank truck.

The oil heaters in process areas should have their own containment walls.

5.10.1.3 Effluent Treatment Plant (ETP)

The industrial liquid effluents from process will be measured by flow, temperature, pH and conductivity and, depending on the results obtained, will be diverted to the emergency lagoon.

Specific effluents

The effluents from the boiler water plant will also be segregated from the main lines, since they do not have organic load, requiring only pH control before its launch. The neutralized specific effluents will be added to the treated effluents in the treated effluent tank to be disposed in the Araguari river.

Sanitary Effluents

The sanitary sewage generated at the plant will be collected and sent to the ETE, directly in the biological treatment.

5.10.1.4 Effluent Characteristics Before Treatment

Predicted quantitative and qualitative characteristics of these effluents, which are the basis for the design of the liquid effluent treatment plant, are presented in the table below.

Table 6 – Effluent Characteristics Before Treatment

Parameters	Unit	Value
Flow	m ³ /h	2 200
pH	-	3,0 to 12,0
Temperature	oC	60 to 70
BOD	kg/day	29 000
	mg/L	550
COD	kg/day	66 500
	mg/L	1 250
TSS	kg/day	20 500
	mg/L	400
N _{total}	kg/day	1 600
	mg/L	30
P _{total}	kg/day	160
	mg/L	3.0
Color	kg/day	52 800
	mg/L	1 000

The Effluent Treatment Plant (ETP) will also receive the contribution of rainwater in a flow of up to 500 m³/h and, in this way, the ETP will have a hydraulic capacity of 2,700 m³/h. It is important to clarify that, even with this increase in flow due to rainfall, the effluent loads (BOD, COD, TSS, color, nitrogen and phosphorus) will be maintained.

5.10.1.5 Effluent Treatment System (ETE)

General

The LD Celulose's effluent treatment system will basically consist of two steps: removal of solids and removal of organic load. The main units of this system are listed and described below.

The main steps of the effluent treatment process are:

- Screening;
- Primary clarifier;
- Emergency lagoon;
- Neutralization;
- Cooling;
- activated sludge - aeration tank;
- Second Secondary clarifier; and,
- Emissary.

Screening

Effluent streams containing suspended solids will be gravity driven to a screening system to remove coarse materials. This system will be provided with 2 sets consisting of a mechanized screen and a manual screen, which will be used in the maintenance of the mechanized screen.

Primary Clarifiers

After passing through the grid and flow measurement system, the raw effluent will be sent to two primary clarifiers with a diameter of 42 m to reduce the amount of suspended solids. These clarifiers will be equipped with a scraper to remove sedimented solids and scum accumulated on the surface thereof. The sedimented solids and scum will be withdrawn by pumps to be sent to the primary sludge dewatering system. The clarified effluent will be sent to the neutralization system.

Primary Sludge Dewatering System

The primary sludge dewatering system will have a total capacity of 23 tSS/day. Each of the assemblies will be comprised of a mechanical drum or gravity table type thickener and a screw type dewatering press. The expected final consistency of dewatered sludge is between 35 to 45%.

Emergency lagoon

In addition to the expected collection and spill leakage and spill systems in each department of the mill, there will be a set of emergency tanks at the effluent treatment plant. The objective of this lagoon will be to receive all effluents with characteristics outside the specification. Once diverted to the emergency lagoon, the contents of the lagoon will be dosed to the inlet of the neutralization tank, so that no disturbance is created in the biological treatment.

The operation of this will be controlled by online monitoring of pH, temperature and conductivity. When levels outside the acceptable range occur, the valves will be closed and the effluent will be diverted to the emergency lagoon.

The total volume will be approximately 53,000 m³ to receive the process effluents considered contaminated.

The lagoon will be constructed as an excavated lagoon with the bottom adequately waterproofed and inclined to the drainage pumps.

Contaminated Rainwater

The rainwater that affects the process areas, because they have a greater contamination potential, will be sent along with the effluents to the effluent treatment plant (ETP) of LD Celulose. The rainwater that affects the areas of roofs, streets, etc. as well as the log storage yard, because they have a lower potential for contamination, will be sent to rainwater lagoons, which will be provided with pH and conductivity measurement to avoid hydraulic overload in the ETP due to high rainfall. In these lagoons, if the pH and / or conductivity parameters are outside acceptable standards, these waters will be sent to the ETP. Otherwise, they will be sent for disposal to the Araguari river, which will be carried out through the emissary of treated effluents. It is important to emphasize that these rainwater will be added to treated effluents after the effluent sampling and sampling point.

Effluent Neutralization

The effluent from the primary clarifiers will be sent to a neutralization tank which will also receive effluents without suspended solids. The purpose of this step will be to neutralize the combined effluent through the addition of caustic soda or sulfuric acid, aiming to maintain a pH between 6 and 8, making it suitable for biological treatment.

The neutralization tank will have an approximate capacity of 550 m³ and will be equipped with mechanical stirrers.

Effluent Cooling

The neutralized effluent still has a temperature considered to be high for biological treatment, then should be cooled to a temperature that does not adversely affect the performance of the biological treatment.

The effluent cooling will be carried out through a cooling tower, being sized to an approximate temperature of 70 °C, and an exit temperature of around 35 °C.

Activated Sludge

The biological treatment system adopted in the LD Celulose will be of the aerobic type by activated sludge. The activated sludge process is a technology proven and commonly used in the pulp and paper industries worldwide.

The biological process requires, for optimum performance, sufficient concentrations of nitrogen and phosphorus in the effluent. The quantities required will be related to the amount of biodegradable organic matter, ie, BOD (Biochemical Oxygen Demand) present in the untreated effluent.

Urea and phosphoric acid are being considered as sources of nitrogen and phosphorus and will be added, if necessary, before the effluent enters the selector tank. The amount required will be dependent on the amount present in the effluent (only the minimum quantities required should be added so that the discharges are minimized).

After the dosage of nutrients, the effluents will be sent to the selector tank, which will have high capacity of oxygenation and aims to eliminate the filamentous organisms. From this tank, the effluents will go to the aeration tank, where they will be submitted to the degradation of the organic matter present in the soluble and colloidal form through the activity of the aerobic microorganisms. The air injection into the system will be performed by fine bubble diffusers that will be installed in the bottom of the

aeration tank. These diffusers will provide oxygen necessary for the development of the bacteria and promote mixing of the liquid mass contained in the aeration tank, keeping the mixture in suspension.

The aeration tank will have a total approximate volume of 55,000 m³ and the diffusers will be fed by 5 (five) blowers with a unitary capacity of 10,600 Nm³/h, one of which will be reserved for maintenance.

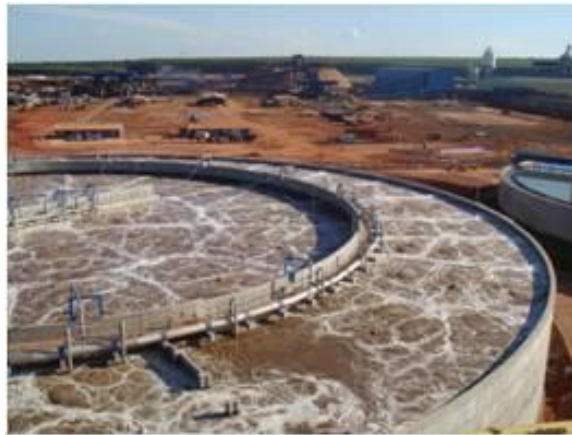


Figure 26 – Aeration Tank

In the activated sludge process, there will be the formation of the biological mass (sludge) that must be physically separated from the liquid mass (clarified effluent), which will occur through four secondary clarifiers with a diameter of 53 m each. The treated and clarified effluent will be released through emissary and diffusers in the river.

Secondary (biological) sludge will be constantly removed from the bottom of the clarifiers through scrapers and directed by gravity into a sludge pit, from where it will be repressed through pumps to the aeration tank, and recirculated. The excess biological sludge will be sent to the secondary sludge dewatering system.

Secondary Sludge Dewatering System

The secondary sludge dewatering system will have a total estimated capacity of 12,000 tSS/day and will consist of mechanical type thickeners and centrifuges. The expected final consistency of dewatered sludge is between 15 to 20%.

Calculation Memorial – Main Equipment

Primary Clarifiers

The sizing of the primary decanters considers mainly the surface application rate at which the effluent will be submitted, in order to optimize the sedimentation of the solids. The rate used was 0.8 m³/m².h.

$$A = \frac{Q}{\text{rate}}$$

where: A = area required for decantation, m^2
 Q = flow rate for sizing = $2,200 m^3/h$
Rate = surface application rate = $0.8 m^3/m^2.h$

$$A_{total} = 2,750 m^2$$

Given that the settling units may be maintained during their operation, and therefore, one of the units may be out of operation for a certain period, two decanters are planned. Thus, the area of each of the decanters will be $1,385 m^2$, which will be circular, because the scraping and sludge collection system is more efficient.

The diameter of each of the decanters shall be:

$$D^2 = \frac{4 A}{\pi} \longrightarrow D = 42 m$$

Neutralization Tank

The neutralization tank was sized based on the hydraulic holding time required for optimized mixing, as well as the correct pH adjustment of the combined effluents.

$$V = \frac{Q}{TD}$$

where: V = tank volume, m^3
 Q = flow = $2,200 m^3/h = 36.7 m^3/min$
 TD = detention time = 15 min

$$V = 540 m^3 \text{ (adopted } 550 m^3 \text{)}$$

Cooling tower

$$Cap = Q \times (T_{inlet} - T_{outlet})$$

where: Cap = thermal capacity of the cooling tower, $Mcal/h$
 Q = flow rate for sizing = $2,200 m^3/h$
 $T_{entrada} = 70 ^\circ C$
 $T_{saída} = 35 ^\circ C$

$$Cap = 77,000 Mcal/h$$

Aeration Tank

The volume of the aeration tank is determined by volumetric loading, volatile solids concentration in the aeration tank, F/M ratio (ratio of organic matter to microorganisms) and hydraulic holding time.

Aeration Tank Volume

$$V = \frac{CO}{CV}$$

where: CV = volumetric loading = 0,5 kgBOD/m³.day (adopted)
CO = organic load = 27,000 kgBOD/d
V = aeration tank volume, m³

$$V = 55,000 \text{ m}^3$$

Ratio F/M

$$F/M = \frac{CV}{SSV}$$

where: SSV = Estimated volatile solids concentration = 4,0 g/L

$$F/M = 0.12 \text{ day}^{-1}$$

Hydraulic holding time

$$TD = \frac{V}{Q}$$

where: V = aeration tank volume = 55,000 m³
Q = flow = 2,200 m³/h
TD = Hydraulic holding time, hours

$$TD = 25 \text{ h}$$

- Aeration System

Need for oxygen under process conditions

$$Nec \text{ O}_2 = Nec_{\text{specific}} \text{ O}_2 \times CO_{\text{removed}}$$

where: Nec O₂ = O₂ need for organic matter removal, kgO₂/d

$$\begin{aligned} \text{Nec}_{\text{specific}} \text{O}_2 &= \text{specific relationship required} = 1.8 \text{ kgO}_2/\text{kgDBO}_{\text{remov}} \\ \text{CO}_{\text{removed}} &= \text{organic load to be removed} = 27,000 \text{ kgDBO}/\text{dia} \\ \text{CO}_{\text{removed}} &= 27,000 \text{ kgDBO}/\text{d} \times 0.923 = 25,400 \text{ kgDBO}/\text{d} \end{aligned}$$

$$\text{Nec O}_2 = 46,000 \text{ kgO}_2/\text{d}$$

Oxygen needed under standard conditions

To ensure that the aeration system manages the amount of oxygen above calculated, it is necessary to calculate the amount of oxygen in the standard conditions (clean water, temperature = 20 °C).

$$\text{SOTR} = \frac{\text{Nec O}_2}{\frac{\alpha (\beta \text{Cs}_2 - \text{C}_0) \Theta^{(T-20)}}{\text{Cs}_1}}$$

where:

- C_0 = concentration of O_2 in the process = 2 mg O_2 /L
- Cs_1 = saturation 20 °C = 11.8 mg O_2 /L
- Cs_2 = saturation at 35 °C = 8.7 mg O_2 /L
- β = saturation coefficient = 0.97
- α = coefficient of aeration type and effluent quality = 0.60
- T = effluent temperature = 35 °C
- Θ = theta factor, temperature dependent = 1,024

$$\text{SOTR} = 98,440 \text{ kgO}_2/\text{d}$$

Air Flow

$$Q = \frac{\text{SOTR}}{E \times \text{kgO}_2/\text{m}^3 \text{ ar}}$$

where:

- Q = air flow, in m³/h
- E = diffuser efficiency = 35% (typical value for thin bubble tubular diffusers)
- kg O_2 /m³ air = 0.2450

$$Q = 47,833 \text{ m}^3/\text{h}$$

$$\text{Fixing for CNTP: } Q = 42,397 \text{ Nm}^3/\text{h} \text{ (adopted} = 42,400 \text{ Nm}^3/\text{h)}$$

Five blowers with unitary capacity of 10,600 Nm³/h will be installed, one being a reserve for maintenance.

Secondary Clarifier

The sizing of the secondary decanter mainly considers the surface application rate at which the effluent will be submitted, in order to optimize the sedimentation of the solids. The rate used was $0.5 \text{ m}^3/\text{m}^2\cdot\text{h}$.

$$A = \frac{Q}{\text{rate}}$$

where: A = area required for decantation, in m^2
 Q = flow rate for sizing = $2,200 \text{ m}^3/\text{h}$
Rate = surface application rate = $0.5 \text{ m}^3/\text{m}^2\cdot\text{h}$

$$A_{\text{total}} = 4,400 \text{ m}^2$$

Considering that the settling units can be maintained during their operation, and also according to the size of these clarifiers (construction methods restriction), it is planned to build 02 decanters. Thus, the area of each of the decanters will be $2,206 \text{ m}^2$, which will be circular, because the scraping and sludge collection system is more efficient.

The diameter of each of the decanters shall be:

$$D^2 = \frac{4 A}{\Pi} \longrightarrow D = 53 \text{ m}$$

Sizing

Data for Sizing

- Project Flow	m^3/h	2,200
- BOD	kgBOD/d	29,000
- Suspended solids	kgTSS/d	20,500
- pH		3-12
- Temperature		60-70

Basic Sizing

Primary treatment

- Mechanical and manual screening

. Quantity	unit	1 manual and 1 mechanic
. Unit capacity	m ³ /h	2,200
. Approach speed	m/s	0.6
. Spacing	mm	50

-- Parshall flume

. Quantity	unit	01
. Flow	m ³ /h	2,200

- Primary decanter

. Quantity	unit	2
. Total Flow	m ³ /h	2,200
. Application rate	m ³ /m ² /h	0.8
. Total required area	m ²	2,750
. Unit diameter	m	42

- Primary Sludge Thickening

. Equipment type		thickening drums
. Quantity	unit	03 (02 + 01)
. Unit capacity	kgSS/d	11,500

- Primary sludge dewatering

. Equipment type	-	Screw press
. Quantity	unit	03 (02 + 01)
. Unit capacity	kgSS/d	11,500
. Dry solids in the sewage sludge	%	35.0 to 45.0

- Neutralization Tank

. Quantity	unit	01
. Flow	m ³ /h	2,200
. Detention time	min	15
. Volume	m ³	540

- Emergency lagoon

. Quantity	unit	01
. Effluent flow	m ³ /h	2,200
. Detention time	h	24
. Volume	m ³	53,000
. Useful height	m	6.0
. Material	Compacted soil, HDPE membrane, concrete layer	

. *Emergency Lagoon Pumps*

.. Quantity	unit	02 (1+1)
.. Unit flow	m ³ /h	200

- Cooling tower pumping station

. Pump Quantity	unit	03 (02 + 01)
. Unit flow	m ³ /h	1,100

- Cooling tower

. Total effluent flow	m ³ /h	2,200
. Number of cells	unit	4
. Input temperature	°C	70
. Output temperature	°C	35

Secondary Treatment

. Type	Activated sludge	
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- Aeration tank

. Volumetric load	kgBOD/m ³ .d	0.5
. Volume Adopted	m ³	55,000

. Water depth	m	8.0
. Concentration of volatile solids	g/L	4.0
. Rate F/M	day ⁻¹	0.12
. Material	excavated, waterproofed with membrane or concrete	

. Air blowers

.. Quantity	unit	05 (04 + 01)
.. Type		centrifugal
.. Total capacity	Nm ³ /h	42,400
.. Unit capacity	Nm ³ /h	10,600

- Secondary clarifiers

. Quantity	unit	02
. Total flow	m ³ /h	2,200
. Application rate	m ³ /m ² /h	0.5
. Total area needed	m ²	4,400
. Diameter (unitary)	m	53

- Secondary sludge pumping system

. Sludge return pumps

.. Total quantity	unit	03 (02 + 01)
.. Quantity by clarifier	unit	1
.. Type		horizontal centrifuge
.. Unit flow	m ³ /h	1,100

. Secondary sludge excess pumps

.. Total quantity	unit	03 (02 + 01)
.. Type		horizontal centrifuge
.. Unit flow	m ³ /h	40

- Secondary sludge dewatering

. Equipment type	Mechanical thickener + centrifuges	
------------------	---------------------------------------	--

. Quantity	unit	03 (02 + 01)
. Unit capacity	kgSS/d	12,000
. Dry solids in the dewatered sludge	%	15.0 – 18.0

Chemical dosing system

- Storage and dosing of sulfuric acid

. *Storage Tank*

.. Quantity	unit	01
.. Capacity	m ³	12

. *Metering Pumps*

.. Quantity	unit	03 (02 + 01)
.. Type		diaphragm
.. Flow	L/h	100

- Storage and dosage of antifoam

. *Storage Tank*

.. Quantity	unit	02
.. Capacity	m ³	01

. *Metering Pumps*

.. Quantity	unit	03 (02 + 01)
.. Flow	L/h	10

- Storage and dosing of urea

. *Preparation and storage tank*

.. Quantity	unit	01
.. Capacity	m ³	15

. *Metering Pumps*

.. Quantity	unit	03 (02 + 01)
.. Flow	L/h	60

- Storage and dosing of phosphoric acid

. *Storage Tank*

.. Quantity	unit	02
.. Capacity	m ³	1.0

. Metering Pumps

.. Quantity	unit	03 (02 + 01)
.. Flow	L/h	20
. Quantity	unit	01
. Capacity	kg/d	75
. Type		polymer powder
. Concentration of polymer (liquid)	%	0.3

. Polymer metering pumps

.. Quantity	unit	03 (02 + 01)
.. Flow	L/h	120

- Parshall flume outlet

. Quantity	unit	01
. Flow	m ³ /h	2,200

5.10.1.6 Effluent Characteristics After Treatment

The expected characteristics of the treated industrial effluents are presented below.

Table 7 – Treated effluent characteristics

Parameters	Unit	Value
Flow	m ³ /h	2 200
pH	-	6.0 to 8.0
Temperature	°C	≤ 40
BOD	kg/day	2 100
	mg/L	40
COD	kg/day	16 700
	mg/L	315
Suspended Solids	kg/day	3 200
	mg/L	60
Color	kg/day	52 800
	mg/L	1 000
N total	kg/day	800

Parameters	Unit	Value
	mg/L	15
P total	kg/day	80
	mg/L	1.5

Source: Pöyry, 2018.

5.10.1.7 Monitoring

LD Celulose effluent flows will be monitored individually through flow meters as a form of monitoring and operational control. Important parameters for the monitoring of the process of treatment of liquid effluents will be followed taking into account the specifications of the suppliers of technology, aiming to meet the legal environmental parameters for the river discharge.

The monitoring and sampling system of the effluent treatment plant is presented in detail in the specific Basic Environmental Program (PBA), in which the parameters, sampling places and the frequency of analysis are presented.

5.10.1.8 Final Disposal

The treated effluent will be released into the Araguari river through an underwater emissary.

The emissary will have a hydraulic capacity of up to 2,700 m³/h, considering that it will receive treated effluents (2,200 m³/h), plus rainwater (500 m³/h) from the process areas and the general areas that are streets , roofs, etc.

The emissary is intended for the treated effluents discharge in the river, under controlled and safe way through the underwater discharge in conditions that prevent the formation of foams and promote dispersion in the most efficient way in the receiving body.

The complete system consists of: (a) one treated effluent well; (b) emissary of treated effluents to the river bank, at the discharging point; (c) control valves; (d) emissary piping in the riverbed; (e) vertical risers with nozzles for underwater discharging and dispersal in river waters.

The underwater pipelines will consist of 3 parallel lines (2 in operation and 1 spare) of HDPE (high density polyethylene) of 560 mm in diameter, in the bed of the river. At certain locations favoring the best dispersion in river waters and the homogenization of the mixture, there will be steel risers, which will conduct the treated effluent from the buried pipelines approximately 50 cm above the river bed.

At the end of each riser there will be a 90° turn to the horizontal. At the end of this curve, a special check valve will be installed, allowing the discharge of effluent jets optimally, as well as prevent the entry of sand and foreign bodies into the system.



Figure 27 – Effluent discharge. Source: Pöyry, 2018

5.10.2 Atmospheric Emissions

5.10.2.1 Emission Source

The main sources of atmospheric emissions from the mill will be generated from the following equipment:

- Recovery boiler;
- Lime kiln; and,
- Biomass boiler.

5.10.2.2 Main Control Parameters

The main control parameters related to the significant atmospheric emissions of a pulp mill correspond to:

- Particulate matter;
- TRS (Total Reduced Sulfur);
- SO_x (sulfur oxides);
- NO_x (nitrogen oxides); and,
- CO (carbon monoxide).

5.10.2.3 Technologies for Minimization, Control and Monitoring of Atmospheric Emissions

The minimization, control and monitoring of atmospheric emissions will be based on the technologies already consecrated and used with great success, which are listed below:

- Use of low odor recovery boiler;
- High dry solids content of up to 80% in the burned liquor in the recovery boiler, which minimizes SO_x emissions;
- Use of high efficiency electrostatic precipitators for the recovery boiler, biomass boiler and lime kilns;
- Collection of concentrated non-condensable gases (CNCG) from the digester and evaporation, and its incineration in the recovery boiler. If these gases can not be burned in the recovery boiler, they will be burned in the biomass boiler and, if this is impossible, the gases will be incinerated in flare;
- Extensive collection of diluted non-condensable gases (DNCG) from the digester, brown pulp line, evaporation, with treatment in the recovery boiler;
- Treatment of the dissolving tank gases in the recovery boiler itself;
- Efficient cleaning of bleach plant relief gases; and,
- Gas monitoring systems and real-time control system, identification and rapid correction of operational disturbances.

Recovery Boiler

The recovery boiler will be equipped with a high efficiency electrostatic precipitator to remove particulate matter, which will be collected and transported to the mixing tank.

This type of equipment for the control of atmospheric emissions of recovery boilers is used worldwide.

The electrostatic precipitator will promote the removal of solid, or liquid, microparticles charged by a gaseous stream through the use of static electricity.

The removal process is based on the ionization (localized concentration of electric charges) of these particles, induced by a powerful electric field, through the action of the so-called "corona effect". This effect consists in the release of electrons from the positive electrode to the gas adjacent to it, thus reaching the particles carried, causing a displacement to the other electrode (or plate) that works as a collector. A layer of dust is formed on this collector.

The powder layer will be compacted and held attached to the electrodes by the electric field forces. When this layer becomes sufficiently thick and agglomerated, it undergoes mechanical action, which causes its detachment, falling to the bottom of the precipitator, being removed by a dry drag conveyor.

The electrostatic pickup process is highly efficient, allowing the removal of extremely fine particles.

Due to the high resistivity of the gaseous media, the potential difference to be applied between the electrodes must be high, which explains the high voltage verified in these equipment.

The precipitator to be used will have separate chambers, operating together, in parallel. In this way it is possible the occasional removal of one of the operating chambers, so as to facilitate its maintenance and not significantly affect the overall efficiency of the control facility, since the system is already designed for such eventualities.

As an integral part of the equipment, an automatic management and control system will be installed, based on the use of instrumentation coupled to microprocessors. Its function will be to maintain the operational conditions of the precipitator in the ideal ranges of operation.

Lime Kiln

For air pollution control, the lime kiln will be equipped with a high efficiency electrostatic precipitator to remove particulate matter from the exhaust gases. This material will return to the lime kiln. The description of the precipitator control is similar to the description of the recovery boiler.

Biomass Boiler

Due to the legal requirements regarding the emission of particulate matter in the exhaust gases, the best alternative for the cleaning of gases generated in the combustion by the biomass boiler will be high efficiency electrostatic precipitators for the removal of particulate matter.

Non-Condensable Gas Collection and Incineration System

The non-condensable gases of high concentration generated in the evaporation plant will be incinerated in the recovery boiler.

The low-concentration non-condensable gases collected at various sources in the process areas of the fiber line and the evaporation plant will be conditioned before being introduced as secondary air into the recovery boiler or the biomass boiler.

The diluted gases from the recovery tank of the recovery boiler will be cooled in a washer, reheated and introduced as secondary air into the recovery boiler.

The exhaust gases from the lime extinguisher, causticizers, storage tanks and causticizing equipment will be collected, cooled in a heat exchanger to remove moisture and sent through a fan as combustion air.

If it is not possible to burn the gases in the recovery boiler, they will be burned in the biomass boiler and, if it is not possible, the gases will be incinerated in flare.

5.10.2.4 Qualitative and Quantitative Emission Characteristics

The main sources of atmospheric emissions and their respective values related to the operation of the dissolving pulp plant are presented in the tables below.

Table 8 – Atmospheric Expected Emissions - Recovery Boiler (flow and concentration values corrected to 8% O₂, dry basis)

Parameter	Unit	Expected Value
Flow	Nm ³ /s	300
Temperature	°C	200
Particulate Material	mg/Nm ³	70
	g/s	21.0
TRS (as SO ₂)	mg/Nm ³	11.3
	g/s	3.4
NO _x (as NO ₂)	mg/Nm ³	80
	g/s	24.0
SO _x (as SO ₂)	mg/Nm ³	400
	g/s	120.0
CO	mg/Nm ³	350
	g/s	105.0
Moisture	%	23.0
Velocity	m/s	20.0
Chimney Height	m	90
Diameter of the chimney	m	5.67

Table 9 – Atmospheric Expected Emissions – Lime Kiln (flow and concentration values corrected to 8% O₂, dry basis)

Parâmetro	Unidade	Expected Value
Flow	Nm ³ /s	35
Temperature	°C	300
Particulate Material	mg/Nm ³	80
	g/s	2.8
TRS (as SO ₂)	mg/Nm ³	22.6
	g/s	0.8
SO _x (as SO ₂)	mg/Nm ³	200
	g/s	7.0
NO _x (as NO ₂)	mg/Nm ³	400
	g/s	14.0
Moisture	%	24
Velocity	m/s	20.0
Chimney Height	m	90
Diameter of the chimney	m	2.14

Table 10 – Atmospheric Expected Emissions - Biomass Boiler (flow and concentration values corrected to 8% O₂, dry basis)

Parâmetro	Unidade	Expected Value
Flow	Nm ³ /s	50
Temperature	°C	170
Particulate Material	mg/Nm ³	80
	g/s	4.0
SO _x (as SO ₂)	mg/Nm ³	250
	g/s	12.5
Moisture	%	20.0
Velocity	m/s	20.0
Chimney Height	m	90
Diameter of the chimney	m	2.37

The emissions from the Recovery Boiler, Lime Kilns and Biomass Boiler will be conducted by individual and independent pipelines until the emission to atmosphere. These independent ducts will be wrapped in a single concrete body, that is, a chimney with a height of 90 m, suitable for atmospheric dispersion.

5.10.2.5 Monitoring

The gas monitoring system will have real-time control in order to quickly identify and correct operational disturbances.

As part of the monitoring, an automatic management and control system will be installed, based on the use of microprocessor-coupled integration. Its function will be to maintain the operational conditions of the electrostatic precipitators in the ideal ranges of operation.

For automatic on-line monitoring of atmospheric emissions, automatic gas flow, temperature, pressure, moisture, excess oxygen, TRS, NO_x, SO_x and CO shall be provided.

To monitor the thermal oxidation efficiency of the CNCG and DNCG gases, the project contemplates the installation of TRS analyzers that will continuously sample the flue gases from each of the equipment responsible for thermal oxidation.

Further details of the monitoring are presented specifically in the specific Basic Environmental Program (PBA).

5.10.2.6 Greenhouse Gas Emissions (GHG)

In LD Celulose will be adopted the kraft pulp production process based on the Best Available Technologies (BAT), which will allow the reduction, control and monitoring of greenhouse gas emissions.

LD Celulose will adopt in its production process a cleaner energy matrix, based on the use of renewable fuels - such as bark or wood chips and black liquor, for steam production, and later, electric power generation, significantly reducing fossil fuel consumption (non-renewable) and, consequently, the emissions of greenhouse gases (GHG), ie, LD Celulose will have the concept of minimum equivalent CO₂ emissions (Greenhouse Gases), producing pulp with the minimum carbon emission. In addition, under normal operating conditions, the plant will be self-sufficient in electricity generation and will also produce surplus electricity (from renewable sources) that will be made available for sale.

The raw material, eucalyptus wood, will come from planted forests, which provide the sequestration (capture) of atmospheric CO₂ through the process of photosynthesis. In this process, CO₂ is "stored" in the vegetation structure.

The management of solid waste from the pulp mill will have as priority the disposal of waste for recycling and production of soil corrective and organic compost, minimizing the disposal of waste in landfill. This fact is important because the decomposition of solid waste into landfill produces methane gas (CH₄), which has a global warming potential (GWP) of approximately 21 times higher than carbon dioxide (CO₂).

In addition, the LD Celulose will adopt rail transportation for the destination of pulp production. It is known that rail transport has a lower emission of greenhouse gases per ton of transported product when compared to road transport. In this way, emissions of greenhouse gases will be minimized with the use of this modal.

5.10.3 Solid Waste

5.10.3.1 Generation Sources

In the dissolving pulp mill, during the operation phase, industrial and non-industrial solid waste will be generated.

Industrial Solid Waste

The industrial solid waste generated by the pulp production process will come from the areas of wood handling, causticizing, boiler and water and effluent treatment plants.

In this category, the following main residues are included:

- Waste from wood preparation;
- Biomass boiler ash;
- Dregs, grits and lime mud;
- Sludge from the water treatment plant; and,
- Primary and secondary sludge from the effluent treatment plant.

The volumes of industrial waste considered for the sizing are presented in the following Table.

Table 11 – Industrial solid wastes (values in m³ / year)

Solid waste	Source	Estimated Value
Wood waste + sand	Wood handling	11,300
Dregs and Grits	Caustification	6,900
Lime mud	Lime Kiln	4,700
Lime from precipitator	Lime Kiln	7,200
Ash + sand	Biomass boiler	14,700
Primary Sludge	ETP	24,300
Secondary Sludge	ETP	36,000
Sludge	WTP	4,500
TOTAL	-	102.400

Non-Industrial Solid Waste

Non-industrial solid waste corresponds to all materials discarded by the administrative and operational support activity that covers the activities of offices, restaurants and maintenance workshops.

The following main residues are included in this category:

- Paper / Cardboard;
- Plastics;
- Metallic Scrap;
- Waste from maintenance workshops;
- Restaurant waste;
- Waste from health services; and,
- Fluorescent lamps, batteries and batteries.

Non-industrial waste volumes are shown in the following table.

Table 12 – Estimated volumes of non-industrial waste (values in t/year)

Solid Waste	Estimated Quantity
Metal scrap	155
Paper / Cardboard	30
Plastic	25
Glass	5
Organic waste	290
Waste from health services	2
Contaminated waste with oil	80
Workshop waste (lubricating oils)	35

5.10.3.2 Solid Waste Management

The solid waste management generated during the dissolving pulp mill operation will contemplate the best practices, as described in Federal Law 12305/2010, among which the following stand out:

- Waste Generation Minimization through the use of the 3R's principle (Reduce, Reuse, Recycle);
- Solid Waste Segregation, according to the color standard established by CONAMA Resolution 275/2001;
- Collection, packaging, storage and transport of solid waste, in accordance with current legislation;
- Environmentally appropriate final destination (reuse, recycling, composting, energy use, etc.) and / or environmentally appropriate disposal (industrial landfill) of the solid waste generated in the project.

Waste Classification

Standard ABNT NBR 10.004 classifies solid waste as regards its hazardousness, that is, its potential risks to the environment and public health. These wastes are classified in: Class I - hazardous waste, Class IIA - non-hazardous and non-inert waste, and Class IIB - non-hazardous and inert waste. The waste from the pulp mill is classified as follows:

- Waste Class I - Hazardous Waste: workshop waste (lubricating oils), health care waste, fluorescent lamp, batteries and batteries.

- Waste Class II - Non-Hazardous Waste: ETP and WTP sludge, biomass boiler ash, dregs/grits, lime sludge, wood (organic) handling waste, paper / cardboard, plastic, scrap metal , glass, organic waste (meal rest), waste tires / rubber.

Segregation and Conditioning of Solid Waste

The mill must have a System of Selective Collection that aims to separate previously in the source the materials with similar characteristics.

In the case of administrative and operational collectors, the color standard follows CONAMA Resolution No. 275/2001, as presented in the Table below.

Table 13 – Color standard for selective collection of solid waste from administrative and operational collectors

Solid wastes	Color
Metal scrap	Yellow
Paper / Cardboard	Blue
Plastic	Red
Glass	Green
Hazardous waste	Orange
General non-recyclable waste	Gray
Health Service	White
Wood	Black
Organic	Brown

In the case of stationary buckets the color pattern is shown in the following Table.

Table 14 – Color standard for selective collection of solid waste from stationary buckets

Solid Waste	Color
Ferrous and non-ferrous scrap, electric cables, wire, copper materials, metal parts and pipes, aluminum and iron cans not contaminated with oil	Yellow
Paper / cardboard	Blue
Plastic	Red
Glass	Green
Hazardous waste, chemicals	Orange
General non-recyclable waste	Gray
Wood	Black
Organic, food rest	Brown

The temporary storage of solid waste will be carried out in suitable collectors in such a way as to eliminate risks to human health and the environment. This storage will be in accordance with the Standards ABNT NBR 11174, ABNT NBR 12235 and CONAMA Resolution 358/2005, as well as ANVISA RDC 306/2004.

The following table presents the ways of solid waste temporary storage in the generating areas.

Table 15 – Temporary Storage in the generating areas

Solid waste	Description
Wood waste + sand	Stationary Bucket
Dregs/ Grits	Stationary Bucket
Lime mud	Stationary Bucket
Precipitator lime	Stationary Bucket
Ash + sand	Stationary Bucket
Primary Sludge	Stationary Bucket
Secondary Sludge	Stationary Bucket
Sludge from WTP	Stationary Bucket
Metal scrap	Collector and / or stationary bucket
Paper / cardboard	Collector and / or stationary bucket
Plastic	Collector and / or stationary bucket
Glass	Collector and / or stationary bucket
Organic	Drum and / or collector
General non-recyclable waste	Stationary bucket and / or bucket with lid
Health Service	Specific collection box
Hazardous waste	Drum or stationary bucket
Lubricant	Drum
Lamps	Specific container for lamp
Batteries	Drum
Tires and Rubbers	Stationary Bucket

Treatment and Final Disposal

The solid wastes will be destined for treatment and / or final disposal, as described in the Table below.

Table 16 – Forms of treatment and / or disposal of solid waste in generating areas

Solid waste	Treatment	Destination or Final Disposition
Wood waste + sand	Composting	Forest Application / industrial landfill of third parties
Dregs/Grits	Corrective Soil Acidity	Forest Application / industrial landfill of third parties
Lime mud	Corrective Soil Acidity	Forest Application / industrial landfill of third parties
Precipitator lime	Corrective Soil Acidity	Forest Application / industrial landfill of third parties
Ash + sand	Corrective Soil Acidity	Forest Application / industrial landfill of third parties
Primary Sludge	Composting / incineration in biomass boiler	Forest Application / industrial landfill of third parties
Secondary Sludge	Composting / incineration in biomass boiler	Forest Application / industrial landfill of third parties
Sludge from WTP	Composting / incineration in biomass boiler	Forest Application / industrial landfill of third parties
Metal scrap	-	Recycling
Paper / cardboard	-	Recycling
Plastic	-	Recycling
Glass	-	Recycling
Organic	Composting	Forest Application / industrial landfill of third parties
General non-recyclable waste	-	Landfill of third parties or of municipality
Health Service	-	Incineration
Hazardous waste	-	Incineration / coprocessing
Lubricant	-	Refining

Composting

Objectives of Composting

The composting process has the following main objectives:

- Properly recycle, through an efficient composting system, the waste generated and likely to be used;
- To systematize and homogenize the return of nutrients contained in the residues to the forest plantations, making fertilizations with the compound produced;
- Improve nutritional status and soil physical parameters by adding organic matter;
- Promote the partial substitution of fertilizers and chemical correctives used, with environmental and economic gains; and,
- Ensure adequate disposal of waste generated by industry to the current technical standards and environmental legislation.

Waste Recycling Benefits

Waste recycling brings together the interests of public power, companies and society, and is also an activity that synthesizes several principles of sustainable development.

Among the determinants of the incentive to waste recycling processes, there are those that are related to the geographic space, such as the lack of adequate areas for disposal, sanitary and environmental aspects, where inadequate disposal can lead to public health problems, as well as the contamination of surface water, groundwater and soil (Brazilian Institute of Geography and Statistics - IBGE, 2002).

Besides the environmental benefits, the recycling of materials favors some social and economic aspects, such as the generation of jobs and the reduction of expenses with investments in new landfills, besides promoting strategies to raise awareness of the population on the environmental theme and the promotion of efficient use of natural resources.

Among the various forms of recycling, composting is an internationally recognized method of high efficiency and utility for the transformation of organic waste (Marche et al., 2003).

The process allows the return of several chemical substances to the productive cycle, when applied both in soil and in composition to other substrates. It thus prevents environmental pollution in several aspects, including the control of greenhouse gas emissions (Marche et al., 2003).

Although the practice of composting is associated with a number of benefits, the technique is still little used in our country. According to IBGE data, published in 1992, there were 80 composting plants in Brazil in 1989, most of them being deactivated or working precariously (Ambiente Brasil, 2004).

Benefits of Composting in Pulp Industries

The waste produced in the pulp mill is predominantly organic and biodegradable, thus allowing the recycling of the same in the soil. Due to the fact that they have

considerable concentrations of organic matter and nutrients, such wastes are already used in forestry plantations by some companies.

Composting System

Residues generated in pulp production processes such as eucalyptus bark, woodyard waste, primary and secondary sludge from the treatment of liquid effluents can be previously submitted to the composting process by accelerated fermentation.

This process, in which the microorganisms transform the initially found Carbon / Nitrogen ratio of 120/1 to below 26/1, will result in excellent quality material for agricultural purposes.

The process will start with the proper mixing of the residues in a row, where the microorganisms responsible for the fermentation will be inoculated.

These patios will be constructed with compacted clay forming an inclined plane towards the system of collecting percolates with slope, that allows the rapid drainage of rainwater, aiming to minimize the drag of solid material.

The composting lines shall be assembled from the material unloaded by the trucks in parallel lines until they occupy the entire length of the respective yard. After all the loads have been deposited, the material will be reassembled with the aid of a loader or hydraulic excavator, forming a trapezoidal shaped belt. These lines will be made alternately with spacing between them to allow the transit of trucks, the revolving with mechanical equipment.

The percolated liquids will be collected by a drainage network, will go to a leach tank and will then be sent to the mill ETP.

In the final stage, nutrients will be added to complete the necessary balancing of the soil to which it is intended.

The product obtained has uniform granulometry, which will facilitate the application to the soil, proven agronomic characteristics and possibility of registration with the Ministry of Agriculture.

The selection of this area is based on the same criteria for the selection of areas for industrial landfill, which aim to use the best available technologies and best environmental practices for environmental protection, which are:

- Minimum distance of 200 m of bodies of surface water;
- Minimum distance of 500 m of residences;
- Depth of groundwater higher than 3 m;
- Implantation of a rainwater drainage system able to support a peak rain with a 25-year period of recurrence (it consists of the construction of protection channels around the embankments to collect rainwater);
- Implantation of aquifer monitoring wells; and,
- Installation of collection system and treatment of percolated liquid.

Soil Acidity Corrective Production

Inorganic waste from causticizing (dregs/grits, lime mud and precipitador lime) and biomass boiler (ash) will be used for the production of soil acidity corrective.

Depending on its composition, lime mud and ash may be used individually as a soil acidity corrector.

Lime mud and dregs with grits are basically carbonated alkaline by-products, which have a high concentration of nutrients such as calcium and magnesium and have high neutralization capacity.

The ash, in spite of the low neutralization capacity, presents concentration of macronutrients such as phosphorus, potassium, calcium and magnesium that enrich the corrective acidity of the soil. These nutrients are important for plant development.

The following figure shows the basic flowchart for the production of soil acidity correctors.

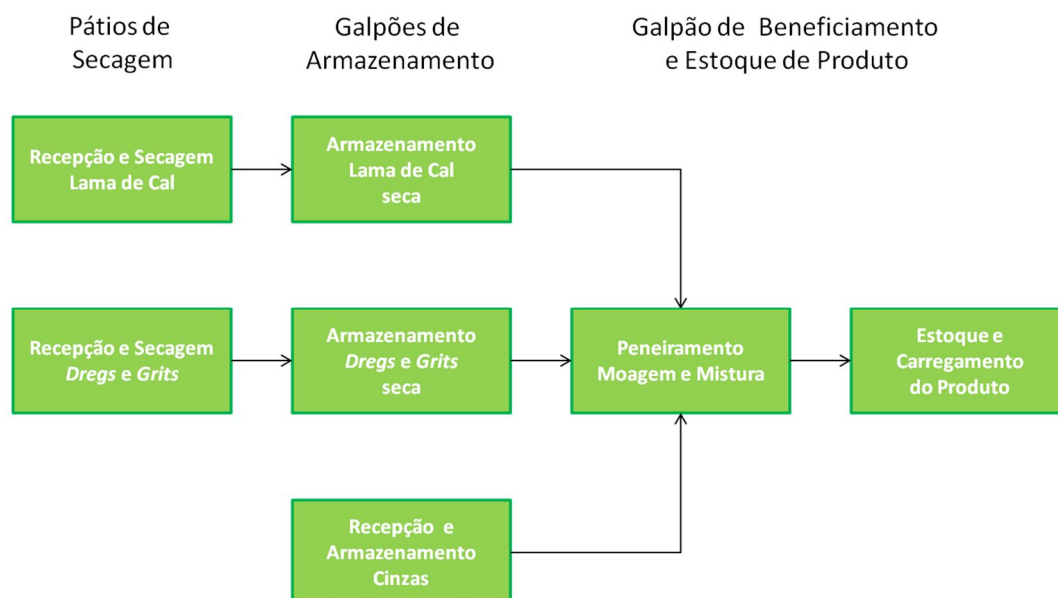


Figure 28 – Soil acidity correction basic flowchart

5.10.4 Noise

The generation of noise during the mill operation will be due to the activities of the industrial process.

LD Celulose will employ noise treatment systems and protective measures for its employees and third parties in its plant, which are based on legislation and technical standards such as:

- CLT - Consolidation of Labor Laws, Law 6514, of December 22, 1977, Section IV
- of personal protective equipment;

- NR-6 - Personal Protective Equipment - EPI;
- NR-15 - Unhealthy Activities and Operations;
- NBR 7731 - Guide for the performance of airborne measurement and evaluation of its effects on man;
- NBR 10151 - Evaluation of noise in inhabited areas aiming the comfort of the community;
- NBR 10152 (NB-95) - Noise levels for acoustic comfort.

The main noise generating areas and their respective levels (sound pressure) are presented in the following table:

Table 17 – Main Noise Generating Areas

Area	Noise dB(A)
Wood handling	
- Chipping	115
- Chip screening	85
Cooking plant	87
Deslignification (washing system)	92
Bleaching (washing system)	92
Pulp dryer	85
Recovery Boiler	100
Biomass Bolier	94
Evaporation	85
Caustizing	85
Lime Kiln	93
Turbines	105
Water Demineralization	95
Treatment of water and effluents	98
Pressure relief valves	115

Source: Pöyry Tecnologia (2018).

The sound pressure will be attenuated by:

- Construction of buildings and facilities designed with adequate acoustics, such as control rooms, offices and other facilities for individual and collective use;
- Use of appropriate materials during the construction of the facilities;
- Installations provided with vibration and shock isolators, with flexible joints;
- Acquisition of machines and equipment with low noise level;
- Equipment installations in suitable locations;
- Acoustic enclosure for equipment with high sound pressure level;
- Installation of silencers, attenuators, sound absorbers.

In addition, LD Celulose will have health and safety programs as a way to control and/or minimize the exposure of its employees and partners to industrial noise.

5.11 Support Infrastructure and Activities of the Construction Phase

5.11.1 Earthmoving Activities

In earthmoving activities, a balance between cut and cover is foreseen, in the way that will be minimized necessary areas for material disposal (bota-fora) and borrow material (jazida) in external locations of the project site.

The estimated cut volume is 1,400,000 m³, land clearance of 1,000,000 m³ and material disposal is 1,000,000 m³. No borrow material will be required, only for material disposal (bota-fora) which will be carried out in locations properly licensed.

The surface soil removed may be reused as a substrate for any areas that will receive landscaping treatment.

The rainwater will be led superficially, through proper trim, to the natural drainage system of the land.

The equipment to be used during the execution of the earthworks and infrastructure, will correspond to blade tractors, wheel loaders, excavators, kite trucks, tippers and carts, among others.

5.11.2 Land Protection during the implementation phase

The project construction provides preventive measures to protect the land to transport sediment to the surrounding water courses. Preference is being given to earthworks in non-rainy periods, in order to reduce the possibility of erosive processes due to the susceptibility of the terrain.

Temporary drainage construction, avoiding silting of water bodies, structures to contain material, minimizing the exposure time of areas without vegetation cover and friable characteristics, monitoring and environmental supervision of the works are some of the measures to be taken during the project construction.

5.11.3 Foundation and civil works

The buildings will have precast concrete structure and concrete slab cover. The internal walls will be masonry of concrete blocks and the outer masonry closures of concrete blocks and metal sheets and floors in the industrial areas will be concrete.

The infrastructure of underground systems will include: electricity distribution cable networks, telephony and optical signal cables, sewage networks, rainwater networks and fire networks.

5.11.4 Concrete Plant

There will be a concrete plant during the construction phase, with a capacity of about 50 m³/h, basically composed of a storage area, weighing and loading of aggregates (sand and gravel) and silo and cement scale.

This area will be used primarily for concrete preparation and washing of concrete mixer trucks and equipment.

It should be noted that the concrete mixing process is carried out inside the concrete mixer truck, and not in the actual area of the concrete plant, which actually will function only as storage and loading site for materials.

The area intended for the washing of concrete mixer trucks and equipment shall be waterproofed with appropriate devices including sedimentation boxes and water / oil separator boxes, with no risk of contamination to soil and groundwater and surface water.

The solid wastes generated will be basically composed of the concrete embedded in the spout and the funnel after loading, which will be removed during the washing operation of the concrete mixer.

5.11.5 Surface Drainage

The drainage system will be composed of two distinct networks, one for the drainage of areas with possibility of contamination and another for areas where there is no possibility of contamination.

The drainage of areas where there is a possibility of contamination will be composed of lobes, lobes, wells and pipes that will receive drainage from the outer streets of the production islands and will direct these waters to the monitoring lagoons. After their measurement these waters will be released for release to the nearest receiving bodies.

For the drainage of areas where there is no possibility of contamination such as construction sites, administrative areas and storage of finished products are provided catchment networks composed of ditches for the unpaved streets, and for the paved streets, manhole covers , manholes, wells and pipes that will receive these waters and launch into the receiving bodies of these areas.

The water discharge will meet the standards as to their standards and maximum speeds.

5.11.6 Streets and paving

The inner streets will be paved with asphalt and will have guides and concrete gutters. The uncontaminated rainwater will be collected superficially through lobes of wolf and led by the rainwater network to the river. Rainwater will be led from the roofs to the underground network by pipelines.

The streets destined to the construction sites will receive provisional paving in gravel and drainage system in ditches.

5.11.7 Employees

The labor required for the plant's implantation is estimated 6,500 workers in the peak period of the work and assembly.

The labor required for construction and assembly of the enterprise will preferably be recruited in the region of Araguari and Indianópolis, State of Minas Gerais.

5.11.8 Employee's accomodation

Professionals coming from outside the region will be properly accommodated in the lodgings (alojamentos), hotel chain and rental houses already available in the region.

5.11.9 Construction Site

Construction sites will be installed next to each process area to be built and will be made up of warehouse for storage and storage of construction materials, equipment, pipelines, equipment assembly areas, administration and personnel control facilities.

In addition to the construction site, the ground preparation activities will be described, as well as the infrastructures necessary for plant implantation, such as earthworks, protection of the ground during construction, pavement, paving, surface drainage, foundations and civil works, fire-fighting protection system, electric power distribution system, and concierge of trucks and personnel.

In the typical construction site, will be installed offices, locker rooms, warehouse, storage area of manufactured parts and equipment and workshops.

These areas of construction site, and those where the common constructions will be installed, will be served by underground networks of water and sewage.

5.11.10 Temporary buildings**5.11.10.1 Restaurants**

The restaurants will have the capacity to serve about 13,000 meals daily.

The facilities will have of industrial kitchen and preparation areas, receiving dock, pantry, cold rooms, washing areas and dining rooms for the preparation and supply of up to 13,000 meals.

Externally there will be area for gas central, transformer to supply power to the set and high reservoir of water.

The cold rooms will be of the prefabricated industrial type.

In the kitchen, the facilities will serve the points of consumption of cold, hot water and gas.

5.11.10.2 Social Center

The building will consist of an area for toilets, TV rooms, snack bar with kitchen area, pantry, washing and games tables and telephone in the outside covered area.

5.11.10.3 Construction offices

The building will consist of blocks with offices, meeting room, auditorium, coffee break, men's and women's toilets, a deposit and air conditioning room.

5.11.10.4 First Aid Post, Emergency Brigade and Work Safety

The brigade area will consist of a duty room, room for material / equipment, toilets and dressing rooms and kitchen.

The first aid post will consist of: reception, waiting room, first dressing room, recovery rooms, doctor's offices, room on duty, physiotherapy room and ultrasound, toilets and kitchen.

The work safety area will consist of common room of technicians, meeting room, safety engineer room, deposit of equipment and safety materials and toilets.

Between the brigade and ambulance area there will be a covered area for the vehicles.

5.11.11 Water Supply

The main uses of water during the construction of the mill are: sanitary purposes, concrete preparation and various uses.

The water supply to the construction site will be carried out through wells. The water will be filtered and will receive chlorination, followed by its storage in the reservoir, for later distribution to the users. At first, this system should provide a flow of the order of 150 m³/h, which should meet the maximum population of 6,500 employees (peak during the work) and also for the preparation of concrete.

The quality required for water should meet the parameters established by Portaria de Consolidação do Ministério da Saúde nº 05/2017.

5.11.12 Electricity Supply

Initially the electricity supply during the works phase will be through electric generators, fueled with diesel oil, and later by local distribution network, until the high voltage transmission line is completed.

It is important to emphasize that the generators and their respective diesel tanks will be installed on a waterproofed area, protected by metal trays, avoiding that any spills will contaminate the soil.

5.11.13 Environmental Control System

5.11.13.1 Liquid Effluent

At the beginning of the construction will be used chemical toilets, and these will be removed by trucks type clean pit, transported and arranged by companies accredited in licensed landfills. The chemical toilets and other facilities at the construction site will be installed in accordance with NR 18. Once the installation of the construction site is completed, the chemical toilets will be deactivated and returned to the company that leased them.

After the infrastructure installation, the sanitary sewage generated during the construction of the plant will be collected and treated in a treatment system consisting of a flow meter, aerated lagoon and polishing lagoon, and afterwards the treated effluent will be collected and sent to fertirrigation of eucalyptus plantation area in the Duratex forests through an irrigation system or by trucks. It is worth mentioning that this system will be used during the period of construction and erection of the site.

This system will be a biological treatment that will work with microorganisms that will degrade the organic matter present in the sewage (expressed in terms of BOD - Biochemical Oxygen Demand) through an aerobic process.

The choice for this system is due to the fact that this type of treatment presents a good performance in terms of BOD removal, besides being a robust system, being able to withstand the variations of load and flow to which the system will be submitted (due to the variations of peak of contingent of the employees).

After the flow measurement, the sewage will pass through the aerated lagoon, equipped with mechanical surface aerators. Aerators, besides providing the necessary oxygen to the development of the microbiology, are also responsible for the maintenance of the mixture in the lagoon, that is, it maintains the biological sludge in suspension, a fundamental condition for the good performance of the process.

The next step of the treatment will be the polishing lagoon. This unit aims at the removal of the biological sludge formed in the aeration lagoon through decantation. The decanted sludge will be mineralized at the bottom of the lagoon, significantly reducing its volume.

The effluent, after passing through the polishing lagoon, will pass through a Parshall flume for flow measurement, which will then be sent to the Duratex forests, where it will be used as reuse water in the planting areas.

The treated effluent must meet the emission standards of the parameters established by CONAMA Resolution 430/2011 and e Deliberação Normativa Conjunta COPAM/CERH-MG 01/2008. In summary, the main parameters to be followed that are applicable to this type of effluent (sanitary sewage) are:

Table 18 –Parameters applicable to sewage

Parameter	Unit	Value
Flow	m³/h	100
pH	-	5,0 a 9,0
Temperature	°C	<40
Sedimented solids	ml/l	< 1,0
BOD concentration	mg/l	< 60

Source: Resolução CONAMA nº 430/2011 and Deliberação Normativa Conjunta COPAM/CERH-MG nº 1/2008.

5.11.13.2 Atmospheric Emissions

In the implementation of the project, dust generation may occur, especially in the initial phase of implementation, especially the earthmoving, vehicle movement, machinery and equipment operation, handling and transportation of materials (such as sand and gravel), etc.

Therefore, during the works, the soil of roads, construction sites and other surfaces that can generate fugitive emissions of dust will be humidified with periodic spraying.

Trucks that carry soil, rocks and all powder material will have their cargo covered, preventing the release of particles and dust.

5.11.13.3 Solid Waste

Management system

The solid waste management generated during the construction phase of the LD Celulose will contemplate the best practices, as described in Federal Law 12305/2010, among which the following stand out:

- Waste Generation Minimization through the use of the 3R's principle (Reduce, Reuse, Recycle);
- Solid Waste Segregation, according to the color standard established by CONAMA Resolution 275/2001;
- Collection, packaging, storage and transport of solid waste, in accordance with current legislation;
- Environmentally appropriate final destination (reuse, recycling, composting, energy use, etc.) and / or environmentally appropriate disposal (landfill) of the solid waste generated in the project.

In the construction phase, there will be a Temporary Storage Center for Solid Waste that will be managed by a company that specializes in this service. This company will be responsible for receiving, storing and disposing of all solid wastes generated during this phase.

All contractors for the implementation of the various process parts, as well as all other companies contracted to perform any other service during the construction phase, will be responsible for the collection, segregation, packaging and disposal of their solid waste to the Storage Center Temporary Solid Waste.

The solid waste generated in the common areas and in the lodgings will also be collected, segregated, conditioned and destined to the Central of Temporary Storage of Solid Waste. The collection of these wastes will be carried out by a company specialized in this service

Solid Waste Characterization

In the implementation of LD Celulose dissolving pulp mill, several types of waste will be generated.

Standard NBR 10004/2004 classifies solid wastes into Hazardous Waste (Class I), Non-Hazardous and Non-Inertial Waste (Class IIA) and Non-Hazardous and Inherent Waste (Class IIB). CONAMA Resolution 307/2002 establishes guidelines, criteria and procedures for the management of construction waste.

The following table shows the solid waste generated, its classification according to NBR 10004 /2004, its class according to CONAMA Resolution 307/2002 and the estimated quantity.

Table 19 – Solid Waste Characterization that will be generated in the implantation of the project

Solid waste	ABNT NBR 10.004/2004	RES. CONAMA 307/2002	Estimated Amount
Debris of works (block, concrete, brick, wood)	II-A	Class A/B	2,600 m ³ /month
Scrap metal	II-A	Class B	125 t/month
Paper / cardboard	II-A	Class B	10 t/month
Plastic	II-A	Class B	15 t/month
Rubber / Tires	II-A	Class B	30 unit/month
Glass	II-B	Class B	2 t/month
Fluorescent lamps	I	Class D	0,5 t/month
Batteries	I	Class D	10 kg/month
Waste from health service	I	Class D	200 kg/month
Equipment maintenance wastes (lubricating oil)	I	Class D	3,5 m ³ /month
Organic waste	II-A	-	280 m ³ /month

Solid Waste Segregation

LD Celulose will have a Selective Collection system that aims at separating previously in the source the materials with similar characteristics.

In the case of administrative and operational collectors, the color standard follows CONAMA Resolution 275/2001.

Temporary Storage

The solid waste temporary storage will be carried out in suitable collectors in such a way as to eliminate risks to human health and the environment. The temporary storage will be in accordance with the Standards ABNT NBR 11174, ABNT NBR 12235 and CONAMA Resolution 358/2005, as well as ANVISA RDC 306/2004.

Health service waste will be collected, conditioned, stored and transported in accordance with the ABNT Standards NBR 12809 and ABNT NBR 12810 and Resolution CONAMA 358/05.

In the Table below, the ways of packaging solid waste in the generating areas are presented.

Table 20 –Solid waste temporary storage in the generating areas

Solid waste	Temporary storage description
Debris of works (block, concrete, brick, wood)	Bulk, in soil/ stationary bucket
Scrap metal	Stationary Bucket
Paper / cardboard	Stationary Bucket
Plastic	Stationary Bucket
Rubber / Tires	Stationary Bucket
Glass	Stationary Bucket
Fluorescent lamps	Specific container for lamp
Batteries	Drum
Waste from health service	Specific collection box
Equipment maintenance wastes (lubricating oil)	Drum
Organic waste	Drum e/ou collector

In this phase the selective collection of solid wastes will be implemented, where appropriate containers will be used and identified according to the color standard established in CONAMA Resolution 275/01, as presented in the Table below.

Table 21 – Color standard for waste storage

Solid waste	Colour
Paper / Cardboard	Blue
Plastic	Red
Glass	Green
Metals	Yellow
Wood	Black
Hazardous waste	Orange
Health Service	White
Radioactive waste	Purple
Organic	Brown
General non-recyclable waste	Gray

Treatment and Final Disposal

The solid waste from the Temporary Storage Center for Solid Waste will be destined for final treatment and/or disposal, as described in the following table.

Table 22 – Forms of treatment and/or disposal of the solid waste generated at the site

Solid waste	Treatment and final disposal
Debris of works (block, concrete, brick, wood)	Recovery and Recycling
Scrap metal	Recycling
Paper / cardboard	Recycling
Plastic	Recycling
Rubber / Tires	Recycling
Glass	Recycling
Fluorescent lamps	Recycling
Batteries	Recycling
Waste from health service	Decontamination / incineration
Equipment maintenance wastes (lubricating oil)	Refining / incineration / coprocessing
Organic waste	Landfill of third party or municipal duly licensed

Most of the solid waste generated in the construction phase will have an environmentally appropriate final destination, ie, will be destined for reuse, recycling, incineration, coprocessing, etc.

Rubbish is classified according to Standard ABNT NBR 10004 as non-hazardous and inert waste (Class II-B). It is preliminarily planned to generate 62,000 m³ of debris during the entire construction phase of the plant.

The debris of works will basically consist of: wood, metal/scrap and remnants of concrete/masonry.

These debris will be properly segregated and will have different treatments or destinations considering their characteristics.

In this way, the following forms of treatment/disposal of the wastes are being considered:

- wood will be separated and destined for companies that can use them for energy use (incineration);
- debris of the concrete/masonry parts will be crushed, being separated into: metal parts (hardware) and crushed concrete, where:
 - metal/scrap will be sent to companies for reuse as raw material;
 - Concrete/masonry debris may be used as a base layer / support for access roads and small roads.

The organic solid wastes generated in the implantation phase will basically come from the kitchen and refectory (waste from food processing, catering waste, napkins and the like) and toilets (toilet paper). According to Standard ABNT NBR 10.004, these wastes are classified as non-hazardous and non-inert waste (Class II-A). During the construction phase of the industry (24 – 28 months), it is expected to generate 6,800 m³ of organic waste. These figures were based on data from recent projects and similar works in the pulp area in Brazil.

5.11.13.4 Noise

In the project implementation, noise generation will be due to the movement of vehicles and the operation of machines and equipment.

5.12 Investment

The total investment foreseen for the project implementation will be in the order of R\$ 3.6 billions.

5.13 Time Schedule

The time schedule for the project implementation is approximately 24 to 28 months, as shown in the following figure.

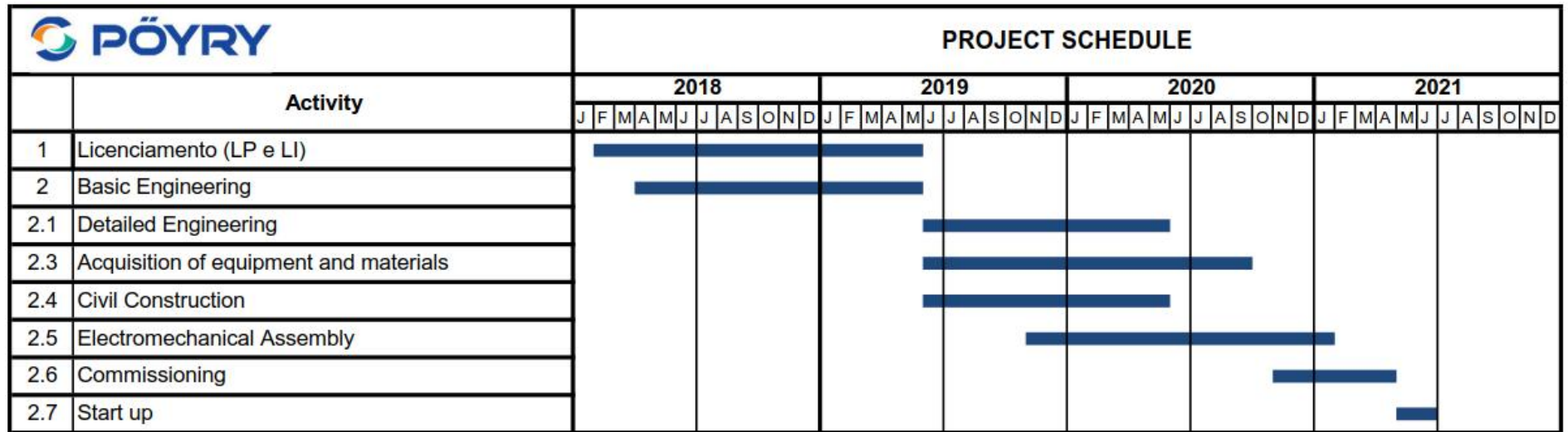


Figure 29 – Project time Schedule

6 GOVERNMENT PLANS AND PROGRAMS AND LEGAL ASPECTS

6.1 Government Plans and Programs

In accordance with the environmental law, is mandatory to complete the assessment of significant impacts' entrepreneurship with an EIA/RIMA and also an evaluation of governmental program and plans already executed in the region of interest. The reason for that is to check the suitability between the pulp mill and those programs and plans proposed and already implemented in this area of interest.

This is necessary because the installation and operation phase of an enterprise of this size may be able to activate the social and economic structures of the region, in particular public infrastructure may be affected such as: leisure, municipal and road traffic conditions, sanitation, water and energy supply, public safety, market impacts, public transportation, availability of food and groceries.

CONAMA Resolution n. 001/1986 determines:

Article 5 - In addition to complying with the law, in particular the principles and objectives expressed in the National Environmental Policy Law, the environmental impact study shall comply with the following general guidelines:

(...)

IV - Consider the governmental plans and programs, proposed and in implementation in the area of influence of the project, and their compatibility.

The objective of the law is to obtain full assessment of the impacts arisen of the activity, considering also its interaction with the projects in the region, and other enterprises consisting in synergies or cumulative impacts attracting new investments in the future.

In fact, the evaluation of the activity at federal, state and municipal level in the area of influence allows to understand the magnitude of all possible impacts that can be generated. This fact is so important, that the same standards states that RIMA must also address the plans and programs:

Article 9 - The environmental impact report - RIMA will reflect the conclusions of the environmental impact study and will contain, at least:

I - The objectives and justifications of the project, their relationship and compatibility with sectoral policies, plans and government programs.

(CONAMA, 1986)

The first approach of this item covers federal programs, and later the state plans and consequently the municipal plans and programs.

Growth acceleration plan (PAC)

The information presented here was obtained from the website of the Growth Acceleration Program (PAC) created by the federal government.

This program was named by federal government “Growth Acceleration Program” - PAC and was created in 2007 with the target of resurrecting the planning and execution of major social, urban, logistics and energy infrastructure projects in the country, with the ultimate goal of generating accelerated and sustainable development.

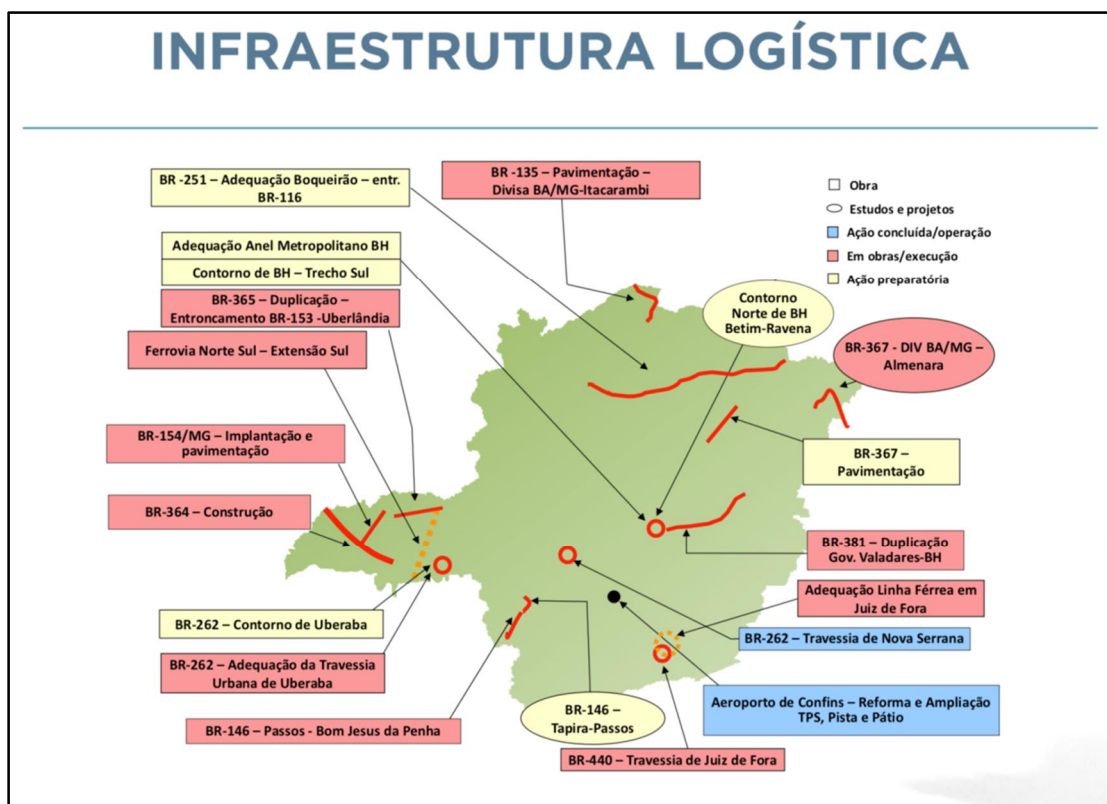
Its conception is to be a strategic plan for the return of investments in structuring sectors of the country, so that this program promotes an increase in the supply of jobs and income generation, raising public and private investment in fundamental works.

In the years 2008 and 2009, this program guaranteed employment and income to low-income Brazilians, and allowed the continued consumption of goods and services, keeping the economy active and alleviating the effects of the crisis on domestic companies.

After 4 years of execution, the PAC was improved with more resources and invested in greater partnerships with states and municipalities, targeting works considered structuring to improve the quality of life in the country. The federal program is structured in three main axes:

- Infrastructure;
- Energy;
- Social and Urban

The logistic infrastructure map of Minas Gerais, representing about R\$ 8 billion in investments in years 2015 and 2018, and covering works already completed and others in execution can comprehend the first axis.



It is noted that the area of influence of the project is located in a region where are located investments of PAC, so that it will be indirectly affected in what concerns the investments in BR-262 in Nova Serrana, and Adequations in Uberaba on the same road BR-262, since doubling of BR-365 and North-South railroad is occurring.

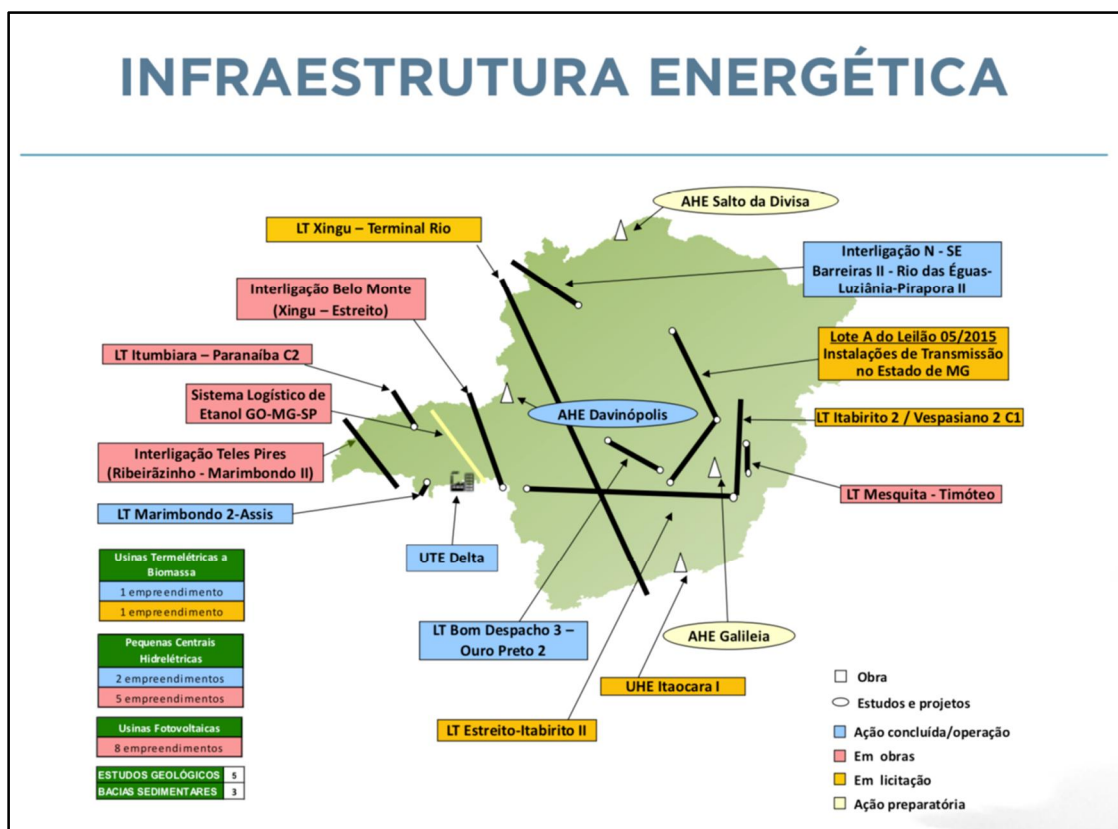
Evaluating the PAC reports available at the electronic address, it is seen that the road investment is the majority, followed later by the airport investments.

On the other hand, the spiral of investments in the tertiary sector, caused by the arrival of the pulp mill in Indianópolis, is also considered to boost these investments. This impulse has an aspect to be considered with regard to the increase of services offered, as well as the greater use of the existing road infrastructure in the region.

In this way, it is necessary to evaluate over a longer period of time the possibility of increasing the road and railway infrastructure, in order to increase the supply of modalities in the region.

The second stream of PAC is the energy infrastructure, which investments from 2015 to 2018 represent more than R\$ 15 billion through energy generation and transmission of electricity.

The map below, provided by the most current PAC report in Minas Gerais, allows the location of the investments in the comment.



In this respect, it is relevant to observe that the macro localization of the project is covered by the transmission line Xingu - Terminal Rio and the transmission line Estreito - Itabirito II and Xingu - Estreito.

It is also important to note that to the west of the project, investments are under construction, increasing the supply of energy in the system.

The energy supply to the East of the analyzed project is in bid phase. It means, that over a longer time horizon, it will be probable that the operation of the pulp mill will increase the supply in the networks and future lines, attracting other investments in the region.

The attraction of investments is linked to the supply of logistics and energy infrastructure, as shown. The region, over a longer time horizon, therefore has potential for growth from future investments that may be attracted by the supply of energy.

In terms of contribution in the system, it should also be emphasized that the energy cogeneration project will increase the supply in the system by use of biomass, its main raw material for pulp production. It should be noted the presence of a biomass energy generation venture on the indicated map.

As a contribution to the discussion, regional energy projects, in the same period, amount to more than R\$ 10 billion, which means, more than double the federal investments.

Public or private projects need logistics and energy infrastructure, but it is not enough for the installation and operation of manufacturing industrial parks. It is necessary to have investments in social and urban infrastructure, which is able to receive the population and man power attracted by job creation, increase in quality of life, human development and other factors.



The region chosen for the implementation of the project is in the center of an axis that goes from the Triângulo Mineiro to Belo Horizonte.

The investments in sanitation The investments in sanitation are in the same proportion of about R\$ 3 billion, being relevant the diffuse aspect of its implantation in several cities, leading to networks of exhaustion and supply of clean water for the largest number of people.

The improvement of the living conditions, among them the water supply services, is a factor of attraction of service providers, generating considerable definitive migration by the population that is attracted during the installation phase. Investments in improvements in the paving of existing roads, tourism and historical infrastructure also generate effective synergies between existing ventures in the region and future ones such as the pulp mill.

The presence of the project, as said, could leverage the attraction of other suppliers of goods and services, having total relation with the investments in social equipment (health units, ready care, education and sports).

What is perceived is that the investments completed and in works exceed the investments in projects in the bidding phase and preparation, so that Minas Gerais has

conditions to house this enterprise. Of course, other new investments and improvements to existing ones will be required over time.

State Programs

The state government has been implementing actions and programs in harmony with the aforementioned federal programs, generating greater effectiveness in the implementation of public policies. In addition, shared investments between Minas Gerais and the actions developed by the Union end up permeating with greater intensity the local citizen.

The following are some state programs of interest that can generate synergies with the enterprise, supporting municipal development and enhancing federal and state government actions.

The Secretariat of Cities and Regional Integration has programs that will strengthen the engagement of Araguari and Indianópolis with the State and, consequently, with the Union.

The strengthening programs with the municipalities are as follows:

- Support to the Cooperation of Municipalities;
- Metropolitan Development Fund;
- Agreements with Municipalities for improvements in Urbanization, Sanitation and Housing;
- Strategic Plans: Large Enterprises

The state government has been institutionally equipped and trained local managers (mayors, councilors and secretaries) in order to align with federal investments.

The Mayor is the first administrator and expert of local needs, so the state government has prepared to allow investment at the regional and local level.

This role of investments and programs is aimed not only at business infrastructure, but also at institutional capacity, improvement and citizen services, as well as regional economic growth.

It is important to note that investments in urban improvement are significant not only financially, but also from the perspective of basic sanitation and sustainable cities.

In terms of regional development, the state government has been increasing the organization and organization of the State Policy for Regional Development. In this sense, in accordance with the other states of the federation and with the Federal Government (Ministry of National Integration), the Government of Minas Gerais held the First State Conference on Regional Development, whose objective was to formulate principles and guidelines for the construction of the Regional Development Policy.

The State Conference is connected to a process of construction of the new National Policy for Regional Development, so that delegates were elected and the principles

and guidelines of the State Conference for the South-Western Macroregional Conferences and the National Conference on Regional Development were forwarded.

The dissolving pulp mill project will benefit from such investments, but will also contribute to the improvement of the local and regional institutional structure. The training program for municipal managers and entities belonging to Local Producers' Arrangements (APL), for example, is a salutary two-way action.

Entrepreneur and Government benefit from a better structure for the care of entrepreneurs, and the generation of new ventures, as well as, the local government owns more collection with the presence of the entrepreneurs and investments at the local level.

In terms of education, the state has acted by the Education Secretariat and the Research Support Foundation.

An individual reminder is the Human Resources Training Program, which is designed to support the training and qualification of human resources of the institutions and entities of the direct and indirect public administration of Minas Gerais State. These institutions should dedicate to the activities of science and technology (research, teaching and technical-scientific services), in terms of paragraph 3 of article 211 and sole paragraph of article 212 of the Constitution of the State of Minas Gerais, amended by Constitutional Amendment 17/95.

In addition, at the elementary and secondary level, the Education Department has been putting into practice the digitization of education. This program offers access to technology for students of the state network, having in two years more than 145 million reais for the purchase of more than 45 thousand computer equipment for all state schools, the 47 Regional Superintendences of Education (SRE), and the State Board of Education.

Also in 2015 and 2016, more than R\$ 24 million were invested in state schools in the logical and electrical network infrastructure required for the operation of these equipments. By the end of 2017, 95% of state schools had access to the internet, both in the computer room and in the administrative sectors.

Another measure is the Polite Schools of Multiple Education (Polem). This is one of the strategies of the Integral and Integrated Education Policy, implemented in August 2017 by Decree 47.227. At the first moment, there are 58 Polem Schools throughout the State, being 44 of High School in Full Time. In total, 9,640 students will benefit, but the goal is to expand to 268 Polem Schools and 30,000 attended directly in the Polem at the end of 2018.

For the selection of these units that began in August 2017, the criteria were: one school by development territory; schools that have activities in Integral Education in the formative axes of Sports and Health and of Culture and Arts and that simultaneously offer Elementary School (Final Years) and Secondary Education and that they have immediate possibility to initiate implantation of the actions of entrepreneurship and vocational training aimed at high school students.

In addition to these programs in vocational education, the number of places for technical courses offered by State schools in the State has increased by 150% in the last two years, from 16 thousand to the unprecedented number of more than 44

thousand enrollments. There are 249 state schools offering professional education, serving 189 municipalities of the State. The volume of investments also increased significantly: from R \$ 4.5 million in 2016 to R \$ 26 million in 2017, an increase of approximately 480%. For the year 2018, the forecast is to open up to 50 thousand new places and reach the total of 300 schools.

Currently, 28 courses are offered in various modalities that prepare the young person and the adult for new opportunities that arise with the development of the economy. Among them: Administration, Community Health Agent, Cooperativism, Nursing, Informatics, Internet Informatics, Logistics, Massotherapy, Marketing, Human Resources, School Secretary, Secretariat, Public Services and Real Estate Transactions. The duration of the courses is one year and a half, divided into three modules.

These courses are free and targeted to high school public school students or young people and adults who have completed high school in public schools.

These courses are free and targeted to high school public school students or young people and adults who have completed high school in public schools. The process of continuing education for the various professional segments and careers of Basic Education in Minas Gerais is coordinated by the School of Training and Professional Development of Educators, linked to the Sub secretariat of Basic Education.

In order to offer the qualifications in a practical and accessible way, considering the contingent of professionals of the state network and the geographic dimension of the mining territory, the Training School bets more and more on the use of Information and Communication Technologies (ICT) as a resource for orient, disseminate and enhance the formative processes in schools and in the state system as a whole.

The actions, materials and digital tools that organize the training policy of the SEE/MG are gathered in the Portal of the Training School. In this portal the educational community is referred to the Interactive School, the Virtual Learning Environment - AVA/moodle and the WEB TV. Each of these virtual resources has different interactive possibilities, which characterize them and define their applicability.

All available technologies and new media are used to strengthen and consolidate Distance Education (EaD), a mode in which the ESS relies as a way to expand and enable training to the largest possible contingent of servers.

The consequence of these investments will be extremely positive in the long run as the level of education will improve, and the capacity of the faculty as well.

This will favor the formation of a contingent of skilled and able labor force to compete in the labor market, in addition to attracting future generations to the academic field and research development and vocational training.

It can be inferred that there is synergy of the future pulp manufacturing enterprise with the federal and state programs and actions presented. The economic dynamism of the state with the strengthening of industry and investments in education, institutional equipment and research and labor are propulsive springs in the region studied.

Considering also the geographical location favorable to development since Minas Gerais is in the center of an area that concentrates about 2/3 of the Brazilian production and near the big business centers and near to heavily industrialized regions of the country. Access is easy to some of the main Brazilian cities, such as São Paulo, Rio de Janeiro, and the federal capital, Brasília.

The same happens with the main Brazilian ports, such as Santos, Rio de Janeiro, Paranagua and those located in the Port Complex of Espirito Santo.

The pulp mill is compatible with the actions and programs promoted by the federal and state public power, with repercussions at the municipal level.

Considering the latent synergy between plans and programs and the enterprise, it is vitally important that the state secretariats mentioned here and others of equal importance be signed, aiming to consolidate and strengthen their participation in the local economic scenario.

Likewise, the entrepreneur should also seek to distribute the benefits of his enterprise, implementing actions in partnership with these and future governmental initiatives, enhancing the positive effects of his presence in Indianópolis.

Therefore, no impediment to the plant in relation to the government plans discussed herein is foreseen, and it is considered compatible with these, in compliance with CONAMA Resolution 001/1986.

6.2 Legal Aspects

This chapter aims to bring the relevant legal aspects about installation of a dissolving pulp mill of the LD Celulose, covering the project design, implementation and operation phase of the enterprise, highlighting the mechanisms for implementing the legal framework for the legal feasibility of this pulp mill.

It is necessary that the environmental licensing process deal with the main legal instruments of environmental protection of use and protection of environmental resources, as well as, it requires the analysis of compatibility with the plans and programs already proposed in the region (Article 5, paragraph IV of CONAMA Resolution n. 001/1986).

The analysis of legal aspects focuses on the main federal, state and municipal laws applicable to the installation and operation of the LD Celulose mill, focusing on licensing and other standards for the use, protection and conservation of natural resources, land use and occupation, solid waste, atmospheric emissions and effluent discharge.

At the end of the chapter, it is performed an analysis of compatibility of this project with Government Plans and Programs proposed and under execution in the area of influence of the enterprise. The compatibility assessment of synergies is discussed at different levels, as determined by CONAMA resolution n. 001/1986

6.2.1 Environmental Licensing

The suitable instrument to obtain environmental permit by environmental law for this pulp mill is Environmental Impact Assessment and Environmental Impact Report (EIA/RIMA, in Brazilian Law).

The purpose of this chapter is to indicate the legal obligations of the federal, state and municipal regulatory framework, indicating what should be observed and addressed by the entrepreneur, and also indicate which ones are related to the implementation and operation of this enterprise.

6.2.2 Licensing of impact generator activities

The environmental licensing of activities already exists in several countries and in particular case of Brazil its origin is based on National Environment Policy Act of 1969 of United States of America, which inspired Brazilian lawmakers who created Federal Law n. 6938/1981 (National Environment Policy - PNMA).

The PNMA regulated by Federal Decree n. 99274/90 established the need of EIA/RIMA for effective and potentially polluting projects to submit to the previous licensing, for the construction, installation, expansion and respective operation. Licensing is an administrative process that occurs before the Public Authorities. In the case of environmental impacts, an organ of the National System of the Environment - SISNAMA, represents the public administration. In this case, SUPPRI belongs to SISNAMA.

The mentioned decree establishes the environmental licenses that are issued (article 19):

- I. Preliminary License (LP), in the preliminary phase of the planning of the activity, containing basic requirements to be met in the phases of location, installation and operation, observing the municipal, state or federal plans of land use;
- II. Installation License (LI), authorizing the start of implementation, according to the specifications of the approved Executive Project;
- III. Operating License (LO), authorizing, after the necessary checks, the beginning of the licensed activity and the operation of its pollution control equipment, according to the provisions of the Previous and Installation Licenses.

The selection of projects submitted to environmental licensing is due to its features and peculiarities, and particularities to its impacts that are really or potentially generated. Thus, technical studies are carried out to understand, identify and evaluate the impacts on the natural environment and on the existing infrastructure in the area of influence of the project.

The EIA/RIMA follows specific rules that provide the instruction for the preparation of environmental studies, which will support the analysis by an agency of SISNAMA, based on the evaluation and comparison of the previous situation (without the enterprise) with the implementation and operation of the enterprise.

This EIA/RIMA will provide the subsidies to the environmental agency of SISNAMA in accordance with CONAMA resolution 001/1986. The present environmental study has the following objectives:

- To instruct the process of request of Preliminary License (LP) for the enterprise that claims to be installed in Minas Gerais;
- Direct the analysis and provide subsidies to SUPPRI to analyze the LP request;
- Comply with environmental law;
- Evaluate the environmental and locational feasibility of the enterprise;
- To work as environmental management tool of pulp mill.

The EIA/RIMA development and its content have fundament on the Federal Constitution dated October, 1988 (article 225, §1st, IV), which creates the constitutional due to carry out and present EIA/RIMA for projects that effectively or potentially can generate significant environmental impacts. Besides are observed guidelines established by sparse law: resolutions CONAMA 001/1986 and CONAMA 237/1997.

The law of Minas Gerais has rules regarding environmental licensing, with criteria for framing and specific procedures to be adopted, such as location, size and degrading potential, based on the typology.

The main standard of material law that governs this matter is the normative deliberation COPAM 217/2017, which deals with environmental licensing in Minas Gerais:

Art. 1 The environmental licensing framework and procedure to be adopted will be defined by the relation of the location of the activity or enterprise, with its size and pollutant / degrading potential, taking into account its typology.

Sole paragraph. Environmental licensing should ensure public participation, transparency and social control, as well as the preponderance of public interest, speed and process economy, prevention of environmental damage and integrated analysis of environmental impacts.

In article 2, the normative deliberation COPAM 217 defines that the classification in classes 1 to 6 are criteria to carry out the licensing of the activity.

Art. 2 The activities and enterprises listed according to potential pollutant/degrading, size and location criteria, whose classification is defined in classes 1 to 6, are subject to environmental licensing at the state level.

(COPAM, 2017 – emphasis added)

The screened enterprise, according to the normative classification (normative deliberation COPAM 217/2017), receives the terminology C-01-01-5 and is considered Class 6.

For legal and procedural purposes, this EIA/RIMA submitted to SUPPRI covers the Enterprise Characterization.

The main purpose of this EIA is to provide information about the specific characteristics of the environment and to identify the impacts arising from installation and operation of the pulp mill and associated infrastructure (road and transmission line) for which LD Celulose requires the prior environmental license (LP).

After described the environmental impacts, the basic environmental plans and environmental mitigation and control measures are presented to prevent or mitigate the negative environmental impacts resulting from the implementation and operation of the industrial unit of the LD Celulose.

With the evolution of environmental law, since the issue of the national environmental policy, there have been complements in the regulatory framework such as the publication of CONAMA Resolution 001/1986, Federal Constitution in 1988, and improvements in federal law in general.

The development of the national regulatory framework adjusts environmental licensing and its operationalization at the national level through supplementary law n. 140/2011.

Article 2:

(...)

I - environmental licensing: the administrative procedure designed to license activities or undertakings that use environmental resources, effectively or potentially polluting or otherwise capable of causing environmental degradation. "

(BRAZIL, 2011 - emphasis added)

As stated in the start of this item, the national environmental policy has its inspiration in the United States homonymous law act and was the first norm to require environmental impact assessment:

Article 9 - They are Instruments of the National Policy of the Environment:

(...)

III - the evaluation of environmental impacts;

IV - the licensing and review of activities that are effective or potentially polluting;

(BRAZIL, 1981. Emphasis added)

Impact assessment is of extreme importance, as will be noted in a specific chapter, as it presents the predictable consequences of the phases of installation and operation of

the enterprise and details the methods to mitigate impacts, as well as manage risks arising from the enterprise with specific plans.

The national policy determined to evaluate environmental impacts (Article 9, III and IV) and created an institutional framework: the National Environmental System - SISNAMA.

SISNAMA has the purpose of gathering the environmental agencies responsible for environmental licensing in the three levels of government, in a harmonious way and in accordance with the competences established recently by supplementary law 140/2011. Considering the legal harmony, the agency in charge of the environmental licensing of this pulp mill of LD Celulose is SUPPRI.

On a complementary basis, reference is made to CONAMA Resolution 237/1997, which also regulates environmental licensing through the EIA/RIMA:

Article 3 – The environmental license for undertakings and activities considered to be effective or potentially causing significant environmental degradation will depend on a previous environmental impact study and its environmental impact report (EIA / RIMA), which will be publicized, public hearings, when applicable, in accordance with the regulations.

(BRAZIL, 1997 – emphasis added).

The CONAMA Resolution 237/1997 also presents an Annex with the list of activities subject to licensing, in the same way as CONAMA Resolution n. 001/1986. Both are representative.

Regarding the competences for environmental licensing, it is important to observe some relevant aspects brought by supplementary law 140/2011.

Supplementary Law 140/2011 disciplined the licensing procedures and harmonized competencies in accordance with Articles 7, 8 and 9, which are discussed below.

6.2.3 Environmental Licensing and Shared Competence

The State of Minas Gerais has consolidated its legal framework and has a governmental structure that is able to provide the necessary margin of safety for entrepreneurs and civil society. This is possible with the organization of competences provided in the supplementary law mentioned.

This combination of organized regulatory framework, qualified institutions and licensed industrial and commercial sectors contributes to a favorable situation, in particular a series of federal and state plans and programs in execution and implementation in the state.

The state-level regulatory environment complements federal law and makes it possible to operationalize between agencies and entities at different levels of government. Thus determines the Constitution of the State of Minas Gerais:

Article 214. Everyone has the right to an ecologically balanced environment, a common good used by the people and essential to a healthy quality of life, and it is the duty of the State and the community to defend and conserve it for present and future generations.

Paragraph 1 - In order to ensure the effectiveness of the right referred to in this article, the State has the following responsibilities:

(...)

IV - to require, pursuant to the law, prior consent of the state environmental control and policy body, to initiate, expand or develop activities, construction or remodeling of facilities capable of causing degradation of the environment in any way, without prejudice to other legal requirements, preserving industrial secrecy;

(MINAS GERAIS, 1989 – emphasis added).

For this project of pulp mill and associated infrastructure, competence is assigned to the State Secretariat for Environment and Sustainable Development (SEMAD), which through its bodies exercises the competence for licensing and inspection of activities potentially or effectively generator of environmental impacts.

SEMAD has other legal attributions to deal with related issues, such as: issuance of standards and authorizations complementary to the licensing, execution of inspection activities, control of activities that generate environmental impacts.

It is, therefore, through SISNAMA that interaction between federal entities (IBAMA) and sectional state agencies, as explained (federal law 6938/1981 - national environment policy) happens. The national policy created SISNAMA in order to distribute competencies at the state level. IBAMA is the "federal agency with supplementary licensing authority".

It means the state system defines the possibility of licensing in the federal, state or municipal levels; considering it shall happen in an alternative and never cumulative level. Consequently, it should be noted that the rules already commented on - CONAMA Resolution 237/1997 and Supplementary Law 140/2011 make it clear that licensing process only occurs on a single level.

Therefore, supplementary law n. 140/2011 confirmed that a single environmental licensing body will be responsible for the environmental licensing, reinforcing the normative forecast of the CONAMA resolution 237/1997:

Article 7. The ventures and activities will be licensed in a single level of competence.

(CONAMA, 1997 – emphasis added).

The state regulatory environment was recently prepared by the state environmental law (State Law n. 21972/2016), which establishes the State System of Environment. Through it, it establishes:

Art. 4 The purpose of the Secretary of State for Environment and Sustainable Development - SEMAD - is to formulate, coordinate, execute and supervise public policies for the preservation and recovery of environmental resources, aiming at sustainable development and improvement of the environmental quality of the State, competing for: (...)

V - guide, analyze and decide on environmental licensing process and authorization for environmental intervention, except for COPAM competencies;

(Minas Gerais, 2016).

Therefore, in case questions arise out of the interpretation of this, the environmental law is clear about this matter: only one environmental agency - in one level of Administration (in this case, Minas Gerais State, SUPPRI) will be responsible for the licensing process of the installation and operation of pulp mill.

Competency sharing exists and its objective aims to SISNAMA bodies to deal with it and interact with other public administrative institutions (example: institutes for the defense of historical heritage, management of water resources, land use, protected areas, etc.).

It means that some activities submitted to environmental license procedure depend of interaction and input of other agencies and departments, once these agencies release decisions of their competences (example: ICMBIO if there is interference in a federal national park; FUNAI if there is interaction with Indian areas or its communities; IPHAN if there is relation with cultural or heritage matters). They will be, within the limits of their attributions, invoked to position themselves on the interactions of a project with the subject of their competence and to contemplate the impacts of the activity.

For this EIA/RIMA, the direct impacts of the pulp mill are restricted to the Indianópolis and Araguari, both located in Minas Gerais State.

The scope of the radius of impact is a determining factor for the competence to be attributed to the agency of Minas Gerais (SUPPRI), which will be responsible for the licensing, since its impacts do not exceed the limits of the state of Minas Gerais.

Shared competence is based on the concept of environmental licensing:

"This is an administrative procedure by which the Public Administration, acting through secretariats, agencies and institutes, competent entities, analyzes a proposed project, based on a technical study whose scope will vary according to the complexity of the enterprise."

In this sense, this study is presented to SEMAD (through SUPPRI) containing subsidies for this State Department to evaluate the application for a prior environmental license for the implementation and operation for the pulp mill.

Therefore, Article 9 of federal law 6938/1981 becomes clear when determining the environmental impact assessment as one of the tools of the PNMA, since this EIA/RIMA serves as a basis for the SUPPRI to analyze the application for environmental license formulated by the LD Celulose.

Normative deliberation COPAM 217/2017 establishes:

Article 24. The administrative processes of environmental licensing appropriately formalized will be analyzed by the competent administrative unit of State Secretariat for Environment and Sustainable Development - SEMAD.

It is confirmed therefore, that environmental law has implemented the principle of prevention, by requiring environmental licensing and impact assessment, considering the areas of influence of the intended undertaking.

SUPPRI will define the environmental conditions and environmental control measures to be adopted and the environmental conservation criteria with the guidelines for implementing and operating the dissolving pulp industrial unit.

It is worth mentioning that the present licensing process through EIA/RIMA is appropriate for the planned enterprise of LD Celulose, and besides that it having been followed the instruments of implementation of this principle, such as:

- Ecological mapping and inventory;
- Integrated planning;
- Land use planning; and,
- Environmental licensing.

The normative deliberation COPAM 217/2017 confirms the alleged:

Article 8 - The following are the environmental licensing modalities:

I - Three - phase Environmental Licensing - LAT: licensing in which the Prior License - LP, the Installation License - LI and the Operation License - LO of the activity are granted in successive stages.

The law that establishes the state environmental system also defines the three-phase licensing applicable to the design of the pulp mill:

Article 18 - In three-phase Environmental Licensing, the stages of environmental feasibility, installation and operation of the activity or enterprise will be analyzed in successive phases and, if approved, the following licenses will be issued:

I - Preliminary License - LP (...) with the establishment of the basic requirements and the conditions to be met in the next phases of its implementation;

II - Installation License - LI (...) according to the specifications

contained in the approved plans, programs and projects, including environmental control measures and other conditions;

III - Operation License - LO (...) after verification of the effective compliance with statements in the LP and LI, with the environmental control measures and conditions determined for the operation and, when necessary, for the deactivation.

(Minas Gerais, 2016)

The environmental licenses to be issued are Administrative Acts. It means that each one of the licenses issued by SUPPRI will establish environmental control that shall be obeyed by LD Celulose.

This administrative act depends of the interactions and interface with other entities, institutions and secretariats. Consequently, it's called an entailed act: when the legal requirements are met by LD Celulose, the environmental license is issued.

As stated, for the issuance of the environmental license, procedures related to sharing of competence are required, as follows:

Granting to Use Water Resources

LD Celulose pulp mill will be located in the Indianópolis municipality (industrial site) and Araguari municipality (water intake and effluent disposal), at Araguari river basin. The operation of the enterprise will require the use of water resources for production process. Araguari river will be used to get raw water and also be used to launch treated effluents, as described in the characterization chapter. The water grant will be filed before IGAM (or SUPPRI).

In the present case, the grant to be requested by the entrepreneur is an important element for the licensing, since both the abstraction of water and the discharge of treated effluents are technical and environmental justification of the feasibility of this project.

In the license phase, the request must be submitted to IGAM (or SUPPRI), in order to enable the use of water resources for the future phases: implementation as well as operation.

It is emphasized that the ownership of the permit remains under the competence of SEMAD, remarking that complementary action of other entities, such as IGAM in the management of water resources, is necessary.

Consultation regarding protected areas – Parks & Recreation

Another topic involving competence sharing between different institutions may also result from legal protection areas. The EIA/RIMA shall evaluate the existence of protected areas (parks & reserves or similar areas) in the region of influence.

In case of interference, environmental law disposes about the manifestation of the Management Council of Parks and Reserves:

Art. 20. It is incumbent upon the conservation unit council:
(...)

VIII - manifesting about work or activity potentially causing impact on the conservation unit (reserve/park), its buffer zone, mosaics or ecological corridors.

(BRAZIL, 2002)

In the same direction as has been demonstrated, the license remains under the competence of SEMAD for this pulp mill. The Parks & Reserves Management Council if necessary issues its opinion about the impacts generated by the enterprise to the conservation unit, and the terms of its opinion will be incorporated by SEMAD in the final opinion when the environmental permit will be issued.

This EIA/RIMA shall evaluate the existence of conservation units in the area of direct influence or its buffer zones, so that it is possible to consider the impacts on such protected areas according to the respective Management Plan.

The objective is to evaluate the exact impact on integral protection units or to verify if the location occurs in the buffer zone of the Conservation Unit, or in a range of 3 km from its surroundings, when there is no buffer zone established by the Management Plan. It is important to note that urban areas are excluded from this consideration.

Therefore, the sharing of competence on which this chapter of the EIA/RIMA addresses this issue demonstrated the possible operation of the Conservation Unit management council if there were conservation units or areas subject to federal law n. 9.985/2000 (approved by the State Institute of Forests - IEF).

Consultation to the Municipality of Indianópolis

The pulp mill covers the municipality of Indianópolis and Araguari, so that these Municipalities participate of the environmental licensing procedure for the implementation of the pulp mill.

The Municipality plays the relevant role from the locational point of view, since it is the authority responsible for the management of land use and occupation within its limits.

As a complement to the other procedures carried out before SEMAD and other bodies (granting of water resources in the IGAM, for example), it is mandatory that the Municipality of Indianópolis and Araguari evaluates the installation and operation of the pulp mill.

The entrepreneur must anticipate the certificate of use and occupation of the land, which certifies that his activity is in accordance with the municipal regulations according to Article 10, VIII, and Paragraph 1 of CONAMA Resolution 237/1997.

The environmental license of the pulp mill depends on the agreement of the Municipal Executive regarding the use and occupation of the land. The future operation of the pulp mill shall be in accordance with environmental conditions and observe impact mitigations.

Supplementary law n. 140/2011 defines:

Art. 3º. The following are the fundamental objectives of the Union, the States, the Federal District and the Municipalities, in the exercise of the common competence referred to in this Complementary Law:

I - protect, defend and conserve the ecologically balanced environment, promoting decentralized, democratic and efficient management;

II - ensure the balance of socio-economic development with the protection of the environment, observing the dignity of the human person, eradicating poverty and reducing social and regional inequalities;

III - to harmonize the administrative policies and actions to avoid overlapping of action among federative entities, in order to avoid conflicts of attributions and to guarantee an efficient administrative action;

IV - guarantee the uniformity of the environmental policy for the whole country, respecting the regional and local peculiarities.

(BRAZIL, 2011 – emphasis added)

The chosen site predominantly covers the municipality of Indianópolis, and Araguari takes the route of pipelines. The Municipality of Indianópolis does not have any regulation of industrial districts, or specific provisions on the use and occupation of the soil by manufacturing enterprises, but it has the capacity to discipline by its organic law.

In the preliminary conclusion, it is confirmed the need to issue a municipal permit by the Municipality of Indianópolis, declaring the suitability of land use and occupation (CONAMA resolution 237/1997, article 10, VIII, §1).

6.2.4 Environmental Permits

Licensing is an administrative process and is a chain of several linked administrative acts, which result on: environmental permits. The entrepreneur LD Celulose aims to obtain the environmental permit according to the project phase.

In the present licensing through the EIA/RIMA, the following environmental licenses will be issued:

Preliminary License (LP)

This is the first license, which is granted during the planning phase of the activity. The prior license is intended to approve the locational feasibility of the project and its general conception (concept); its purpose is to give the guarantee on the insertion of the enterprise considering the area of influence and its economic, environmental and social components. The LP establishes conditions that must be met as requirements for the next stage: the phase of installation of the activity. The chosen alternative covers the municipalities of Indianópolis and Araguari and will be considered by SEMAD, evaluating the compatibility with the use and occupation of the Indianópolis soil.

Installation License (LI)

LI is the second stage of the licensing process, through which it is possible to carry out the intervention in the physical environment (beginning of civil works such as harvesting, earthworks, foundations) and interventions at biotic environment (vegetation suppression, collect and research of fauna/flora). The activities foreseen in each of the environmental licenses are accompanied by environmental constraints and follow the prescription of the environmental plans and programs foreseen in the EIA/RIMA and contained in the LI.

Operating License (LO)

The operating license terminates the ritual of environmental permit material process, and its purpose is to allow the start of operations of the enterprise.

This license is the administrative act that allows the entrepreneur to perform the activity. Its issuance is directly linked to compliance with the conditions of the previous license (LI). Its legitimacy, in most cases, is linked to the operation under supervision, during a period in order to verify its correct operation.

The legal nature of the abovementioned environmental licenses is a "entailed administrative act", and its issuance and renewal is bound to meet the conditions.

The project in question, according to the COPAM n. 217/2017, its locational and classification criteria, the licensing will occur through three-phase environmental licensing (LAT).

6.2.5 Deadlines for environmental permits

The issuance and deadlines for environmental permits are linked to the project phases, and specified federal level (CONAMA Resolution n. 237/1997). In the present case, state law establishes deadlines, according to the Single Annex - Item 6 of the normative deliberation COPAM n. 217/2017:

Preliminary License - LP - It certifies the environmental feasibility of the activity or enterprise in terms of its design and location, with the establishment of basic requirements and conditions to be met in the next phases of its implementation and has a validity period of five) years.

Installation License - LI - Authorizes the installation of the activity or enterprise, according to the specifications contained in the approved plans, programs and projects, including environmental control measures and other conditions, and has a validity period of six (6) years.

Operating License - LO - Authorizes the operation of the activity or enterprise, after verifying the effective compliance with what is stated in the LP and LI, with the environmental control measures and conditions determined for the operation and, when necessary, for the deactivation and has a term of validity of 10 (ten) years.

(MINAS GERAIS, 2017 - emphasis added)

Environmental licensing deadlines are important elements for the scheduling of engineering project activities, which is why licensing and engineering must be in tune, not causing delays in the implementation of civil works, or delays in the delivery of environmental condition reports.

The licensing of this pulp mill is three-phase process, with each environmental license being issued in the rite prescribed by COPAM n. 217/2017.

After the issuance of the preliminary license, the entrepreneur must comply with the requirements and conditions of SUPPRI, so that it can consider the proposed locational alternative and the conceptual aspects of the project.

Then, with the issuance of the installation license, environmental control measures and other measures will be established to mitigate and monitor the impacts. The complete synchronization between projects and production of reports is important for the implementation and monitoring of mitigation measures by SEMAD. Once the legal requirements are fulfilled, the permit is issued.

6.2.6 Regulatory Framework

Minas Gerais is among the important states of the Southeast region, both for the historical formation and preservation of these roots, and for the vocation of its entrepreneur and generator of economic development. The state that has this ability to generate business and wealth stands out for mining and metallurgy, favored by the existence of deposits and its availability for extraction, industrial processing and social growth.

In fact, Minas Gerais regulates environment and created a legal and institutional framework able of evaluating the enterprises and their respective impacts associated with the plans and programs (public or private), as well as the direct and indirect investments resulting from these enterprises.

Minas Gerais is household to and will continue to hold investments of various natures, which makes this state auspicious for economic development, as well as for the institution of future government policies and plans, providing propulsion to existing and future projects such as LD Celulose.

To better understand environmental licensing and the environmental impact assessment tool, it is important to situate the historical framework of environmental licensing in Brazil.

The National Environmental Policy Act of US was the inspiring north for many countries, such as Brazil, to create their environmental systems.

The need to adopt the prevention of damages to the environment inspired the creation of Brazilian environmental legal order, generating changes in the decision-making process and in the consideration and evaluation of projects, with sectorial and environmental interfaces.

The mechanisms of implementation have developed over and over through the years, as already presented, so that the national environment policy in force in Brazil today led to the emergence of norms of programmatic content. This is possible because the pillar of the national environmental system is harmonious with other government plans and programs through interlinked sectorial policies.

The assessment of environmental impacts is gradually adopted in several countries with different degrees of complexity, and different means of approach according to the regulatory environment of each country. Thus, considerable progress has been observed since the second half of the twentieth century: it has come to be seen as a management tool, so that several countries and international organizations (especially financial entities, international and multilateral agencies) their decision-making processes.

The World Bank and its branches, European Investment Bank, and the National Bank for Economic and Social Development are examples of institutions that have adopted guidelines requiring environmental studies and impact assessments as prerequisites for granting major works and projects.

In order to keep up with global changes, Brazil has also required to equip its legal system and its agencies within SISNAMA, among them SEMAD of Minas Gerais, which has the legal and institutional tools with a complete set of advanced environmental norms.

The legal and regulatory framework of Minas Gerais allows it to enact legislation on environmental matters at the same level of quality as the developed countries, as exemplified by the State Environmental System of Minas Gerais (2016) and the normative deliberation COPAM 217/2017 that harmonized state legal framework.

Brazil instituted the pillar of its legal system, both seeking state preparing and outlining the first legal procedures for licensing activities, which at the beginning still carried the strong connotation of "command and control".

Historically, Federal Law n. 6.803/1980 (which dealt with industrial zoning in critical areas of pollution) determined the elaboration of an Environmental Impact Study (EIA) for the installation of certain enterprises such as nuclear industries, petrochemicals, etc.

These enterprises were mostly implemented by state-owned companies such as Eletrobrás, Telebrás and others. National policy (Federal Law No. 6.938 / 1981) has this programmatic content and creates the assessment of environmental impacts as an instrument of Brazilian environmental policy. Impact assessment is now required and applicable to public or private enterprises, whether industrial or non-industrial, urban or rural, and not only in industrial areas. It addresses the issue when it determines the assessment of environmental impacts as one of its instruments (Article 9, III). This allowed state environmental agencies to actually operationalize licensing.

Minas Gerais was the first State to enact legislation on conservation and preservation matters, with the entry into force the State Law n. 7.772 / 1980, which was published the National Environmental Policy itself (1981). Currently, the regulatory standard is the State Law n. 21972 / 2016.

It should be noted that Minas Gerais has institutional capacity before PNMA and SISNAMA, with a decentralized structure capable of providing permits and managing environmental policies. Establishes the National Environment Policy:

Article 6 - The agencies and entities of the Union, States, Federal District, Territories and Municipalities, as well as the foundations established by the Government, responsible for the protection and improvement of environmental quality, shall constitute the National System of the Environment - SISNAMA, so structured:
I - Superior Organ: the National Council of the Environment - CONAMA, with the function of assisting the President of the Republic in the formulation of directives of the National Environmental Policy;

(...)

IV - Sectional Bodies: the state organs or entities responsible for the execution of programs and projects and for control and inspection of activities that may degrade environmental quality;

(...)

Paragraph 1 - The states, in the sphere of their competences and in the areas of their jurisdiction, will elaborate supplementary and complementary norms and standards related to the environment, observing those that are established by CONAMA.

(BRAZIL, 1981 – emphasis added).

From a qualitative point of view, this decentralized structure privileges the human resources at environmental agencies in order to speed the analysis of environmental studies. This feature is especially notable in Minas Gerais, where socioeconomic development and environmental protection are priorities.

At the federal level, as already pointed out, the Constitution requires elaboration of an environmental impact study for enterprises that have a significant impact:

Article 225. All have the right to an ecologically balanced environment, which is an asset of common use and essential to a healthy quality of life, and both the Government and the community shall have the duty to defend and preserve it for present and future generations.

Paragraph 1. In order to ensure the effectiveness of this right, it is incumbent upon the Government to:

(...)

IV – demand, in the manner prescribed by law, for the installation of works and activities, which may potentially cause significant degradation of the environment, a prior environmental impact study, which shall be made public;

(BRAZIL, 1988 – emphasis added)

It should be noted that the term "activity may potentially cause significant degradation" should be understood as "an activity that can cause significant environmental impact". It means, there is a gap between environmental degradation and environmental impact.

The environmental impact is the result of human action, its intervention on the environment due to the exploitation of natural resources, resulting in impacts, which are subject to state control under environmental license procedure.

In the same sense, Minas Gerais law also protects the environment, when mentioned state law n. 7.772/1980, which outlines in article 8 the need for prior environmental licensing or authorization:

Article 8 - The location, construction, installation, expansion, modification and operation of undertakings and activities that use environmental resources considered as effective or potentially polluting, as well as those that may cause environmental degradation, subject to the provisions of regulation, will depend on previous licensing or environmental authorization of the State Environmental Policy Council - COPAM.

(MINAS GERAIS, 1980 - emphasis added)

Environmental degradation may occur due to events disconnected to human action or due to lack of control of a particular activity. In the latter case, there is the known case of environmental damage, which must be repaired in the forms provided by law (ANTUNES, 2004).

The regulatory framework has a legal mechanism for this hypothesis: Article 5, paragraph 6 of federal law n.7347/1985, mentioning settlement agreement (TAC, in Portuguese).

Also state decree n. 44.844/2008 determines the possibilities of this agreement. For example, Article 70, paragraph 1, provides for TAC in the event of failure to comply with measures imposed in an assessment notice:

Paragraph 1 - The competent agency shall indicate the appropriate measures and deadlines for the cessation of pollution or environmental degradation, by means of a Self-Inspection, Opinion or Settlement Agreement, with the participation of the entrepreneur who will be responsible for proving the regularization of the situation.

(MINAS GERAIS, 2008)

This possibility is remarkable, since simple prohibition and imposition of exorbitant fines do nothing to repair environmental damage. The law of Minas Gerais is rich in this sense, and awards the possibility of settlement agreement in cases of embargo of activities:

Art. 74. The embargo of work or activity shall be determined and effected, immediately, in the cases provided for in this Decree.

§ 1 The embargo of work or activity shall prevail until the offender takes the specific measures to stop or correct the pollution or environmental degradation or firm Settlement Agreement with the environmental body, with the conditions and deadlines for operation until their regularization.

(MINAS GERAIS, 2008 - emphasis added)

Likewise, before the possibility of suspending activities, the possibility of celebration of new settlement of adjustment for cases of relapse is also allowed:

Art. 76. The penalty of suspension of activity will be applied by the accredited server, in the hypotheses in which the offender is engaging in activity without the license or the competent environmental authorization and may be applied in cases of second recidivism (relapse) in violation punishable by a fine.

(...)

Paragraph 4. The Settlement Agreement referred to in paragraph 3 shall be signed for a maximum term of twelve months, extendable once, for up to the same period, provided that environmental regularization has been provided.

(MINAS GERAIS, 2008 – emphasis added)

According to the experience of many license procedures, CONAMA starts to edit other standards covering different matters such as: process publications, public hearings, limits of atmospheric emissions, discharge of effluents, framing of water bodies, etc.

The CONAMA Resolution n. 237/1997 provides for environmental licensing procedures, license terms and also EIA/RIMA.

Art. 3 - The environmental license for undertakings and activities considered effective or potentially causing significant environmental degradation will depend on previous environmental impact study and related environmental impact report (EIA/RIMA), which will be publicity, guaranteed the holding of public hearings, when applicable, in accordance with the regulations.

(CONAMA, 1997).

In addition to the aforementioned provision, which gives the competent environmental agency the proper competence to define the depth and scope of the study, this activity that will be carried out at the LD Celulose plant is among those activities listed in Annex 1, such as:

Industry of Paper and Pulp

- manufacture of pulp and mechanical pulp
(CONAMA, 1997 – emphasis added).

The transmission line and road are also listed in CONAMA 237/1997, but they can be included in a single project turning this project in a Greenfield, demanding the performing of EIA/RIMA.

6.2.7 Comments to new normative deliberation COPAM 217

Minas Gerais established the new law provision to rule Environmental studies as mentioned. The Normative Resolution COPAM n. 74/2004 classified the enterprises using the following criteria:

- The general potential pollutant of the activity based on the individualities of the activity and the environmental circumstances: air, water and soil and;
- Size, varying according to the unit of measurement adopted for each activity.

In the past, it was carried out a joint analysis about the size of the activity and its polluting potential, generating a classification of 1, 2, 3, 4, 5 or 6. The second step was to define the type of environmental licensing applicable to the process.

But, the new deliberation COPAM 217/2017 revoked the former law as will be succinctly pointed.

The normative deliberation COPAM n° 217/2017 brings new criterion from the environmental point of view, which is the inclusion of the locational criterion highlighting more importance in the definition of the modality of environmental licensing. The locational aspect is considered from the relevance and sensitivity of the environmental aspects (components) of the intended place, considering the characteristics of the site.

The activity is analyzed, its potential pollutant, its size and locational criteria are verified, being able to later identify the applicable environmental licensing modality, according to Table 3 (Single Annex) of the normative deliberation COPAM 217/2017.

What happens is the beginning of a new set of considerations for licensing based on conditions conjugated differently, using three tools to evaluate the enterprise, instead of two tools used by the old COPAM normative. Consequently, the locational criterion becomes part of the framing process.

The locational criterion considers the relevance and sensitivity of the affected environmental component, assigning a weight of 0 (zero) and 2 (two) according to the characteristics of the component. A first observation that deserves attention is that the locational criteria of Table 4 of the COPAM 217 deliberation do not imply in restriction or impediment exemplified in Table 5. They also do not imply in amplification or increase of the license procedure.

The use of locational criteria enriches the licensing matrix, since from the point of view of the locational environmental impacts the previously considered simple enterprise receives a realistic treatment that considers the region in which it is inserted. Thus, it will be submitted to more detailed studies, if it affects conservation unit, for example.

Therefore, the location is determinant factor considering similar enterprises with potential pollutant and size have different licensing processes due to their location. This is compatible with the guidelines provided by the federal and state environmental compensation standard.

Minas Gerais innovates and adopts a strategic environmental planning for its ventures, since it is known that environmental licensing so that activities can insert in their evaluation and planning the locational criteria. With this consideration, ventures can be installed in less demanding locations with less environmental sensitivity, avoiding areas that are more environmentally sensitive, and which require more in-depth studies.

It is understood that the new framework has relevance allowing improvements and agility in the process and avoiding compensations for entrepreneurs.

Environmental Impact Assessment

According to CONAMA regulations, and specifically normative n. COPAM 217/2017, the activities subject to licensing are given codes as determined by the state. The classification considers the size, nature and location of the activity.

The license in question follows normative deliberation COPAM nº 217/2017. This pulp mill receives code "C-01-01-5 Manufacture of pulp and/or mechanical pulp".

The associated infrastructure (transmission line and road) is considered sheltered under that main license procedure. This is in accordance with the provisions of mentioned normative deliberation COPAM n. 217/2017:

Art. 5 - The framework of the enterprises and activities in classes will be according to the matrix of conjugation of the potential contaminator and size organized in Table 2 of the Single Annex of this Normative Deliberation.

Sole paragraph - Enterprises that seek the concomitant regularization of two or more activities included in the Listing of Activities in the Sole Annex of this Normative Deliberation shall be regularized considering the framework of the activity of the highest class.

(COPAM, 2017 – emphasis added)

This Environmental Impact Assessment was performed in accordance with the orientations and guidelines present in the “Termo de Referência para Elaboração de Estudo de Impacto Ambiental (EIA) e Relatório de Impacto Ambiental (RIMA) – EIA/RIMA – GER001”, defined by Fundação Estadual de Meio Ambiente (FEAM), with some adjustments, as well as based on Resolução CONAMA 01/1986 and Resolução CONAMA nº 237/1997.

In terms of delimitation of the impact range, it is necessary to present the classification of the area directly affected and directly affected (ADA and AID) regarding the predominant land use, areas of legal reserve, presence of water bodies, need for suppression of vegetation and intervention in APP (permanent preservation areas), types of use of the water body that receives the effluent from the enterprise, types of use of the area of influence, characteristics of the land where the enterprise is located, location plan, relationship between the company and the community in the area of influence.

The description of the production process shall be clear and explain the environmental and main improvements of equipment and systems used by LD Celulose, demonstrating the state of the art. It should address the efficiency on use of natural resources and use of raw materials and inputs (water use and treatment systems, generation and use of electricity, cooling systems, air compression, heat generation) as well as externalities such as effluents or waste.

Finally, the EIA/RIMA shall present the positive environmental impacts of the enterprise and its negative impacts, as well as the mitigation measures to reduce the externality of the pulp mill.

If licensing is considered a way of state control of activities, due to the impacts generated, can be understand its continuity with its environmental management (present in the Federal Constitution and Federal Law No. 6938/81), enshrining the principle of prevention. The objective of environmental licensing is to prevent activities from causing pollution, and to create prevention and control mechanisms for negative environmental impacts, managing the exploitation of natural resources that have an economic feature.

License procedure is one of the mechanisms of implementation of the prevention principle. After its development and presentation to the environmental agency and society, is relevant to spread knowledge and generate debate about its impacts to the region influenced by its implementation and operation. In order to illustrate how this mechanism occurs, the following is a summary of the process of the EIA/RIMA developed herein, currently regulated by state law 21972/2016 and state decree 46953/2016. Once the EIA/RIMA has been prepared, it will be presented to the SUPPRI Regional, which is linked to COPAM:

Article 3. The purpose of COPAM is to deliberate on guidelines and policies and to establish regulatory norms and techniques, standards and other operational measures for the preservation and conservation of the environment and environmental resources.

(...)

III - to decide, through its technical chambers, on the process of environmental licensing of activities or undertakings:

medium-sized and high polluting potential;

large and medium polluting potential;

large and potentially polluting potential;

(MINAS GERAIS, 2016)

The State Law 1 establishes:

Art. 14. The purpose of the State Council for Environmental Policy - COPAM - is to deliberate on guidelines and policies and establish regulatory norms and techniques, standards and other operational measures for the preservation and conservation of the environment and environmental resources:

(...)

III - to decide, through its technical chambers, on the environmental licensing process of activities or undertakings: a) medium-sized and with great potential for pollution; b) large and medium polluting potential; c) large and potentially polluting potential; d) in cases where there is suppression of vegetation in the stage of medium or advanced regeneration, in priority areas for the conservation of biodiversity;

(...)

Paragraph 2. In cases where the environmental licensing process covers activities of competence of two or more specialized technical chambers, the process shall be submitted to the technical chamber whose competence includes the main activity, as declared by the entrepreneur.

(Minas Gerais, 2016)

With the support of COPAM, a Technical Opinion is prepared, presenting the necessary considerations regarding the granting of license application, based on the expertise of one of COPAM's Technical Chambers (CID). The second paragraph is essential so that this enterprise is licensed under a Technical Chamber that will be in charge of this process.

Upon the issuance of the prior license, the conditions determined by SUPPRI shall be executed.

The national policy instruments related to the LD Celulose project are the following:

- The environment belongs to roll of natural rights, it means the community without the possibility of pointing out a specific holder. It is pointed out the duty-power imposed to the Administration and the to community to watch over the environment for the present and future generations – “intergenerational right”. (see section I).
- Rational and balanced exploitation of natural resources available in environment, with specific protection of environmentally relevant and representative areas (see section IV); to establish territorially protected areas, such as the Priority Areas for Conservation, thus defined by MMA as defined with regional peculiarities.

¹ State Law n. 21972/2016

- Control over activities that can generate significant environmental impacts on environmental resources, on a preventive basis - environmental licensing and routine inspection. Consider the imposition of sanctions and punishments in cases of reparation of injured property, in the forms of the law. Define economic ecological zoning systems (EEZ) of activities (see section V).
- The state of environmental quality must be monitored systematically by the Government and especially by environmental managers (see section VII).
- Special attention and attention should be paid to the recovery of degraded areas and the protection of other areas compromised with degradation (as per items VIII and IX).
- The principles of environmental education shall be observed, especially considering its interaction with the plans for monitoring impacts during the operation of the pulp mill and operation of the road and transmission line.
- Popular participation should happen through the necessary publicity of the studies and their conclusions and the exposure of the project to the public in public hearings.

6.2.8 Principles of Environmental Law related to the project

So far, environmental regulation has been identified identifying the main legal aspects of federal, state and municipal legal framework.

The following pages briefly presents the principles related to the legal aspects, to provide legal support for SEMAD in the process of analyzing this EIA/RIMA.

Sustainable development

It was analyzed the license procedure with an emphasis in the EIA/RIMA, as an instrument to installation the principle of prevention as a prerequisite to the implantation and operation of the pulp mill and its associated infrastructure, considered activities of significant environmental impact.

It is necessary for a complete analysis of this license procedure, analyze the other principles of Environmental Law that may apply to the LD Celulose project.

A project that contemplates a pulp mill with road and transmission line should be based on environmental, social and economic-financial assumptions. The characterization of the enterprise is verified by the economic, technological and environmental justifications that give support to the phases of planning, implementation and operation of the enterprise.

For the implementation of sustainable development, the association of economic and environmental justifications is essential. There should be the possibility of freedom of enterprise (it's a Brazilian Constitutional Principle), aiming to preserve environmental conditions for present and future generations.

Historically, the 1972 UN Convention (Stockholm, Sweden) was the foundation of the discussion of the planet's environmental limits if economic development did not assess its impact on the environment. A favorable environment was created to discuss the resilience of the planet, and the Bründtland Commission structured its concept: "development that meets present needs without compromising the ability of future generations to meet their own needs" (Bründtland, "Our Common Future Report").

The concept is based on the connection between economic feasibility and satisfaction of social and environmental needs; thus, the report "Our Common Future" followed the trend of associating social, scientific, technological, political, and cultural aspects to achieve what is called "sustained development". The report proposes a series of multidisciplinary measures to understand and solve challenges and to avoid environmental calamity.

This concept became relevant when the Club of Rome led by Dennis L. Meadows commissioned the "Growth Limits" report to the Massachusetts Institute of Technology (MIT) addressing resilience capacity of natural resources, proposing the use of the principle sustainable development to guide actions in the world, emphasizing that such resources are finite.

Twenty years after the UN Conference, the event known as "Eco-92" in Rio de Janeiro adopted sustainable development as a basic principle, in Rio Declaration (1992): "In order to achieve sustainable development, environmental protection must be an integral part of the development process and can not be considered in isolation from it".

The principle is centered on the equal of freedom of initiative and environmental protection.

The national environmental policy thus determines:

Art. 2º. The National Environmental Policy aims to preserve, improve and recover the environmental quality conducive to life, in order to ensure, in the country, conditions for socioeconomic development, the interests of national security and the protection of the dignity of human life.

(...)

Article 4 - The National Environmental Policy shall aim at:

I - the compatibility of social economic development with the preservation of the quality of the environment and the ecological balance;

(BRAZIL, 1981, emphasis added)

In practical terms, LD Celulose shall incorporate environmental, social, economic, legal and technological assumptions in this project and in the three mentioned phases.

The development of projects and activities shall consider the multidisciplinary evaluation of environmental, economic and social statements, endorsing "sustainability without compromising the capacity of future generations to meet their own needs" (Bründtland Report).

Prevention

This principle is mainly presented in the planning phase, when it was chosen the site in the municipalities of Indianópolis and Araguari. The process of site location brings together technological elements of the future operation of the enterprise, as well as the environmental aspects likely to undergo changes (environmental impacts). Regarding site location, are taken into account some concerns about impact mitigation:

- Traditional populations (Indian tribes, etc.);
- Communities, neighborhoods or villages;
- Permanent Preservation Area (APP);
- Ecological and biodiversity corridors;
- Protected Areas, Parks and Reserves;
- Priority Areas for Biodiversity Conservation.

The site choice is closely related to instruments of implementation of the prevention principle, like technical, social and environmental assumptions analyzed site choices and the significant impacts assessed.

The entrepreneur LD Celulose claims the environmental license, so that the enterprise shall adopt the best available technologies and best environmental practices, respectively BAT ("Best Available Technologies") and BEP ("Best Environmental Practices").

In relation to implementation and operation phases, special emphasis shall be given to this principle, regarding atmospheric emission standards and maintenance of air quality, human health care and safety and comfort. In the same way, shall be give special attention for discharge of effluents quality, quality standards on surface water bodies and groundwater.

The prevention principle is present in the planning, installation and operation phases.

Therefore, the location of the site in Indianópolis and Araguari is in accordance with the legal impositions and restrictions of use and occupation of the soil of this municipality. This is a legal imposition of resolutions CONAMA 01/1986 and CONAMA 237/1997.

In addition to the technical standards defined in the mentioned legal issues, public plans and programs implemented in the area of influence it will assessed to verify synergies with the activities of third parties (governmental or private sector), which will be included in the evaluation of impacts.

The LD Celulose pulp mill shall follow the environmental best practices already implemented mills in the world and its externalities will be treated within the perimeter of the plant. It means, the use of state-of-the-art technology is very allied to the principle of prevention and its mechanisms. The process chosen for the operation of manufacturing of pulp are the best available technologies and best environmental practices.

User-Pays Principle

Natural resources (water, forestry, atmospheric resources, etc.) are used for the purpose of generating wealth through products and services. This transformation leads to jobs, wealth and the impacts generation as consequences and many others. Thus, an enterprise that uses natural resources for any economic purpose, is incurring in the situations generating the user-pays principle. For this reason, we must speak of this inseparable relation between the terms ecology and economy already treated by PINHEIRO PEDRO (2003).

The economic profile is one of the fundamental pillars of sustainability, which is also based on the principle of user-pays principle. Considering the shortage and sensitivity of environmental resources, it is established by this principle that anyone who "uses resources of the environment should be burdened by this use of natural resources". Therefore, the text adopts the terms "environmental-economic resources" and "natural-economic resources".

Public authorities thus determine the financial compensation for the purpose of directly or indirectly defraying the protection of these environmental-economic resources, especially those whose access is limited. Economic mechanisms are created to control the use and economic exploitation of natural-economic resources to maintain environmental quality, and improve environmental quality. Therefore, natural resources receive an economic value for its economic exploitation.

It is necessary to pay for the use of natural resources, since the holders of this diffuse right are diverse, indeterminable and are perpetuated by several generations, whose rights to the ecologically balanced environment is constitutionally guaranteed.

The concept of "internalisation of environmental costs: a form of obligation to absorb the undesirable effects of economic activity and not pass it on to society" is therefore adopted in Environmental Law.

A clear example of that in LD Celulose project is happens on water resources: the user-pays principle demands that industrial users in Araguari River Basin pay for water and pay user for the treatment the equivalent of effluents also. The calculation is determined by Hydrographic Committee of Araguari River Basin.

6.2.9 Applicable Law to the project

The environmental law is analyzed by the matters that embrace the licensing, which provides a systematic view of its applicability, and can later be used as a practical guide of environmental management of this pulp mill.

Environmental License

- Federal Constitution of 1988 - determines the licensing for activities that generate significant impact, as well as, it requires the maintenance of environmental quality for future generations.
- Federal Law n. 6938/1981 - establishes the National Environment Policy.
- Supplementary Law n. 140/2011 – discipline environmental competences on three levels of government.

- CONAMA Resolution n. 1/1986 - regulates the elaboration of the EIA/RIMA as environmental licensing tool.
- CONAMA Resolution n. 6/1986 - provides for the models for publication of license applications.
- CONAMA Resolution n. 237/1997 - provides for environmental licensing and license terms.
- CONAMA Resolution n. 9/1987 - provides for the holding of a public hearing
- Constitution of the State of Minas Gerais.
- State Law n. 7772 / 1980 - protection, conservation and improvement of the environment in the State of Minas Gerais.
- State Law n. 20922/2013 - Establishes state biodiversity policy
- Decree n. 47.383 / 2018 - Establishes norms for environmental licensing and other matters.
- Normative Resolution COPAM n. 217/2017 - Establishes criteria for environmental licensing in the State of Minas Gerais and provides other measures.

When analyzing environmental licensing as an environmental planning tool, it is noted that the application for an environmental license for this LD Celulose project is also based on the guiding principles of Environmental Law, which provide the pillars of environmental licensing itself.

Among those reporting principles analyzed, it was seen that the EIA / RIMA is an instrument informing the principle of prevention, with other instruments implementing this principle.

LD Celulose is initially respecting the Federal Constitution of 1988, when it claims the environmental license through its own administrative process and the presentation of the environmental study. This environmental study, EIA/RIMA, aims to perform the mapping of the region of interest and make the environmental and social diagnosis of the region (area of influence of the enterprise).

The EIA/RIMA should address the main aspects of the environment and social environment, and identify the main socio-environmental aspects that may be impacted by pulp production, considering the environmental resilience of the area of influence of the enterprise. When performing the environmental diagnosis of the area of influence and identify aspects that will receive the environmental impacts of the enterprise, another mechanism is implemented:

- Integrated planning to mitigate identified environmental impacts
Mapping these aspects and evaluating the impacts, the enterprise should establish mitigating measures to maintain the environmental quality, that allow the perpetuity of the enterprise and its synergy with other enterprises, plans and governmental programs.
- Land use planning

The perpetuity of the enterprise must observe the norms of rational occupation and sustainable use of the soil, stimulating the implementation of new ventures in an appropriate way. To do so, observe the provisions of the municipalities of Indianópolis and Araguari.

- Environmental licensing (future periodic audits and certifications)

The licensing process works as a tool of governmental control impact generating activities, and secondly as a tool for environmental management of the enterprise, with this EIA / RIMA as the initial guide for the entrepreneur LD Celulose and for SEMAD.

- Environmental inspection

Considering the objective of the entrepreneur is the permanence of the pulp mill, the entrepreneur should be aware of the principle of cooperation with SEMAD, considering the objective to execute the mitigation of impacts and revising it to avoid the occurrence of damages to environment. The principle of cooperation is that "duty-of-power" provided in Federal Constitution, which requires "the Public Administration and the community to defend and preserve it for present and future generations" (article 225, main section).

The enterprise is in the stage of prior licensing (LP) before the environmental agency (SEMAD / SUPPRI), in order to present the EIA/RIMA that essentially deals with the locational feasibility of pulp mill.

The federal and state environmental licensing standards present the main details that may guide the installation and operation of the pulp mill.

In this preliminary stage, it can be stated that the first legal obligation to prepare and present the environmental study is fulfilled, with QWERT having a public hearing, presenting the detailed Environmental Basic Plans (PBA) and complying with the other stages of the licensing of this project in the deployment and operation phases.

Minas Gerais also determined environmental obligations at Constitutional State level, to implement projects of significant size and nature, determining that such projects shall be subject to license through EIA/RIMA.

Thus determines the State Constitution of Minas Gerais:

Art. 214 - Everyone has the right to an ecologically balanced environment, a common use of the people and essential to a healthy quality of life, and to the State and to the community, it is the duty of defending and preserving it for present and future generations.

Paragraph 1 - To ensure the effectiveness of the right referred to in this article, the State has the following responsibilities:

(...)

III - prevent and control pollution, erosion, silting and other forms of environmental degradation;

IV - to require, pursuant to the law, prior consent of the state environmental control and policy body, to initiate, expand and develop

activities, construction or remodeling of facilities capable of causing degradation of the environment in any way, without prejudice to other legal requirements, preserving industrial secrecy.

(MINAS GERAIS, 1989 – emphasis added)

The installation and operation phases of pulp mill shall observe criteria and exigencies established by Indianópolis and Araguari authorities regarding land use and soil occupation.

In addition, zoning plan shall also be observed in the area of influence of the future enterprise and to evaluate the already disturbed and modified rural area and the socio-environmental aspects present there.

The choice of EIA/RIMA as an environmental study that provides subsidies to the environmental agency (SUPPRI) is in compliance with the environmental law applicable to the enterprise, and in compliance with the principle of prevention as mentioned above.

At last, licensing ritual in its first phase will be consolidated with the application of the environmental basic plans and programs (PBA) to mitigate medium and long-term impacts.

Therefore, it is observed that the project meets the requests demanded by the Law, especially the state decree n. 47.383/2018 that establishes rites for three-phase environmental licensing:

Art. 14 - The following are environmental licensing modalities:

I - Three-phase Environmental Licensing - LAT: licensing in which the LP, LI and LO of the activity or enterprise are granted in successive phases;

(...)

Art. 16 - The environmental licensing procedure starts with the characterization of the activity or enterprise, including environmental intervention and the use of water resources, in which all the activities it exercises should be considered, even in contiguous areas or interdependent, under penalty of applying a penalty in case of fragmentation of the licensing process.

(MINAS GERAIS, 2018 – emphasis added)

This mentioned law reinforces the legal opinion that the project will be subject to global licensing, in three procedural stages: LP, LI and LO.

As noted, the pulp mill located in Indianópolis and pipelines in Araguari (MG), so the license happens before the state agency under the terms of article 8 of supplementary law n. 140/2011.

Cultural heritage. Archeology and History

- Federal Decree-Law n. 25/1937 - provides for national historical and artistic heritage;
- Federal Law n. 3.924/1961 - provides for archaeological and prehistoric monuments;
- Federal Decree n. 3.551 / 2000 - Establishes registration of cultural heritage and creates National Heritage Program;
- IPHAN Normative Instruction n. 001/2015 - administrative procedures for environmental licensing process with participation of IPHAN;
- State Decree n. 42505 / 2002 - Establishes the forms of Registration of heritage materials in Minas Gerais State;
- Deliberation Normative CONEP n. 007/2014 perform impact studies of cultural heritage in Minas Gerais State;
- Deliberation IEPHA n. 52/2014 - procedures for Preliminary Study of Cultural Impact and approval of the respective Impact Report on Cultural Heritage;
- Law n. 11.726/1994 - cultural policy of Minas Gerais State.

As mentioned, the central objective of a study is to meet the legal requirements to protect natural rights. In this spectrum of rights, the protection of cultural heritage (which is divided into material and immaterial) is supposed.

The works of art, material vestiges of works, buildings and physical remnants referring to culture and history manifest the material cultural. In this sense, the Brazilian culture has been protected by specific law since 1937, when the President of Republic Getulio Vargas published Decree-Law n. 25; the first legal document to deal with the protection of cultural heritage.

Since then, the Brazilian cultural heritage in its different forms of manifestation has been receiving intense legislative activity so that it is possible to implement protective measures, as well as, from a practical point of view, feasible the development of studies and research and the performance in licensing processes to prevent possible degradation of material with archaeological cultural potential.

In this sense, this environmental impact assessment shall bring the locational information of the pulp mill and its infrastructure. To achieve this proposal, non-interventional diagnosis shall be developed and present potential areas archaeological and cultural interest, consolidating compliance with legal instruments and regulations of IPHAN and IEPHA.

The EIA/RIMA should follow the guidelines in the general Term of Reference issued by FEAM regarding the archaeological component. This will allow it to be possible to proceed with the planned schedule in the archaeological diagnosis for later stage: implantation of the pulp production, considering the TR guidelines.

Should the entrepreneur follow the Normative Instruction IPHAN nº 001/2015.

Therefore, the environmental licensing (SEMAD) deems it necessary to consult with the organ of historical and cultural patrimony, so that its manifestation will be incorporated into the licensing of the activity considering the mitigating measures to the identified impacts on the cultural patrimony existing in the area of influence.

Protection to Fauna

- Federal Law n. 5.197 / 67 - deals with wildlife protection
- IBAMA Ordinance n. 1522 / 89 - Recognizes the list of endangered species of fauna
- MMA Ordinances n. 444/2014 and 445/2014 - publish a new list of endangered species of fauna.
- State Law n. 20922 / 2013 - forest policies and protection of biodiversity in the State.
- COPAM Resolution n. 366/2008 - List of Endangered Species of Fauna in the State of Minas Gerais.

As verified, the State of Minas Gerais has an advanced legal framework in the environmental matter, mainly protective norms that strengthen the principle of prevention. Included among the elements protected by the mining legislation are the environmental protection.

In this EIA / RIMA, especially the volume Environmental Diagnosis, it is performed a diagnosis of the species of fauna presented in the region (in the area of influence), which may be affected by the impacts of pulp mill. It is essential that the indicative species are identified and sensitive to the habitat change possibly caused by the mill operation.

The environmental study shall identify the fauna species that may be potentially and effectively affected by the mill operation. The diagnosis of the fauna species shall be related to the identification of habitats, especially the flora of the area of influence of the chosen site.

The MMA directives dealing with endangered species are fundamentally based on the affirmation that loss and degradation of natural habitat of species, mainly due to agricultural and urban expansion, and installation of large enterprises constitute a threat to the species listed by the norm.

The environmental conditions of the aquatic species in the Araguari River, where effluents will be released, and environmental standards compliance will also be evaluated, a subject that is treated in the specific item (surface waters and effluents). Mitigation measures should be adopted to avoid damages and adverse effects on the quality of surface waters of the Araguari water body.

Environmental licenses issued will establish conditions related to noise emission (movement of machinery and equipment), air quality (dust generation, atmospheric emissions), among others, covering protection of the fauna and also mitigation of impacts on the flora.

Any species threatened with extinction or considered vulnerable that may be found on the site should be part of the forest and floristic inventory in case of any interventions on site or in the region.

Protection to Vegetation and Relevant Important Areas

- Forest Code - Federal Law 12.651 / 2012
- Priority Areas for Biodiversity Conservation - MMA Ordinance no. 9/2007 and Resolution CONABIO n° 46/2006.
- Normative deliberation COPAM n. 76/2004 - Provides for interference in areas considered as Permanent Preservation and provides other measures.
- Joint Resolution SEMAD / IEF n. 1905/2013 - Provides for the authorization procedures for environmental intervention in the scope of the State of Minas Gerais and provides other measures.
- MMA Ordinance n. 443/2008 - presents the list of endangered flora species

The law that deals with protection of flora covers several topics such as protection and interference in areas of permanent preservation (APP in Portuguese), fragments of forest, areas of relevant environmental interest (ARIA in Portuguese); vulnerability and fragility of species of fauna by suppressing habitat; forestry etc.

When choosing the region, the entrepreneur has been committed to a feasible locational alternative, whose impacts from the installation do not generate significant impacts in the so-called vulnerable areas. As a treaty, the standards of protection of flora are related to the preservation of species of fauna.

Thus, there is a strong character of protection and restriction from these standards, which are applicable to Greenfield projects in which habitat is one of the focuses during environmental licensing. This is because, in the installation and operation phases, the biotic and physical resources are altered, being of relevant role the mitigation of impacts for the maintenance and recovery of significant parcels of the local biome.

Thus, the chosen site had, among several precautions, non-overlay in Priority Areas for Biodiversity Conservation, according to MMA Ordinance 09/2007, which has been constantly updated. From the legal point of view, the last versions of the maps made available at the Ministry of Environment's electronic address (MMA) were evaluated, evidencing that there is no overlay or indirect impact in relation to these priority areas.

It is part of the international obligations of the Country to support actions that provide information necessary for the establishment of priorities that lead to the conservation, sustainable use and sharing of benefits of Brazilian biological diversity. These actions are part of a wide range of guidelines of the Biodiversity Convention, as well as elaborating its National Biological Diversity Policy and the National Biological Diversity Program - PRONABIO, making feasible the actions proposed by the

national policy. Among the actions of PRONABIO and PROBIO is the creation and planning of priority areas.

Consulting the technical and legal bases of the Priority Areas for Conservation and the Map of Biomes of IBGE, for systematic evaluation of conservation (representativeness, persistence and vulnerability of the environments), it was confirmed there is no interference of proposed site in these sort of sensitive areas.

It is worth mentioning that there is a constant updating of Priority Areas and Actions within all Brazilian biomes/environments and involves several public and private institutions (FUNBIO, IPAM, WWF, IBAMA, GEF CAATINGA, TNC etc.).

According to the Map of the Priority Areas for Conservation, the project is located in the Cerrado Biome, and is approximately 80 and 70 kilometers away from areas of biological importance considered "VERY HIGH" (Ce067 and Ce081). This can be considered, in a regional level that this pulp mill will not interfere in a Priority Area.

The intervention to be carried out in a permanent preservation area (APP) must observe the provision of the Forest Code (Law 12651/2012), which includes the text:

Art. 8 The intervention or the suppression of native vegetation in the Permanent Preservation Area will only occur in the hypotheses of public utility, social interest or low environmental impact foreseen in this Law.

(...)

Art. 9 It is allowed the access of people and animals to the Permanent Preservation Areas to obtain water and to carry out activities of low environmental impact.

(BRAZIL, 2012 - cf. Cf. STF judgments in ADC 42 and ADIN 4.903)

The intervention in the permanent preservation areas for the case under study will be based on two criteria supported by the forest code: hypothesis of low impact and non-existence of other locational alternative, according to article 3, X, "b":

(...) implementation of facilities necessary for the abstraction and conduction of treated water and effluent, provided that the right to use water is proved, when applicable;

(BRAZIL, 2012 – emphasis added)

In effect, the Federal Supreme Court recently decided for the possibility of intervention in permanent preservation areas, without the possibility of imposing a notice of infringement or any suspension of permit.

The activity of water intake and discharge of treated effluent on river Araguari is considered as an intervention of low impact. In addition, the main fact: the only alternative to capture raw water through permanent preservation area (APP), but in a short period and does not cross a big area.

The intervention in APP is an activity that demands the necessary granting of water resources at first.

- X - occasional activities or low environmental impact:
(...)
b) implementation of facilities necessary for the abstraction and conduction of treated water and effluents, provided that the right to use water is proved, when applicable;
(BRAZIL, 2012)

The subject is of extreme relevance, so it took almost 6 years for the STF could judge the constitutionality of this device of the forest code.

Protected Areas. Parks & Reserves

- Federal Law n. 9985/2000 - National System of Conservation Units (SNUC).
- Federal Decree n. 4340 /2002 - Regulates SNUC.
- State Decree n. 45.175 /2009 - deals with the methodology for grading environmental impacts and procedures for setting and applying environmental compensation.
- IEF Ordinance n. 99/2013 - Procedures for analysis and compliance with forest compensation established by COPAM for intervention in the Atlantic Forest Biome.

Among the numerous forms of biodiversity protection, the creation and maintenance of protected areas is one of the most common: in Brazil these areas are known as “Conservation Units”, the equivalent to the National Parks and Reserves in United States. The federal law 9985/2000 and state decree 45175/2009 create different categories of conservation units with several types and purposes.

The environmental diagnosis of the biotic environment shall identify if there are conservation units in the area of influence of this pulp mill, and identify the occurrence of impacts on these protected areas. The purpose is to verify if the pulp mill, road, transmission line can direct or indirectly affect some conservation of integral protection.

According to the nature of the impacts and their levels of magnitude, and significance, and considering the chosen location, there are no impacts in any Conservation Unit. Also, according to the criteria determined by Federal Decree n. 6848/2009, there are no conservation units in the area of direct influence that will receive the impacts of this project.

The integral protection Park identified was the “Pau Furado State Park”, located 30 km far from the pulp mill site, and it will not be affected by the impacts.

However, according to the federal legal text, the proposal for calculating environmental compensation must be submitted according to the dictates of article 36 of Federal Law 9985/2000 and its regulatory decrees.

Considering that the identification and evaluation of social and environmental impacts on potential conservation units is an obligation in the EIA/RIMA, the entrepreneur can submit to the environmental agency his proposal for calculating the compensation and

possible destination of application of the amount collected by the licensing body. The destination of the specific amount to be paid by the entrepreneur will be applied according to the order of priority determined by article 33 of Federal Decree n. 4340/2002.

In the present case, the proposal for environmental compensation will be presented in reports for implementation of the project. Thus defines the state standard:

Art. 3 It is incumbent upon the Collegiate Regional Unit of the Environmental Policy - URC / COPAM, the definition, based on EIA / RIMA, of the environmental compensation envisaged as a condition of the environmental licensing process by Federal Law 9,985, of December 18, July 2000.

The regulatory environment of Minas Gerais defines by state decree n 45175/2009 the incidence of this obligation in the cases of licensing through EIA/RIMA, reinforcing the federal norm.

In conclusion, the environmental diagnosis of the biotic environment and the characterization of the project should indicate the need for physical interventions, harvesting vegetation, or occurrence of impacts in sensitive areas or protected areas.

The legal forecast of the environmental compensation as predicted by SNUC and state decree n. 45.175/2009 is supposed for the continuance of the project.

Water resources protection

- CONAMA Resolution n. 357/05 - classification of water bodies and guidelines for its classification, as well as establishing conditions and standards for discharge of effluents.
- CONAMA Resolution n. 430/2011 - conditions and standards for discharge of effluents, complements and amends CONAMA Resolution 357/2005.
- Federal Law n. 9.433 / 97 - National Water Resources Policy
- Decree n 41.578 / 2001 and state law 13.199 / 1999 - State Policy of Water Resources
- Joint Normative Resolution COPAM / CERH-MG No. 01/2008 - provides for the classification of water bodies and environmental guidelines for their classification, as well as establishing conditions and standards for the discharge of effluents
- Joint Normative Resolution COPAM-CERH n. 06/2017 - Provides for general procedures for the framing of surface water bodies, and provides other measures.

The pulp mill will use water resources from the Araguari River, based on the technical and environmental control conditions required by the regulatory environment to make its operation possible.

Thus, the industrial unit must obtain the necessary grant issued by IGAM so that the pulp mill can get raw water and disposal of treated effluents in the Araguari River. The discharge of effluents should be at the levels required by CONAMA Resolution 430/2011, as well as Deliberação Normativa Conjunta COPAM/CERH-MG nº 1/2008.

Environmental diagnosis verified water body presents conditions to provide water resources to production process and capacity to receive treated effluents.

To understand the matter: National Policy on Water Resources is a programmatic and public policy. Considering the environmental licensing of this industrial plant, and especially respecting the multiple uses of water resources, LD Celulose can guarantee its right to use the water resource within the priority role of users of a river basin.

This right shall be observed to protect environmental right of third parties and other uses. This is what determines Article 13 of the national policy:

Art. 13. All grants shall be subject to the priorities of use established in the Water Resources Plans and shall respect the class in which the water body is framed and the maintenance of appropriate conditions for water transport, when applicable.

(BRAZIL, 1997)

Therefore, recalling the role that the environmental study assumes as a tool planning and environmental management instrument when operating the (with the issuance of LO).

In this context, the study contemplates the territorial aspect, the use and occupation of the area of influence of the enterprise, so that the implementation and do not disqualify the water body, much less development of other activities in the region, mainly safeguarding the uses water resources in the river basin where the enterprise pulp production.

The appropriate administrative instrument that guarantees the service to other users, as well as, guarantees compliance with the technical requirements is the granting of right to use water resources, as established by state decree n 41.578 /2001.

In the present case, the water intake is located in a state river whose management is in charge of IGAM, the institute connected to SEMAD. For this reason, the entrepreneur, as established by federal and state law, must request the granting of right to use water resources to IGAM at state level. The entrepreneur must request the grant before IGAM, an authority with legal competence to analyze the application for use and issue of the respective grant, both for water abstraction and for the disposal of treated effluents.

IGAM plays an important role in this stage of licensing, since the prior license (LP) depends on the issuance of the grant of use of water resources.

Based on the technological, environmental and social assumptions of this project, as well as the mitigating measures of the impacts, it is inferred from the environmental legal point of view that the formal legal assumptions are satisfied, without prejudice to the entrepreneur to observe norms of the CONAMA and the joint COPAM / CERH deliberation n. 001/2008 on water frameworks and effluent releases.

For educational purposes, article 20 of the aforementioned resolution will be observed:

Art. 20. It is prohibited to launch and authorize the release of effluents in disagreement with the conditions and standards established in this Normative Deliberation.

(COPAM / CERH, 2008)

Regarding the discharge of the effluents, it should be observed the provisions of Articles 28 and 29 of this determination:

Article 28 - In the zone of mixture of effluents, the competent environmental agency may authorize, taking into account the type of substance, values in disagreement with those established for the respective class of framework, provided they do not compromise the intended uses for the body of Water.

(...)

Article 29 - Effluents from any source of pollution can only be released, directly or indirectly, in bodies of water provided they comply with the conditions and standards set forth in this article, subject to other applicable requirements:

(...)

Paragraph 1. The effluent shall not cause or possess the potential to cause toxic effects to aquatic organisms in the recipient body, in accordance with the toxicity criteria established by the competent environmental agency.

(...)

§4 - Conditions for the discharge of effluents:

I - pH between 6.0 to 9.0;

II - temperature: less than 40 °C, whereby the temperature variation of the receiving body must not exceed 3 ° C at the boundary of the mixing zone;

III - sedimentable materials: up to 1 mL/L in 1 hour Imhoff cone test. For launching in ponds and lagoons, whose circulation velocity is practically zero, sedimentable materials should be virtually absent;

IV - release system with maximum flow rate of up to 1.5 times the average flow of the daily activity period of the pollutant, except in cases allowed by the competent authority;

V - oils and greases:

a) Mineral oils: up to 20 mg/L;

b) vegetable oils and animal fats: up to 50 mg/L.

VI - absence of floating materials;

VII - BOD: up to 60 mg/L or:

a) treatment with BOD reduction efficiency of at least 60% and an annual average of 70% or more for sanitary sewage and percolated municipal landfill systems;

b) treatment with BOD reduction efficiency of at least 75% and an annual average of 85% or more for the other systems.

VIII - COD - up to 180 mg / L or:

a) treatment with a COD reduction efficiency of at least 55% and an annual average of 65% or more for sanitary sewage and percolated municipal landfill systems;

b) treatment with a COD reduction efficiency of at least 70% and an annual average of 75% or more for the other systems;

(COPAM / CERH, 2008)

SUPPRI should comply with the most recent standard on procedures for framing water resources at the time of issuance of environmental permits. The joint deliberation COPAM/CERH n. 006/2017 establishes the command:

Art. 10. The state agencies of environment and water resources shall articulate for the accomplishment of the intermediate and final goals established in the framework, especially regarding the instruments of granting of water resources and of environmental licensing.

(COPAM / CERH, 2017)

It should also be noted in this environmental study that Araguari river basin establishes water billing for the use of water resources, regulated by state decree n. 44.046 / 2005.

About user-pays principle, the use of water resources was raised as an example. It is an economic instrument of governmental management, and aims to get users to use water in a rational and sustainable way.

Attributing value to the natural resource, provide its use with the feature of retribution, and means that the end user understands the economic and environmental value of the water resource.

According to information obtained in the CBH database of the Araguari river, the financial resources arising from the collection are intended for the financing of programs, actions and interventions foreseen in the Water Resources Plans of the Basin Committees in order to protect and improve the quality and quantity available in each region. The charge is not a tax, but a public price which is set at a pact between water users, civil society, government Municipal and State.

The financial resources collected from user-pays principle are reverted to the Araguari river basin itself; and the control of these resources happens in a decentralized manner through the Araguari Basin Committee. The basin committee deliberates on the

programs, actions and interventions foreseen in the Water Resources Master Plan and the Basin Agency complies with what is established.

Protection of Underground water and Soil Contamination

- CONAMA Resolution n. 420/2009 - criteria and guiding values of soil quality regarding the presence of chemical substances and establishes guidelines for the environmental management of areas contaminated by these substances as a result of anthropic activities (modified by CONAMA Resolution No. 460/2013);
- Ordinance Ministry of Health nº 2.914 / 2011 - provides for procedures to control and monitor the quality of water for human consumption;
- Law n. 13.771 / 2000 - provides for the administration, protection and conservation of groundwater in the state of Minas Gerais;
- Joint Regulatory Deliberation COPAM / CERH No. 02/2010 - Establishes the State Program for the Management of Contaminated Areas, which establishes the guidelines and procedures for soil quality protection and environmental management of areas contaminated by chemical substances;
- Normative Resolution COPAM nº 166/2011 - treats the reference values of soils and groundwater (amends Annex I of the Normative Resolution COPAM CERH nº 02/2010)

Some states in Brazil recently passed through water crisis in 2015 and 2016 in a similar situation to the present like Brasília (DF). Increased exploration and consumption of groundwater has been an alternative to water supply. The abundance and the best quality, besides the low cost of capture, are determining factors for the search for groundwater, instead of superficial waters, that have high cost for treatment and with improper conditions to the supply.

Groundwater analysis is relevant because it counts for hydrological cycle and the multiple uses of water and its role in recharging surface water. CNRH Resolution n. 22 establishes that the Water Resources Plan should promote characterization of aquifers and define the relationships of each aquifer with other surface and underground water bodies and with the environment, aiming at systemic, integrated and participatory water management.

The state of Minas Gerais has a standard on protection of groundwater resources. Accordingly, it determines state law 1371/2000:

Art. 9 - The areas with waste deposits built in the ground and with hazardous effluents will be equipped with a groundwater monitoring system, under the responsibility of the developer, executed according to plan, approved by COPAM-MG, which will contain:

I - the location and constructive details of the monitoring well;

II - the sample collection, the frequency of sampling, the parameters to be analyzed and the analytical methods adopted;

III - the thickness of the saturated zone and the flow direction of the water table, as well as the identification of possible interconnections with other aquifer units.

(MINAS GERAIS, 2000).

Article 10 - The developer will prepare reports and provide the information obtained in the qualitative monitoring whenever requested by the State Council of Water Resources - CERH-MG.

Article 11 - In case of proven alteration of the natural parameters of groundwater quality, the person in charge of the undertaking will carry out the work necessary for its recovery, being subject to the applicable sanctions, according to art. 25 and 26 of this law, without prejudice to other legal sanctions.

(MINAS GERAIS, 2000).

There are guiding values in the state law appropriate to this project: normative deliberation COPAM n. 166/2011, whose Single Annex determines the reference values for soils and groundwater.

In an investigative nature, the Prevention and Investigation Values established in the Joint Normative Resolution COPAM/CERH n. 02/2010 are considered:

Art. 12 - An area in which the confirmatory investigation indicates values between VP and VI may be monitored, at the decision of the competent environmental agency, for at least two years, at least every six months.

(COPAM / CERH, 2010 - emphasis added).

The environmental agency may decide:

Art. 13 - Contamination with concentrations of chemical substances in soil or groundwater above VIs will be classified as a Contaminated Area under Investigation (IA) by the competent environmental agency, where it is proven by Confirmatory Investigation.

Paragraph 1 - Upon confirmation of the contamination, the responsible for the area shall immediately report the fact to the competent environmental agency.

Paragraph 2 - The term for rehabilitation of a Contaminated Area under Investigation (AI) is up to 6 (six) years from the date of its classification by the competent environmental agency.

Paragraph 3 - Due to the magnitude and complexity of the case, the period for the rehabilitation of the area may be reviewed, upon

presentation of a technical justification, with the competent environmental agency.

(COPAM / CERH, 2010 – emphasis added).

It's important to highlight the paragraph 6 of this item:

"The concentration of a substance is recognized by the competent environmental agency as occurring naturally in soil or groundwater, the area will not be considered Contaminated under Investigation (AI), however, it will be necessary to implement specific actions to protect human health, defined by the competent bodies "(sic – emphasis added).

Solid waste

- Federal Law n. 12,305 / 2010 - instituted the National Policy on Solid Waste - PNRS;
- State Law n 18.031 / 2009 - Provides for the State Policy on Solid Waste;
- CONAMA Resolution n. 307/212 - guidelines, criteria and procedures for the management of construction waste (modified by CONAMA resolution 448/2012);
- CONAMA Resolution n. 313/2002 - provides for the national inventory of solid waste;
- Standard ABNT NBR 10004 - deals with the classification of solid waste;
- Standard ABNT NBR 10007 - deals with solid waste sampling.
- Municipal Law n. 57/2009 - integrated plan for the management of construction waste (Araguari / MG)

Brazil has a national programmatic federal law regarding waste management, and it covers the main actors in this process such as States, Municipalities, generators, distributors, and even final consumers of all types of waste. This is called National Solid Waste Policy - PNRS. This law brings modern concepts of solid waste management and distributes the responsibilities for waste management, through tools that fit the environmental law, as is the case of Sector Agreements for each segment.

Within the concept of waste management, it is the entrepreneur's duty to consider the life cycle of the waste generated by it in its production process.

This national policy brings the concept of Reverse Logistics applicable to some waste generators: an instrument of economic and social development, characterized by a set of actions, procedures to enable the collection and restitution of solid waste to the business sector, for reuse, in its cycle or in other productive cycles, or another final destination environmentally adequate (National System of Information on the Management of Solid Waste - SINIR).

SINIR aims to store, process and provide information that supports the functions or processes of an organization. They consist of a subsystem of people, processes, information and documents, and another of equipment and means of communication.

Among the innovative elements is the Solid Waste Plan:

Article 45. The following constitute solid waste plans:

I - the National Solid Waste Plan;

II - the state solid waste plans;

III – micro-regional solid waste plans and solid waste plans of metropolitan regions or urban agglomerations;

IV – inter-municipal solid waste plans;

V - municipal solid waste management plans; and,

VI - solid waste management plans.

Paragraph 1. The Ministry of the Environment and other competent bodies will give wide publicity, including through the World Wide Web, to the preliminary proposal, the studies that supported it, the results of the formulation stages and the contents of the plans referred to in Chapter II of this Title, as well as ensure social control in its formulation, implementation and operationalization, observing the provisions of Law 10.650 of April 16, 2003 and Law 11,445 of 2007.

Paragraph 2 The plans for the management of construction waste shall be governed by the standards established by the competent bodies of SISNAMA.

(BRAZIL, 2010 – emphasis added)

The national policy is mentioned, since it brings the concepts of "reuse of waste in the production process "and alternative" final disposal environmentally proper". However, in an environmental issue of waste, it can be said that there is a closed circuit, where externalities are reused, with the principle of non-generation of waste.

In fact, the pulp production process described in the characterization indicates that the waste generated is reused, and there is recirculation of the waste generated in the production process and avoiding the load of waste to the landfill.

The waste sent to the landfill is those that have no energetic purpose or any form of reuse, which makes it useless and necessarily sent to the landfill.

On this project, besides the waste generated in the production process, it is important to deal with the waste generated during the installation phase of the mill, which are other waste points.

The management of waste from the implementation phase of civil works should be included in one of the Basic Environmental Plans (PBA), in the form of a Solid Waste Management Plan, with the purpose of mitigating these impacts by the generation of waste. In some projects, it is also known as Environmental Construction Plan – or PAC.

Considering that this EIA / RIMA has the purpose of serving as an instrument for environmental planning and as a management tool, it is worth mentioning that resolution CONAMA 448/2012 disciplines the theme according to the PNRS.

In the implementation phase, it will be necessary to make an inventory of these wastes, evaluating the need to create areas for transshipment and sorting of construction waste and bulk residues for separation, temporary storage of the segregated materials, transformation and subsequent appropriate disposal. If necessary, the mechanisms should be implemented with integrated management, understood as a set of actions that establish solutions for solid waste, in accordance with the waste management plans required by Federal Law n. 12305/2010 - National Policy on Solid Waste.

Construction solid waste cannot be disposed in municipal solid waste landfills, slopes, water bodies, land and vacant lots, protected areas. The mean to implement this tool is a Solid Waste Civil Construction Management System prepared in accordance with the Municipal Plans integrated with township policies.

And also, in order to provide operational aspect for Civil Construction Management Plan, these are specific phases to be described in their elaboration:

- (a) characterization, identification and quantification of waste;
- (b) sorting, preferably carried out by the generator at the source or in licensed areas according to the class of waste;
- (c) packaging, from the generation to the transport, ensuring the possibilities of reuse and recycling;
- (d) transport, in accordance with technical standards for the transport of waste;
- (e) disposal in accordance with classes A, B, C and D of the waste. The deadline for municipalities to prepare their respective construction waste management plans is twelve months from the publication of Resolution 448/2012 (January / 2013) and should be implemented in six months (July / 2013). Several municipalities when appropriate for the preparation of inter-municipal may prepare these plans jointly or micro-regional solid waste plans (Article 14 of Federal Law 12305/2010 and Article 45 of Federal Decree No. 7404/2010).

Regarding the classification of solid waste, it is of great value to observe the provisions of ABNT NBR 10004, especially Class A waste arising from the implementation process of the project.

It is therefore the obligation of the waste generator (the entrepreneur) to collect and allocate this waste, in accordance with the legal provisions of CONAMA Resolution 448/2012, during the implantation phase (civil works), until the complete deactivation of its construction site. Works, documenting the collection and destination of the waste in a proper place for this specific class of waste, as determined by the environmental law. For completeness, please state the following:

Class A - waste is reusable or recyclable as aggregates, such as:

(a) construction, demolition, alteration and repair of paving and other infrastructure works, including land from earthworks;

b) construction, demolition, renovation and repair of buildings: ceramic components (bricks, blocks, tiles, flooring boards etc.), cement and concrete;

c) process of manufacture and / or demolition of precast concrete parts (blocks, tubes, bundles, etc.) produced at construction sites;

Class B - are recyclable waste for other destinations, such as: plastics, paper / cardboard, metals, glass, wood and others;

Class C - are the wastes for which no economically feasible technologies or applications have been developed to enable their recycling / recovery, such as products from gypsum;

Class D - are hazardous waste from the construction process, such as paints, solvents, oils, and others, or those contaminated or harmful to health from demolitions, alterations and repairs to radiological clinics, industrial installations and others, as well as tiles and other objects and materials containing asbestos or other products harmful to health. "

(BRAZIL, 2004).

Residues resultants of workers' activities that collaborate in implementation of civil works will also be subject to analysis and planning. With regard to waste from workers, the collection, separation and final destination will be the responsibility of the entrepreneur not to generate impacts on the local infrastructure of sanitation, urban cleaning.

It is possible, therefore, to conclude that the entrepreneur must, during the implementation phase and demobilization of the workforce, be attentive and obey the legal provisions herein and the correlated NBR ABNT standards.

The central aspect of waste management is project management as described in the Characterization.

Regarding waste responsibility, it will be applied: "Responsibility from cradle to the grave" prevails, duly clarified in the item on the environmental control measures that will be implemented by the entrepreneur, and the respective reference to the legal texts mentioned herein.

In addition to complying with the legal provisions mentioned herein, the LD Celulose should use the best practices of waste management and use the best available technologies to avoid damages on environment.

Control of noise levels and air quality

- CLT - Consolidation of Labor Laws: Law n. 6514 / 1977 (Section IV - Of the Individual Protection Equipment);
- NR-6 - Personal Protective Equipment - PPE;

- NR-15 - Unhealthy Activities and Operations;
- NBR 7731 - Guide for the execution of airborne noise measurement services and evaluation of their effects on man;
- NBR 10151 - Evaluation of noise in inhabited areas aiming the comfort of the community;
- NBR 10152 (NB-95) - Noise levels for acoustic comfort;
- CONAMA Resolution n. 001/1990 - Provides criteria and standards for the emission of noise from industrial activities;
- State Law n. 7302 / 1978 - provides for protection against noise pollution in the State of Minas Gerais (as amended by Law 10100 / 1990);
- CONAMA Resolution n. 382/2006 - establishes the parameters of atmospheric emission by fixed sources;
- CONAMA Resolution n. 003/1990 - establishes the parameters of air quality.
- COPAM Normative Deliberation nº 187, of September 19, 2013 - Establishes maximum emission limits and conditions for atmospheric pollutants for stationary sources.
- COPAM normative deliberation n 01/1981 - air quality and concentrations of air pollutants in the State of Minas Gerais.

The impact arising from noise generation is categorized by the potential for generating irritations to individuals in neighborhood, and consequently possible complaints, labor damages and probably impacts on employees' health. In a wider temporal analysis, changing noise levels can generate significant impacts around the enterprise.

Minas Gerais has standards on "noise level" that is already projected as an impact for each phase: implantation and infrastructure. It is also expected to generate noise arising from the operation of the plant. The objective of the law is to establish noise levels according to the location of the sources.

In the implementation phase, vehicles traffic, machine operation, load and unloading with inputs and products, civil works, installations of equipment, machinery will contribute to noise.

After those, the operation phase of pulp mill and the operation phase of the road will demand systems for noise mitigation and must contain protective measures for employees (cf. Consolidation of Labor Laws and NBR applicable as Standard NBR 7731) for surround also.

State law n. 10.100/1990 establishes an initial standard to be considered:

Art. 2 - For the purposes of this Law, any noise that is harmful to public health, safety or public peace is considered to be:

I - in the external environment of the premises in which they originate, the sound level of more than 10 (ten) decibels - dB(A) above the background noise in the place, without traffic;

II – independently of environment noise, meet in the environment

outside of the premises in which they originate, a sound level higher than 70 (seventy) decibels - dB(A) during the day, and 60 (sixty) decibels - dB(A), during the night, the night time is specified as being between 22 pm and 6 (six) am, if another is not established in the pertinent municipal law.

(MINAS GERAIS, 1990 – emphasis added)

The pulp mill will be endowed with a large structure for its operation, such as boilers, furnaces, ducts, chimneys, etc. The ABNT Standard NBR-10.151 regulates the noise levels, with the purpose to ensure comfort for surrounding community and its health integrity. Thus, it is a legal duty to obey the appropriate levels of acoustic comfort.

CONAMA has set limits for noise emission referring to industrial activities, which should be observed in the project under analysis, as well as the legal standards of the NBR-10.151 ABNT standard, on community comfort in outdoor environments that should be obeyed.

Noise levels for external environment [unit: dB(A)]²

Type of area	Day	Night
Farms areas	40	35
Strictly residential urban area or hospitals or schools	50	45
Mixed area, predominantly residential	55	50
Mixed area, with commercial and administrative vocation	60	55
Mixed area with recreational vocation	65	55
Predominantly industrial area	70	60

The legislation establishes that measurements be taken prior to implantation, in the surroundings and at sampling sites near the future site of the enterprise.

The so-called background noise, or reference noise level obtained in the measurements the standard to be obeyed by the entrepreneur.

Regarding atmospheric emission standards, the Atmospheric Dispersion Study (known as “EDA”) may follow the Technical Note "Technical guidelines for the preparation of an atmospheric dispersion study of FEAM - DQGA - GESAR - NT 02/2017", or adopt other procedures that will support the decision of the licensing agency.

² Source: NBR 10.151

For the operation of the pulp mill, the parameters in the Table of Annex VII of the CONAMA Resolution 382/2006, as well as Table IV of Annex IV of Deliberação Normativa COPAM nº 187/2013, shall be observed.

Equipment	PM ⁽¹⁾	TRS ⁽¹⁾ (as SO ₂)	SOx ⁽¹⁾ (as SO ₂)	NO ⁽¹⁾ (as NO ₂)
Recovery boiler	100	15	100	470
Dissolving tank	0,1 kg/tSS ⁽²⁾	0,008 kg/tSS	N.A.	N.A.
Lime Kiln	100	30	N.A.	470

⁽¹⁾ The results should be expressed in the concentration unit mg/Nm³ on a dry basis and corrected at 8% oxygen, except for the limits established for the dissolution tank.

⁽²⁾ “tSS”: ton of dry solids

N.A. – not applicable

Municipality Legislation – Indianópolis

Following the approach on municipal law briefly covered, this item advances the subject over the municipal law of Indianópolis to verify some impediment or restriction present on its legal framework, and at same time evaluate the suitability of this enterprise at the municipal level.

It was verified, under the legal aspects that the Municipalities of Indianópolis do not present any restrictive norm, which prevents the location, or specific impediment in law. On the contrary, it is possible the implementation and operation of the enterprise according to the framework analyzed.

Regarding the locational compatibility of the enterprise in Indianópolis, there is no regulatory framework that addresses the location of projects or environmental licensing of activities of significant impact.

Until the formal delivery of this environmental study, there's no impediment in both municipalities that can negative affect this project in terms of license procedure; it means Indianópolis and Araguari are suitable Municipalities to receive the pulp mil without any impediment in terms of environmental, locational, economic or social criteria.

However, in accordance with the principle of sustainable development, it is important that the entrepreneur maintains throughout the operation of the enterprise direct contact Municipality of Indianópolis and Araguari and their respective authorities to monitor the evolution of the local regulatory environment. This will allow greater efficiency in implementation and performance of the mitigation measures implemented for the environmental impacts.

It should be noted that the Municipality of Indianópolis does not yet have zoning municipalities, which in a way does not generate a legal impediment to the analyzed. Reinforce the need to monitor the regulatory framework to ensure the continued suitability of the enterprise.

ANNEX I
ANNOTATION OF TECHNICAL RESPONSIBILITY (ART)



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977

Conselho Regional de Engenharia e Agronomia de Minas Gerais

CREA-MG

Via do Contratante

Página 1/1

ART de Obra ou Serviço
14201800000004794176

SUBSTITUTA À ART
14201800000004788386

1. Responsável Técnico

MARCIA REGINA MASTROCOLA

Título profissional:
ENGENHEIRO QUIMICO;

RNP: 2603327020

Registro: 06.0.0000201598

Empresa contratada:
POYRY TECNOLOGIA LTDA

Registro: 31338

2. Dados do Contrato

Contratante: **LD CELULOSE S.A.**

CNPJ: 29.627.430/0001-10

Logradouro: **AVENIDA BERNARDINO DE CAMPOS**

Nº: 000098

Complemento: **7º ANDAR - SALA 54**

Bairro: **PARAÍSO**

Cidade: **SÃO PAULO**

UF: **SP**

CEP: 04004040

Contrato: **PROP. X349014/17**

Celebrado em: **10/01/2018**

Valor: **1.774.500,00**

Tipo de contratante: **PESSOA JURÍDICA DE DIREITO PRIVADO**

3. Dados da Obra/Serviço

Logradouro: **AVENIDA ALFREDO EGÍDIO DE SOUZA ARANHA**

Nº: 000100

Complemento: **BLOCO B - 5º ANDAR**

Bairro: **VILA CRUZEIRO**

Cidade: **SÃO PAULO**

UF: **SP**

CEP: 04726170

Data de início: **10/01/2018** Previsão de término: **30/05/2019**

Finalidade: **AMBIENTAL**

Proprietário: **LD CELULOSE S.A.**

CNPJ: 29.627.430/0001-10

4. Atividade Técnica

1 - CONSULTORIA

Quantidade: Unidade:

ESTUDO, MEIO AMBIENTE, ESTUDO IMPACTO AMBIENTAL E REL. IMPACTO 1.00 un

AMBIEN.-EIA/RIMA

ESTUDO, MEIO AMBIENTE, PLANO DE CONTROLE AMBIENTAL-PCA 1.00 un

Após conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

PROJ. 109000573-001 - ESTUDOS DE EIA/RIMA, PCA E OUTORGA DE DIREITO DE USO DE RECURSOS HÍDRICOS DE UMA FÁB. CELULOSE SOLÚVEL C/ CAPAC. DE 540.000 TON/ANO, NO MUN. DE INDIANÓPOLIS E ARAGUARI-MG.....

6. Declarações

7. Entidade de Classe

SEM INDICAÇÃO DE ENTIDADE DE CLASSE

8. Assinaturas

Declaro ser verdadeiras as informações acima

SÃO PAULO, 01 de OUTUBRO de 2018

Marcia Regina Mastrocola

RNP: 2603327020

LD CELULOSE S.A.

CNPJ: 29.627.430/0001-10

9. Informações

- A ART é válida somente quando quitada, mediante apresentação do comprovante do pagamento ou conferência no site do Crea.
- A autenticidade deste documento pode ser verificada no site www.crea-mg.org.br ou www.confma.org.br
- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

VALOR DA OBRA: R\$ 1.774.500,00. ÁREA DE ATUAÇÃO: MEIO AMBIENTE, MEIO AMBIENTE,

www.crea-mg.org.br | 0800 0312732



Valor da ART: 82,94

Registrada em: 01/10/2018

Valor Pago: 82,94

Nosso Número: 000000004666599

INSTRUÇÕES:

ART NACIONAL: PROFISSIONAL: SP-201598/DIPIPO: OBRA/SERVICO - NOVA ART - NUMERO: 14201800000004794176ATENCAO: NAO RECEBER APOS A DATA DE VENCIMENTO.1A VIA

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Física.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Jurídica.

BANCO DO BRASIL		001-9	00190.00009 02832.133009 04666.599172 3 76700000008294		
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POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468002028					
RUA DESEMBARGADOR JORGE FONTANA 498 - SALAS 901 A 905 - BEL, BELO HORIZONTE -MG CEP:30320670					
Sacador/Avalista					
Nosso Número	Nr Documento	Data de Vencimento	Valor do Documento	(=) Valor Pago	
28321330004666599	28321330004666599	07/10/2018	82,94		
Nome do Beneficiário/CPF/CNPJ/Endereço					
CONSELHO REGIONAL DE ENGENHARIA E AGRONO CPF/CNPJ: 17.254.509/0001-63					
AV ALVARES CABRAL 1600 , BELO HORIZONTE - MG CEP: 30170001					
Agência/Código do Beneficiário			Autenticação Mecânica		
3394-4 / 5780-0					

BANCO DO BRASIL		001-9	00190.00009 02832.133009 04666.599172 3 76700000008294		
Local de Pagamento					
PAGÁVEL EM QUALQUER BANCO ATÉ O VENCIMENTO					
Nome do Beneficiário/CPF/CNPJ					
CONSELHO REGIONAL DE ENGENHARIA E AGRONO CPF/CNPJ: 17.254.509/0001-63					
Data do Documento	Nr Documento	Especie DOC	Acete	Data do Processamento	
27/09/2018	28321330004666599	DS	N	27/09/2018	
Uso do Banco	Carteira	Especie	Quantidade	vValor	
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Informações de Responsabilidade do Beneficiário					
ART NACIONAL: PROFISSIONAL: SP-201598/DIPIPO: OBRA/SERVICO - NOVA ART - NUMERO : 14201800000004794176ATENCAO: NAO RECEBER APOS A DATA DE VENCIMENTO.1A VIA					
Nome do Pagador/CPF/CNPJ/Endereço					
POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468002028					
RUA DESEMBARGADOR JORGE FONTANA 498 - SALAS 901 A 905 - BEL, BELO HORIZONTE-MG CEP:30320670					
Sacador/Avalista					
Data de Vencimento					
07/10/2018					
Agência/Código do Beneficiário					
3394-4 / 5780-0					
Nosso Número					
28321330004666599					
(=) Valor do Documento					
82,94					
(-) Desconto/Abatimento					
(-) Juros/Multa					
(-) Valor Cobrado					
Código de Barra					
Autenticação Mecânica					
Ficha de Compensação					




**30**
horas**Comprovante de pagamento de boleto****Dados da conta debitada / Pagador Final**

Agência/conta: 8044/01578-5 CPF/CNPJ: 50.648.468/0001-65 Empresa: POYRY TECNOLOGIA LTDA

Dados do pagamento

Identificação no meu comprovante:

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Beneficiário: CREA MG	CPF/CNPJ do beneficiário:	Data de vencimento:	
Razão Social:		07/10/2018	
		Valor do boleto (R\$):	
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		(-) Desconto (R\$):	
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informações fornecidas pelo pagador:		(+)-Mora/Multa (R\$):	
		0,00	
		(=) Valor do pagamento (R\$):	
		82,94	
Autenticação mecânica 783BC81BF147D02BBDADB5F3DEF423BFA26EB465		Data de pagamento:	
		01/10/2018	
		Pagamento realizado em espécie:	
		Não	

Operação efetuada em 01/10/2018 às 15:05:19 via Sispag, CTRL 599968548000038.



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço
28027230181160177

1. Responsável Técnico

MARCIA REGINA MASTROCOLA

Título Profissional: Engenheira Química

Empresa Contratada: POYRY TECNOLOGIA LTDA

RNP: 2603327020

Registro: 0682015982-SP

Registro: 1203388-SP

2. Dados do Contrato

Contratante: LD CELULOSE S.A.

Endereço: Avenida BERNARDINO DE CAMPOS

Complemento: 7º ANDAR - SALA 54

Cidade: São Paulo

Contrato: PROP. X349014/17

Valor: R\$ 1.774.500,00

Ação Institucional:

Celebrado em: 10/01/2018

Tipo de Contratante: Pessoa Jurídica de Direito Privado

Bairro: PARAÍSO

UF: SP

Vinculada à Art nº:

CPF/CNPJ: 29.627.430/0001-10

Nº: 98

CEP: 04004-040

3. Dados da Obra/Serviço

Endereço: Avenida ALFREDO EGÍDIO DE SOUZA ARANHA

Complemento: BLOCO B - 5º ANDAR

Cidade: São Paulo

Data de Início: 10/01/2018

Previsão de Término: 30/05/2019

Coordenadas Geográficas:

Finalidade: Ambiental

Proprietário: LD CELULOSE S.A.

Nº: 100

Bairro: VILA CRUZEIRO

UF: SP

CEP: 04728-170

Código:

CPF/CNPJ: 29.627.430/0001-10

4. Atividade Técnica

			Quantidade	Unidade
Consultoria 1	Estudo	Estudo de Impacto Ambiental / EIA	1,00000	unidade
	Estudo	Plano	1,00000	unidade
	Estudo	Relatório de Impacto Ambiental / RIMA	1,00000	unidade

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

PROJ. 109000573-001 - ELABORAÇÃO DE ESTUDO DE IMPACTO AMBIENTAL E RELATÓRIO DE IMPACTO AMBIENTAL (EIA/RIMA), PLANO DE CONTROLE AMBIENTAL (PCA) E OUTORGA DE DIREITO DE USO DE RECURSOS HÍDRICOS DE UMA FÁBRICA DE CELULOSE SOLÚVEL COM CAPACIDADE DE 540.000 TON/ANO, NO MUNICÍPIO DE INDIANÓPOLIS E ARAQUARI - NO ESTADO DE MINAS GERAIS.

6. Declarações

Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

7. Entidade da Classe

0-NÃO DESTINADA

8. Assinaturas

Declaro serem verdadeiras as informações acima

São Paulo 19 de SETEMBRO de 2018

Local

data

Márcia Regina Mastrocola

MARCIA REGINA MASTROCOLA - CPF: 021.085.988-12

LD CELULOSE S.A. - CPF/CNPJ: 29.627.430/0001-10

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

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- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br
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Valor ART R\$ 218,54

Registrada em: 19/09/2018

Valor Pago R\$ 218,54

Nosso Número: 28027230181160177

Versão do sistema

Impresso em: 20/09/2018 09:16:35

[bb com.br] - Boleto gerado pelo sistema MPAG 18/09/2018 16:41:48

INSTRUÇÕES:

Nro do Registro: 1203388

CREASP: 0682015982

Nome: MARCIA REGINA MASTROCOLA

- A quitacao do titulo ocorrera somente apos a compensacao bancaria.


Deposito ou transferencia nao serao reconhecidos para quitacao do titulo.

Pagamento a menor nao sera considerado para quitacao do titulo.

Nao pagar apos o vencimento.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Física.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Jurídica.

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Nome do Pagador/CPF/CNPJ/Endereço POYRY TECNOLOGIA LTDA CPF/CNPJ 50648468000165 AVENIDA ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO -SP CEP 04726170				
Sacador/Avalista				
Nosso Número	Nr Documento	Data de Vencimento	Valor do Documento	(*) Valor Pago
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Agência/Código do Beneficiário 3336-7 / 401783-8			Autenticação Mecânica	

 BANCO DO BRASIL		001-9	00190.00009 02802.723011 81160.177176 7 76600000021854	
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Nome do Beneficiário/CPF/CNPJ CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ 60 985 017/0001-77				
Data do Documento	Nr Documento	Especie DOC	Acerto	Data do Processamento
18/09/2018	28027230181160177	DS	N	18/09/2018
Uso do Banco	Carteira	Especie	Quantidade	xValor
28027230181160177	17	R\$		
Informações de Responsabilidade do Beneficiário Nro do Registro: 1203388 CREASP: 0682015982 Nome: MARCIA REGINA MASTROCOLA - A quitacao do titulo ocorrera somente apos a compensacao bancaria. Deposito ou transferencia nao serao reconhecidos para quitacao do titulo. Pagamento a menor nao sera considerado para quitacao do titulo. Nao pagar apos o vencimento.				
Nome do Pagador/CPF/CNPJ/Endereço POYRY TECNOLOGIA LTDA CPF/CNPJ 50648468000165 AVENIDA ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO-SP CEP 04726170				
Sacador/Avalista				
Código de Barra			Ficha de Compensação	
Autenticação Mecânica				




**30**
horas**Comprovante de pagamento de boleto****Dados da conta debitada / Pagador Final**

Agência/conta: 8044/01578-5 CPF/CNPJ: 50.648.468/0001-65 Empresa: POYRY TECNOLOGIA LTDA

Dados do pagamento

Identificação no meu comprovante:

 BANCO DO BRASIL		00190 00009 02802 723011 81160 177176 7 76600000021854
Beneficiário:	CONSELHO REG DE ENGENHARIA E A	CPF/CNPJ do beneficiário:
Razão Social:	CONSELHO REG DE ENGENHARIA E A	60.985.017/0001-77
		Data de vencimento:
		27/09/2018
		Valor do boleto (R\$):
		218,54
		(-) Desconto (R\$):
		0,00
		(+) Mora/Multa (R\$):
		0,00
Pagador:	POYRY TECNOLOGIA LTDA	CPF/CNPJ do pagador:
		50.648.468/0001-65
		(=) Valor do pagamento (R\$):
		218,54
		Data de pagamento:
		19/09/2018
Autenticação mecânica		Pagamento realizado em espécie:
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Operação efetuada em 19/09/2018 às 14:56:09 via Sispag, CTRL 599427485000022.



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço
28027230181173794

1. Responsável Técnico

Corresponsabilidade- vinculada à 28027230181160177

ROMUALDO HIRATA

Título Profissional: Engenheiro Industrial - Química

RNP: 2609666578

Registro: 0600332092-SP

Registro: 1203388-SP

Empresa Contratada: POYRY TECNOLOGIA LTDA

2. Dados do Contrato

Contratante: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

Endereço: Avenida BERNARDINO DE CAMPOS

Nº: 98

Complemento: 7º ANDAR - SALA 54

Bairro: PARAÍSO

Cidade: São Paulo

UF: SP

CEP: 04004-040

Contrato: PROP. X349014/17

Celebrado em: 10/01/2018

Vinculada à Art nº:

Valor: R\$ 1.774.500,00

Tipo de Contratante: Pessoa Jurídica de Direito Privado

Ação Institucional:

3. Dados da Obra Serviço

Endereço: Avenida ALFREDO EGÍDIO DE SOUZA ARANHA

Nº: 100

Complemento: BLOCO B - 5º ANDAR

Bairro: VILA CRUZEIRO

Cidade: São Paulo

UF: SP

CEP: 04726-170

Data de início: 10/01/2018

Previsão de Término: 30/05/2019

Coordenadas Geográficas:

Finalidade: Ambiental

Código:

Proprietário: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

4. Atividade Técnica

Consultoria

1

Estudo

Relatório de Impacto Ambiental / RIMA

Quantidade

Unidade

1,00000

unidade

Estudo

Estudo de Impacto Ambiental / EIA

1,00000

unidade

Estudo

Plano

Controle Ambiental

1,00000

unidade

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

PROJ. 109000573-001 - ELABORAÇÃO DE ESTUDO DE IMPACTO AMBIENTAL E RELATÓRIO DE IMPACTO AMBIENTAL (EIA/RIMA), PLANO DE CONTROLE AMBIENTAL (PCA) E OUTORGA DE DIREITO DE USO DE RECURSOS HÍDRICOS DE UMA FÁBRICA DE CELULOSE SOLÚVEL COM CAPACIDADE DE 540.000 TONELADAS, NO MUNICÍPIO DE INDIANÓPOLIS E ARAGUARI - NO ESTADO DE MINAS GERAIS., SENDO RESPONSÁVEL PELA COORDENAÇÃO GERAL.

6. Declarações

Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

RLA

7. Entidade de Classe

0-NÃO DESTINADA

8. Assinaturas

Declaro serem verdadeiras as informações acima

SÃO PAULO 24 de SETEMBRO de 2018

Local data

ROMUALDO MIRATA - CPF: 451.014.698-15

LD CELULOSE S.A. - CPF/CNPJ: 29.627.430/0001-10

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confea.org.br

- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br
Tel: 0800 17 18 11
E-mail: acessarlink@creasp.org.br Fale Conosco do site acima



Valor ART R\$ 82,94

Registrada em: 24/09/2018

Valor Pago R\$ 82,94

Nosso Número: 28027230181173794 Versão do sistema

Impresso em: 26/09/2018 10:43:57

[bb.com.br] - Boleto gerado pelo sistema MPAG. 20/09/2018 15:28:18

INSTRUÇÕES:

Nro do Registro: 1203388

CREASP: 0600332092

Nome: ROMUALDO HIRATA

- A quitacao do titulo ocorrera somente apos a compensacao bancaria.


Deposito ou transferencia nao serao reconhecidos para quitacao do titulo.


Pagamento a menor nao sera considerado para quitacao do titulo.

Nao pagar apos o vencimento.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Física.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Jurídica.

 BANCO DO BRASIL		001-9	00190.00009 02802.723011 81173.794173 8 76620000008294		Recibo do Pagador
Nome do Pagador/CPF/CNPJ/Endereço POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165 AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO -SP CEP:04726170					
Sacador/Avalista					
Nosso Número 28027230181173794	Nr Documento 28027230181173794	Data de Vencimento 29/09/2018	Valor do Documento 82,94	(*) Valor Pago	
Nome do Beneficiário/CPF/CNPJ/Endereço CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77 AV BRIG FARIA LIMA 1059 9 ANDAR, SAO PAULO - SP CEP: 1452002					
Agência/Código do Beneficiário 3336-7 / 401783-8			Autenticação Mecânica		

 BANCO DO BRASIL		001-9	00190.00009 02802.723011 81173.794173 8 76620000008294		
Local de Pagamento PAGÁVEL EM QUALQUER BANCO ATÉ O VENCIMENTO					
Nome do Beneficiário/CPF/CNPJ CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77					
Data do Documento 20/09/2018	Nr Documento 28027230181173794	Espécie DOC DS	Acréscimos N	Data do Processamento 20/09/2018	Agência/Código do Beneficiário 3336-7 / 401783-8
Uso do Banco 28027230181173794	Carteira 17	Espécie R\$	Quantidade	xValor	Nosso Número 28027230181173794
Informações de Responsabilidade do Beneficiário Nro do Registro: 1203388 CREASP: 0600332092 Nome: ROMUALDO HIRATA - A quitacao do titulo ocorrera somente apos a compensacao bancaria. Deposito ou transferencia nao serao reconhecidos para quitacao do titulo. Pagamento a menor nao sera considerado para quitacao do titulo. Nao pagar apos o vencimento.					(*) Valor do Documento 82,94
					(-) Desconto/Abatimento
					(-) Juros/Multa
					(-) Valor Cobrado
Nome do Pagador/CPF/CNPJ/Endereço POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165 AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO-SP CEP:04726170					
Sacador/Avalista					
Código de Barra					
Autenticação Mecânica - Ficha de Compensação					




**30**
horas**Comprovante de pagamento de boleto****Dados da conta debitada / Pagador Final**

Agência/conta: 8044/01578-5 CPF/CNPJ: 50.648.468/0001-65 Empresa: POYRY TECNOLOGIA LTDA

Dados do pagamento

Identificação no meu comprovante:

 BANCO DO BRASIL		00190 00009 02802 723011 81172 874174 8 76620000008294	
Beneficiário:	CONSELHO REG DE ENGENHARIA E A	CPF/CNPJ do beneficiário:	Data de vencimento:
Razão Social:	CONSELHO REG DE ENGENHARIA E A	60.985.017/0001-77	29/09/2018
		Valor do boleto (R\$):	82,94
		(-) Desconto (R\$):	0,00
		(+) Mora/Multa (R\$):	0,00
		(=) Valor do pagamento (R\$):	82,94
Pagador:	POYRY TECNOLOGIA LTDA	CPF/CNPJ do pagador:	50.648.468/0001-65
		Data de pagamento:	24/09/2018
Autenticação mecânica C8D435F2C53C67E02E1C3C99644E09C48337A254		Pagamento realizado em espécie: Não	

Operação efetuada em 24/09/2018 às 15:04:03 via Sispag, CTRL 199632458000016.



Anotação de Responsabilidade Técnica - ART

Lei nº 6.496, de 7 de dezembro de 1977

Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço

28027230181172874

1. Responsável Técnico

Equipe-vinculada à 28027230181160177

KAREN HARUMY FREITAS

Título Profissional: Engenheira Química

RNP: 2609603428

Registro: 5063578289-SP

Registro: 1203388-SP

Empresa Contratada: POYRY TECNOLOGIA LTDA

2. Dados do Contrato

Contratante: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

Endereço: Avenida BERNARDINO DE CAMPOS

Nº: 98

Complemento: 7º ANDAR - SALA 54

Bairro: PARAÍSO

Cidade: São Paulo

UF: SP

CEP: 04004-040

Contrato: PROP. X349014/17

Celebrado em: 10/01/2018

Vinculada à Art nº:

Valor: R\$ 1.774.500,00

Tipo de Contratante: Pessoa Jurídica de Direito Privado

Ação Institucional:

3. Dados da Obra Serviço

Endereço: Avenida ALFREDO EGÍDIO DE SOUZA ARANHA

Nº: 100

Complemento: BLOCO B - 5º ANDAR

Bairro: VILA CRUZEIRO

Cidade: São Paulo

UF: SP

CEP: 04726-170

Data de Início: 10/01/2018

Previsão de Término: 30/05/2019

Coordenadas Geográficas:

Finalidade: Ambiental

Código:

Proprietário: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

4. Atividade Técnica

			Quantidade	Unidade
Consultoria 1	Estudo	Estudo de Impacto Ambiental / EIA	1,00000	unidade
	Estudo	Relatório de Impacto Ambiental / RIMA	1,00000	unidade
	Estudo	Plano	1,00000	unidade
		Controle Ambiental	1,00000	unidade

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

PROJ. 109000573-001 - ELABORAÇÃO DE ESTUDO DE IMPACTO AMBIENTAL E RELATÓRIO DE IMPACTO AMBIENTAL (EIA/RIMA), PLANO DE CONTROLE AMBIENTAL (PCA) E OUTORGA DE DIREITO DE USO DE RECURSOS HÍDRICOS DE UMA FÁBRICA DE CELULOSE SOLÚVEL COM CAPACIDADE DE 540.000 TON/ANO, NO MUNICÍPIO DE INDIANÓPOLIS E ARAGUARI - NO ESTADO DE MINAS GERAIS., SENDO RESPONSÁVEL PELA CARACTERIZAÇÃO DO EMPREENDIMENTO, RELATÓRIO DE IMPACTO AMBIENTAL (RIMA).

6. Declarações

Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

7. Entidade de Classe

0-NÃO DESTINADA

8. Assinaturas

Declaro serem verdadeiras as informações acima

SÃO PAULO 24 de SETEMBRO de 2018

Local

Data

KAREN ROSEMY FREITAS - CPF: 369.902.978-67

LD CELULOSE S.A. - CPF/CNPJ: 29.627.430/0001-10

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confes.org.br

- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br

Tel: 0800 17 18 11

E-mail: [acessar link Fale Conosco do site acima](#)



CREA-SP

Valor ART R\$ 82,94

Registrada em: 24/09/2018

Valor Pago R\$ 82,94

Nosso Número: 28027230181172874

Versão do sistema

Impresso em: 28/09/2018 10:29:15

[bb.com.br] - Boleto gerado pelo sistema MPAG. 20/09/2018 14:50:35

INSTRUÇÕES:

Nro do Registro: 1203388

CREASP: 5063578289

Nome: KAREN HARUMY FREITAS

- A quitacao do titulo ocorrera somente apos a compensacao bancaria.

Deposito ou transferencia nao serao reconhecidos para quitacao do titulo.

Pagamento a menor nao sera considerado para quitacao do titulo.

Nao pagar apos o vencimento.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Física.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Jurídica.

BANCO DO BRASIL		001-9	00190.00009 02802.723011 81172.874174 8 76620000008294		Recibo do Pagador
Nome do Pagador/CPF/CNPJ/Endereço					
POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165					
AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO -SP CEP:04726170					
Sacador/Avalista					
Nosso Número		Nr Documento	Data de Vencimento	Valor do Documento	(=) Valor Pago
28027230181172874		28027230181172874	29/09/2018	82,94	
Nome do Beneficiário/CPF/CNPJ/Endereço					
CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77					
AV BRIG FARIA LIMA 1059 9 ANDAR, SAO PAULO - SP CEP: 1452002					
Agência/Código do Beneficiário				Autenticação Mecânica	
3336-7 / 401783-8					

BANCO DO BRASIL		001-9	00190.00009 02802.723011 81172.874174 8 76620000008294	
Local de Pagamento				
PAGÁVEL EM QUALQUER BANCO ATÉ O VENCIMENTO				
Nome do Beneficiário/CPF/CNPJ				
CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77				
Data do Documento	Nr Documento	Espécie DOC	Acerto	Data do Processamento
20/09/2018	28027230181172874	DS	N	20/09/2018
Uso do Banco	Carteira	Espécie	Quantidade	xValor
28027230181172874	17	R\$		
Informações de Responsabilidade do Beneficiário				
Nro do Registro: 1203388 CREASP: 5063578289 Nome: KAREN HARUMY FREITAS - A quitacao do titulo ocorrera somente apos a compensacao bancaria. Deposito o u transferencia nao serao reconhecidos para quitacao do titulo. Pagamento a menor nao sera considerado para quitacao do titulo. Nao pagar apos o vencime nto.				
Nome do Pagador/CPF/CNPJ/Endereço				
POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165				
AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO-SP CEP:04726170				
Sacador/Avalista				
Código de Barra				
Autenticação Mecânica				
Ficha de Compensação				




**30**
horas**Comprovante de pagamento de boleto****Dados da conta debitada / Pagador Final**

Agência/conta: 8044/01578-5 CPF/CNPJ: 50.648.468/0001-65 Empresa: POYRY TECNOLOGIA LTDA

Dados do pagamento

Identificação no meu comprovante:

 BANCO DO BRASIL		00190 00009 02802 723011 81173 794173 8 76620000008294	
Beneficiário:	CONSELHO REG DE ENGENHARIA E A	CPF/CNPJ do beneficiário:	60.985.017/0001-77
Razão Social:	CONSELHO REG DE ENGENHARIA E A	Data de vencimento:	29/09/2018
		Valor do boleto (R\$):	82,94
		(-) Desconto (R\$):	0,00
		(+) Mora/Multa (R\$):	0,00
Pagador:	POYRY TECNOLOGIA LTDA	(=) Valor do pagamento (R\$):	82,94
		CPF/CNPJ do pagador:	50.648.468/0001-65
		Data de pagamento:	24/09/2018
Autenticação mecânica B27D5576D1343A798DE7A309B5DC171D2ED0A4D5		Pagamento realizado em espécie:	Não

Operação efetuada em 24/09/2018 às 15:04:03 via Sispag, CTRL 199632458000032.



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço.
28027230181173974

1. Responsável Técnico

Equipe-vinculada à 28027230181160177

CELSO TOMIO TSUTSUMI

Título Profissional: Engenheiro de Produção - Química

RNP: 2602080349

Registro: 5060443241-SP

Empresa Contratada: POYRY TECNOLOGIA LTDA

Registro: 1203388-SP

2. Dados do Contrato

Contratante: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

Endereço: Avenida BERNARDINO DE CAMPOS

Nº: 98

Complemento: 7º ANDAR - SALA 54

Bairro: PARAÍSO

Cidade: São Paulo

UF: SP

CEP: 04004-040

Contrato: PROP. X349014/17

Celebrado em: 10/01/2018

Vinculada à Art nº:

Valor: R\$ 1.774.500,00

Tipo de Contratante: Pessoa Jurídica de Direito Privado

Ação Institucional:

3. Dados da Obra Serviço

Endereço: Avenida ALFREDO EGÍDIO DE SOUZA ARANHA

Nº: 100

Complemento: BLOCO B - 5º ANDAR

Bairro: VILA CRUZEIRO

Cidade: São Paulo

UF: SP

CEP: 04726-170

Data de Início: 10/01/2018

Previsão de Término: 30/05/2019

Coordenadas Geográficas:

Finalidade: Ambiental

Código:

Proprietário: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

4. Atividade Técnica

			Quantidade	Unidade
Consultoria 1	Estudo	Estudo de Impacto Ambiental / EIA	1,00000	unidade
	Estudo	Plano	1,00000	unidade
	Estudo	Relatório de Impacto Ambiental / RIMA	1,00000	unidade

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

PROJ. 109000573-001 - ELABORAÇÃO DE ESTUDO DE IMPACTO AMBIENTAL E RELATÓRIO DE IMPACTO AMBIENTAL (EIA/RIMA), PLANO DE CONTROLE AMBIENTAL (PCA) E OUTORGA DE DIREITO DE USO DE RECURSOS HÍDRICOS DE UMA FÁBRICA DE CELULOSE SOLÚVEL COM CAPACIDADE DE 340.000 TON/ANO, NO MUNICÍPIO DE INDIANÓPOLIS E ARAGUARI - NO ESTADO DE MINAS GERAIS, SENDO CO-RESPONSÁVEL PELA COORDENAÇÃO TÉCNICA REFERENTE AO ESTUDO DE IMPACTO AMBIENTAL E RESPECTIVO RELATÓRIO DE IMPACTO AMBIENTAL (EIA/RIMA).

8. Declarações

Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

7. Entidade de Classe

0-NÃO DESTINADA

8. Assinaturas

Declaro serem verdadeiras as informações acima

SÃO PAULO 24 de DEZEMBRO de 2018

Local data

CELSONIO TSUTSUMI - CPF: 144.253.188-62

LD CELULOSE S.A. - CPF/CNPJ: 29.627.430/0001-10

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confex.org.br

- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br
Tel: 0800 17 18 11
E-mail: acessarlink@faleconosco.org.br



Valor ART R\$ 82,94

Registrada em: 24/09/2018

Valor Pago R\$ 82,94

Nosso Número: 28027230181173974

Versão do sistema

Impresso em: 26/09/2018 10:46:29

[bb.com.br] - Boleto gerado pelo sistema MPAG. 20/09/2018 15:51:32

INSTRUÇÕES:

Nro do Registro: 1203388

CREASP: 5060443241

Nome: CELSO TOMIO TSUTSUMI

- A quitacao do titulo ocorrera somente apos a compensacao bancaria.

Deposito ou transferencia nao serao reconhecidos para quitacao do titulo.

Pagamento a menor nao sera considerado para quitacao do titulo.

Nao pagar apos o vencimento.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Física.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Jurídica.

BANCO DO BRASIL		001-9	00190.00009 02802.723011 81173.974171 6 76620000008294		Recibo do Pagador
Nome do Pagador/CPF/CNPJ/Endereço					
POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165					
AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO -SP CEP:04726170					
Sacador/Avalista					
Nosso Número		Nr Documento	Data de Vencimento	Valor do Documento	(=) Valor Pago
28027230181173974		28027230181173974	29/09/2018	82,94	
Nome do Beneficiário/CPF/CNPJ/Endereço					
CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77					
AV BRIG FARIA LIMA 1059 9 ANDAR , SAO PAULO - SP CEP: 1452002					
Agência/Código do Beneficiário				Autenticação Mecânica	
3336-7 / 401783-8					

BANCO DO BRASIL		001-9	00190.00009 02802.723011 81173.974171 6 76620000008294		
Local de Pagamento					
PAGÁVEL EM QUALQUER BANCO ATÉ O VENCIMENTO					
Nome do Beneficiário/CPF/CNPJ					
CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77					
Data do Documento	Nr Documento	Espécie DOC	Acerto	Data do Processamento	Data de Vencimento
20/09/2018	28027230181173974	DS	N	20/09/2018	29/09/2018
Uso do Banco	Carteira	Espécie	Quantidade	=Valor	Agência/Código do Beneficiário
28027230181173974	17	R\$			3336-7 / 401783-8
Informações de Responsabilidade do Beneficiário					Nosso Número
Nro do Registro: 1203388 CREASP: 5060443241 Nome: CELSO TOMIO TSUTSUMI - A					28027230181173974
quitacao do titulo ocorrera somente apos a compensacao bancaria. Deposito o					(=) Valor do Documento
u transferencia nao serao reconhecidos para quitacao do titulo. Pagamento a					82,94
menor nao sera considerado para quitacao do titulo. Nao pagar apos o vencime					(-) Desconto/Abatimento
nto.					(=) Juros/Multa
					(=) Valor Cobrado
Nome do Pagador/CPF/CNPJ/Endereço					
POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165					
AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100,					
SAO PAULO-SP CEP:04726170					
Sacador/Avalista					
Código de Barra					
Autenticação Mecânica					
Ficha de Compensação					




**30**
horas**Comprovante de pagamento de boleto****Dados da conta debitada / Pagador Final**

Agência/conta: 8044/01578-5 CPF/CNPJ: 50.648.468/0001-65 Empresa: POYRY TECNOLOGIA LTDA

Dados do pagamento

Identificação no meu comprovante:

 BANCO DO BRASIL		00190 00009 02802 723011 81173 974171 6 76620000008294	
Beneficiário:	CONSELHO REG DE ENGENHARIA E A	CPF/CNPJ do beneficiário:	Data de vencimento:
Razão Social:	CONSELHO REG DE ENGENHARIA E A	60.985.017/0001-77	29/09/2018
		Valor do boleto (R\$):	82,94
		(-) Desconto (R\$):	0,00
		(+) Mora/Multa (R\$):	0,00
Pagador:	POYRY TECNOLOGIA LTDA	CPF/CNPJ do pagador:	(=) Valor do pagamento (R\$):
		50.648.468/0001-65	82,94
		Data de pagamento:	24/09/2018
Autenticação mecânica 0FBB36A8EF52AF41DFD37DD7AF41D678324319F3		Pagamento realizado em espécie: Não	

Operação efetuada em 24/09/2018 às 15:04:03 via Sispag, CTRL 199632458000040.



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço
28027230181173601

1. Responsável Técnico

Equipe-vinculada à 28027230181160177

CRISTINA MARIA COLELLA

Título Profissional: Engenheira Química

RNP: 2604914697

Registro: 5061787977-SP

Empresa Contratada: POYRY TECNOLOGIA LTDA

Registro: 1203388-SP

2. Dados do Contrato

Contratante: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

Endereço: Avenida BERNARDINO DE CAMPOS

Nº: 98

Complemento: 7º ANDAR - SALA 54

Bairro: PARAÍSO

Cidade: São Paulo

UF: SP

CEP: 04004-040

Contrato: PROP. X349014/17

Celebrado em: 10/01/2018

Vinculada à Art nº:

Valor: R\$ 1.774.500,00

Tipo de Contratante: Pessoa Jurídica de Direito Privado

Ação Institucional:

3. Dados da Obra/Serviço

Endereço: Avenida ALFREDO EGÍDIO DE SOUZA ARANHA

Nº: 100

Complemento: BLOCO B - 5º ANDAR

Bairro: VILA CRUZEIRO

Cidade: São Paulo

UF: SP

CEP: 04726-170

Data de Início: 10/01/2018

Previsão de Término: 30/05/2019

Coordenadas Geográficas:

Finalidade: Ambiental

Código:

Proprietário: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

4. Atividade Técnica

			Quantidade	Unidade
Consultoria 1	Estudo	Estudo de Impacto Ambiental / EIA	1,00000	unidade
	Estudo	Plano	1,00000	unidade
	Estudo	Relatório de Impacto Ambiental / RIMA	1,00000	unidade

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

PROJ. 109000573-001 - ELABORAÇÃO DE ESTUDO DE IMPACTO AMBIENTAL E RELATÓRIO DE IMPACTO AMBIENTAL (EIA/RIMA), PLANO DE CONTROLE AMBIENTAL (PCA) E OUTORGA DE DIREITO DE USO DE RECURSOS HÍDRICOS DE UMA FÁBRICA DE CELULOSE SOLÚVEL COM CAPACIDADE DE 540.000 TON/ANO, NO MUNICÍPIO DE INDIANÓPOLIS E ARAGUARI - NO ESTADO DE MINAS GERAIS, SENDO CO-RESPONSÁVEL PELA ELABORAÇÃO DA AVALIAÇÃO DE IMPACTOS, PROGRAMAS BÁSICOS AMBIENTAIS E DIAGNÓSTICO SOCIOECONÔMICO.

6. Declarações

Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

7. Entidade de Classe

0-NÃO DESTINADA

8. Assinaturas

Declaro serem verdadeiras as informações acima

SÃO PAULO 24 de SETEMBRO de 2018

Local

data

Cristina M. Colella

CRISTINA MARIA COLELLA - CPF: 222.265.666-05

LD CELULOSE S.A. - CPF/CNPJ: 29.627.430/0001-10

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confex.org.br

- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br

Tel. 0800 17 18 11

E-mail: [acessar link Fale Conosco do site acima](#)



CREA-SP

Valor ART R\$ 82,94

Registrada em: 24/09/2018

Valor Pago R\$ 82,94

Nosso Número: 28027230181173601

Versão do sistema

Impresso em: 26/09/2018 10:32:50

INSTRUÇÕES:

Nro do Registro: 1203388

CREASP: 5061787977

Nome: CRISTINA MARIA COLELLA

- A quitacao do título ocorrerá somente após a compensação bancária.

Deposito ou transferencia nao serao reconhecidos para quitacao do título.

Pagamento a menor nao sera considerado para quitacao do título.

Nao pagar apos o vencimento.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Física.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Jurídica.

BANCO DO BRASIL		001-9	00190.00009 02802.723011 81173.601170 5 76620000008294		Recibo do Pagador
Nome do Pagador/CPF/CNPJ/Endereço					
POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165					
AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO -SP CEP:04726170					
Sacador/Avalista					
Nosso Número		Nr Documento	Data de Vencimento	Valor do Documento	(=) Valor Pago
28027230181173601		28027230181173601	29/09/2018	82,94	
Nome do Beneficiário/CPF/CNPJ/Endereço					
CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77					
AV BRIG FARIA LIMA 1059 9 ANDAR , SAO PAULO - SP CEP: 1452002					
Agência/Código do Beneficiário				Autenticação Mecânica	
3336-7 / 401783-8					

BANCO DO BRASIL		001-9	00190.00009 02802.723011 81173.601170 5 76620000008294	
Local de Pagamento				
PAGÁVEL EM QUALQUER BANCO ATÉ O VENCIMENTO				
Nome do Beneficiário/CPF/CNPJ				
CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77				
Data do Documento	Nr Documento	Espécie DOC	Acerto	Data do Processamento
20/09/2018	28027230181173601	DS	N	20/09/2018
Uso do Banco	Carteira	Espécie	Quantidade	=Valor
28027230181173601	17	R\$		
Informações de Responsabilidade do Beneficiário				
Nro do Registro: 1203388 CREASP: 5061787977 Nome: CRISTINA MARIA COLELLA -				
A quitacao do título ocorrerá somente após a compensação bancária. Deposito ou transferencia nao serao reconhecidos para quitacao do título. Pagamento a menor nao sera considerado para quitacao do título. Nao pagar apos o vencimento.				
Nome do Pagador/CPF/CNPJ/Endereço				
POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165				
AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO-SP CEP:04726170				
Sacador/Avalista				
Código de Barra				
Autenticação Mecânica				
Ficha de Compensação				




**30**
horas**Comprovante de pagamento de boleto****Dados da conta debitada / Pagador Final**

Agência/conta: 8044/01578-5 CPF/CNPJ: 50.648.468/0001-65 Empresa: POYRY TECNOLOGIA LTDA

Dados do pagamento

Identificação no meu comprovante:

		00190 00009 02802 723011 81173 601170 5 76620000008294	
Beneficiário:	CONSELHO REG DE ENGENHARIA E A	CPF/CNPJ do beneficiário:	Data de vencimento:
Razão Social:	CONSELHO REG DE ENGENHARIA E A	60.985.017/0001-77	29/09/2018
		Valor do boleto (R\$):	82,94
		(-) Desconto (R\$):	0,00
		(+) Mora/Multa (R\$):	0,00
Pagador:	POYRY TECNOLOGIA LTDA	CPF/CNPJ do pagador:	(=) Valor do pagamento (R\$):
		50.648.468/0001-65	82,94
		Data de pagamento:	24/09/2018
Autenticação mecânica 4D388C1381C3134392B5963547B1628C33CDA14B		Pagamento realizado em espécie Não	

Operação efetuada em 24/09/2018 às 15:04:03 via Sispag, CTRL 199632458000024.



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço
28027230181174242

1. Responsável Técnico

Equipe-vinculada à 28027230181160177

RAFAEL LOURENCO THOMAZ FAVERY

Título Profissional: Engenheiro Ambiental, Engenheiro de Segurança do Trabalho

RNP: 2605484297

Registro: 5062655712-SP

Empresa Contratada: POYRY TECNOLOGIA LTDA

Registro: 1203388-SP

2. Dados do Contrato

Contratante: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

Endereço: Avenida BERNARDINO DE CAMPOS

Nº: 98

Complemento: 7º ANDAR - SALA 54

Bairro: PARAÍSO

Cidade: São Paulo

UF: SP

CEP: 04004-040

Contrato: PROP. X349014/17

Celebrado em: 10/01/2018

Vinculada à Art nº:

Valor: R\$ 1.774.500,00

Tipo de Contratante: Pessoa Jurídica de Direito Privado

Ação Institucional:

3. Dados da Obra/Serviço

Endereço: Avenida ALFREDO EGÍDIO DE SOUZA ARANHA

Nº: 100

Complemento: BLOCO B - 5º ANDAR

Bairro: VILA CRUZEIRO

Cidade: São Paulo

UF: SP

CEP: 04726-170

Data de Início: 10/01/2018

Previsão de Término: 30/05/2018

Coordenadas Geográficas:

Finalidade: Ambiental

Código:

Proprietário: LD CELULOSE S.A.

CPF/CNPJ: 29.627.430/0001-10

4. Atividade Técnica

Consultoria

1

Estudo

Plano

Controle
Ambiental

Quantidade

Unidade

1,00000

unidade

Estudo

Relatório de Impacto
Ambiental / RIMA

1,00000

unidade

Estudo

Estudo de Impacto
Ambiental / EIA

1,00000

unidade

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

PROJ. 109000573-001 - ELABORAÇÃO DE ESTUDO DE IMPACTO AMBIENTAL E RELATÓRIO DE IMPACTO AMBIENTAL (EIA/RIMA), PLANO DE CONTROLE AMBIENTAL (PCA) E OUTORGA DE DIREITO DE USO DE RECURSOS HÍDRICOS DE UMA FÁBRICA DE CELULOSE SOLÚVEL COM CAPACIDADE DE 540.000 TON/ANO, NO MUNICÍPIO DE INDIANÓPOLIS E ARAQUARI - NO ESTADO DE MINAS GERAIS, SENDO CO-RESPONSÁVEL PELOS ESTUDOS COMPLEMENTARES E LAUDOS.

6. Declarações

Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

7. Entidade de Classe

0-NÃO DESTINADA

8. Assinaturas

Declaro serem verdadeiras as informações acima

SÃO PAULO, 24 de SETEMBRO de 2018

Local data

RAFAEL LOURENÇO THOMAZ FAVERY - CPF: 307.270.208-03

LD CELULOSE S.A. - CPF/CNPJ: 29.627.430/0001-10

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confes.org.br

- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br

Tel: 0800 17 18 11

E-mail: acessarlink@faleconosco.org.br Fale Conosco do site acima



Valor ART R\$ 82,94

Registrada em: 24/09/2018

Valor Pago R\$ 82,94

Nosso Número: 28027230181174242

Versão do sistema

Impresso em: 28/09/2018 10:48:50

[bb.com.br] - Boleto gerado pelo sistema MPAG: 20/09/2018 16:07:12

INSTRUÇÕES:

Nro do Registro: 1203388

CREASP: 5062655712

Nome: RAFAEL LOURENCO THOMAZ FAVERY

- A quitacao do titulo ocorrera somente apos a compensacao bancaria.

Deposito ou transferencia nao serao reconhecidos para quitacao do titulo.

Pagamento a menor nao sera considerado para quitacao do titulo.

Nao pagar apos o vencimento.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Física.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Jurídica.

BANCO DO BRASIL		001-9	00190.00009 02802.723011 81174.242172 9 76620000008294		Recibo do Pagador
Nome do Pagador/CPF/CNPJ/Endereço POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165 AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO -SP CEP:04726170					
Sacador/Avalista					
Nosso Número	Nr Documento	Data de Vencimento	Valor do Documento	(R\$) Valor Pago	
28027230181174242	28027230181174242	29/09/2018	82,94		
Nome do Beneficiário/CPF/CNPJ/Endereço CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77 AV BRIG FARIA LIMA 1059 9 ANDAR , SAO PAULO - SP CEP: 1452002					
Agência/Código do Beneficiário 3336-7 / 401783-8			Autenticação Mecânica		

BANCO DO BRASIL		001-9	00190.00009 02802.723011 81174.242172 9 76620000008294		
Local de Pagamento PAGÁVEL EM QUALQUER BANCO ATÉ O VENCIMENTO					
Nome do Beneficiário/CPF/CNPJ CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77					
Data do Documento	Nr Documento	Especie DOC	Acerto	Data do Processamento	
20/09/2018	28027230181174242	DS	N	20/09/2018	
Uso do Banco	Carteira	Especie	Quantidade	xValor	
28027230181174242	17	RS			
Informações de Responsabilidade do Beneficiário					
Nro do Registro: 1203388 CREASP: 5062655712 Nome: RAFAEL LOURENCO THOMAZ FAVERY - A quitacao do titulo ocorrera somente apos a compensacao bancaria. Deposito ou transferencia nao serao reconhecidos para quitacao do titulo. Pagamento a menor nao sera considerado para quitacao do titulo. Nao pagar apos o vencimento.					
(-) Desconto/Abatimento					
(+/-) Juros/Multa					
(+/-) Valor Cobrado					
Nome do Pagador/CPF/CNPJ/Endereço POYRY TECNOLOGIA LTDA CPF/CNPJ: 50648468000165 AVENIDA: ALFREDO EGIDIO DE SOUZA ARANHA 100, SAO PAULO-SP CEP:04726170					
Sacador/Avalista					
Código de Barra					
Autenticação Mecânica					
Ficha de Compensação					




**30**
horas**Comprovante de pagamento de boleto****Dados da conta debitada / Pagador Final**

Agência/conta: 8044/01578-5 CPF/CNPJ: 50.648.468/0001-65 Empresa: POYRY TECNOLOGIA LTDA

Dados do pagamento

Identificação no meu comprovante:

		00190 00009 02802 723011 81174 242172 9 76620000008294
Beneficiário:	CONSELHO REG DE ENGENHARIA E A	CPF/CNPJ do beneficiário:
Razão Social:	CONSELHO REG DE ENGENHARIA E A	60.985.017/0001-77
		Data de vencimento:
		29/09/2018
		Valor do boleto (R\$):
		82,94
		(-) Desconto (R\$):
		0,00
		(+) Mora/Multa (R\$):
		0,00
Pagador:	POYRY TECNOLOGIA LTDA	CPF/CNPJ do pagador:
		50.648.468/0001-65
		(=) Valor do pagamento (R\$):
		82,94
		Data de pagamento:
		24/09/2018
Autenticação mecânica		Pagamento realizado em espécie
3DF49AF6703BFFF9E7D38423FA631AB49EDE5889		Não

Operação efetuada em 24/09/2018 às 15:04:03 via Sispag, CTRL 199632458000057.



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço
28027230181180883

1. Responsável Técnico**DOMINGOS FERNANDES PIMENTA NETO**Título Profissional: **Geólogo**Empresa Contratada: **POYRY TECNOLOGIA LTDA**RNP: **2108756477**Registro: **5063844549-SP**Registro: **1203388-SP****2. Dados do Contrato**Contratante: **POYRY TECNOLOGIA LTDA**CPF/CNPJ: **33.931.486/0014-55**Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA**Nº: **100**Complemento: **7º ANDAR - BLOCO B**Bairro: **VILA CRUZEIRO**Cidade: **São Paulo**UF: **SP**CEP: **04726-170**Contrato: **4505124149**Celebrado em: **23/03/2018**

Vinculada à Art nº:

Valor: R\$ **36.720,00**Tipo de Contratante: **Pessoa Jurídica de Direito Privado**

Ação Institucional:

3. Dados da Obra ServiçoEndereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA**Nº: **100**Complemento: **7º ANDAR - BLOCO B**Bairro: **VILA CRUZEIRO**Cidade: **São Paulo**UF: **SP**CEP: **04726-170**Data de Início: **23/03/2018**Previsão de Término: **23/03/2019**

Coordenadas Geográficas:

Finalidade: **Ambiental**

Código:

CPF/CNPJ:

4. Atividade Técnica**Consultoria****1****Estudo de viabilidade ambiental****Estudo de Impacto Ambiental / EIA**

Quantidade

Unidade

1,00000**unidade****Estudo de viabilidade ambiental****Caracterização do Meio Físico****1,00000****unidade**

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

Estudo de Impactos Ambiental e Relatório de Impacto Ambiental (EIA/RIMA) do empreendimento da LD Celulose localizado no município de Indianópolis/MG (Caracterização do Meio Físico e Mapas)

6. Declarações

Acessibilidade: Declaro atendimento às regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004.

7. Entidade de Classe

47 - RIO CLARO - ASSOCIAÇÃO DE ENGENHARIA, ARQUITETURA, AGRONOMIA E GEOLOGIA DE RIO CLARO

8. Assinaturas

Declaro serem verdadeiras as informações acima

São Paulo 25 de setembro de 2018
Local data
Domingos Fernandes Pimenta Neto.

DOMINGOS FERNANDES PIMENTA NETO - CPF: 009.941.254-37

POYRY TECNOLOGIA LTDA - CPF/CNPJ: 33.931.486/0014-55

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confex.org.br

- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br
Tel: 0800 17 18 11

E-mail: acessarlink@creasp.org.br Fale Conosco do site acima



Valor ART R\$ 218,54

Registrada em: 21/09/2018

Valor Pago R\$ 218,54

Nosso Número: 28027230181180883 Versão do sistema

Impresso em: 25/09/2018 09:41:17

25/09/2018 - BANCO DO BRASIL - 09:48:11
153301533 0003

COMPROVANTE DE PAGAMENTO DE TITULOS

CLIENTE: D F P NT C G M AMBIENTE

AGENCIA: 1533-4 CONTA: 50.735-0

=====

BANCO DO BRASIL

00190000090280272301181180883175176630000021854

BENEFICIARIO:

CONSELHO R E A E S P - CREA-SP

NOME FANTASIA:

CONSELHO REG DE ENGENHARIA E AGRONO

CNPJ: 60.985.017/0001-77

PAGADOR:

POYRY TECNOLOGIA LTDA

CNPJ: 50.648.468/0001-65

NR. DOCUMENTO 92.101

NOSSO NUMERO 28027230181180883

CONVENIO 02802723

DATA DE VENCIMENTO 30/09/2018

DATA DO PAGAMENTO 21/09/2018

VALOR DO DOCUMENTO 218,54

VALOR COBRADO 218,54

=====

NR.AUTENTICACAO 2.E43.81E.A96.74E.E64



Serviço Público Federal
CONSELHO FEDERAL/CONSELHO REGIONAL DE BIOLOGIA -
4ª REGIÃO

Situação: TRABALHO EM ANDAMENTO

Data: 24/09/2018 10:10:59 AM

ANOTAÇÃO DE RESPONSABILIDADE TÉCNICA - ART

Nº: 2018/07725

CONTRATADO

Nome: FABIO MAFFEI

Registro CRBio: 056558/RS

CPF: 21686455828

Tel: 32083903

E-mail: maffei.fabio@gmail.com

Endereço: R BATISTA DE CARVALHO - 15 - 26

Cidade: BAURU

Bairro: JARDIM BRASIL

CEP: 17013-011

UF: SP

CONTRATANTE

Nome: POYRY TECNOLOGIA LTDA.

Registro profissional:

CPF/CGC/CNPJ: 50.648.468/0001-65

Endereço: RUA ALEXANDRE DUMAS n.º 1901 1,2 BL A

Cidade: SAO PAULO

Bairro: CHACARA SANTO ANTONIO (ZONA SUL)

CEP: 04717-004

UF: SP

Site:

DADOS DA ATIVIDADE PROFISSIONAL

Natureza: Prestação de Serviços - Execução de estudos, projetos de pesquisa e/ou serviços, Realização de consultorias/assessorias técnicas, Supervisão de estudos/projetos de pesquisa e/ou outros serviços

Identificação: Coordenação técnica de estudos ambientais do meio biótico

Município do trabalho: Indianópolis

UF: MG

Município da sede: Araguari

UF: MG

Forma de participação: Equipe

Perfil da equipe: Biólogos

Área do conhecimento: Zoologia

Campo de atuação: Meio ambiente

Descrição sumária da atividade: COORDENAÇÃO TÉCNICA DOS ESTUDOS AMBIENTAIS DO MEIO BIÓTICO DA FLORA TERRESTRE, FAUNA TERRESTRE (MASTOFAUNA, AVIFAUNA, HERPETOFAUNA E ENTOMOFAUNA) E FAUNA AQUÁTICA (ICTIOFAUNA, FITOPLÂNTON, ZOOPLÂNTON E ZOOBENTOS) PARA O EIA/RIMA DO EMPREENDIMENTO DA LD CELULOSE S/A

Valor: R\$ 46995,67

Total de horas: 120

Início: 20/09/2018

Término:

ASSINATURAS

Declaro serem verdadeiras as informações acima

Data: 24/09/2018

Data: / /

Assinatura do profissional

Assinatura e carimbo do contratante

Solicitação de baixa por distrato

Solicitação de baixa por conclusão

Declaramos a conclusão do trabalho anotado na presente ART, razão pela qual solicitamos a devida BAIXA junto aos arquivos desse CRBio.

Nº do protocolo: 40286/NET

Data: / /

Data: / / Assinatura do profissional

Assinatura do profissional

Data: / /

Data: / / Assinatura e carimbo do contratante

Assinatura e carimbo do contratante

Para verificar a
autenticidade desta ART
acesse o **CRBio-04**
Online em nosso site e
depois o serviço
Conferência de ART



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço
28027230181174093

1. Responsável Técnico

DANIEL CONSTANTINO ZACHARIAS

Título Profissional: **Meteorologista, Técnico em Eletrônica**

Empresa Contratada: **LENTZ CONSULTORES EM MEIO AMBIENTE LTDA**

RNP: **2607182689**

Registro: **5063075757-SP**

Registro: **1148478-SP**

2. Dados do Contrato

Contratante: **Poyry Tecnologia Ltda.**

CPF/CNPJ: **50.648.468/0001-65**

Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA**

Nº: **100**

Complemento: **BI B, 6º andar**

Bairro: **VILA CRUZEIRO**

Cidade: **São Paulo**

UF: **SP**

CEP: **04726-170**

Contrato: **Proposta Lentz QA 180228r1**

Celebrado em: **28/02/2018**

Vinculada à Art nº:

Valor: **R\$ 5.000,00**

Tipo de Contratante: **Pessoa Jurídica de Direito Privado**

Ação Institucional:

3. Dados da Obra Serviço

Endereço: **Rodovia BR 365 KM 574**

Nº:

Complemento:

Bairro: **Zona Rural**

Cidade: **Estrela do Sul**

UF: **MG**

CEP: **38525-000**

Data de Início: **28/02/2018**

Previsão de Término: **26/09/2018**

Coordenadas Geográficas:

Finalidade: **Ambiental**

Código:

CPF/CNPJ:

Endereço: **Rua DOMINGOS CRUDO**

Nº: **189**

Complemento:

Bairro: **VILA CONCEIÇÃO**

Cidade: **Barueri**

UF: **SP**

CEP: **06404-030**

Data de Início: **28/02/2018**

Previsão de Término: **26/09/2018**

Coordenadas Geográficas:

Finalidade: **Ambiental**

Código:

CPF/CNPJ:

4. Atividade Técnica

				Quantidade	Unidade
Consultoria					
1	Estudo	Interpretação Meteorológica	Atmosfera	1,00000	unidade

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

Análise de dados meteorológicos

6. Declarações

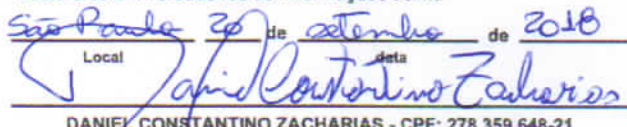
Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

7. Entidade de Classe

62 - APAEF - ASSOCIAÇÃO PAULISTA DE ENGENHEIROS
FLORESTAIS - APAEF

8. Assinaturas

Declaro serem verdadeiras as informações acima

São Paulo 30 de setembro de 2018
Local data


DANIEL CONSTANTINO ZACHARIAS - CPF: 278.359.648-21

Poyry Tecnologia Ltda. - CPF/CNPJ: 50.648.468/0001-65

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confea.org.br

- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br

Tel: 0800 17 18 11

E-mail: acessar link Fale Conosco do site acima



Valor ART R\$ 82,94

Registrada em: 20/09/2018

Valor Pago R\$ 82,94

Nosso Número: 28027230181174093

Versão do sistema

Impresso em: 21/09/2018 08:34:31



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço
28027230181171143

1. Responsável Técnico

GEORGE LENTZ CESAR FRUEHAUF

Título Profissional: **Engenheiro Ambiental**

RNP: **2604359316**

Registro: **5062008073-SP**

Registro: **1148478-SP**

Empresa Contratada: **LENTZ CONSULTORES EM MEIO AMBIENTE LTDA**

2. Dados do Contrato

Contratante: **Poyry Tecnologia Ltda.**

CPF/CNPJ: **50.648.468/0001-65**

Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA**

Nº: **100**

Complemento: **BL B, 6º ANDAR**

Bairro: **VILA CRUZEIRO**

Cidade: **São Paulo**

UF: **SP**

CEP: **04726-170**

Contrato: **Proposta Lentz MA 180222r1**

Celebrado em: **16/03/2018**

Vinculada à Art nº:

Valor: **R\$ 86.000,00**

Tipo de Contratante: **Pessoa Jurídica de Direito Privado**

Ação Institucional:

3. Dados da Obra Serviço

Endereço: **Rua DOMINGOS CRUDO**

Nº: **189**

Complemento:

Bairro: **VILA CONCEIÇÃO**

Cidade: **Barueri**

UF: **SP**

CEP: **06404-030**

Data de Início: **16/03/2018**

Previsão de Término: **26/09/2018**

Coordenadas Geográficas:

Finalidade: **Ambiental**

Código:

CPF/CNPJ:

Endereço: **Rodovia BR 365 KM 574**

Nº:

Complemento:

Bairro: **Zona Rural**

Cidade: **Estrela do Sul**

UF: **MG**

CEP: **38525-000**

Data de Início: **16/03/2018**

Previsão de Término: **26/09/2018**

Coordenadas Geográficas:

Finalidade: **Ambiental**

Código:

CPF/CNPJ:

4. Atividade Técnica

			Quantidade	Unidade
Consultoria				
1	Monitoramento	Controle de Emissões Atmosféricas e Qualidade do Ar	1,00000	unidade

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

Coleta e análise ambiental, Monitoramento de ar ambiente em Araguari/MG.

6. Declarações

Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

7. Entidade de Classe

62 - APAEF - ASSOCIAÇÃO PAULISTA DE ENGENHEIROS
FLORESTAIS - APAEF

8. Assinaturas

Declaro serem verdadeiras as informações acima

São Paulo 20 de setembro de 2018

Local

data

GEORGE LENTZ CESAR FRUEHAUF CPF: 754.637.257-72

Poyry Tecnologia Ltda. - CPF/CNPJ: 50.648.468/0001-65

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confex.org.br

- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br

Tel: 0800 17 18 11

E-mail: [acessar link Fale Conosco do site acima](#)



Valor ART R\$ 218,54

Registrada em: 20/09/2018

Valor Pago R\$ 218,54

Nosso Número: 28027230181171143

Versão do sistema

Impresso em: 21/09/2018 08:19:53

LENTZ CONSULTORES EM MEIO AMBIENTE LTDA Agência: 3829 Conta Corrente: 13-000575-3

DETALHE DO COMPROMISSO

Convênio:	0033-3829-004900634357	Conta de Débito:	3829-000130005753
Tipo de Pagamento:	BLQ Outros		
Código de Barras:	00190000090280272301181171143175276620000021854		
No. compromisso banco:	900003010	No. compromisso cliente:	
Instituição Financeira Favorecida:	001 - BANCO DO BRASIL S.A.		
Nome/Razão Social do Beneficiário Original:	CONSELHO REG DE ENGENHARIA E AGRONO DO EST S		
CPF/CNPJ do Beneficiário Original:	60.985.017/0001-77		
Nome/Razão Social do Pagador Original:	LENTZ CONSULTORES EM MEIO AMBIENTE LTDA		
CPF/CNPJ do Pagador Original:	86.838.240/0001-85		
Nome/Razão Social do Pagador Efetivo:	LENTZ CONSULTORES EM MEIO AMBI		
CPF/CNPJ do Pagador Efetivo:	86.838.240/0001-85		
Valor Nominal:	218,54		
Desc./Abat.:	0,00	Juros:	0,00
Data de Vencimento:	29/09/2018		
Data de Pagamento:	20/09/2018		
Situação:	Efetivado	No. Protocolo:	PGTFORNI20092018900003010
No. Lista de Débito:			
Autenticação:			

Valor a Pagar: 218,54

Tipo de Serviço:	Pagamento Fornecedor
Complemento do Tipo de Serviço:	ART GEORGE - POYRY - DURATEX ARAGUARI MG
Emitir Aviso:	Não emitir

Central de Atendimento Santander Empresarial	4004-2125 (Regiões Metropolitanas) 0800 726 2125 (Demais Localidades)	SAC 0800 762 7777 Ouvidoria 0800 726 0322
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[Voltar](#) [Imprimir](#)



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia de Minas Gerais

CREA-MG

Via do Contratante

Página 1/1

ART de Obra ou Serviço
14201800000004790247
SUBSTITUTA À ART
14201800000004567484

1. Responsável Técnico

HELIO CORREIA DA SILVA JHUNIOR

Título profissional:
ENGENHEIRO CIVIL;

RNP: 1414249268

Registro: 04.0.0000191204

2. Dados do Contrato

Contratante: **POYRY TECNOLOGIA LTDA**

Logradouro: **AVENIDA ALFREDO EGÍDIO DE SOUZA ARANHA**

Cidade: **SÃO PAULO**

Contrato:

Valor: **25.000,00**

Celebrado em:

Tipo de contratante: **PESSOA JURÍDICA DE DIREITO PRIVADO**

Bairro: **VILA CRUZEIRO**
UF: **SP**

CNPJ: **50.648.468/0001-65**

Nº: **000100**

CEP: **04726170**

3. Dados da Obra/Serviço

Logradouro: **AVENIDA ALFREDO EGÍDIO DE SOUZA ARANHA**

Cidade: **SÃO PAULO**

Data de início: **02/03/2018** Previsão de término: **06/06/2018**

Finalidade: **AMBIENTAL**

Proprietário: **POYRY TECNOLOGIA LTDA**

Bairro: **VILA CRUZEIRO**
UF: **SP**

Nº: **000100**

CEP: **04726170**

CNPJ: **50.648.468/0001-65**

4. Atividade Técnica

1 - ELABORAÇÃO

ESTUDO, SANEAMENTO, SANEAMENTO

Quantidade: Unidade:

24.36

km

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

ELABORAÇÃO DE ESTUDO DE AUTO DEPURAÇÃO DOS EFLUENTES TRATADOS DA LD CELULOSE NO RIO ARAGUARI.....

6. Declarações

7. Entidade de Classe

SEM INDICAÇÃO DE ENTIDADE DE CLASSE

8. Assinaturas

Declaro serem verdadeiras as informações acima

Helio Correia da Silva Jhunior de 28 de setembro de 2018

HELIO CORREIA DA SILVA JHUNIOR

RNP: 1414249268

POYRY TECNOLOGIA LTDA

CNPJ: 50.648.468/0001-65

9. Informações

- A ART é válida somente quando quitada, mediante apresentação do comprovante do pagamento ou conferência no site do Crea.
- A autenticidade deste documento pode ser verificada no site www.crea-mg.org.br ou www.confrea.org.br
- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

VALOR DA OBRA: R\$ **R\$25.000,00.** ÁREA DE ATUAÇÃO: **MEIO AMBIENTE,**

www.crea-mg.org.br | 0800.0312732



Valor da ART: **0,00**

Registrada em: **28/09/2018**

Valor Pago: **0,00**

Nosso Número: **0000000000000000**

ISENTO CONFORME RESOLUÇÃO N.º 1.067/15 E DECISÃO PLENÁRIA - PL-1.759/2017 DO CONFEA.

**Anotação de Responsabilidade Técnica - ART**

Leinº 6.496, de 7 de dezembro de 1977

Conselho Regional de Engenharia e Agronomia de Minas Gerais**CREA-MG**

Via da Obra/Serviço

Página 1/1

ART de Obra ou Serviço**14201800000004790247**

SUBSTITUTA À ART

14201800000004567484

1. Responsável Técnico

HELIO CORREIA DA SILVA JHUNIOR

Título profissional:

ENGENHEIRO CIVIL;

RNP: 1414249268

Registro: 04.0.0000191204

2. Dados do Contrato

Contratante: **POYRY TECNOLOGIA LTDA**Logradouro: **AVENIDA ALFREDO EGÍDIO DE SOUZA ARANHA**Cidade: **SÃO PAULO**

Contrato:

Valor: **25.000,00**

Celebrado em:

Tipo de contratante: **PESSOA JURÍDICA DE DIREITO PRIVADO**Bairro: **VILA CRUZEIRO**UF: **SP**CNPJ: **50.648.468/0001-65**Nº: **000100**CEP: **04726170**

3. Dados da Obra/Serviço

Logradouro: **AVENIDA ALFREDO EGÍDIO DE SOUZA ARANHA**Cidade: **SÃO PAULO**Data de início: **02/03/2018** Previsão de término: **06/06/2018**Finalidade: **AMBIENTAL**Proprietário: **POYRY TECNOLOGIA LTDA**Bairro: **VILA CRUZEIRO**UF: **SP**Nº: **000100**CEP: **04726170**CNPJ: **50.648.468/0001-65**

4. Atividade Técnica

1 - ELABORAÇÃO**ESTUDO, SANEAMENTO, SANEAMENTO**

Quantidade:

24.36

Unidade:

km

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

ELABORAÇÃO DE ESTUDO DE AUTO DEPURAÇÃO DOS EFLUENTES TRATADOS DA LD CELULOSE NO RIO ARAGUARI.....

6. Declarações

7. Entidade de Classe

SEM INDICAÇÃO DE ENTIDADE DE CLASSE

8. Assinaturas

Declaro serem verdadeiras as informações acima

Uberlândia, 28 de setembro de 2018**HELIO CORREIA DA SILVA JHUNIOR**

RNP: 1414249268

POYRY TECNOLOGIA LTDA

CNPJ: 50.648.468/0001-65

9. Informações

- A ART é válida somente quando quitada, mediante apresentação do comprovante do pagamento ou conferência no site do Crea.
- A autenticidade deste documento pode ser verificada no site www.crea-mg.org.br ou www.confea.org.br
- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

VALOR DA OBRA: R\$ **R\$25.000,00.** ÁREA DE ATUAÇÃO: **MEIO AMBIENTE,****CREA-MG**

Conselho Regional de Engenharia e Agronomia de Minas Gerais

www.crea-mg.org.br | 0800.0312732Valor da ART: **0,00**Registrada em: **28/09/2018**Valor Pago: **0,00**Nosso Número: **0000000000000000****ISENTO CONFORME RESOLUÇÃO N.º 1.067/15 E DECISÃO PLENÁRIA - PL-1.759/2017 DO CONFEA.**



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977

Conselho Regional de Engenharia e Agronomia de Minas Gerais

CREA-MG

Via do Profissional

Página 1/1

ART de Obra ou Serviço

14201800000004790247

SUBSTITUTA À ART

14201800000004567484

1. Responsável Técnico

HELIO CORREIA DA SILVA JHUNIOR

Título profissional:

ENGENHEIRO CIVIL;

RNP: 1414249268

Registro: 04.0.0000191204

2. Dados do Contrato

Contratante: POYRY TECNOLOGIA LTDA

Logradouro: AVENIDA ALFREDO EGÍDIO DE SOUZA ARANHA

Cidade: SÃO PAULO

Contrato:

Valor: 25.000,00

Celebrado em:

Tipo de contratante: PESSOA JURÍDICA DE DIREITO PRIVADO

Bairro: VILA CRUZEIRO

UF: SP

CNPJ: 50.648.468/0001-65

Nº: 000100

CEP: 04726170

3. Dados da Obra/Serviço

Logradouro: AVENIDA ALFREDO EGÍDIO DE SOUZA ARANHA

Cidade: SÃO PAULO

Data de início: 02/03/2018 Previsão de término: 06/06/2018

Finalidade: AMBIENTAL

Proprietário: POYRY TECNOLOGIA LTDA

Bairro: VILA CRUZEIRO

UF: SP

Nº: 000100

CEP: 04726170

CNPJ: 50.648.468/0001-65

4. Atividade Técnica

1 - ELABORAÇÃO

ESTUDO, SANEAMENTO, SANEAMENTO

Quantidade:

24.36

Unidade:

km

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

ELABORAÇÃO DE ESTUDO DE AUTO DEPURAÇÃO DOS EFLUENTES TRATADOS DA LD CELULOSE NO RIO ARAGUARI.....

6. Declarações

7. Entidade de Classe

SEM INDICAÇÃO DE ENTIDADE DE CLASSE

8. Assinaturas

Declaro serem verdadeiras as informações acima

Helio Correia da Silva Jhunior de 28 de setembro de 2018

HELIO CORREIA DA SILVA JHUNIOR

RNP: 1414249268

POYRY TECNOLOGIA LTDA

CNPJ: 50.648.468/0001-65

9. Informações

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- A autenticidade deste documento pode ser verificada no site www.crea-mg.org.br ou www.confrea.org.br
- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

VALOR DA OBRA: R\$ R\$25.000,00. ÁREA DE ATUAÇÃO: MEIO AMBIENTE,

www.crea-mg.org.br | 0800.0312732



CREA-MG
Conselho Regional de Engenharia e Agronomia de Minas Gerais

Valor da ART: 0,00

Registrada em: 28/09/2018

Valor Pago: 0,00

Nosso Número: 0000000000000000

ISENTO CONFORME RESOLUÇÃO N.º 1.067/15 E DECISÃO PLENÁRIA - PL-1.759/2017 DO CONFEA.



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977

Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço
28027230181173777

1. Responsável Técnico

GEORGE LENTZ CESAR FRUEHAUF

Título Profissional: **Engenheiro Ambiental**

RNP: **2604359316**

Registro: **5062008073-SP**

Registro: **1148478-SP**

Empresa Contratada: **LENTZ CONSULTORES EM MEIO AMBIENTE LTDA**

2. Dados do Contrato

Contratante: **Poyry Tecnologia Ltda.**

CPF/CNPJ: **50.648.468/0001-65**

Endereço: **Avenida ALFREDO EGÍDIO DE SOUZA ARANHA**

Nº: **100**

Complemento: **BI B, 6º andar**

Bairro: **VILA CRUZEIRO**

Cidade: **São Paulo**

UF: **SP**

CEP: **04726-170**

Contrato: **Proposta Lentz QA 180228r1**

Celebrado em: **28/02/2018**

Vinculada à Art nº:

Valor: **R\$ 22.000,00**

Tipo de Contratante: **Pessoa Jurídica de Direito Privado**

Ação Institucional:

3. Dados da Obra Serviço

Endereço: **Rua DOMINGOS CRUDO**

Nº: **189**

Complemento:

Bairro: **VILA CONCEIÇÃO**

Cidade: **Barueri**

UF: **SP**

CEP: **06404-030**

Data de Início: **28/02/2018**

Previsão de Término: **26/09/2018**

Coordenadas Geográficas:

Finalidade: **Ambiental**

Código:

CPF/CNPJ:

Endereço: **Rodovia BR 365 KM 574**

Nº:

Complemento:

Bairro: **Zona Rural**

Cidade: **Estrela do Sul**

UF: **MG**

CEP: **38525-000**

Data de Início: **28/02/2018**

Previsão de Término: **26/09/2018**

Coordenadas Geográficas:

Finalidade: **Ambiental**

Código:

CPF/CNPJ:

4. Atividade Técnica

Consultoria

			Quantidade	Unidade
1	Monitoramento	Controle de Emissões Atmosféricas e Qualidade do Ar	1,00000	unidade

Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART

5. Observações

EDA - Estudo de dispersão atmosférica e Avaliação da Qualidade do Ar, voltados à processo de licenciamento ambiental para compor EIA/RIMA.

6. Declarações

Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

7. Entidade de Classe

62 - APAEF - ASSOCIAÇÃO PAULISTA DE ENGENHEIROS
FLORESTAIS - APAEF

8. Assinaturas

Declaro serem verdadeiras as informações acima

São Paulo 20 de setembro de 2018
Local data

George Lentz Cesar Fruehauf
GEORGE LENTZ CESAR FRUEHAUF - CPF: 754.637.257-72

Pory Tecnologia Ltda. - CPF/CNPJ: 50.648.468/0001-65

9. Informações

A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confea.org.br

A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br

Tel: 0800 17 18 11

E-mail: [acessar link Fale Conosco do site acima](#)



Valor ART R\$ 218,54

Registrada em: 20/09/2018

Valor Pago R\$ 218,54

Nosso Número: 28027230181173777

Versão do sistema

Impresso em: 21/09/2018 08:15:11

LENTZ CONSULTORES EM MEIO AMBIENTE LTDA Agência: 3829 Conta Corrente: 13-000575-3

DETALHE DO COMPROMISSO

Convênio:	0033-3829-004900634357	Conta de Débito:	3829-000130005753
Tipo de Pagamento:	BLQ Outros		
Código de Barras:	00190000090280272301181173777178976620000021854		
No. compromisso banco:	900003011	No. compromisso cliente:	
Instituição Financeira Favorecida:	001 - BANCO DO BRASIL S.A.		
Nome/Razão Social do Beneficiário Original:	CONSELHO REG DE ENGENHARIA E AGRONO DO EST S		
CPF/CNPJ do Beneficiário Original:	60.985.017/0001-77		
Nome/Razão Social do Pagador Original:	LENTZ CONSULTORES EM MEIO AMBIENTE LTDA		
CPF/CNPJ do Pagador Original:	86.838.240/0001-85		
Nome/Razão Social do Pagador Efetivo:	LENTZ CONSULTORES EM MEIO AMBI		
CPF/CNPJ do Pagador Efetivo:	86.838.240/0001-85		
Valor Nominal:	218,54		
Desc./Abat.:	0,00	Juros:	0,00
Data de Vencimento:	29/09/2018		
Data de Pagamento:	20/09/2018		
Situação:	Efetivado	No. Protocolo:	PGTFORNI20092018900003011
No. Lista de Débito:			
Autenticação:			

Valor a Pagar: 218,54

Tipo de Serviço:	Pagamento Fornecedor
Complemento do Tipo de Serviço:	ART GEORGE - POYRY - EDA DURATEX ARAGUAR
Emitir Aviso:	Não emitir

Central de Atendimento Santander Empresarial	4004-2125 (Regiões Metropolitanas) 0800 726 2125 (Demais Localidades)	SAC 0800 762 7777 Ouvidoria 0800 726 0322
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[Voltar](#) [Imprimir](#)



Anotação de Responsabilidade Técnica - ART
Lei nº 6.496, de 7 de dezembro de 1977
Conselho Regional de Engenharia e Agronomia do Estado de São Paulo

CREA-SP

ART de Obra ou Serviço
28027230181162990

1. Responsável Técnico

CARMEN LIDIA VAZQUEZ MESQUITA

Título Profissional: Engenheira Química, Engenheira de Segurança do Trabalho

RNP: 2602792101

Registro: 0601798051-SP

Empresa Contratada: INERCO CONSULTORIA BRASIL LTDA

Registro: 0395612-SP

2. Dados do Contrato

Contratante: POYRY TECNOLOGIA LTDA.

CPF/CNPJ: 50.648.468/0001-65

Endereço: Avenida ALFREDO EGÍDIO DE SOUZA ARANHA

Nº: 100

Complemento: Bloco B ? 5º andar

Bairro: VILA CRUZEIRO

Cidade: São Paulo

UF: SP

CEP: 04726-170

Contrato: PC: 4505214413 - Proposta

Celebrado em: 11/05/2018

Vinculada à Art nº:

03.074-SI/18

Valor: R\$ 18.477,65

Tipo de Contratante: Pessoa Jurídica de Direito Privado

Ação Institucional:

3. Dados da Obra Serviço

Endereço: Avenida AVENIDA PAULISTA 1499

Nº: 1499

Complemento: 10º andar

Bairro: BELA VISTA

Cidade: São Paulo

UF: SP

CEP: 01311-928

Data de Início: 11/05/2018

Previsão de Término: 21/09/2018

Coordenadas Geográficas:

Finalidade:

Código:

Proprietário: INERCO Consultoria Brasil Ltda.

CPF/CNPJ: 29.052.818/0001-30

4. Atividade Técnica

			Quantidade	Unidade
Elaboração				
1	Estudo	Análise de Risco	1,00000	unidade
Após a conclusão das atividades técnicas o profissional deverá proceder a baixa desta ART				

5. Observações

Elaboração de Estudo de Análise de Riscos (EAR's) de uma planta industrial localizada nos municípios de Araguari e Indianópolis no estado de Minas Gerais.

6. Declarações

Acessibilidade: Declaro que as regras de acessibilidade previstas nas normas técnicas da ABNT, na legislação específica e no Decreto nº 5.296, de 2 de dezembro de 2004, não se aplicam às atividades profissionais acima relacionadas.

7. Entidade de Classe

48 - SANTOS - ASSOCIAÇÃO DE ENGENHEIROS E ARQUITETOS DE SANTOS

8. Assinaturas

Declaro serem verdadeiras as informações acima

São Paulo de Setembro de 2018
Local data

CARMEN LIDIA VAZQUEZ MESQUITA - CPF: 066.136.418-63

POYRY TECNOLOGIA LTDA. - CPF/CNPJ: 50.648.468/0001-65

9. Informações

- A presente ART encontra-se devidamente quitada conforme dados constantes no rodapé-versão do sistema, certificada pelo Nosso Número.

- A autenticidade deste documento pode ser verificada no site www.creasp.org.br ou www.confea.org.br

- A guarda da via assinada da ART será de responsabilidade do profissional e do contratante com o objetivo de documentar o vínculo contratual.

www.creasp.org.br
tel: 0800-17-18-11



Valor ART R\$ 218,54

Registrada em: 19/09/2018

Valor Pago R\$ 218,54

Nosso Número: 28027230181162990 Versão do sistema

Impresso em: 20/09/2018 15:07:10

INSTRUÇÕES:

Nro do Registro: 395612

CREASP: 0601798051

Nome: CARMEN LIDIA VAZQUEZ MESQUITA

- A quitacao do titulo ocorrera somente apos a compensacao bancaria.


Deposito ou transferencia nao serao reconhecidos para quitacao do titulo.


Pagamento a menor nao sera considerado para quitacao do titulo.

Nao pagar apos o vencimento.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Física.

Clique aqui e pague este boleto através do Auto Atendimento Pessoa Jurídica.

		001-9	00190.00009 02802.723011 81162.990170 2 76610000021854		Recibo do Pagador
Nome do Pagador/CPF/CNPJ/Endereço INERCO CONSULTORIA BRASIL LTDA CPF/CNPJ: 29052818000130 AVENIDA: PAULISTA 1499, SAO PAULO -SP CEP:01311928 Sacador/Avalista					
Nosso-Número 28027230181162990	Nr. Documento 28027230181162990	Data de Vencimento 28/09/2018	Valor do Documento 218,54	(=) Valor Pago	
Nome do Beneficiário/CPF/CNPJ/Endereço CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77 AV BRIG FARIA LIMA 1059 9 ANDAR, SAO PAULO - SP CEP: 1452002					
Agência/Código do Beneficiário 3336-7 / 401783-8			Autenticação Mecânica		

		001-9	00190.00009 02802.723011 81162.990170 2 76610000021854	
Local de Pagamento PAGÁVEL EM QUALQUER BANCO ATÉ O VENCIMENTO				
Nome do Beneficiário/CPF/CNPJ CONSELHO REG DE ENGENHARIA E AGRONO DO E CPF/CNPJ: 60.985.017/0001-77				
Data do Documento 19/09/2018	Nr. Documento 28027230181162990	Espécie DOC DS	Aceite N	Data do Processamento 19/09/2018
Uso do Banco 28027230181162990	Carteira 17	Espécie R\$	Quantidade	xValor
Informações de Responsabilidade do Beneficiário Nro do Registro: 395612 CREASP: 0601798051 Nome: CARMEN LIDIA VAZQUEZ MESQUITA - A quitacao do titulo ocorrera somente apos a compensacao bancaria. De posito ou transferencia nao serao reconhecidos para quitacao do titulo. Paga mento a menor nao sera considerado para quitacao do titulo. Nao pagar apos o vencimento.				
Data de Vencimento 28/09/2018				
Agência/Código do Beneficiário 3336-7 / 401783-8				
Nosso-Número 28027230181162990				
(=) Valor do Documento 218,54				
(-) Desconto/Abatimento				
(+) Juros/Multa				
(=) Valor Cobrado				
Nome do Pagador/CPF/CNPJ/Endereço INERCO CONSULTORIA BRASIL LTDA CPF/CNPJ: 29052818000130 AVENIDA: PAULISTA 1499, SAO PAULO-SP CEP:01311928 Sacador/Avalista				
Código de Baixa Autenticação Mecânica - Ficha de Compensação				



**Bradesco****Comprovante de Pagamento**

Boleto de Cobrança

Autenticação Bancária: 2608069618020638000543666

Conta de débito: **Agência: 7863-8 | Conta: 5378-3**Pagador: **INERCO CONSULTORIA BRASIL LTDA | CNPJ: 29.052.818/0001-30**Beneficiário: **CONSELHO REG DE ENGENHARIA E**CNPJ: **60.985.017/0001-77**

Sacador Avalista:

Número de identificação: **00190.00009 02802.723011 81162.990170 2 76610000021854**Banco: **001 - BANCO DO BRASIL S.A.**Data de vencimento: **28/09/2018**Número de pagamento: **S182620000000924**Data de pagamento: **19/09/2018**

Número documento:

Data do documento: **19/09/2018**

Nosso número:

Carteira:

Tipo de documento: **Outros**

Nº NF / FAT / DUP:

(=) Valor do documento: **218,54**

(-) Desconto / abatimento:

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(+) Mora / multa:

(+) Outros acréscimos:

(=) Valor cobrado: **218,54**

Uso da empresa:

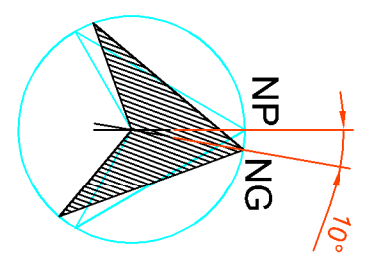
A transação acima foi realizada no Multipag Bradesco.

SAC - Serviço de
Apoio ao ClienteAlô Bradesco
0800 704 8383Deficiente Auditivo ou de Fala
0800 722 0099Cancelamentos, Reclamações e Informações,
Atendimento 24 horas, 7 dias por semana.Demais telefones
Consulte o siteOuvidoria **0800 727 9933**

Atendimento de segunda a sexta-feira, das 8h às 18h, exceto feriados.

Fale Conosco.

ANNEX II
PROJECT LAYOUT



PREDOMINANT WIND DIRECTION

Y= 10.000.000

ESTACIONAMENTO

BRASIL FERROVIÁRIO

ESTACIONAMENTO DE CAMINHÕES

APÓS O CAMINHÃO

PORTADA DE CAMINHÃO

PORTADA DE CAMINHÃO

PORTADA DE CAMINHÃO

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REVISION TABLE		DATA	FEITO POR	REVISADO POR	COMENTÁRIOS
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					
11					
12					

NOTAS:

- LEGENDA:
- ÁREAS DE PROCESSO
 - UTILIDADES E BALANÇO DA PLANTA
 - QUÍMICOS
 - PRÉDIOS NÃO PROCESSOS
 - FUTURO
 - LIMITE DO SITE

ITEM PENDENTE:

REFERENCE DOCUMENTS

ITEM	DOCUMENTO
01	
02	
03	
04	
05	
06	
07	
08	
09	
10	
11	
12	

DISTRIBUTION

QUANTIDADE	1	2	3	4	5	6	7	8	9	10	11	12
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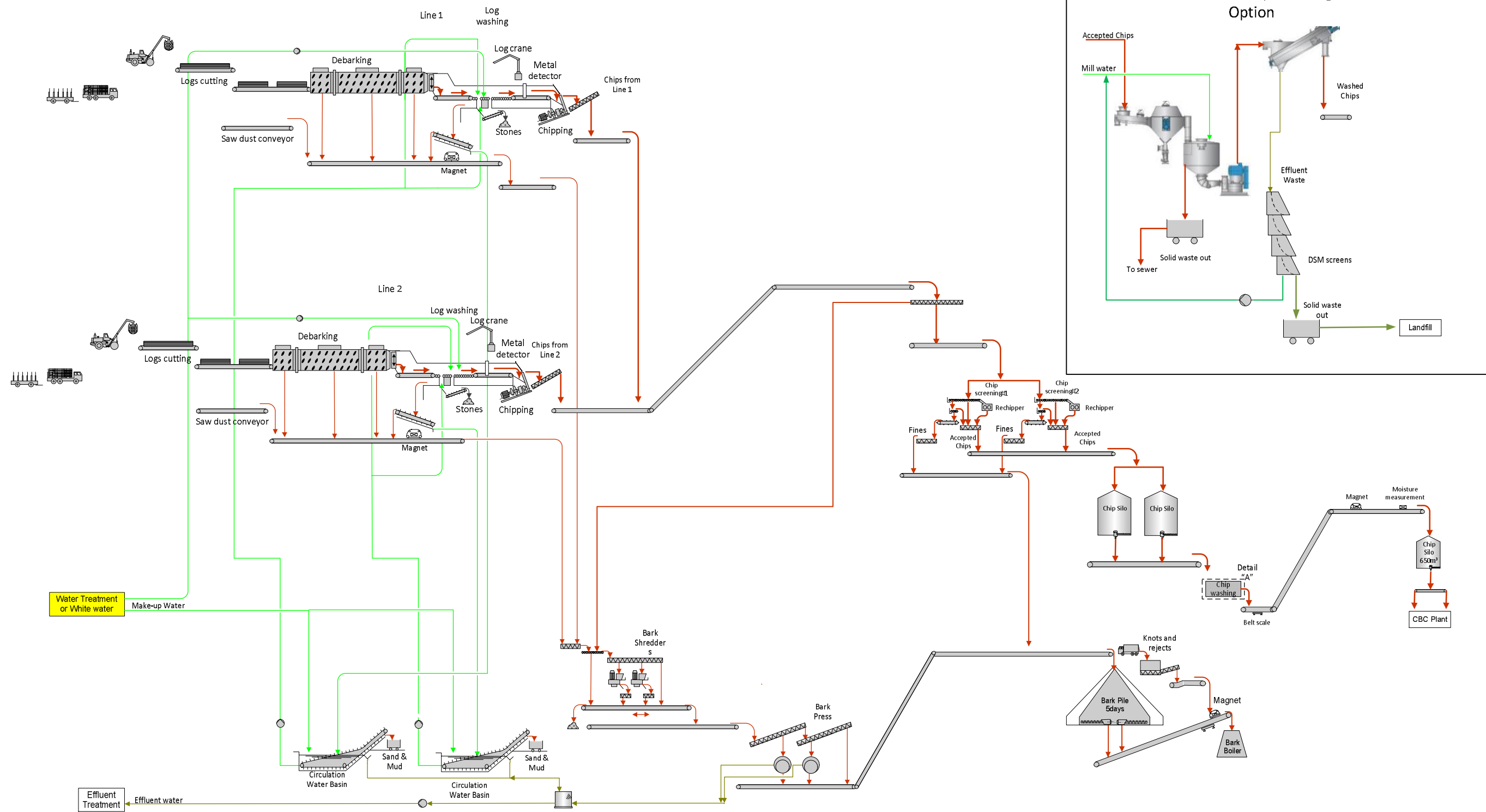
PRELIMINARY

PROJETO AMAPÓS

LAYOUT GERAL DA FABRICA

SCALE: 1:1000

ANNEX III
PROCESS FLOW DIAGRAM



PRELIMINARY



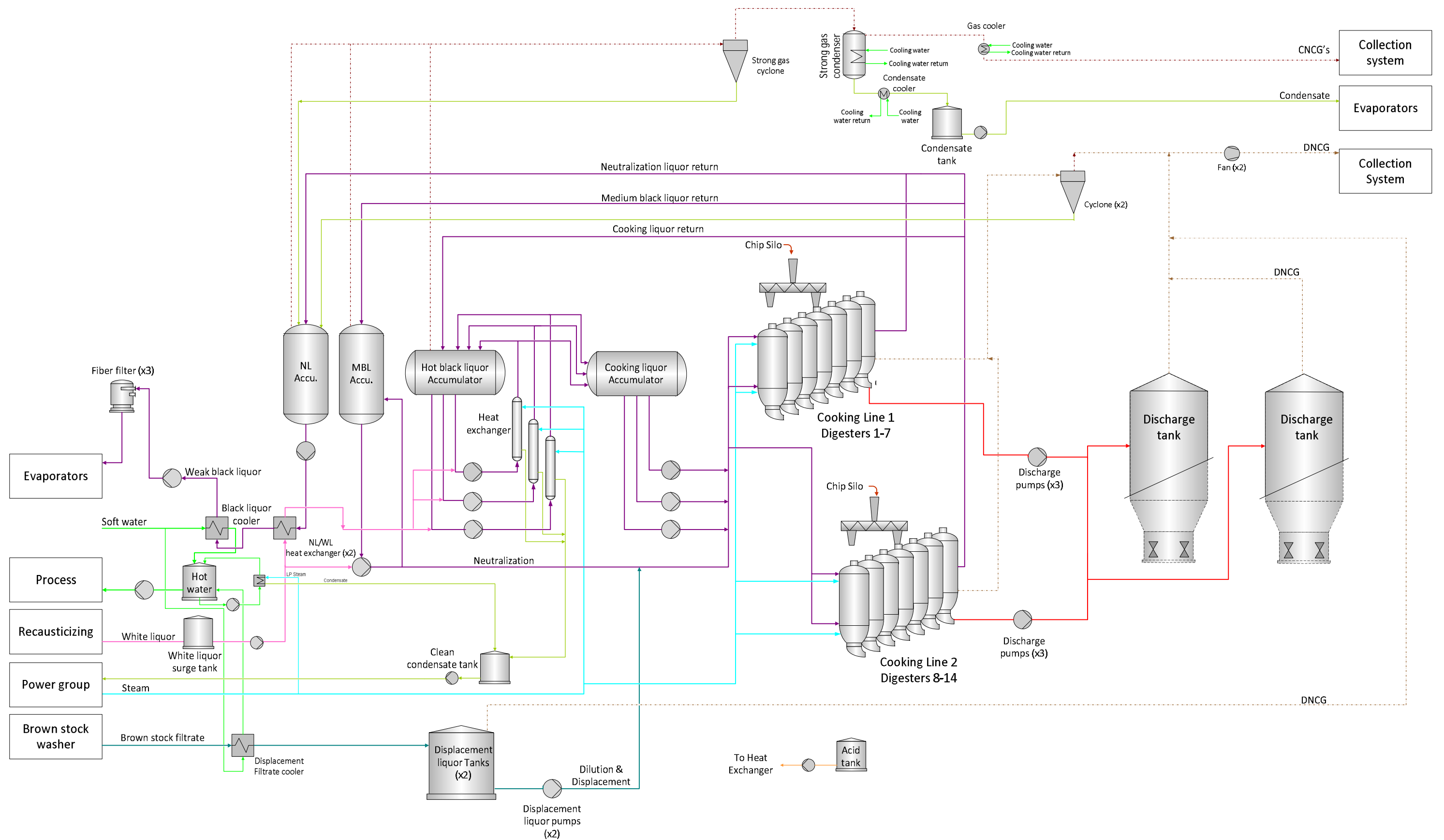
Amadeus

102001502-001

Woodhandling Department

15.02.2018
TS

REVISED 20/3/2018 10:50 AM



PRELIMINARY



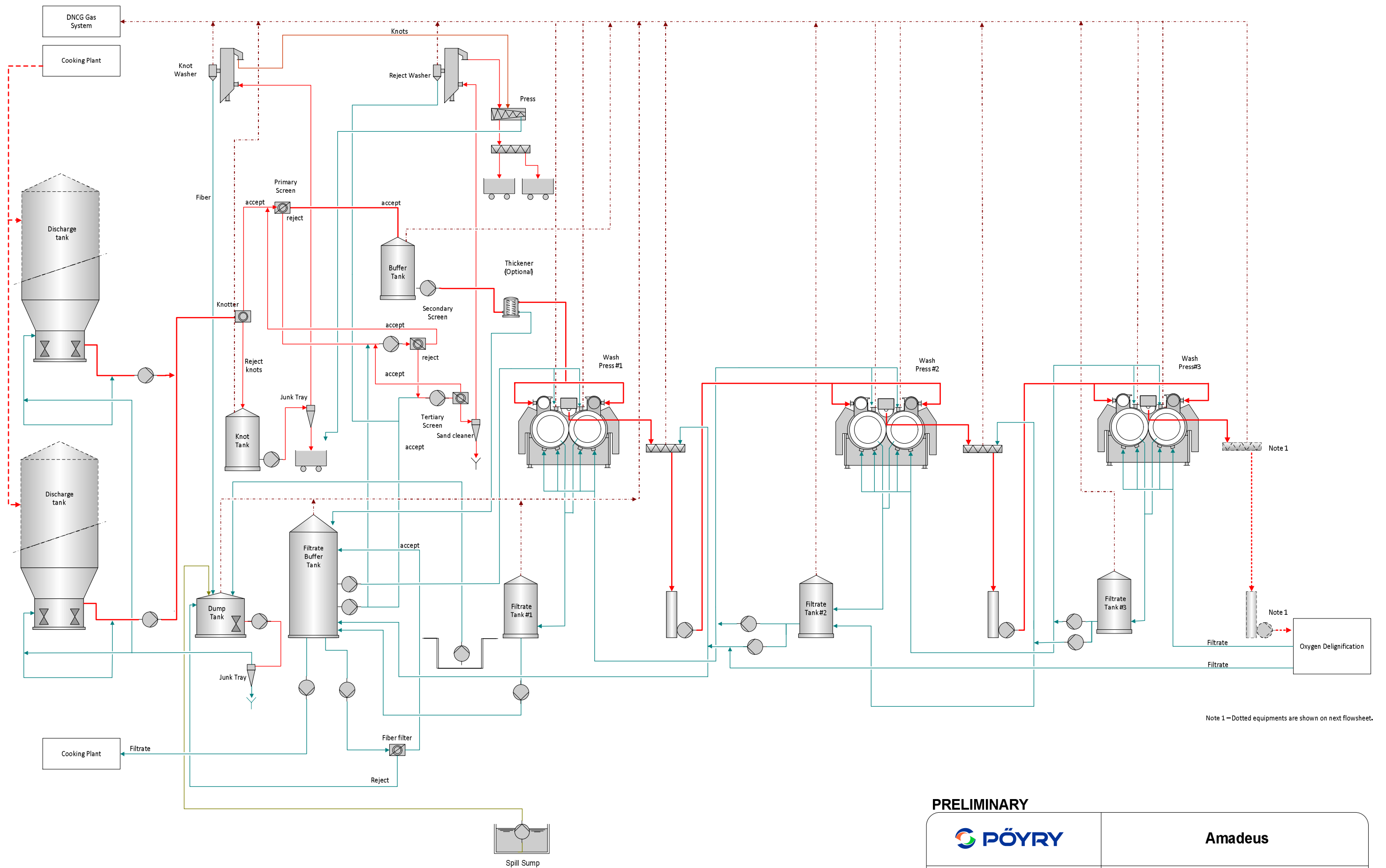
Amadeus

102001502-002

15.02.2018
TS

Hardwood Dissolving Pulp
Batch Cooking

REVISED 20/2/2018 1:42 PM



Note 1 – Dotted equipments are shown on next flowsheet.

PRELIMINARY



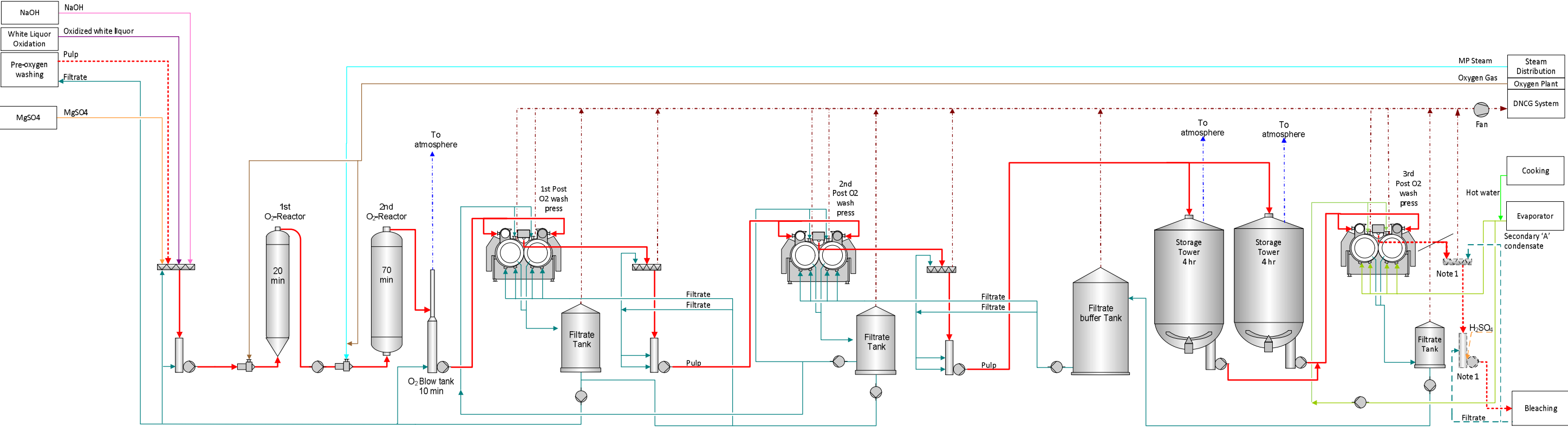
Amadeus

102001502-003

20.03.2018
TS


Screening and Pre-Oxygen Washing

REVISED 20/3/2018 10:44 AM

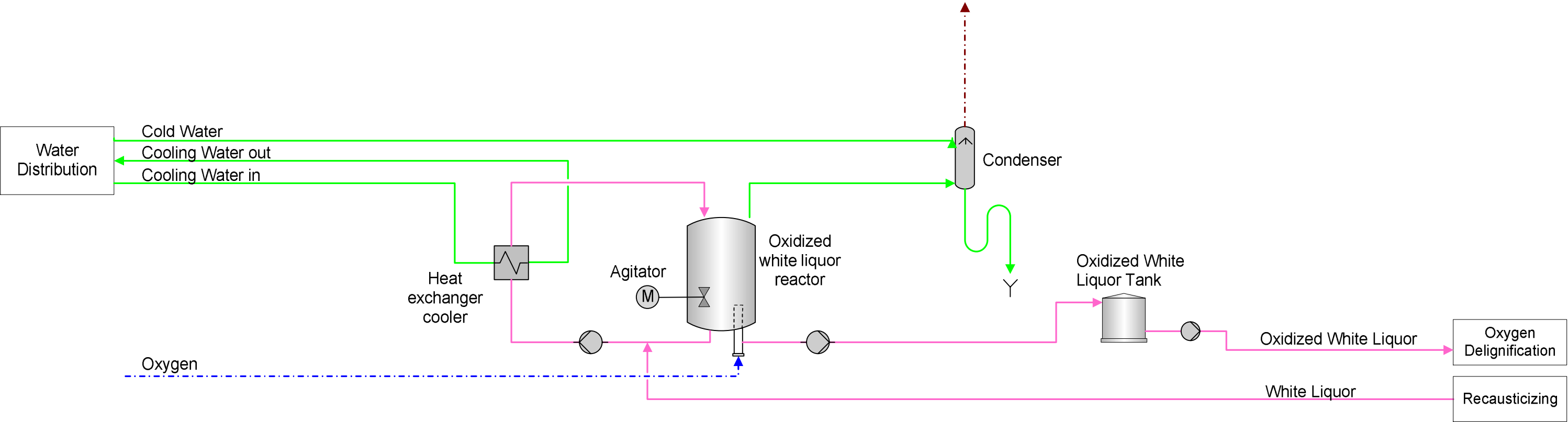


Note 1 – Dotted equipments are shown on next flowsheet.

PRELIMINARY

	Amadeus
102001502-004	Oxygen delignification and Post washing
20.03.2018 TS	

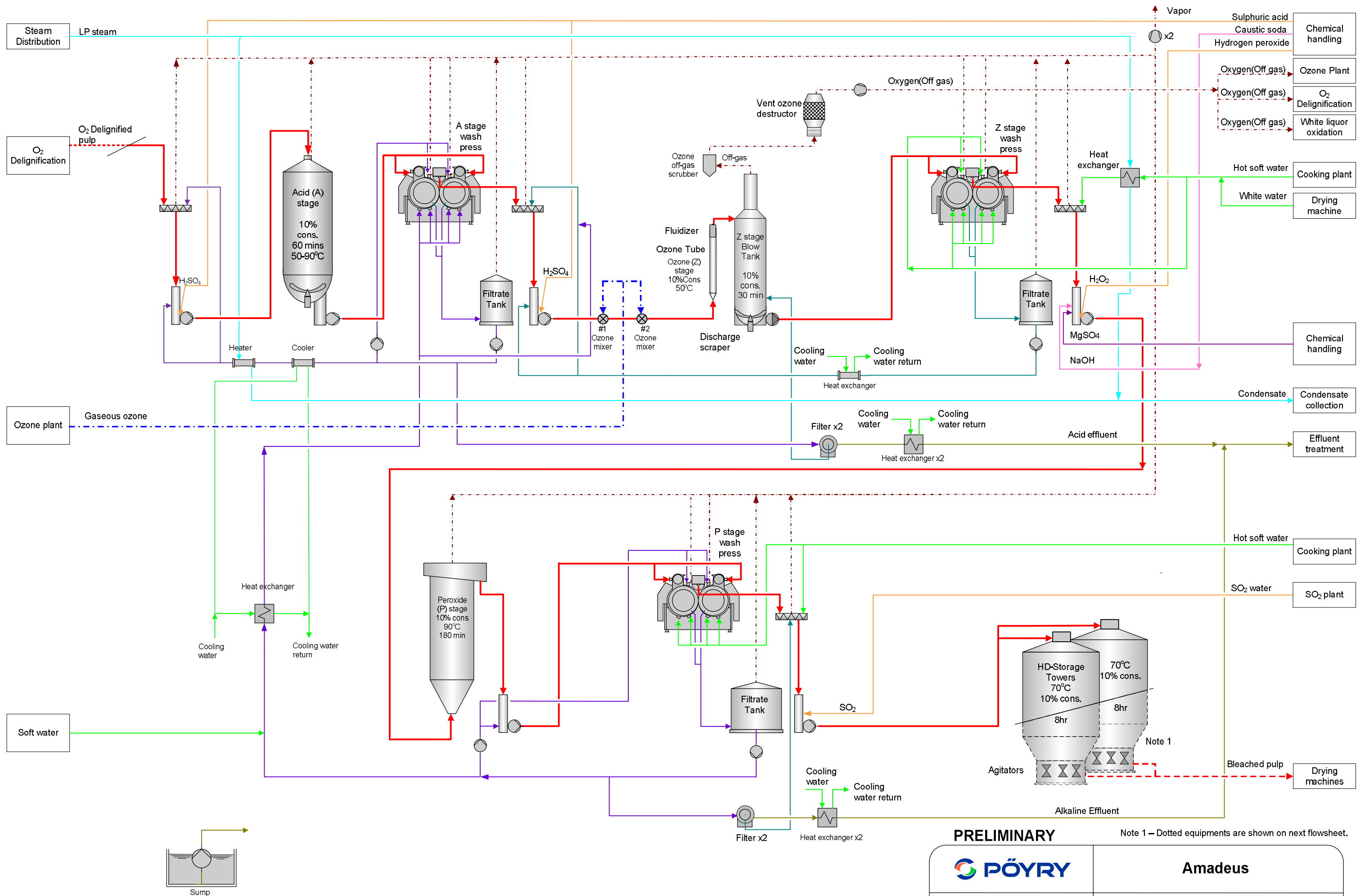
REVISED 20/3/2018 10:37 AM



PRELIMINARY

	Amadeus
102001502-005	White Liquor Oxidation
22.2.2018 TS	

REVISED 22/2/2018 9:20 AM



PRELIMINARY



102001502-006

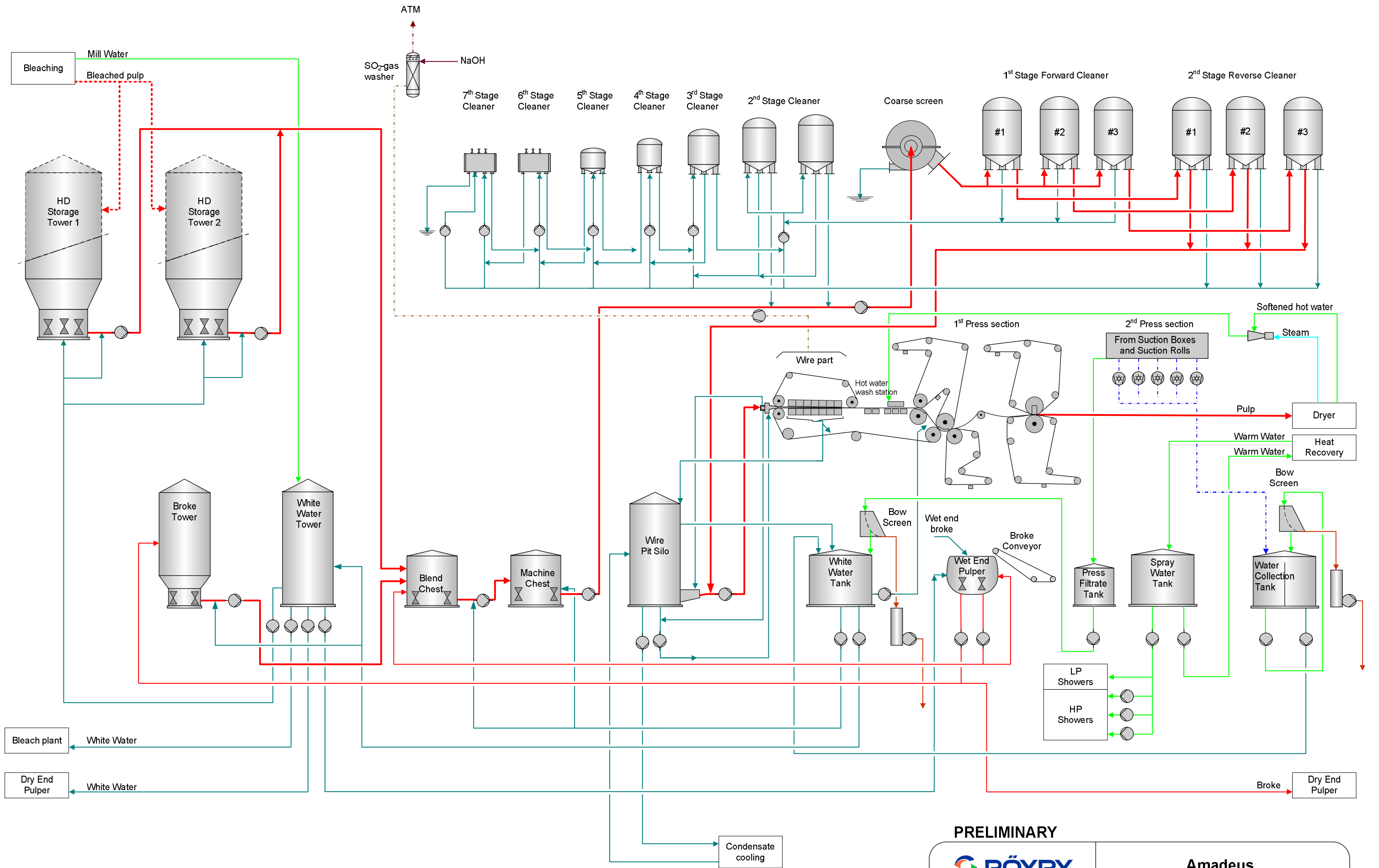
20.03.2018
TS

Amadeus

Bleaching

REVISED 20/3/2018 10:42 AM

Note 1 – Dotted equipments are shown on next flowsheet.



PRELIMINARY



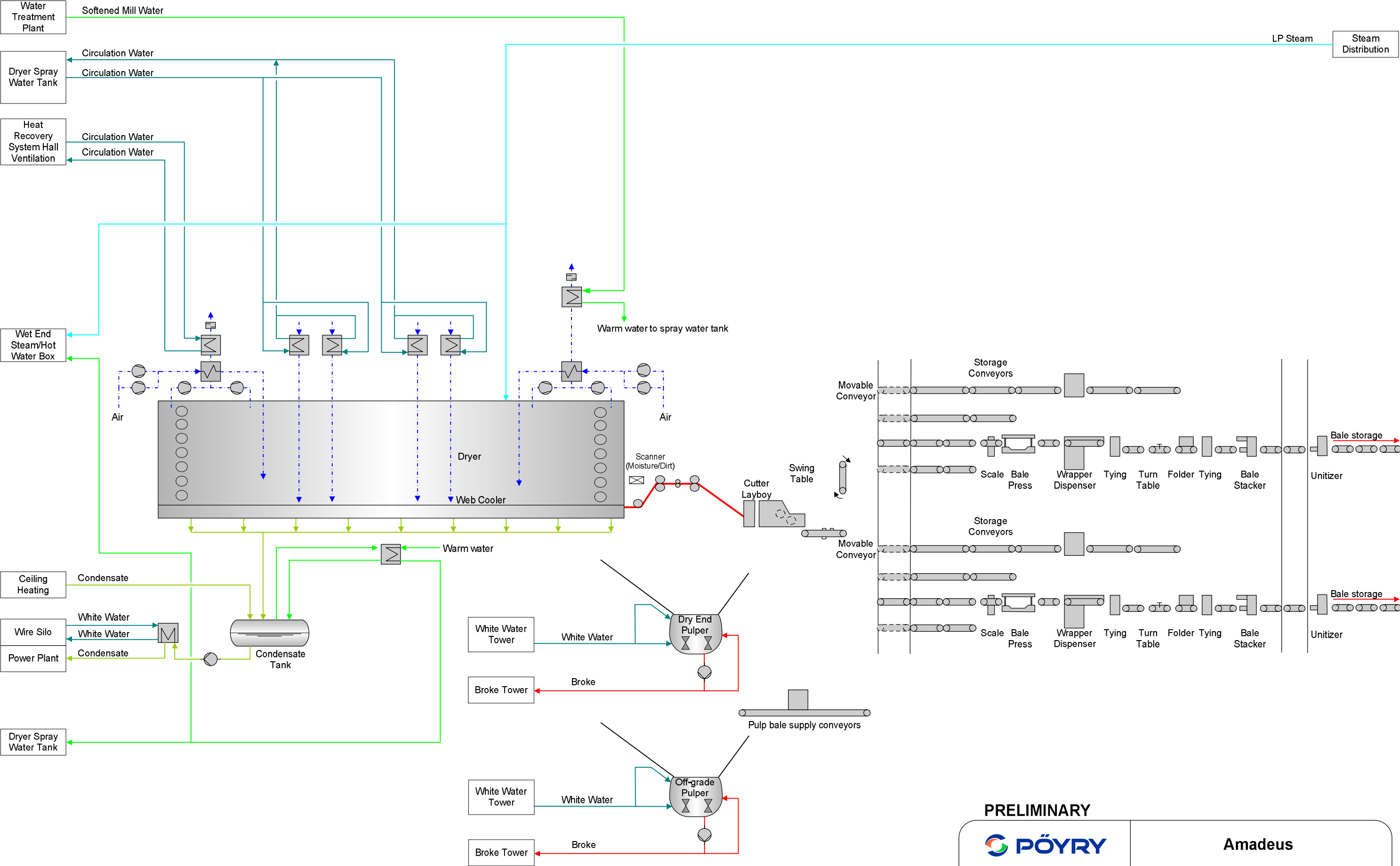
102001502-007


20.02.2018
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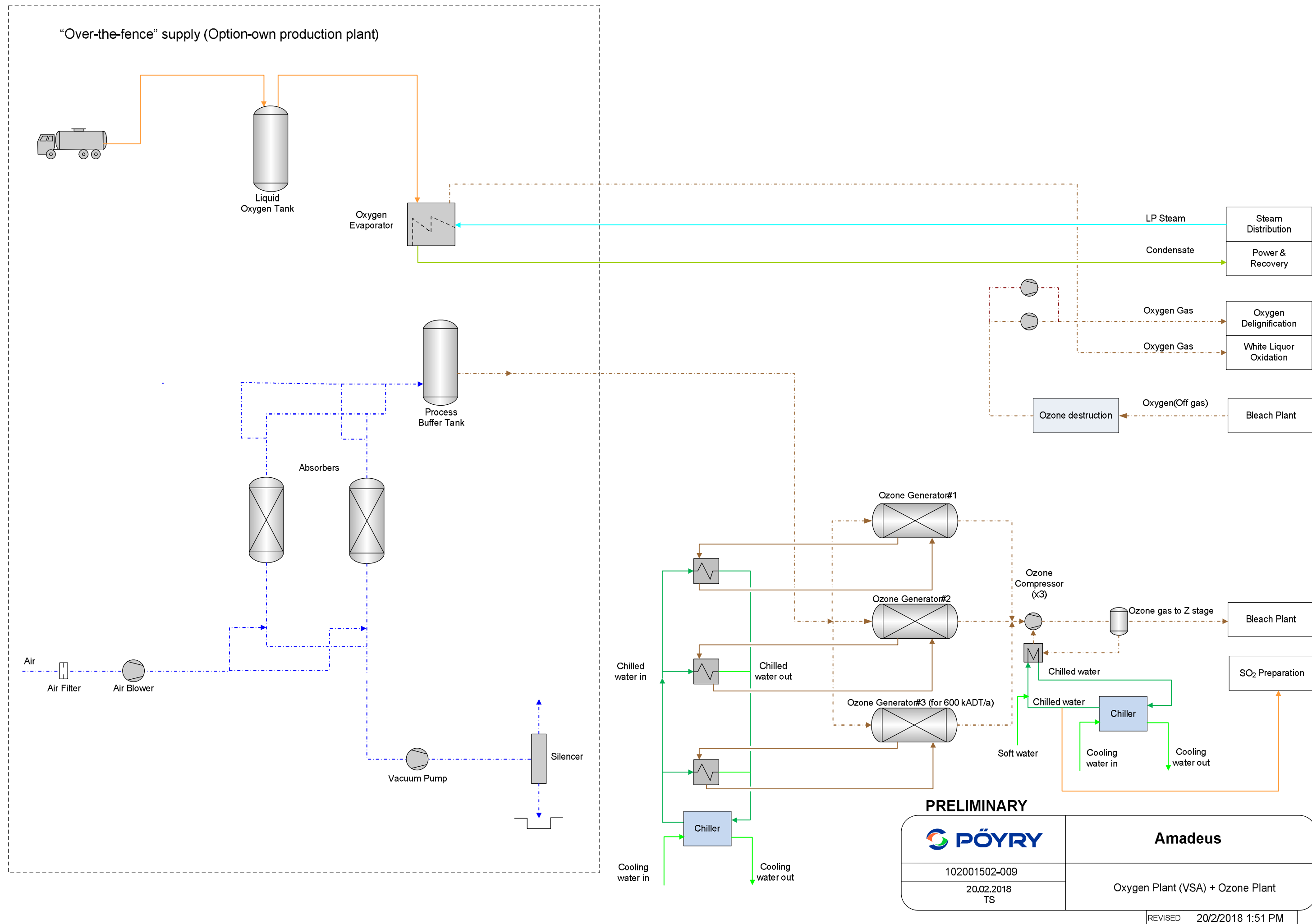
Amadeus

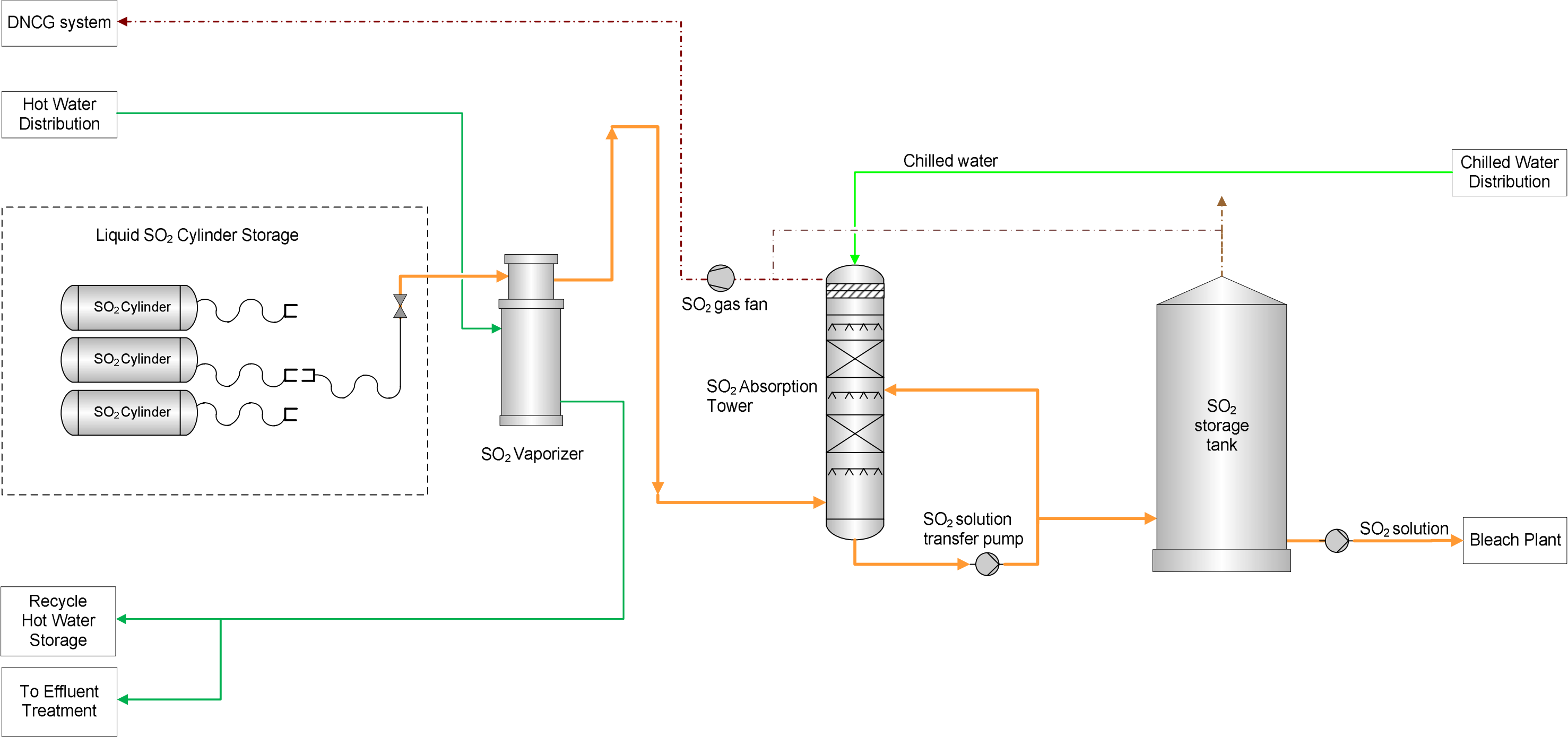
Drying Machine Stock
Preparation and Wet end

REVISED 20/2/2018 1:49 PM




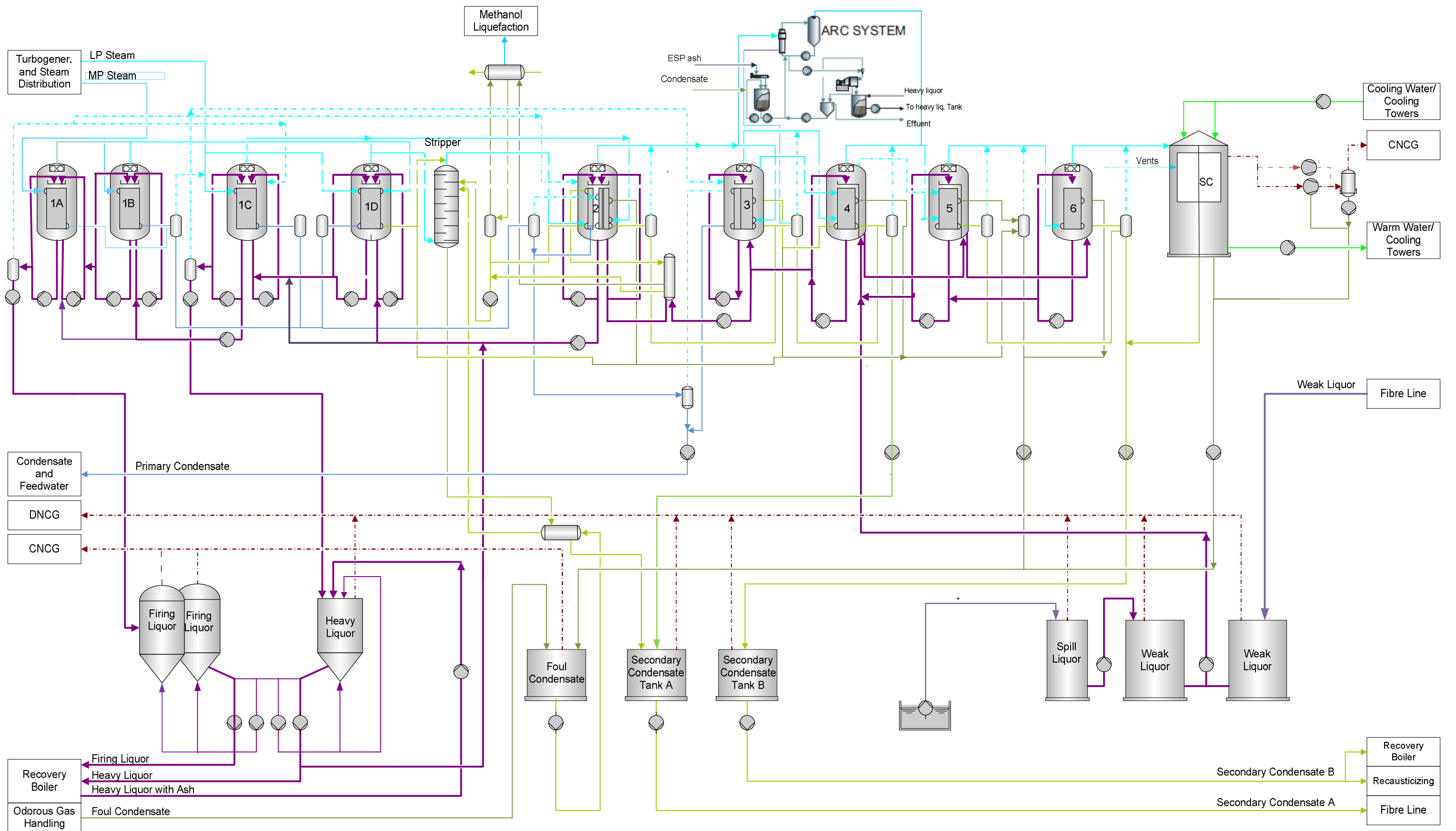
PRELIMINARY		
		Amadeus
102001502-008		Drying Machine Dryer, Cutting and Baling
20.02.2018 TS		
		REVISED 20/2/2018 1:50 PM






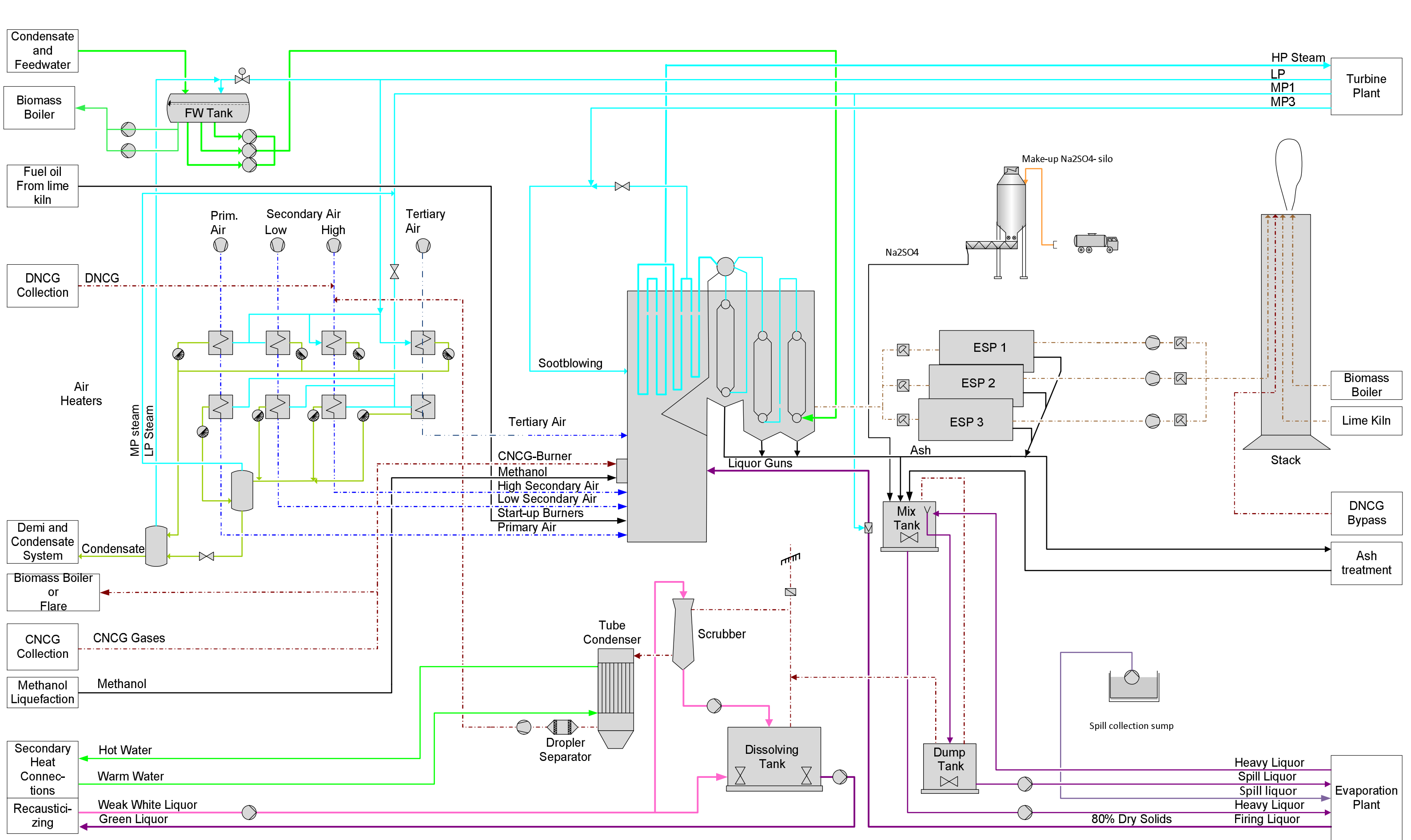
PRELIMINARY

	Amadeus	
102001502-010	Sulphur dioxide preparation plant	
20.02.2018 TS		
		REVISED 1/3/2018 7:30 PM



PRELIMINARY	
	Amadeus
102001502-011	Evaporation Plant
20.2.2018 MPe	

REVISED 16/3/2018 10:01 PM



PRELIMINARY



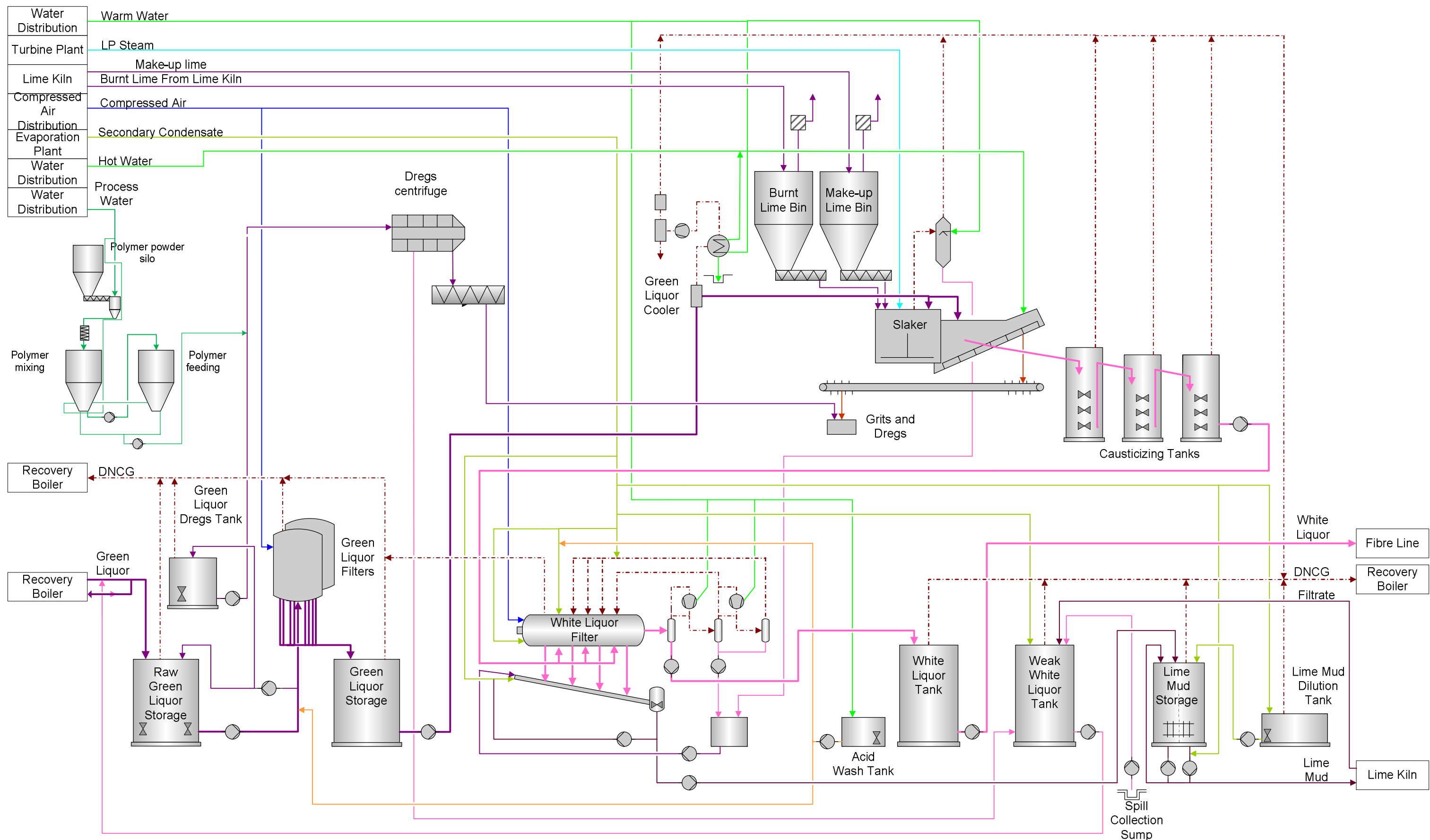
102001502-012

20.2.2018
MPe

Amadeus

Recovery Boiler

REVISED 20/2/2018 2:06 PM



PRELIMINARY



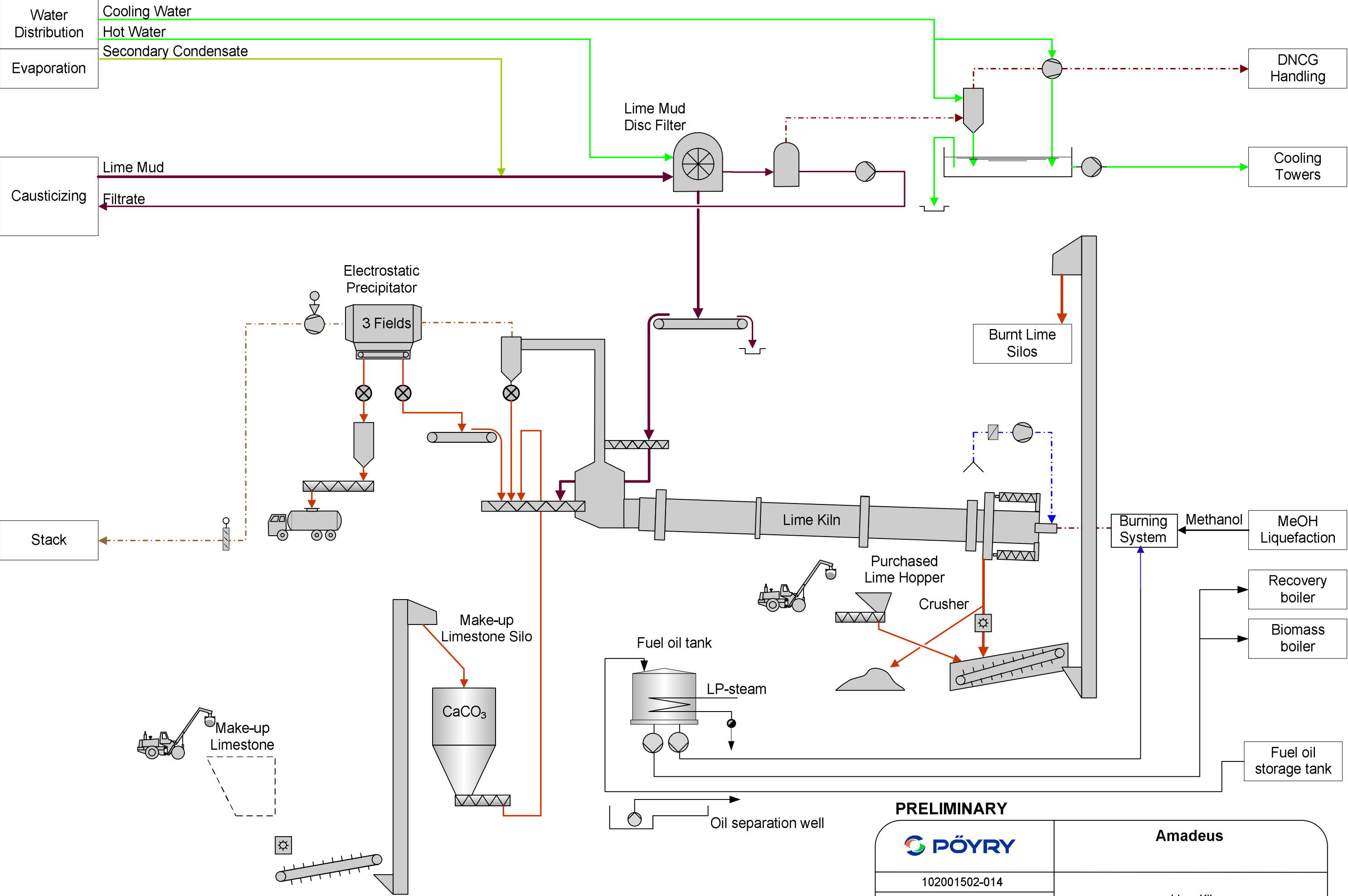
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22.02.2018
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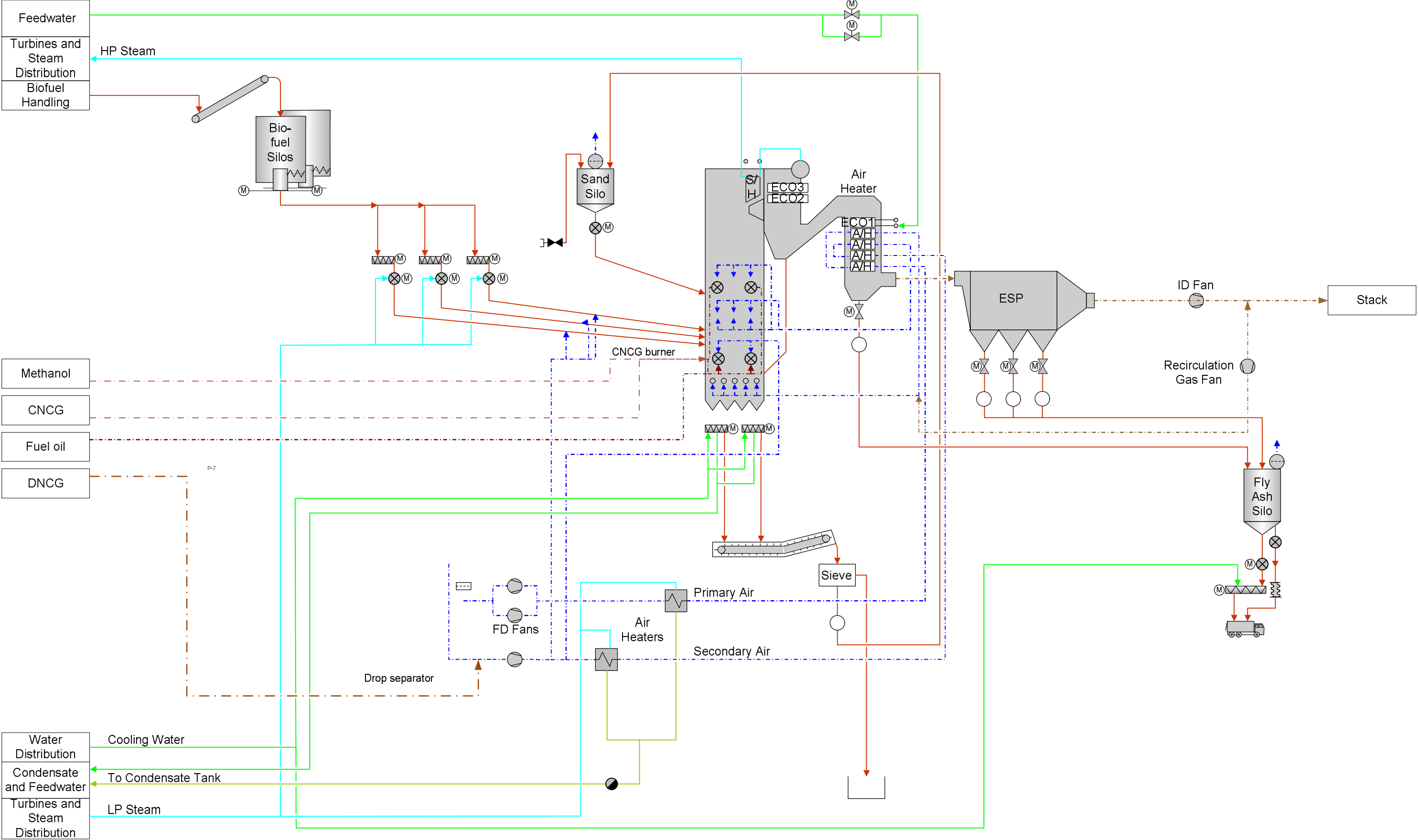
Amadeus

Recausticizing

REVISED 17/3/2018 3:55 PM



PRELIMINARY	
	Amadeus
102001502-014	Lime Kiln
22.02.2018 MPe	
REVISED 22/2/2018 9:31 AM	



PRELIMINARY



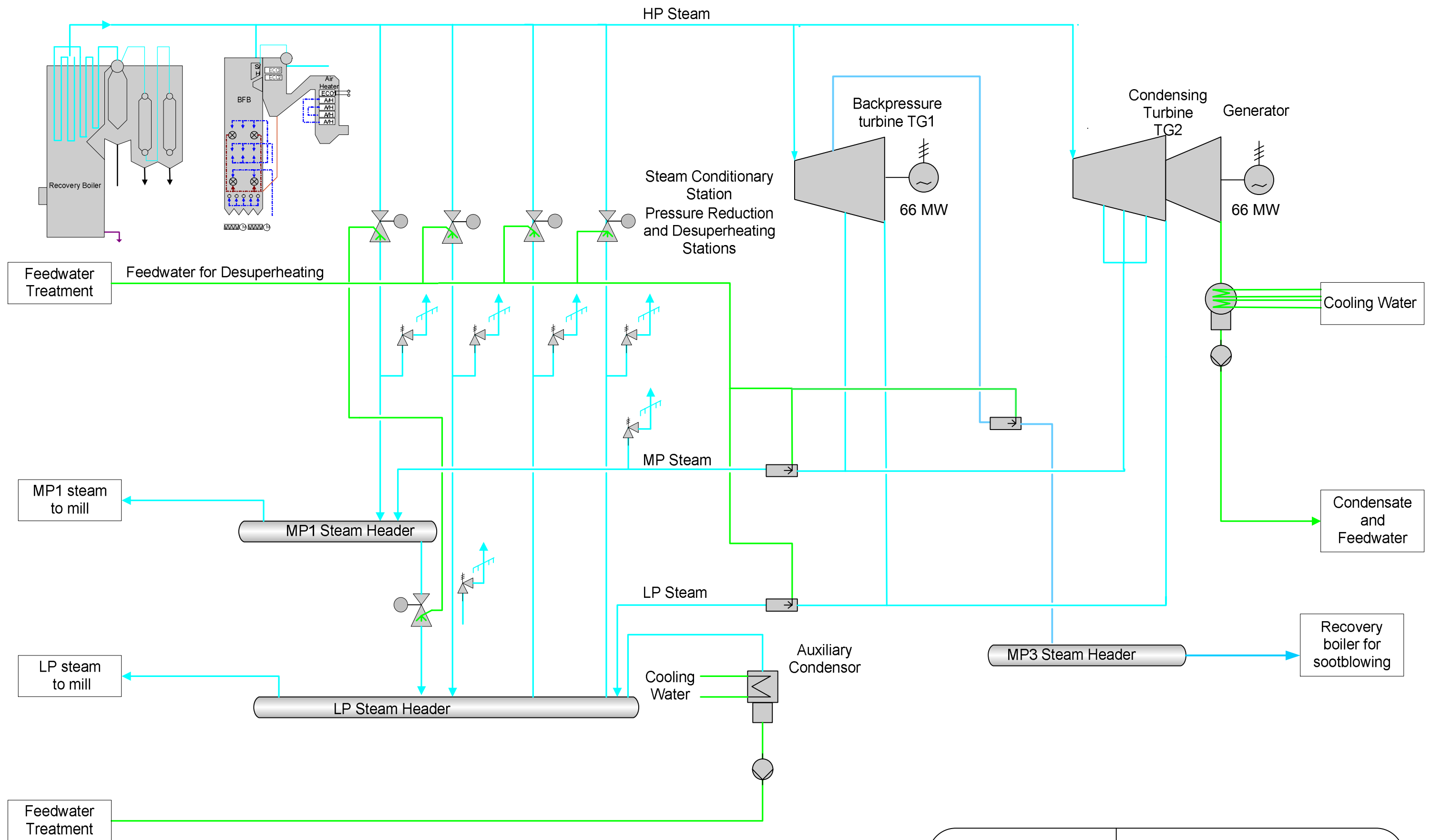
1012001502-015


22.02.2018
MPe

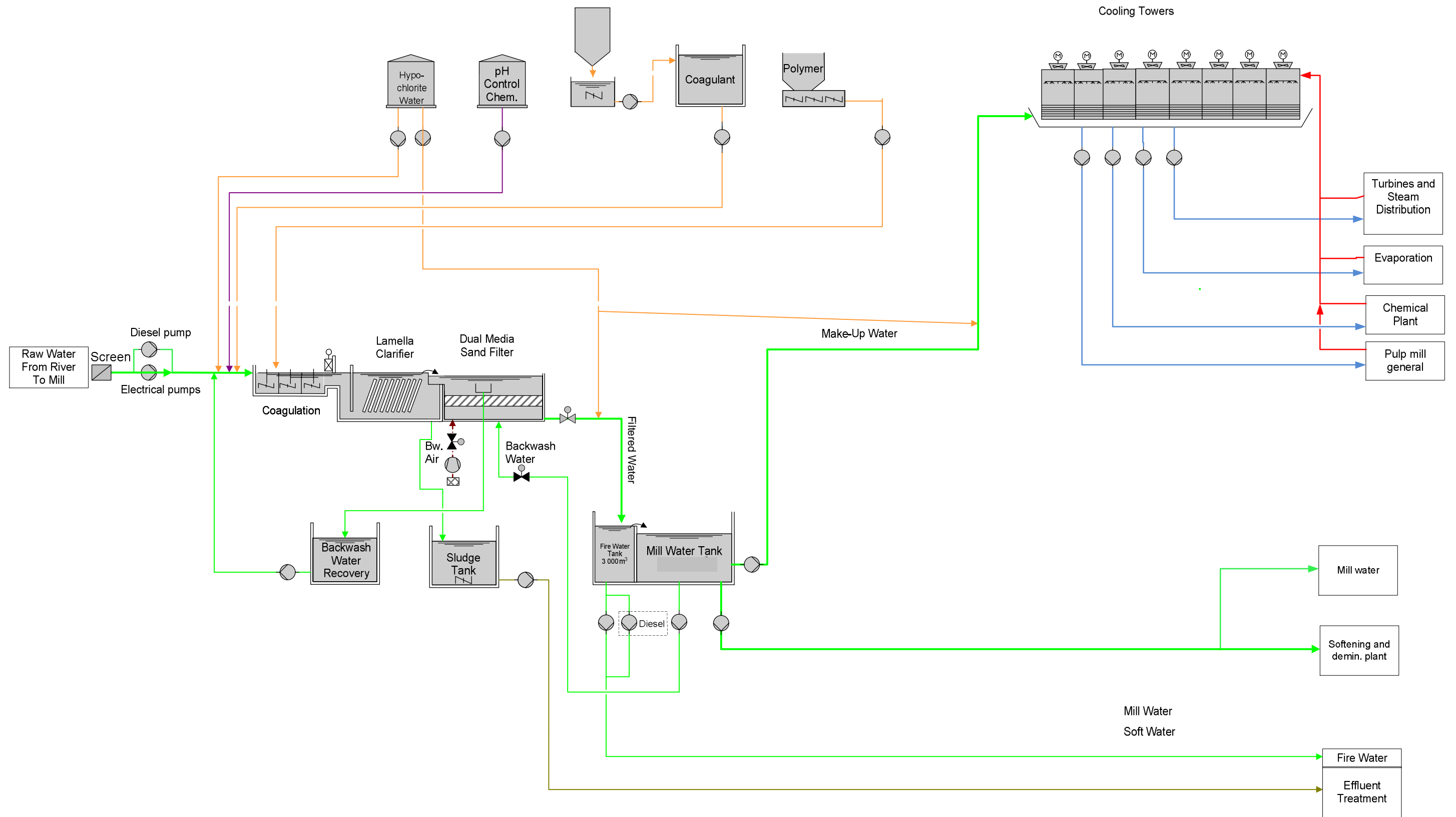
Amadeus

Biomass Boiler


REVISED 22/2/2018 9:33 AM

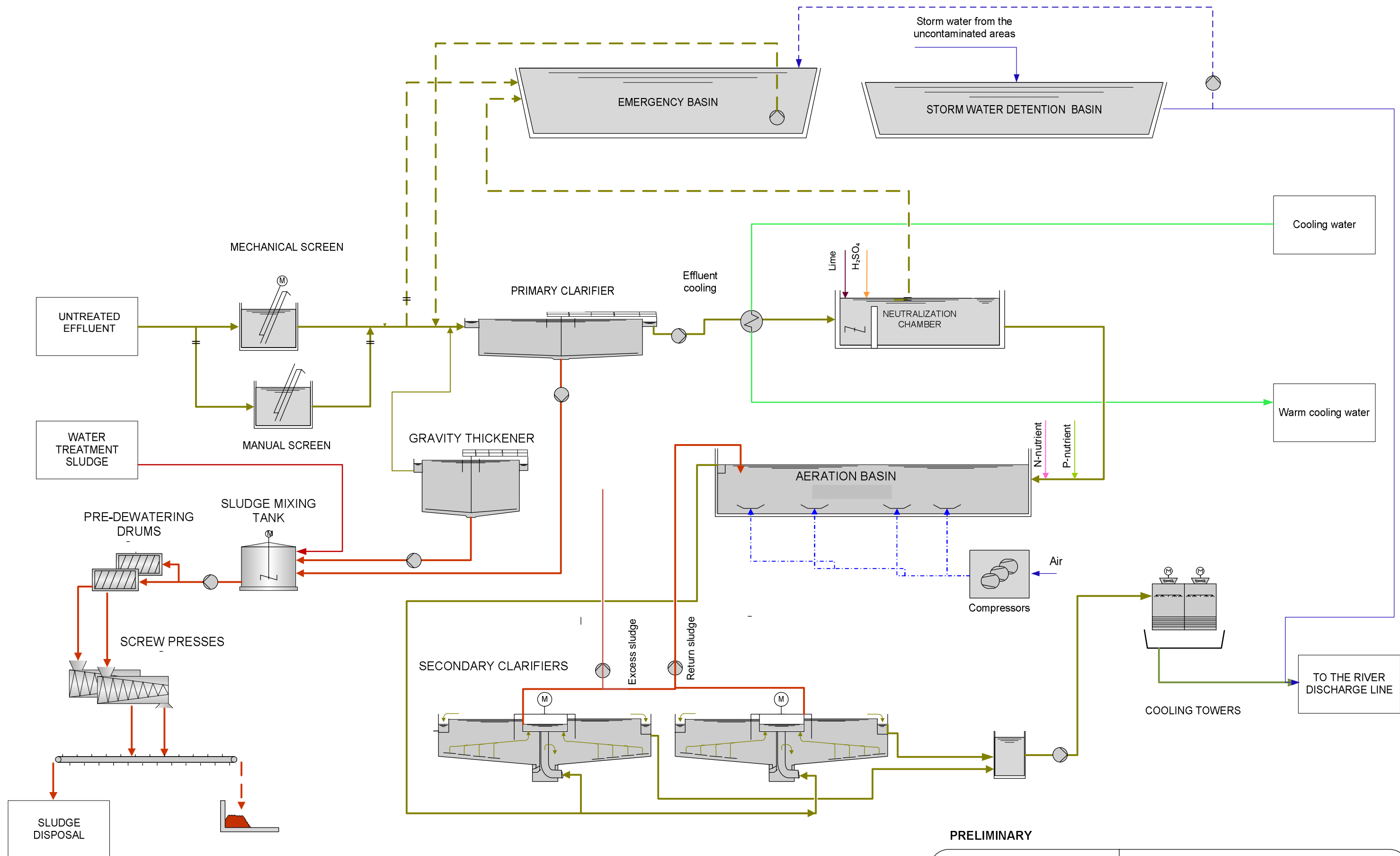


 PÖYRY	Amadeus
102001502-016	Turbogenerators
22.02.2018	
REVISED 1/3/2018 2:56 PM	



PRELIMINARY

	<p>Amadeus</p>
<p>102001502-020</p> <p>22.02.2018 JTI</p>	<p>Water Treatment and Cooling Water</p>
	<p>REVISED 1/3/2018 2:59 PM</p>



PRELIMINARY



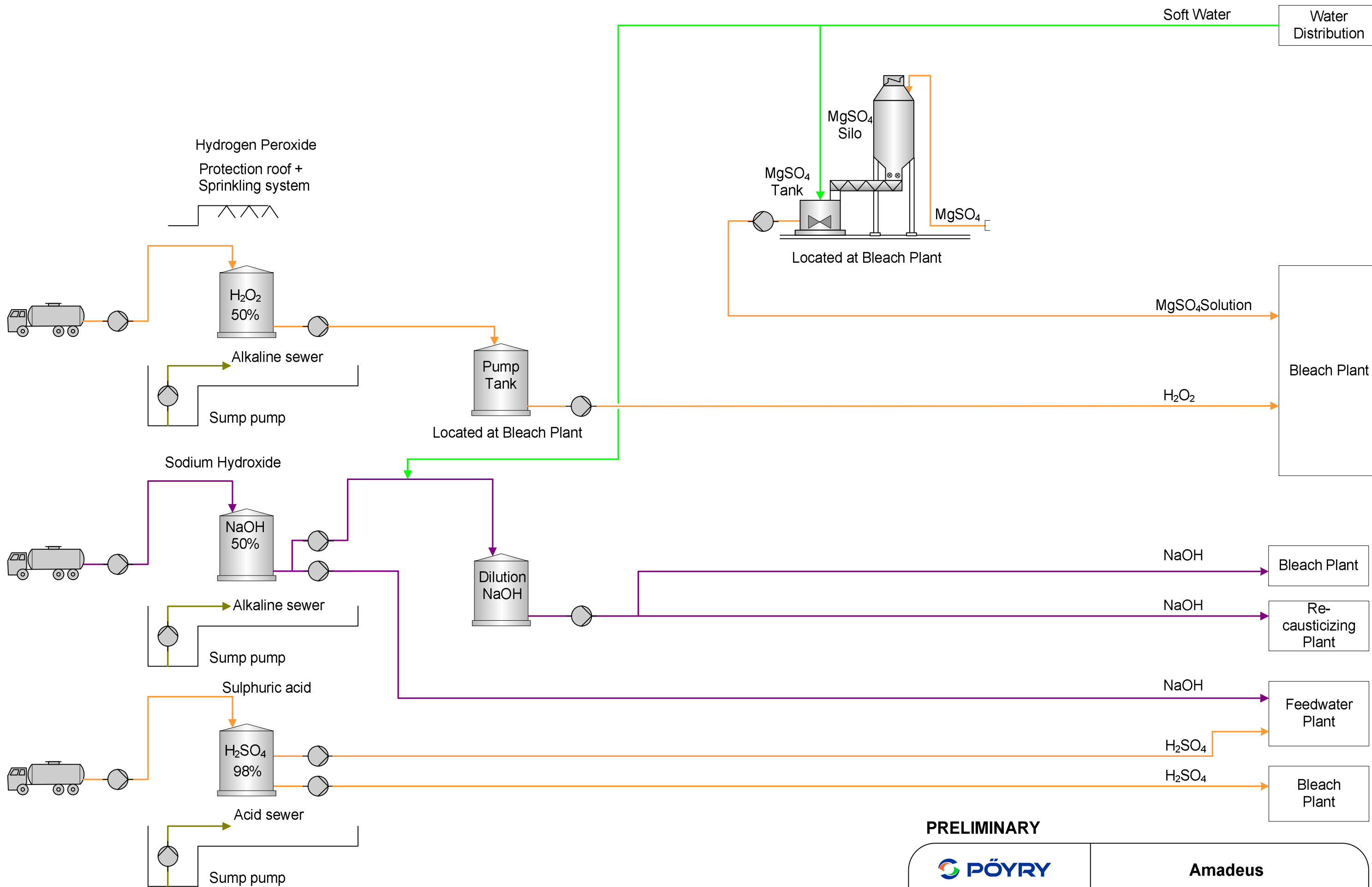
Amadeus

102001502-021

19.2.2018
MPe

Effluent treatment plant

REVISED 19/2/2018 4:45 PM



PRELIMINARY



102001502-024

22.02.2018
TS

Amadeus

Purchased Chemicals Handling

REVISED 22/2/2018 9:41 AM