

ENVIRONMENTAL IMPACT STUDY (EIA-RIMA)

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LD Celulose S.A.

Dissolving pulp mill in Indianópolis and Araguari, Minas Gerais

VOLUME III – IMPACTS ASSESSMENT

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9 ENVIRONMENTAL IMPACTS IDENTIFICATION AND ASSESSMENT

9.1 Methodological procedures for the impacts assessment

This document consists in the LD Celulose S.A dissolving pulp mill environmental impacts assessment, located in the city of Indianópolis (mill site) as well as in Araguari (water intake and treated effluent disposal pipelines), in the State of Minas Gerais.

According to CONAMA Resolution nº 01/86, the environmental impact is "any change in the physical, chemical or biological characteristics of the environment, caused by any form of matter or energy resulting from human activities, directly or indirectly, that affect: a) health, safety and well-being of the population; b) the social and economic activities; c) the biota; d) the aesthetic and sanitary conditions of the environment; e) the environmental resources quality".

Thus, the knowledge of the project characteristics and the environmental aspects of its influence area have enabled, from an appropriate methodology, to identify and evaluate the possible consequences for the natural or man-made environments in the future. The analysis of such consequences was supported by the following procedures:

- Identification of activities that generate impacts;
- Environmental impacts identification;
- Environmental impacts assessment methodology;
- Environmental impacts assessment;
- General assessment table.

The environmental diagnosis at the influence area also provided a greater knowledge of the region, allowing a prognosis related to its future development. The conclusions obtained at the impacts assessment stage will allow the proposition of mitigating measures when dealing with negative impacts, as well as the ways to maximize the positive impacts, optimizing the benefits generated by this enterprise.

The methods and criteria used in this evaluation consist in the impacts analysis arising from the enterprise actions on each environmental component (physical, biotic and socioeconomic), and later, in the detailed assessment of each environmental impact through individual worksheets, in accordance with the CONAMA Resolution nº 01/1986.

9.1.1 Identification of activities that generate impacts

To identify the activities of enterprise that generate impacts, it was made an evaluation of the actions to be carried out at the various phases of the project: planning, implementation, erection works deactivation and operation. In each of these phases, due to actions taken by the enterprise, there may be changes in the environment, which must be recorded and evaluated.

The main identified activities of the enterprise that generate impact (generator factor) for each phase were:

Planning phase: Dissemination of information about the project implementation.

Implementation phase: Earthmoving activities; Using of vehicles and machines; Noise generation; Dust generation; Solid waste generation; Sewage generation; Implementation of water intake and effluent disposal pipelines systems; Mill erection consisting of buildings, towers, chimneys; Demand for products and services and Labor mobilization.

Erection works deactivation phase: Demobilization of the temporary workforce.

Operation phase: Noise generation; Solid waste generation; Use of chemicals products; Effluent generation; Atmospheric emissions generation; Movement of vehicles; Demand for products and services and Need for manpower.

9.1.2 Environmental impacts identification

From the enterprise characterization and based on the environmental diagnosis at the influence area, it was possible to start the identification of the environmental impacts generated on the physical, biotic and socioeconomic environment into the different phases of the project: planning, implementation, erection works deactivation and operation.

To identify the impacts, there were considered the environmental factors studied in the environmental diagnosis, listed in the table below.

Table 1 – Environmental factors most likely to suffer impacts

PHYSICAL ENVIRONMENT	Soil
	Water
	Air
BIOTIC ENVIRONMENT	Terrestrial flora
	Terrestrial fauna
	Aquatic fauna
SOCIOECONOMIC ENVIRONMENT	Urban and rural structure
	Productive and economic structure
	Social structure
	Roads infrastructure
	Public finances
	Archaeological Heritage

The main mechanism used in the impacts identification was the control list (check list), containing the list of potentially main actions that can generate environmental impacts, associated with the phases of the project. The impacts identified from the enterprise actions are listed in the following table.

Table 2 – Enterprise impacts identification check list

Phases	Component	Activity (Generator Factor)	Aspect	Impact
Planning	Socioeconomic	Dissemination of information about the project implementation	<ul style="list-style-type: none"> - Jobs' offer; - Life quality improvement 	Population expectation
Implementation	Physical	Earthmoving activities and water intake and effluent disposal pipelines construction	Soil revolving and interventions near Araguari river bank	Increased erosion and siltation processes
		Using of vehicles and machines	Noise generation	Disturbance to the neighborhood
		Using of vehicles and machines	Dust and black smoke generation	Air quality change
		Solid waste generation	Improper disposal of the solid waste	Soil and/or surface and ground waters quality change
		Sewage generation	Improper disposal of effluents	Surface and/or ground waters quality change
	Biotic	Earthmoving activities	Removal of vegetation	Loss of vegetation and fauna disappearance
		Implementation of water intake and effluent disposal pipelines systems	Interventions in the river bed and land areas near the river	Aquatic ecosystems change

Phases	Component	Activity (Generator Factor)	Aspect	Impact
Implementation	Biotic	Using of vehicles	Increased vehicle traffic	Increase the risk of animals run over
	Socioeconomic	Earthmoving activities	Possibility to affect areas with potential historical and archaeological heritage	Interference to the historical and archaeological heritage
		Labor mobilization	Pressure on urban infrastructure due to increase of population represented by labor in the implementation phase	Urban infrastructure interference
		Mill erection consisting of buildings, towers, chimneys, etc.	Changing the landscape and land use	Impact on morphology
		Labor mobilization	Hiring temporary labor	Direct and indirect jobs' offer
		Demand for products and services	Growth of tertiary sector	Fomentation of local economy
		Demand for products and services	Need for accommodation places to the manpower during the project implementation	Valuation of the urban real estate market

Phases	Component	Activity (Generator Factor)	Aspect	Impact
Implementation	Socioeconomic	Demand for products and services	Growth of goods and services producing activities	Increase in tax collection
Erection works deactivation	Socioeconomic	Demobilization of the temporary workforce	End of enterprise erection works	Reduction in the number of jobs
Operation	Physical	Operational activities for the dissolving pulp manufacture	Noise generation	Disturbance to the neighborhood
		Solid waste generation	Improper disposal of the solid waste	Soil and/or surface and ground waters quality change
		Use of chemicals products	Improper storage and/or chemicals handling causing leaks or spills of hazardous products	Air, soil and/or surface and ground waters quality change
		Effluent generation	Untreated effluent disposal or improper effluent treatment	River quality change
		Operational activities for the dissolving pulp manufacture	Atmospheric emissions generation	Air quality change

Phases	Component	Activity (Generator Factor)	Aspect	Impact
Operation	Biotic	Effluent generation	Treated effluent disposal at the river	Aquatic ecosystems change
	Socioeconomic	Need for manpower	Manpower hiring for the enterprise operation	Direct and indirect jobs' offer
		Operational activities for the dissolving pulp manufacture	Demand for products and services	Fomentation of economy
		Demand for products and services	Growth of goods and services producing activities	Increase in tax collection

9.1.3 Environmental impacts assessment methodology

There are many methodological lines developed for the environmental impacts assessment: spontaneous methodologies (Ad hoc), Lists (Checklist), arrays of interactions, networks of interactions (Networks), quantitative methodologies, simulation models, overlay maps (Overlays), scenarios projection, among others.

Pöyry technology has a multidisciplinary team with vast experience and has conducted numerous environmental studies (EIA/RIMA, RAP, RAS, EAP, etc.) in various sectors, and especially in the pulp and paper sector. So, over the years, through the accumulation of experiences and increase of technical and scientific papers repertoire, Pöyry has developed its own methodology for the identification and assessment of impacts.

This methodology is based on elaboration of a control list - check-list (which in its turn, already included arrays of interactions), on which are listed the factors generators (activities), the environmental aspects and impacts on the environmental components in the various phases of the project.

The methodology of impact assessment is also based on the legal provisions (CONAMA resolution nº 01/1986) and therefore assumes temporal and spatial scales of impacts. In this study, there were employed as temporal scales the phases of planning, implementation, erection works deactivation and operation, and the spatial scales the directly affected area, the area of direct influence and the area of indirect influence. The assessment was consolidated through discussion among the members of the multidisciplinary technical team.

Thus the impacts assessment began, by qualifying the impacts in terms of their specific characteristics and indicating their magnitude (qualitative measurement) and their importance level. According to such criteria, they were characterized by the following attributes:

- The **nature/qualification**: indicating if the impact has beneficial/positive effects (P) or negative/adverse effects (N) on the environment;
- In relation to the **form of incidence**: indicating whether the impact reaches directly (D) or indirectly (I) the affected environmental factor;
- With regard to the **coverage area**: can be local (L), when it occurs in the direct influence area of the enterprise, regional (R), when it spreads in Indianópolis and Araguari cities, extra regional (ER), when it propagates to the Minas Gerais State, or strategic (E), when it connects with local and/or regional development strategies;
- The **period of occurrence**: if the impact happens immediately (I) after the start of the generating activities or in short-term (CP); medium term (MP) or long term (LP);
- With respect to impact **temporality or duration**: it refers to the impact duration, it may be temporary (T), when it occurs in a specified period, permanent (P), when it occurs throughout the project life, and cyclical (C), when it is manifested in certain time intervals;
- What involves the **reversibility level**: reversible (R), when the environmental impacted factor tends to return to original condition, or partially reversible (PR) and irreversible (I), when the environmental factor does not return to the original condition;
- With respect to the **cumulative type**: the impact is established as simple (S), cumulative type I (I), cumulative type II (II), cumulative type III (III):
 - § Simple (S): it is characterized by bioaccumulation or biomagnification processes; the impact does not accumulate in time or in space; it does not induce or increase any other impact; it does not present any kind of interaction with other(s) impact(s); and it does not show any increase in past and present actions (European Commission, 2001);
 - § Cumulative type I (I): cumulative impact by bioaccumulation;
 - § Cumulative type II (II): cumulative impact by repetition or overlapping, accumulating in time and/or in space;
 - § Cumulative type III (III): cumulative impact by interactivity or synergy.

- According the **magnitude**: it refers to the impact spread level on the studied element, and it may be low (B), medium (M) or high (A), depending on the coverage area;
- In relation to the **possibilities of mitigation**: the impact is mitigable (M), partially mitigable (PM) or not mitigable (NM);
- In relation to the **importance**: it is established as low (P), medium (M) or high (G), considering the impact magnitude and the impacts possibilities of mitigation on environmental factors. In order to establish a combinatory rule of magnitude and possibilities of mitigation attributes for defining the importance, it was elaborated the following table:

Table 3 – Criteria for assessing the impacts at importance component

Importance	Criteria
Low	<ul style="list-style-type: none"> - Low Magnitude and mitigable (or low potentiation degree for the positive impacts) - Low Magnitude and partially mitigable (or medium potentiation degree for the positive impacts) - Medium Magnitude and mitigable (or low potentiation degree for the positive impacts)
Medium	<ul style="list-style-type: none"> - Low Magnitude and not mitigable (or high potentiation degree for the positive impacts) - Medium Magnitude and partially mitigable (or medium potentiation degree for the positive impacts) - High Magnitude and mitigable (or low potentiation degree for the positive impacts)
High*	<ul style="list-style-type: none"> - Medium Magnitude and not mitigable (or high potentiation degree for the positive impacts) - High Magnitude and partially mitigable (or medium potentiation degree for the positive impacts) - High Magnitude and not mitigable (or high potentiation degree for the positive impacts)

* Except when the impact although evaluated with low or medium magnitude and mitigable is of extreme importance to the environment and/or the society.

Source: Pöyry, 2018.

- Proposed measures **resolution** levels, to reduce or increase a given impact: low (B), medium (M) or high (A).

Each impact assessment has been carried out according to the table shown below, which explains the attributes that were identified during the analysis.

In this methodology, the mitigating measures, in the case of negative impacts, or potentialize measures capable to increase the positive impacts are provided and related to the technical reasons, being evaluated the impact resolution level (high, medium or low). From the impact measurement and the proposed measures to the impact it was

set the impact level of importance, taking into account the environmental situation before the project implementation.

In the case of a positive impacts (beneficial), it should be adopted measures to make the most of the benefits; are called measures capable to potentialize the impacts.

Table 4 – Basic script to the potential environmental impacts assessment and the mitigating measures

Potential environmental impact	
Impacts that may result in changes into the environment.	
Environmental aspect	
Elements of the activities, products or services of an organization that can interact with the environment, causing or may cause environmental impacts, either positive or negative.	
Potentially impact generator factor	
Any form of matter or energy resulting from human activities that directly or indirectly affect the health, safety, populations welfare and/or the biota, the social and economic activities and the infrastructure.	
Technical reasons	
Impacts analysis, with the technical and scientific reasons for their assessment.	
Impact characterization	
The environmental impacts characterization is carried out according to the current environmental legislation and in accordance with the following specific characteristics and attributes:	
Nature/qualification:	positive/beneficial or negative/adverse
Form of incidence:	direct or indirect
Coverage area:	local, regional, extra regional, strategic
Period of occurrence:	immediately / short term, medium term or long term
Temporality or duration:	temporary, permanent or cyclical
Reversibility level:	reversible, partially reversible or irreversible
Cumulative type:	simple, cumulative type I, cumulative type II or cumulative type III
Magnitude:	high, medium or low
Mitigation possibilities:	mitigable, partially mitigable or not mitigable
Importance:	high, medium or low
Potentialization possibilities:	high, medium or low

Measures resolution levels: **high, medium or low**

Mitigating measures or measures capable to potentialize

Actions that aim to reduce or minimize the negative impacts or potentialize the positive impacts.

Responsible for the measures implementation

Indicates the responsible for the application of the measures.

Prognosis after the implementation of the measures

Impact assessment after the implementation of the measures.

9.1.4 Environmental impacts assessment

After identified the activities that generates impacts, the environmental impacts and set the assessment methodology, the environmental impacts evaluation in the influence areas began, and the mitigating or capable to potentialize measures to be applied were proposed on the basis of the change level which may occur in the physical, biotic and anthropic environment at the different phases of the project: planning, implementation, erection works deactivation and operation, as described below.

9.1.4.1 Planning Phase

9.1.4.1.1 Socioeconomic Environment

9.1.4.1.1.1 Population expectation

Potential environmental aspect

Jobs' offers resulting from project implementation and consequently improving the population life quality.

Potential impact generator factor

Dissemination of information about the project implementation to the population.

Technical reason

As soon as the dissemination of enterprise implementation reaches the population, an expectation is raised in the region about the jobs offers.

According to similar projects, the jobs' generation of such enterprise benefits the local and the regional population.

According to the IBGE, the busy people are categorized according to the following groups: owners or company members with a formal role, such as CEOs and directors; registered non-construction personnel; and construction personnel, such as: superior level staff (managers, leaders and supervisors), also masters, workers, shipbuilders, carpenters, bricklayers, maids, etc., with an activity role in the company. In 2015, the busy people in Indianópolis city corresponded only to 845 people, equivalent to 12.6%

of the total population. While in Araguari city the busy people in 2015 were 24,687 people, equivalent to 21.2% of the total population.

The busy people in both cities in 2015 were less than 50% of the total population, meaning that not many people had formal registered jobs.

Having said that, this enterprise is an attractive of jobs' generation to the population, since it will need jobs from various types: basic, outsourcers and specialized.

The population also expects an improvement in the life quality through the development of municipal infrastructure in health, education, sanitation, etc. departments, since the higher tax collection generated by the enterprise can be converted into the municipalities infrastructure improvement.

Therefore, the population expectations in general is positive, however it is important to emphasize the need for implementation the Social Communication Program with the local population. The Program should be done, especially, aiming the presentation of the project to the main Indianópolis and Araguari community representatives, because it is important for the company's good image to the population and show transparency with the municipalities.

Impact characterization

Nature:	Positive
Form of incidence:	Direct and indirect
Coverage area:	Local, regional, extra regional and strategic
Period of occurrence:	Medium term
Temporality or Duration:	Temporary
Reversibility level:	Reversible
Cumulative type:	Simple
Magnitude:	Medium
Importance:	High
Potential possibilities:	High
Measures resolution level:	High
Area of influence:	AID and AII

Potential measures

- Project disclosure, reporting capacity data, technology to be used, environmental control systems, number of jobs, information on the enterprise impacts, among others to all stakeholders, especially through the Social Communication Program.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

The project dissemination to all stakeholders (community, employees, suppliers, Government, customers, etc.) and the doubts clarification of the enterprise that may arise, will bring confidence and satisfaction to the population regarding the project implementation, contributing for the good image and transparency of the company.

9.1.4.2 Implementation phase

9.1.4.2.1 Physical Environment

9.1.4.2.1.1 Increased erosion and siltation processes

Potential environmental aspect

Earthmoving activities and water intake and effluent disposal pipelines construction.

Potential impact generator factor

Soil revolving and interventions near Araguari river bank.

Technical reason

It is foreseen a soil balance from the earthwork activities between cut and fill, so that the areas required to send-off and loan material offsite will be minimized, but if they are necessary, these areas will be properly licensed.

The removed topsoil can be reused as a substrate for landscaping and gardening purposes in the project areas.

According to the environmental diagnosis, it was found that the main type of soil presented in ADA is called “Cambissolo Háplico”, formed by thick and well drained soils, generally with low to moderate susceptibility to erosion.

The equipment to be used during the execution of the earthworks will be the blade tractors, loaders, excavators, tank trucks, dump trucks and wagons, among others.

Apart from earthworks in the area of the enterprise, interventions in areas near the Araguari river bank for construction of the water intake and the effluent disposal pipelines can increase turbidity and concentration of suspended material in the Araguari river.

In relation to the works which will be carried out in the terrain near the river bank to build the water intake and the effluent disposal pipelines, project foresees preventive protection measures for sediment transportation to Araguari river. It is being preferred planning the earthwork execution in dry periods in order to reduce the possibility of erosion due to the soil slipping susceptibility in the rainy periods. The temporary

drainage system and structures for material containment construction will prevent the potential solids drag to the water bodies, and it should not occur silting.

In addition, minimizing the exposure time of the areas without covered vegetation, and tracking and supervising the works are some of the measures to be adopted during the project implementation to prevent environmental impacts.

Besides that, the rainwater will be conducted through proper slope to water bodies, being drained naturally in the area.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local
Period of occurrence:	Immediately
Temporality or Duration:	Temporary
Reversibility level:	Irreversible
Cumulative type:	Type II
Magnitude:	Medium
Importance:	Low
Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	ADA

Mitigating measures

- Plan the soil revolving and cleaning field works execution preferably during dry periods in order to reduce the possibility of erosive events due to the soil slipping susceptibility in the rainy periods;
- Minimize the exposure time of areas without covered vegetation;
- Store in proper location the organic top soil layer, for its later reuse in landscape and gardening purposes in the project area;
- Build temporary drainage system and sedimentation boxes around the excavation works, to retain solid, avoiding siltation of the water body.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

It is not expected to have changes in water quality due to sediment transportation, since the project includes measures to mitigate this impact.

9.1.4.2.1.2 Disturbance to the neighborhood

Potential environmental aspect

Using of vehicles and machines.

Potential impact generator factor

Noise generation.

Technical reason

It is expected that during the construction phase of the enterprise there will be a significant increase in traffic of vehicles, like machinery, trucks and buses in local access routes, because the work will require a certain quantity of material, equipment, machinery, various inputs and transportation of hired staff.

An impact resulting from the increase in the traffic of vehicles on the road refers to the noise generation.

The periodic maintenance of vehicles and equipment plays a fundamental role in the control of noise and safety, besides increasing the useful life of the equipment. The machines higher level of noise causes with their use are the following: wear of gears, bearings, lubrication, imbalance of rotating elements, obstructions in air pipes, cutting not sharp devices, clogged and damaged silencers, noise attenuator device removal, etc. (BISTAFA, 2011).

Noise is an important factor to be observed for mill integration with neighboring communities.

The noise levels, both daytime as at night time must meet within the NBR ABNT 10,151 standard.

In the surrounding area of the enterprise predominates agricultural activities. The most immediate presence of agglomeration population is approximately 20 km away towards South, being the urban area of Indianópolis city.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local and regional
Period of occurrence:	Immediately

Temporality or Duration:	Temporary
Reversibility level:	Reversible
Cumulative type:	Type II
Magnitude:	Low
Importance:	Low
Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	ADA, AID

Mitigating measures

- Follow the guidelines of the Environmental Construction Program – PAC, for the noise generation, such as:
 - Conduct activities predominantly during the day time;
 - Conduct regulating maintenance of machines, trucks and vehicles;
 - Monitor noise levels during the implementation phase.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

There should be no nuisance to the neighborhood with respect to noise generated by the movement of vehicles in the implementation phase, given that the measures will be implemented, moreover, the closest population is approximately 20 km away from the site.

9.1.4.2.1.3 Air quality change

Potential environmental aspect

Using of vehicles and machines.

Potential impact generator factor

Dust and black smoke generation.

Technical reason

It is expected that during the construction phase of the enterprise there will be a significant increase in traffic of vehicles, like machinery, trucks and buses in local access routes, because the work will require a certain quantity of material, equipment, machinery, various inputs and transportation of hired staff.

The vehicular traffic, both on the access roads to the yard of works as on the paved existing roads of the region, during the implementation phase of the project, may cause an increase in pollutants in the atmosphere due to vehicles exhausts gases emission.

When regulating the machines engines as preventive maintenance of trucks and vehicles as well as the monitoring the black smoke emission from diesel-powered vehicles, this impact will be minimized.

Other impact caused by the vehicles traffic is the generation of dust, related to traffic on unpaved roads, which may be transported with the winds of the region. An important point is that the new internal circulation routes and work yard pavement will be watered during the execution of the services.

In addition, the trucks carrying soil, rocks and all powder load material must be covered, preventing the release of particles and dust.

For the air quality assessment, as shown in the environmental diagnosis, two monitoring campaigns in one sampling point was carried out in the area near the future enterprise.

These campaigns could verify that, with regard to sampled particulate pollutants: total suspended particles-PTS and inhalable particles-PI (PM10), whose air quality standards are established by CONAMA Resolutions n° 03/1990, taking into account the weightings of FEAM and the Ministry of Cities, where in this work is considered to be applicable the primary air quality standards, the results have shown compliance to both parameters standards.

It should be noted that in the surrounding area of the enterprise predominates agricultural activities. The most immediate presence of agglomeration population is approximately 20 km away towards South, being the urban area of Indianópolis city.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local and regional
Period of occurrence:	Immediately
Temporality or Duration:	Temporary
Reversibility level:	Reversible
Cumulative type:	Type II
Magnitude:	Low
Importance:	Low

Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	ADA, AID

Mitigating measures

- Follow the guidelines of the Environmental Construction Program – PAC, to minimize the generation of dust and black smoke, such as:
 - Conduct regulating maintenance of machines, trucks and vehicles;
 - Perform monitoring to control black smoke emission in diesel-powered vehicles;
 - Wetting the internal traffic routes and the work yard pavement during the execution of the services, when necessary; and
 - Cover the trucks which transport soil, rocks and all powder material with canvas.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

There should not be any nuisance to the neighbourhood regarding the emission of dust and black smoke generated by the movement of vehicles in the implementation phase, whereas the mitigating measures shall be implemented, in addition, the nearest agglomeration population is located approximately 20 km away from the site.

9.1.4.2.1.4 Soil and/or surface and ground waters quality change

Potential environmental aspect

Improper disposal of the solid waste.

Potential impact generator factor

Solid waste generation.

Technical reason

During the project implementation phase there will be generated several types of solid waste as: rubble (concrete block, brick, wood), metal, paper/cardboard, plastics, rubber/tires, glass, fluorescent lamps, batteries, health service waste, equipment maintenance wastes (like oil) and organic waste (leftover meals).

The NBR 10,004/2004 classifies solid waste in Hazardous Waste (Class I), Non-hazardous Waste and Not Inert (Class IIA) and Non-hazardous Waste and Inert (Class IIB). The CONAMA Resolution nº 307/2002 establishes guidelines, criteria and

procedures for the management of construction waste. Most of the waste generated in the construction phase is classified as Non-hazardous Waste and Not Inert (Class IIA) according to NBR 10,004/2004 and Class A/B according to CONAMA Resolution n° 307/2002.

In addition to these wastes, at earthmoving activities it is foreseen the generation of material from the excavations. To minimize the generation of excavations wastes and consequently minimize the necessary areas to send-off and loan material offsite the enterprise terrain, it is foreseen the balance between cutting and landfill soil.

The generated solid waste in the implementation phase should have a final disposal environmentally appropriate, i.e. they will be destined for reuse, recycling, incineration, co-processing, third parties or municipal landfill properly licensed etc.

The lack of control and inadequate solid waste disposal may compromise the environmental quality of the area.

The proper control of solid wastes will be accomplished through the gathering, packaging, transportation and disposal according to their nature, which will minimize the potential environmental impacts. In addition, the reusing process of material through selective collection can significantly decrease this impact.

In the implementation phase, there will be a Temporary Solid Waste Storage Area to be managed by a company specialized in this service. This company will be responsible for receiving, storing temporary and disposing all solid waste generated during this phase.

All contractors for the implementation of various parts of the process, as well as all the other enterprise contractors to perform any other services during the works, will be responsible for collection, segregation, packing and allocation their solid waste to the Temporary Solid Waste Storage Area.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local and regional
Period of occurrence:	Medium term
Temporality or Duration:	Temporary
Reversibility level:	Reversible
Cumulative type:	Type III
Magnitude:	Medium
Importance:	Low

Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	ADA, AID

Mitigating measures

- Follow the guidelines of the Environmental Construction Program – PAC, regarding the best practices for solid waste management as described in Federal Law n° 12,305/2010, among which stand out:
 - Minimize waste generation through the use of the 3R's principle (Reduce, Reuse, Recycle);
 - Segregation of solid waste, according to the color pattern established by CONAMA Resolution n° 275/2001;
 - Collecting, packaging, storage and transportation of solid waste, according to the laws in force;
 - Environmentally appropriate final disposal (reuse, recycling, composting, energy use, etc.) and/or environmentally suitable disposal of the solid waste generated in the enterprise.
- Disposing materials (soil excavation), if necessary, in send-off areas properly licensed.
- Implement a Temporary Solid Waste Storage area to be managed by a company specialized in this service.

Responsible for the measures implementation

The entrepreneur, together with the company specialized in managing the Temporary Solid Waste Storage area.

Prognosis after the implementation of the measures

It is not expected to have changes in soil and/or waters quality due to the handling of waste, that is, the waste will be properly identified, packed, stored, transported and disposed properly, strictly following the guidelines of the PAC, and, in addition, the loan materials and areas of send-off, if needed, will come from licensed locations, without compromising the environmental quality of the area.

9.1.4.2.1.5 Surface and/or ground waters quality change

Potential environmental aspect

Improper disposal of effluents.

Potential impact generator factor

Swage generation.

Technical reason

At the beginning of the works it will be used chemical toilets, and their wastes will be removed by septic type trucks, transported and disposed by accredited companies in licensed destinations. The chemical toilets and other facilities at the construction site will be installed in accordance with the NR 18 standard. Once completed the installation of the yard work with sewage treatment system, the chemical toilets will be deactivated and returned to the leasing company.

After the installation of the infrastructure, the generated sewage during the construction phase of the plant will be collected and treated in a treatment system consisting of flow meter, aerated lagoon, and polishing pond, and subsequently the treated effluent will be removed and forwarded to Fertigation of planting area at eucalyptus forests of Duratex through irrigation system or by trucks. It is worth mentioning that this system will be used during the period of construction and installation of the yard.

This system will have a biological treatment, which will work with microorganisms that will degrade organic matter present in the sewage (expressed in terms of BOD-biochemical oxygen demand) through an aerobic process.

The treated sewage will meet the emission standards of the parameters established by CONAMA Resolution n° 430/2011 and Joint Normative Deliberation COPAM/CERH-MG n° 1/2008.

The sewage flow generation during the implementation phase of the project will be approximately 100 m³/h, considering the maximum population of 6,500 employees (peak during the work).

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local
Period of occurrence:	Immediately
Temporality or Duration:	Temporary
Reversibility level:	Reversible
Cumulative type:	Type II
Magnitude:	Low
Importance:	Medium
Mitigating possibilities:	Mitigable

Measures resolution level:	High
Area of influence:	AID

Mitigating measures

- Take measures to ensure that the hired company to collect the sewage of the chemical toilets will be properly regulated, and will allocate the sewage in na appropriate environmentally way;
- Follow the guidelines of the Environmental Construction Program – PAC, for the effluents management, which are:
 - Monitor liquid effluents;
 - Conduct audits and inspections;
 - Meet the treated effluents emission standards of the parameters established by CONAMA Resolution n° 430/2011 and Joint Normative Deliberation COPAM/CERH-MG n° 1/2008.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

There will not be changes in the surface water and/or groundwater quality, once the generated sewage during the implementation phase will be properly treated and used as Fertigation in the eucalyptus forests of Duratex.

9.1.4.2.2 Biotic Environment

9.1.4.2.2.1 Loss of vegetation and fauna disappearance

Potential environmental aspect

Removal of vegetation.

Potential impact generator factor

Earthmoving activities.

Technical reason

The earthmoving activities will require a removal of vegetation in the project area, as well as, in the areas where the water intake and effluent disposal pipelines will be built. Therefore, there will be loss of vegetation and terrestrial habitat associated with it, and may scare away the wildlife. However, it is known that in similar enterprises the wildlife tends to back off on the implementation phase and the return to the area in the operation phase, not interfering significantly in local wildlife.

It should be noted that within the dissolving pulp mill area occurs predominantly eucalyptus plantation (*Eucalyptus* sp).

The water intake and treated effluent disposal pipelines will occur in a linear path, with some interventions in forest fragments.

According to the two field survey campaigns carried out for the present EIA in distinct sections in the mill area of influence, 409 vascular flora species were registered, as well as three varieties and two subspecies, belonging to 94 Botanical families and four divisions (or phyla). The high number of species found in the diagnosis highlights the importance of the remaining flora in its conservation and preservation.

As the area suffers a high degree of anthropization, due mainly to the existence of sugar cane, coffee plantations and forestry, most individuals found consists of generalists species regarding the Habitat use, that are favored in troubled and fragmented environments.

After the forest inventory in the area of interest, when there will be raised the needs of selective cutting of native vegetation, there should be compensation through planting and forest replacement of native species in the region, as set out in the environmental agency procedures.

So, this impact could be compensated through the enrichment and vegetation management in Areas of Permanent Preservation (APP) inside and near the future enterprise.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Simple
Magnitude:	Medium
Importance:	Medium
Mitigating possibilities:	Partially Mitigable
Measures resolution level:	Medium
Area of influence:	ADA

Mitigating measures

- Follow the guidelines of the Environmental Construction Program – PAC, as the criteria and operational controls to be carried out regarding the vegetation suppression, which are:
 - Perform the forest inventory in the area of interest;
 - Start the suppression only after obtaining the Authorization of Suppression issued by the environmental organ responsible;
 - Perform picketting for marking the area to be suppressed;
 - Use a team with experience in this activity;
 - Dispose properly the organic waste and vegetation from the suppression activity;
 - Store in proper location, top soil organic layer, for later re-use;
 - Perform environmental compensation, as established by the Authorization of Suppression;
 - Perform environmental compensation, as established by the Authorization of Suppression;
 - Perform environmental monitoring and supervision of the Works;
 - Prohibit the use of fire for the vegetation removal.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

Through the adoption of mitigating measures, one can say that the vegetation removal will be minimal, and properly compensated the natural vegetation removal with native trees, especially with the region's vegetation, not interfering significantly in local biota, since the area already suffers a high degree of anthropization.

9.1.4.2.2.2 Aquatic ecosystems change

Potential environmental aspect

Interventions in the river bed and land areas near the river.

Potential impact generator factor

Implementation of water intake and effluent disposal pipelines systems.

Technical reason

Interventions in the river bed for construction of the water intake and effluent disposal pipelines can increase turbidity and the suspended material concentration in the Araguari river, consequently, disrupt the habitats over there, which may affect the existing aquatic communities sites during the construction period.

In relation to the works to be carried out on the terrestrial part of the pipelines, the project foresees land protection measures to prevent sediment transportation to Araguari River. It is being planned the execution of earthwork preferred not in rainy periods in order to reduce the possibility of erosion due to the susceptibility of the land.

The temporary drainage construction, structures for containing solid materials, minimizing the exposure time of the areas without cover vegetation and with crumbly characteristic, followed by environmental monitoring and supervision of the works, are some of the measures to be adopted during the implementation phase of the project.

During the earth moves activities, even if it occurs in the rainy period, the rainwater will be collected in the area of the project and should not change the water quality of the Araguari river. Since there will not be changes in the river quality, it is not expected any changes to affect the aquatic communities.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local
Period of occurrence:	Immediately
Temporality or Duration:	Temporary
Reversibility level:	Irreversible
Cumulative type:	Type I
Magnitude:	Low
Importance:	Medium
Mitigating possibilities:	Mitigable
Measures resolution level:	Medium
Area of influence:	AID

Mitigating measures

- Employ technologies that minimize the impacts caused by the works on the bank and bottom of the Araguari River in the implementation of the water intake and effluent disposal pipelines;

- Monitor the surface water quality during the implementation phase.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

Since there will not be send sediment to the Araguari river, there will not be changes in the River quality, neither is expected any changes that may affect the aquatic communities.

9.1.4.2.2.3 Increase the risk of animals run over

Potential environmental aspect

Increased vehicle traffic.

Potential impact generator factor

Using of vehicles.

Technical reason

During the implementation phase there will be a considerable increase on vehicles circulation, especially trucks and carts in the main access routes to the enterprise and in the internal property access, enlarging the risk of roadkill animals. Especially on State Highway MG-748 and Federal Highway BR-365, being the main access routes to the future enterprise, where there will be noticed the increase on vehicles movement.

It is important to highlight that the impact caused to the fauna in the highways of the region (BR 365 and MG 748) already exists. Five sampled species in the biotic diagnosis were found run over which is a reflection of the intense landscape fragmentation the caused by the local roads. Silva et al. (2011), found 35 vertebrate species ran over in the region, being 12 species only mammals, and many of which were found during this study. The characteristics of roads and the high flow of cars and, especially, loaded trucks make it constant to find roadkill animals.

Thus it is important that employees from the enterprise as well as third parties employees receive information about defensive driving, traffic laws and the local legislation in order to avoid accidents, including with the local wildlife.

Impact characterization

Nature:	Negative
Form of incidence:	Direct and Indirect
Coverage area:	Local
Period of occurrence:	Immediately

Temporality or Duration:	Temporary
Reversibility level:	Irreversible
Cumulative type:	Simple
Magnitude:	Low
Importance:	Low
Mitigating possibilities:	Mitigable
Measures resolution level:	Medium
Area of influence:	AID

Mitigating measures

- Inform and raise awareness for vehicles drivers about defensive driving, traffic law and local legislation.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

There should not be any increase in the risk of roadkill animals due to the movement of vehicles at the implementation phase of the project, since its own employees and contractors will receive information on defensive driving, traffic laws and the local legislation.

9.1.4.2.3 Socioeconomic Environment

9.1.4.2.3.1 Interference to the historical and archaeological heritage

Potential environmental aspect

Earthmoving activities.

Potential impact generator factor

Possibility to affect areas with potential historical and archaeological heritage.

Technical reason

Throughout the proposed project area extension, so far the archaeological researches carried out indicates the presence of indigenous groups since at least 12,630 years BP, corresponding to the oldest presence in the State of Tocantins (DE BLASIS & ROBRAHN-GONZÁLEZ, 2003). This earliest period is characterized by hunters and gatherers groups who occupied extensively all over the Brazilian Planalto Meridional, having as main trace industry pieces in open air places, or in shelters under Rock.

According to the Archaeological Sites National Registers CNSA-IPHAN database, Indianópolis counts with the presence of one archaeological heritage site called Serra Dourada, and Araguari counts with the presence of six archaeological heritage sites known as: Santo Antônio do Fundão, Tenda, Rodrigues, Tubertino, Folha Larga and Jeová.

Therefore, the raised archaeological information on the diagnosis attests the potential of archaeological sites occurrence in the region. However, it should be noted that the area where the dissolving pulp mill will be installed is already anthropized.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Simple
Magnitude:	Low
Importance:	Medium
Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	ADA

Mitigating measures

- Take measures to ensure that the dissolving pulp mill erection activities will not impact or destroy the cultural heritage of Brazilians considered protected by laws.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

There should not be any interference in the historical and archaeological heritage sites due to the implementation of the project since the area is significantly anthropized, so the potential of archaeological sites presence is reduced. However, all measures shall

be taken not to be any interference in the possible historical and archaeological heritage sites.

9.1.4.2.3.2 Urban infrastructure interference

Potential environmental aspect

Pressure on urban infrastructure due to increase of population represented by labor generation in the implementation phase.

Potential impact generator factor

Labor mobilization.

Technical reason

The population increase, represented by the manpower in the implementation phase and people possibly attracted by the possibility of professional insertion in the activity, tends to raise the demand for public equipment like: education, health establishments, sanitation, transportation, etc. For the purpose of this study, the population increase in the region corresponds to approximately 6,500 employees in the greater intensity of construction phase, planned for during 24 months.

Labor immigration tends to raise the demand for basic education to their families who migrate along with them, whether the technical education demand is for the interested population in integrating the activity developed in the operation phase of the enterprise.

In 2017, the Araguari city had 43 kindergarten schools, being 28 public and 15 private; 68 elementary schools, being 50 public and 18 private; and 15 high schools, of which 9 were public and 6 private. The Indianópolis city only had public establishments, being 3 early kindergarten schools, 6 elementary schools and 1 high school. In addition, only Araguari city had technical and graduation education institutions. This information must be disclosed to the staff hired who might come from outside the region, especially those who will aim to migrate with their families.

In addition, the LD Celulose S.A should promote training and qualifications of people in the region of the enterprise to the pulp sector, to mechanical, electrical and instrumentation needs for the mill, favoring the possibility of hiring them for the operation phase.

As for the health establishments, according to standards set by OMS (World Health Organization), the classic indicator of health infrastructure and attendance is formed by the number of beds per inhabitants. To meet the necessary beds demand, the OMS recommends a minimum of 4 beds for every thousand inhabitants. In Araguari, the ratio of beds per 1000 inhabitant is 2 and it is therefore below the standards set by the OMS. In Indianapolis that ratio was not available according to DATASUS CNES official data.

To prevent the possible over use of the health establishments, the LD Celulose S.A. shall provide an ambulatory structure and first aid services that minimize dependence on the region's health infrastructures. In addition, all categories of the mill activities will be framed in the respective NR's-regulatory standards adopted by Ordinance n°

3,214 from 08/06/78, to ensure a safe and healthy working environment for all employees and subcontractors.

Other infrastructure that shows the evolution on the population's life quality is the access to basic services infrastructure in the houses, like piped water, electricity, garbage collection and sanitation. The professionals who come from outside the region will be properly accommodated in places to be built in the region, in hotels and in rental properties available in the area, with at least toilets, cafeteria, recreation area, electricity, garbage collection system, sewage collection and disposal system and drinking water, and must not over use the existing system of the municipalities.

To minimize the pressure use on public transportation, the transport of the employees to the project's area can be carried out by the entrepreneur or contractors.

Impact characterization

Nature:	Negative
Form of incidence:	Indirect
Coverage area:	Local and regional
Period of occurrence:	Immediately / Medium Term
Temporality or Duration:	Temporary
Reversibility level:	Reversible
Cumulative type:	Type II
Magnitude:	Medium
Importance:	Medium
Mitigating possibilities:	Mitigable
Measures resolution level:	Medium
Area of influence:	AID and AII

Mitigating measures

- Promote training and qualifications of people from the region, to the pulp sector, to mechanical, electrical and instrumentation mill's needs, favoring the possibility of hiring them for the operation phase;
- Install an ambulatory structure and first aid services that minimize dependence on the region's health infrastructures;

- Accommodate professionals who come from outside the region in places to be built in the region, in hotels and in rental existing properties available in the area provided with basic sanitation infrastructures;
- Provide mechanisms to transport the employees from the cities to the project's area.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

The interference in urban infrastructure will be minimal considering the implementation of the proposed measures and once the works are completed the impact should normalize.

9.1.4.2.3.3 Impact on morphology

Potential environmental aspect

Changing the landscape and land use.

Potential impact generator factor

Mill erection consisting of buildings, towers, chimneys, etc.

Technical reason

Located on the right bank of the River, towards the southwest of the future mill area is the Araguari River. The nearest access to the enterprise is the State Highway MG-748 located west of the mill, in addition to the Federal highway BR-365 towards the Southwest.

The most immediate presence of population agglomeration from the mill's area is located approximately 20 km away towards South, being the urban area of Indianópolis.

According to the environmental diagnosis, the highways and existing monocultures throughout the studied area, historically have already changed the landscape, favoring generalists species, as opposed to those most sensitive to changes in the environment.

For the operation of the dissolving pulp industrial unit, it will be required the deployment of an internal and external infrastructure that will comprise the water intake pipeline and water treatment plant, in addition to the treatment and disposal of treated effluent, and industrial solid waste storage, which will change again the local landscape.

The Land Use and Occupation in the municipality of Araguari was regulated by law n°. 34/04, which divided the territories into different zones. The municipality of Indianópolis hasn't regulated the land use and occupation yet, however there have been compiled data during preparation of the ecologic-economic zoning of Minas Gerais (ZEE-MG) data that have been structured into an information system geographic spatial model that uses a dot matrix, also known as raster, available on Minas Gerais environmental portal by the Secretary of State for Environment and Sustainable Development-SEMAD.

The place foreseen for LD Celulose S.A industrial unit implementation area (object of this study) is located outside the urban perimeter established by the master plan for urban development-PDU of the Araguari municipality. In this sense, the the industrial unit location is classified as a rural area.

After the dissolving pulp mill deployment, the land use and occupation should be changed to industrial zone.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Type III
Magnitude:	Low
Importance:	Low
Mitigating possibilities:	Partially Mitigable
Measures resolution level:	High
Area of influence:	ADA

Mitigating measures

- Deploy the project encouraging the integration with the landscape and the environment area, decreasing the contrast effect of the buildings and structures with the natural landscape.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

The mill erection will inevitably alter the landscape and local land use, however the landscape design should minimize this impact.

9.1.4.2.3.4 Direct and indirect jobs' offer

Potential environmental aspect

Hiring temporary labor.

Potential impact generator factor

Labor mobilization.

Technical reason

The implementation phase presents the emergence of temporary jobs, for the directly activities linked to the project, as well as for the indirectly activities such as inputs supply, services and workers demand. This impact tends to spread throughout the region, both by the insertion of other companies to provide services, as well as by the effects of migration commuting.

A contingent of approximately 6,500 workers for the enterprise erection in the peak period of the work is expected.

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

Impact characterization

Nature:	Positive
Form of incidence:	Direct and indirect
Coverage area:	Local, regional, extra regional and strategic
Period of occurrence:	Immediately
Temporality or Duration:	Temporary
Reversibility level:	Reversible
Cumulative type:	Type III
Magnitude:	High
Importance:	High
Potential possibilities:	High
Potential level:	High
Measures resolution level:	High
Area of influence:	AID and AII

Measures capable to potentialize

- Promote the labor hiring disclosure campaign for the implementation phase, and give priority to local people;
- Encourage some companies to continue providing service and work during the operation phase.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

This impact could spread throughout the region by inserting other contractors for the project implementation and by the effects of migration commuting generated by the indirect jobs.

9.1.4.2.3.5 Fomentation of local economyPotential environmental aspect

Growth of tertiary sector.

Potential impact generator factor

Demand for products and services.

Technical reason

In the implementation phase, there is the tendency of the tertiary sector growth, possibly generating the installation of new trade units (workshops, service units, transport unit, food establishments and other activities).

Thus, the local economy tends to be benefited by the emergence of the services demand, both directly linked to the activity of the enterprise's implementation as indirectly, through the consumption by the labors linked to the implementation.

This local economy fomentation can be proven through indicators that can be the significant increase in public investment, from the increase in the taxes collection.

The informal economy also will increase due to the enterprise implementation. The unqualified people, or who are unable to enter into formal activity services, tend to start informal activities, due to the demand generated by the presence of labors in the project's implementation phase. The emergence of bars, food stalls, tobacco sellers and other consumer items sell may occur in the area next to the future enterprise.

The informal trade activities, in general, are not recognized. If there are no records, there is no way to assess the benefits that could be generated for the public coffers and there is no way to monitor the services quality.

On the other hand, such trade may be analyzed as positive, taking into account the income generation and economic activities that promote the money circulation in the municipalities and in the region.

Impact characterization

Nature:	Negative/Positive
Form of incidence:	Indirect
Coverage area:	Local, regional and extra regional
Period of occurrence:	Immediately /medium term
Temporality or Duration:	Temporary
Reversibility level:	Reversible
Cumulative type:	Type II
Magnitude:	Medium
Importance:	Medium
Potentialization possibilities:	Medium
Potentialization level:	Medium
Mitigating possibilities:	Mitigable
Measures resolution level:	Medium
Area of influence:	AID and AII

Measures capable to potentialize / Mitigating measures

- Give preference to companies, subcontractors and service providers from the studied region.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

There will be local economy fomentation since the implementation phase due to demand for products and services for enterprise erection and for the workforce employed, the public authorities are responsible for supervising the informal activities and convert taxes collected into improvements to the municipalities.

9.1.4.2.3.6 Valuation of the urban real estate market

Potential environmental aspect

Need for accommodation places to the manpower during the project implementation.

Potential impact generator factor

Demand for products and services.

Technical reason

The demand for properties growth to the LD Celulose S.A hired staff tends to make the properties' owners raise the value for sale and rental. Especially because the interested party on purchase/rent is a large company.

Besides the LD Celulose S.A hired staff, various third party service providers staff should rent or buy properties, mainly in Araguari and Indianópolis, that values the real estate market.

Despite the generated income by such leases increase even more the money circulation in the cities, there are few locally properties owners, and not all resident people will follow this high real estate valuation. As a result of this valuation, many people can reside in the same house.

Impact characterization

Nature:	Negative/Positive
Form of incidence:	Indirect
Coverage area:	Regional
Period of occurrence:	Medium term
Temporality or Duration:	Permanent
Reversibility level:	Reversible
Cumulative type:	Type II
Magnitude:	Medium
Importance:	Medium
Potential possibilities:	Medium
Potential level:	Medium
Mitigating possibilities:	Partially mitigable
Measures resolution level:	Medium
Area of influence:	AID

Measures capable to potentialize / Mitigating measures

- Accommodate the professionals who come from outside the region in accommodation to be built in the region, or in the hotel existing chain or in rental buildings already available in the region.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

The demand for properties to the LD Celulose S.A implementation and to third party companies, generates movement in sector, resulting an increase of the properties sale/rental price. However, there must be a control to overcrowding buildings.

9.1.4.2.3.7 Increase in tax collectionPotential environmental aspect

Growth of goods and services producing activities.

Potential impact generator factor

Demand for products and services.

Technical reason

The growth of goods and services producing activities, arising from the demands generated by the mill implementation, tends to increase the taxes collection both among companies that will provide direct services to the enterprise, as among those companies indirectly involved.

The construction materials purchase and the demand for other services, in Indianópolis (mill site) and Araguari (water intake and treated effluent disposal pipelines) represent the direct influence to the erection work in relation to the taxes collection.

Not only construction materials shall be considered, there should also be considered the acquisition of personal use items (hygiene and living), food, fuel, lodging, leisure and sport, among others. They are commercial and service activities that, certainly, should be part of the tertiary sector in the region.

The enterprise will generate taxes collection increase in the municipal, State and federal spheres, in accordance with current legislation. Such income increase could be used to improve the basic infrastructure, to meet the social needs of the municipalities.

Impact characterization

Nature:	Positive
Form of incidence:	Direct and indirect
Coverage area:	Local, regional, extra regional

	and strategic
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Type II
Magnitude:	High
Importance:	High
Potentialization possibilities:	High
Potentialization level:	High
Measures resolution level:	High
Area of influence:	AID and AII

Measures capable to potentialize

- Potentialize the purchase of goods and services in the project implementation phase, preferably in Araguari and Indianópolis.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

The enterprise will generate an increase in tax collection in the municipal, State and federal spheres due to the demands generated by the mill erection. However, it will be the Government roll to convert the taxes collected on improvements to the municipalities.

9.1.4.3 Erection works deactivation phase

9.1.4.3.1 Socioeconomic Environment

9.1.4.3.1.1 Reduction in the number of jobs

Potential environmental aspect

End of enterprise erection works.

Potential impact generator factor

Demobilization of the temporary workforce.

Technical reason

The manpower needed for the implementation phase is estimated to be approximately 6,500 workers at the peak period of the erection work.

This workforce for construction and erection of the enterprise will be recruited preferentially in the region of Araguari and Indianópolis, Minas Gerais State.

The professionals who come from outside the region will be properly accommodated in accommodation to be built in the region, or in the hotel existing chain or in rental buildings already available in the region.

The end of enterprise erection works will represent a reduction number of jobs from the temporarily hired labors for such activity. The non-resident workers from the region should gradually return to their places of origin. The decrease for goods and services demands will represent the retraction of produced income, with the closure or reduction of some service companies providers.

Therefore, the LD Celulose S.A. will monitor the accommodation, hotels and rental properties demobilization to ensure that, at a minimum, all hired workers have their rights guarantee to return to their place of origin.

To mitigate this impact, the LD Celulose S.A can encourage some companies to continue providing their services during the mill operation phase, not requiring their demobilization.

Impact characterization

Nature:	Negative
Form of incidence:	Direct and indirect
Coverage area:	Local and strategic
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Reversible
Cumulative type:	Type II
Magnitude:	Medium
Importance:	Medium
Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	ADA and AID

Mitigating measures

- Encourage the temporarily hired labors for the construction phase to return to their municipalities of origin;
- Encourage some companies to continue providing their service during the mill operation phase.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

Despite some service provider companies can continue their activities in the operation phase and be prioritization of hiring local labors, the manpower demobilization is inevitable after the completion of the works. When carrying out the demobilization according to the legal arrangements of the hiring system, the dissatisfaction caused by this impact is minimized.

9.1.4.4 Operation phase

9.1.4.4.1 Physical Environment o

9.1.4.4.1.1 Disturbance to the neighborhood

Potential environmental aspect

Noise generation.

Potential impact generator factor

Operational activities for the dissolving pulp manufacture.

Technical reason

To obtain a background noise level, it was measured the environment sound pressure level in 8 different points during the day and night periods, in the surrounding area planned for LD Celulose S.A dissolving pulp mill implementation.

At all environment sound pressure levels measured points the results are below the criteria assessment level (NCA) established by the standard NBR 10,151/2000 for predominantly industrial area (70 dB(A) for daytime and 60 dB (A) for nighttime), and they are also below the maximum limits established by State Law n°. 10,100/1990 (70 dB(A) for daytime and 60 dB (A) for nighttime).

However, if the environment sound pressure levels are compared with the NCA established by the standard NBR 10,151/2000 for farms and ranches areas (40 dB(A) for daytime and 35 dB (A) for nighttime), there is 1 point during the daytime which is above the NCA and 8 points are above the NCA during the nighttime. In this case, according to NBR 10,151/2000, when environment sound pressure levels are above the NCA level, it remains as a criterion for sound pressure levels evaluation the value obtained in the field measure.

In the noise propagation study it was verified the noise prediction to be issued after the project implementation. For this study there were considered 2 scenarios, with the

presence or absence of the train operation yard in the mill area to transport the dissolving pulp production.

In General, in Scenario 1 (without train yard) and in Scenario 2 (with train yard), some sound pressure levels values in the area outside the boundaries of the site are slightly above the established values by the standard NBR 10,151/2000 and by State law nº 7,302/1978 and its amendments, i.e. 70 dB(A) for daytime and 60 dB(A) for nighttime, as noted in the following figure.

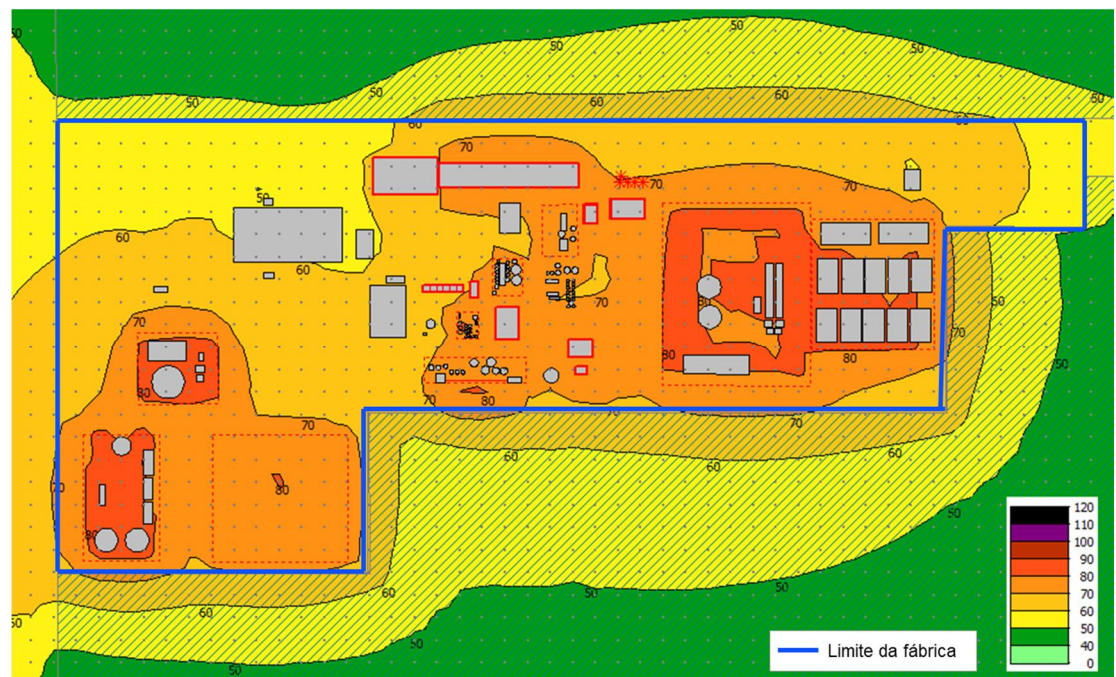


Figure 1 –Scenario 1 results (without train yard).

The use of software for noise simulation of a future enterprise is an important tool to assist the assessment of possible impacts, however it is always important to emphasize that this is an estimation, which should be evaluated later by environmental noise monitoring.

It should be noted that the most immediate presence of population agglomeration is located approximately 20 km away towards South, being the urban area of Indianópolis.

It is important to note that the LD Celulose mill site is located within the Nova Monte Carmelo Farm, leased to Duratex.

Therefore, it can be concluded based on the performed simulations for the present study, that the sound pressure levels relating to the operation of the LD Celulose dissolving pulp mill will not cause disturbance to the neighborhood, since there is no population agglomeration around the future enterprise.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Reversible
Cumulative type:	Type II
Magnitude:	Low
Importance:	Low
Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	ADA and AID

Mitigating measures

- Purchase machinery and equipment aiming the low noise level emission;
- Whenever possible, cloister acoustically the equipment aiming the low noise level emission;
- Deploy the noise monitoring program.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

There should not be any disturbance to the neighborhood in relation to the noise generated by the enterprise once mitigation measures will be implemented, in addition the immediate population agglomeration presence is approximately 20 km away towards south of the enterprise area, being the urban area of Indianópolis.

9.1.4.4.1.2 Soil and/or surface and ground waters quality change

Potential environmental aspect

Improper disposal of the solid waste.

Potential impact generator factor

Solid waste generation.

Technical reason

In dissolving pulp mill, during the operation phase, will generate industrial and non-industrial solid wastes.

The industrial solid wastes generated by the dissolving pulp production process will come from wood handling areas, causticizing, boiler and water treatment plant and effluent treatment plant.

In this category there are included the following main wastes:

- Wood handling wastes;
- Biomass boiler ashes;
- *Dregs, grits* and lime mud;
- Sludge from the water treatment plant; and,
- Primary and secondary sludge from the effluent treatment plant.

There will also be generated non-industrial solid wastes that match to all the discarded materials from administrative and operational support activities which cover the offices activities, cafeteria and maintenance workshops.

In this category there are included the following main wastes:

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

The solid waste management generated during the dissolving pulp mill operation will contemplate the best practices, as described in Federal Law 12,305 / 2010.

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

In the case of administrative and operational collectors, the color standard will follow CONAMA Resolution nº 275/2001.

The solid waste storage area will be provided with suitable collectors, following the current laws and standards, such a way to eliminate risks to human health and to the environment.

The solid wastes will be discharged to treatment and/or final disposal, as described in the following table.

Table 5 – Solid wastes in the generating areas, treatment forms and final disposal

Waste	Treatment	Discharge or Final Disposal
Wood handling wastes + sand	Composting / incineration at biomass boiler	Forest Application / industrial third parties landfill
<i>Dregs/ grits</i>	Corrective Soil Acidity	Forest Application / industrial third parties landfill
Lime mud	Corrective Soil Acidity	Forest Application / industrial third parties landfill
Precipitator lime	Corrective Soil Acidity	Forest Application / industrial third parties landfill
Ash + sand	Corrective Soil Acidity	Forest Application / industrial third parties landfill
Primary Sludge	Composting / incineration at biomass boiler	Forest Application / industrial third parties landfill
Secondary Sludge	Composting / incineration at biomass boiler	Forest Application / industrial third parties landfill
Sludge from ETA	Composting / incineration at biomass boiler	Forest Application / industrial third parties landfill
Metal scrap	-	Recycling
Paper / Cardboard	-	Recycling
Plastic	-	Recycling
Glass	-	Recycling
Organic waste	Composting	Forest Application / industrial third parties landfill
General non-recyclable waste	-	Third parties landfill or municipal landfill properly licensed
Health Service	-	Incineration
Oil-contaminated waste	-	Incineration / coprocessing
Workshops waste (lubricants)	Composting / incineration at biomass boiler	Re-refining

All solid waste generated during the enterprise operation phase shall follow the procedures of the Solid Waste Management Program (PGRS), giving preference to reuse and recycle wastes and when necessary send them to treatment and/or to final disposal into properly licensed companies.

The solid wastes generated in pulp production processes such as eucalyptus bark, wood handling waste, primary and secondary sludge from the liquid effluents treatment plant can be previously submitted to the composting process by accelerated fermentation.

The inorganic wastes from causticizing (dregs/grits, lime mud and precipitador lime) and from biomass boiler (ashes) will be used for the production of soil acidity corrective.

So it will be deployed an area to carry out the process of composting / soil acidity corrective treatment of wastes, which will be located within the mill area.

Impact characterization

Nature:	Negative
Form of incidence:	Direct and Indirect
Coverage area:	Local
Period of occurrence:	Medium term
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Type I and II
Magnitude:	Medium
Importance:	Medium
Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	ADA and AID

Mitigating measures

- Deploy the best practices, as described in Federal Law n° 12,305/2010 and other applicable laws and regulations, regarding the solid wastes management;
- Deploy the Solid Waste Management Program (PGRS);
- Train employees to correct disposal of generated wastes;
- Operate properly the composting system and the soil acidity correction production process.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

The soil and/or surface and groundwater quality will not be affected since there will be implanted a Solid Waste Management Program containing a set of recommendations and procedures that aim to draw the guidelines for the management, final disposal and reduction of generated wastes, in order to minimize the environmental impacts.

9.1.4.4.1.3 Air, soil and/or surface and ground waters quality change

Potential environmental aspect

Improper storage and/or chemicals handling causing leaks or spills of hazardous products.




Potential impact generator factor









Use of chemicals products.

Technical reason

The LD Celulose S.A dissolving pulp mill process will use several chemicals. The following table presents the main products to be used and their respective class/subclass of risk established by the ONU.

Table 6 – Main products and their risk class

Product	Number ONU	Risk Class	Risk Label
Caustic Soda	1824	8 – Corrosive Substance	
Sulfuric Acid	1830	8 – Corrosive Substance	
Hydrogen peroxide	2014	5.1 - Oxidizer	
Sodium sulphate	not regulated		
Magnesium sulfate	not regulated		

Product	Number ONU	Risk Class	Risk Label
Ozone	not regulated		
Oxygen	1072	2.2 – Non-toxic compressed gas	
Sulphur dioxide	1079	2.3 – Toxic gas	
Lime	1910	8 – Corrosive Substance	
Aluminum sulfate	1760	8 – Corrosive Substance	
Phosphoric acid	1805	8 – Corrosive Substance	
Urea	not regulated		
Sodium hypochlorite	1791	8 – Corrosive Substance	
Diesel Oil	1202	3 – Flammable Liquid	
Fuel Oil	3256	3 – Flammable Liquid	

From the initial characterization of the products, to the risk analysis study, there were selected the liquid or gaseous chemicals with greater representativeness in terms of

flammability and toxicity. To do this, it was used the criteria set out by CETESB for chemicals classification as for dangerousness set out in the standard P/4,261 2011 – Accident Risk of Technological Origin - Method for decision and terms of reference.

The Preliminary Hazards Analysis (APP), identified 37 dangers related to the facilities and operations with the products handled in LD Celulose, considering only the most relevant accidental situations, i.e. events caused by leaks and significant releases in the plant.

The possible effects associated with accidental assumptions identified in the APP were classified in terms of severity, considering always two kinds of phenomena, where appropriate; that is, large and medium leakage, associated with the containment loss of these products.

The distribution of the associated effects of these accidents hypotheses (dangers) took place as follows:

- 11 dangers (30%) classified as Despicable Risk;
- 10 dangers (27%) of Minor Risk;
- 16 dangers (43%) of Moderated Risk;
- No danger classified as Serious or Critical Risk.

The following figure presents the risk matrix with the quantification of the risks chances of occurrence according to the adopted classification.

		FREQUENCY OF OCCURRENCE				
		A	B	C	D	E
SEVERITY	IV					
	III		2	6		
	II	3	8	7	10	
	I				1	

Figure 2 – Risk matrix with the quantification of the risks chances of occurrence.

The following table presents the ratio of risks chances of occurrence, extracted from the Preliminary Hazards Analysis - APP and that were taken to the simulation of the consequences.

Table 7 – Accidents hypotheses to the simulation of the consequences

IDD at APP	Hypotheses n°	Accidents hypotheses description	Area Installed
13	1	Non-Condensable Concentrated gases leakage (GNCC) after condenser	Evaporation plant
14	2	Process methanol storage tank explosion	Evaporation plant
15	3	Process methanol leakage at supply line until the incineration points	Evaporation plant
34	4	Ozone leakage on the compressor discharge	Chemical Area – Ozone production (O ₃)
35	5	Sulphur dioxide leakage from storage cylinders	Chemical Area – Preparation of sulfur dioxide (SO ₂)
36	6	Sulphur dioxide leakage between the cylinders and the vaporizer	Chemical Area – Preparation of sulfur dioxide (SO ₂)
37	7	Sulphur dioxide leakage between the vaporizer and the absorption tower	Chemical Area – Preparation of sulfur dioxide (SO ₂)

The 7 dangers were taken for simulation of the consequences by PHAST software version 6.7, where it was found that all the effects are restricted to the internal area of the mill, not reaching population outside the walls.

Thus, it is possible to affirm that the project is feasible, comparing the results obtained with the recommended standard CETESB P 4,261 reinforcing the attendance of the measures to be adopted, recommended the risk analysis study.

Impact characterization

Nature:	Negative
Form of incidence:	Direct and Indirect

Coverage area:	Local
Period of occurrence:	Medium term
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Type I and II
Magnitude:	Medium
Importance:	High
Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	ADA

Mitigating measures

- Deploy containment, impermeable systems in the areas around chemical tanks, and deploy a maintenance plan and surveys;
- Train professionals involved in handling, storage and transportation of dangerous products;
- Install fire fighting systems;
- Deploy the recommendations of the risk analysis study.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

There should not be any change in the air, soil and/or surface and ground waters quality due to the use of hazardous chemicals in the plant, so it will be deployed a system focused on the establishment requirements containing management guidelines to prevent accidents through the anticipation, recognition, evaluation and risks consequences control from the existing environmental occurrences or that will exist in the workplace, taking into consideration the protection of the environment and the natural resources.

9.1.4.4.1.4 River quality change

Potential environmental aspect

Untreated effluent disposal or improper effluent treatment.

Potential impact generator factor

Effluent generation.

Technical reason

Basically, the liquid effluents generation sources, that will correspond to the activities of the dissolving 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 from bleaching;
- Effluents from drying machine;
- Effluent from evaporation and recovery area;
- Effluents from causticizing area and lime kiln;
- Contaminated condensate;
- Sewage effluent;
- Contaminated rainwater; and,
- Others (spills, leakages, cleaning areas etc.).

The industrial liquid effluents from process mill will pass through flow, temperature, pH and conductivity measurement and, depending on the obtained results, the effluents will be diverted to the emergency pond.

The effluents from make-up water of the boilers 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.

The sewage effluents generated at the mill will be collected and sent to ETE (effluent treatment plant), directly in the biological treatment.

The L.D Celulose S.A effluents will be treated at ETE, which will have a biological treatment system adopted from activated sludge. The activated sludge process is a proven technology and commonly used in the pulp and paper industries all over the world.

The treated L.D Celulose S.A effluent will be discharged into the Araguari river through an underwater pipeline.

The effluent pipeline will have a hydraulic capacity of up to 2,700 m³/h, whereas it will receive the treated effluents (2,200 m³/h), plus the rain water from the areas (500 m³/h) which are the streets, roofs, etc.

The effluent pipeline is intended to launch the treated effluents into the River in a controlled manner and safely through the underwater disposal under conditions that prevent foaming formation and promote the dispersion in the most efficient way in the water body.

It is worth noting that the treated effluent will meet the emission standards established by Normative Deliberation COPAM n° 01/2008 as well as the CONAMA Resolution n° 430/2011.

It should also be noted that at the LD Celulose mill it will be adopted the Kraft pulp production process based on best available technologies (BAT-Best Available Technologies), beyond the technology of TCF (Total Chlorine Free), i.e., entirely free of elementary chlorine, which will make it possible to minimize the generation of liquid effluent (in terms of flow and organic load).

In order to meet the surface water quality of the Araguari River before the dissolving pulp mill operation, to be considered as background and reference for future monitoring studies there were held 2 (two) surface water collections and campaigns analysis, one during the dry season (18/07/17 to 11/08/17) and one during the rainy season (03/04/18 to 26/04/18) for this EIA.

The water analysis encompassed the parameters established in the Normative Deliberation COPAM n° 01/2008 and CONAMA Resolution n° 357/2005.

In general, the Araguari river water quality is in accordance with standard class 2, but some parameters were in discordance with the legislation, in the first campaign the discordance parameters were: manganese, BOD, pH, total phosphorus and dissolved oxygen, and in the 2nd campaign they were: sulfide and phosphorus.

To verify the impact of the effluents release into the River, there were held Water Dispersion Study and the Self-depuration Study.

According to the simulations results, the future effluent will meet the quality standards established by CONAMA Resolution n° 357/2005 and Normative Deliberation COPAM/CERH n° 01/2008, with regard to the DBO, color and total phosphorus in the most critical conditions (minimum flow- $Q_{7.10}$) and average flow conditions, and the distances required for the mixing zone of the LD Celulose dissolving pulp treated effluents in Araguari River ranges from 0.52 to 1,009.85 m.

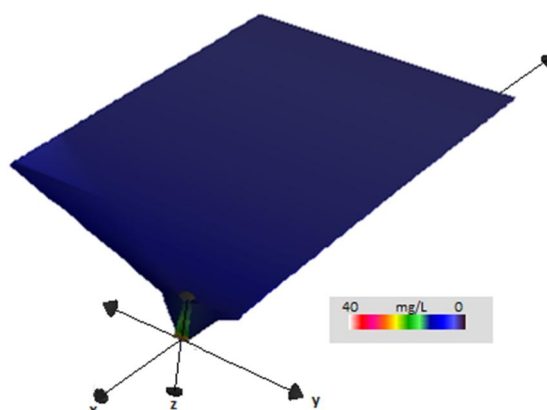


Figure 3 – Simulation of plume dispersion in 3 dimensions. (BOD, at Minimum flow - $Q_{7.10}$)

The most critical scenarios consist of total phosphorus scenario, both the minimum flow and average flow conditions. At the minimum flow condition, the plume length required to reach the quality standard of total phosphorus (0.030 mg/L) was 1,009.85 meters.

According to the results of Araguari River water quality campaigns performed for this EIA for the mill project, the concentration of total phosphorus is already in discordance with the quality standard for class 2 River (lentic environment), at CONAMA Resolution n° 357/2005 and Normative Deliberation COPAM/CERH n° 01/2008.

It can be concluded based on the performed simulations in the present study that the BOD and the color parameters present in the treated effluent from the LD Celulose mill will not impact the water quality of the Araguari River, being demonstrated that it quickly reaches the standard of water quality established by the environmental legislation. In the case of total phosphorus, it was found that it would take more than 1,000 m to reach the quality standards of total phosphorus (0.030 mg/L), without considering the phosphorus concentration in the Araguari river, which is already above the standard of quality.

In terms of water supply it was found that downstream from the discharge point, up to 2.5 km, there is no water intake to human activities supply. In this sense it is also important to note that the phosphorus does not present health problems in the supply water (VON SPERLING, 2007).

Still, with respect to phosphorus parameter, it is known that it is an essential element for the growth of algae and, when in high concentrations in lakes and dams (lentic environment), it can lead to an overgrowth of these organisms, leading to process of eutrophication (VON SPERLING, 2007).

The LD Celulose mill treated effluent Self-depuration Study launched in Araguari river, checked the assimilation capacity of this river (lentic) to the average River flow of the studied parameters: dissolved oxygen, Biochemistry oxygen demand, organic nitrogen, ammonia, nitrate and total phosphorus. In the critical flow scenario (Q7,10), only the parameter of total phosphorus does not fit the CONAMA Resolution 357:2005 and COPAM Deliberation n° 1/2008.

In this way, it can be concluded that the LD Celulose dissolving pulp mill treated effluent, will not impact significantly on the Araguari River water quality, i.e. the Water Dispersion and Self-depuration Studies, even in the minimum conditions of the River flow, indicate that there will not be significant changes from its current quality.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local

Period of occurrence:	Medium term
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Type I and II
Magnitude:	Medium
Importance:	Medium
Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	AID

Mitigating measures

- Use in the production process the best available technologies (BAT) to minimize the generation of liquid effluent (in terms of flow and organic load);
- Install an effluent treatment plant that is based on best available practice technology (modern and safe) of activated sludge type;
- Operate properly the effluent treatment plant so that the treated liquid effluents disposal are in accordance with the legislation in force;
- Perform the Liquid Effluent Monitoring Program;
- Perform periodic inspection in the effluent disposal pipeline system and its diffusers;
- Perform surface water quality monitoring.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

The use of the best available technologies which aims to minimize the generation of liquid effluents and the tracking and monitoring the efficiency of the ETE will serve as control system so that the Araguari river water quality will not be compromised and which will also be monitored.

9.1.4.4.1.5 Air quality change

Potential environmental aspect

Atmospheric emissions generation.

Potential impact generator factor

Operational activities for the dissolving pulp manufacture.

Technical reason

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

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

The main atmospheric emissions parameters generated of a pulp mill will correspond to: Particulate matter; TRS (Total Reduced Sulfur - reduced sulfur compounds); SO_x (sulfur oxides); NO_x (nitrogen oxides); and CO (carbon monoxide).

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 (GNCC) from the digester and evaporation, and its incineration in the recovery boiler. If it is not possible to burn it on the recovery boiler, it will be burnt on biomass boiler, and in case also of its impossibility, the gases will be burnt in flare;
- Extensive collection of diluted non-condensable gases (GNCD) from the digester, brown pulp line, evaporation and causticizing, with treatment in the recovery boiler;
- Treatment of gases from the dissolution tank in the recovery boiler itself;
- Efficient cleaning of gases from the bleach plant relief; and,
- Gas monitoring systems and real-time control system, identification and rapid correction of operational disturbances.

It should be noted that LD Celulose will adopt the Kraft pulp production process based on the Best Available Technologies (BAT), which will allow the reduction, control and monitoring of greenhouse gases emissions.

In addition all atmospheric emission sources will meet emission standards according to limits on Normative Deliberation COPAM n° 187/2013 and on CONAMA Resolution n° 382/2006.

Besides it, all atmospheric emission sources will be properly dispersed through a chimney with 90 meters height.

The control of atmospheric emission sources and air quality will also be monitored.

According to the air quality monitoring campaign report, it was concluded that the concentrations of all the analyzed parameters (particulate matter (PM10), nitrogen oxides (NO_x), ozone (O₃), carbon monoxide (CO), Sulphur dioxide (SO₂) and Total Reduced Sulphur (TRS) meet the air quality standards established by CONAMA Resolution n° 03/90, and are below the odor perception limit (TRS).

To assess the future pollutants concentration in the atmosphere from the stationary source of LD Celulose S.A. mill, it was conducted an atmospheric dispersion study.

According to this study of atmospheric pollutants dispersion, the values found for the major pollutants that will be generated by the dissolving pulp mill, which are: particulate matter, NO_x, SO_x, TRS and CO, were below the standards set by the CONAMA n°. 03/1990, as well as will be below the odor perception limit (TRS). The biggest concentrations found at ground level, show that the values are below the standards of air quality required by current environmental legislation, being within a radius of 3 km around the enterprise.

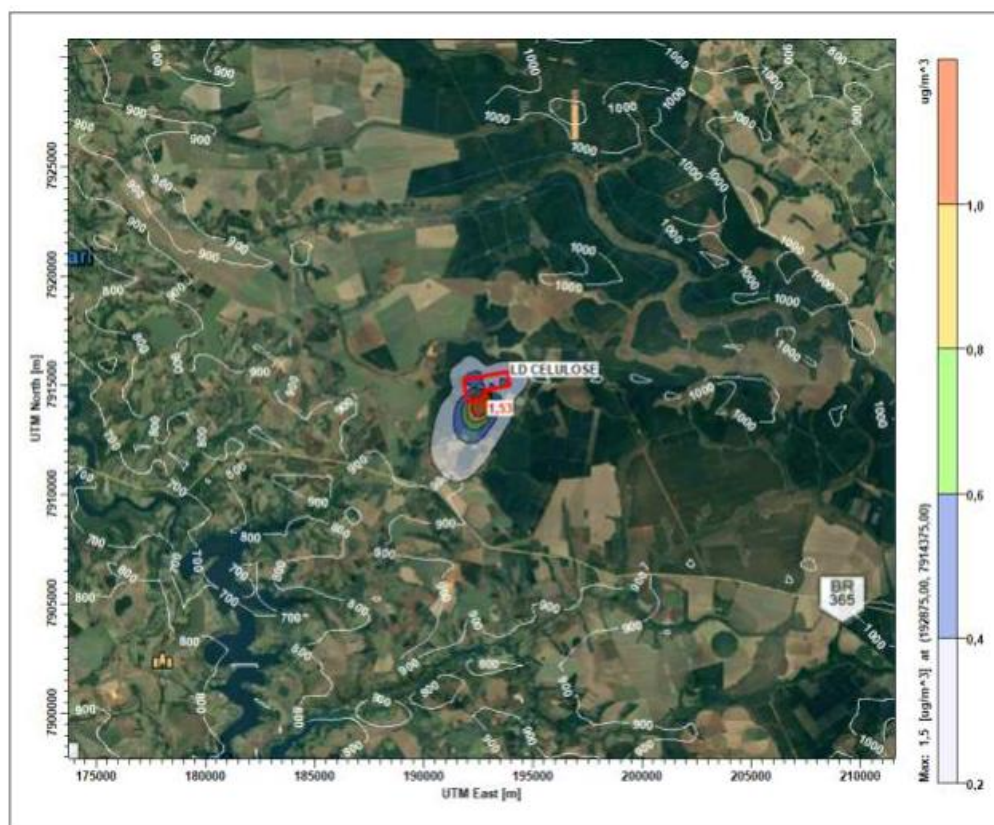


Figure 4 – Annual average spatial distribution of PTS concentration in an image of 40 km x 40 km, with the maximum concentration highlighted and the unit boundaries in red, isolines of terrain in white, in the future scenario.

Therefore, the air quality in Indianópolis and Araguari will be little altered due to mill's installation, because the parameters are inferior to the air quality standards established by CONAMA resolution n° 03/1990.

Impact characterization

Nature:	Negative
Form of incidence:	Direct
Coverage area:	Local
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Reversible
Cumulative type:	Type I and III
Magnitude:	Medium
Importance:	Medium
Mitigating possibilities:	Mitigable
Measures resolution level:	High
Area of influence:	AID

Mitigating measures

- Install high efficiency emission control equipment, such as electrostatic precipitators;
- Install chimney with height set in atmospheric dispersion modeling;
- Adopt in its production process a cleaner energy matrix, based on the use of renewable fuels, producing pulp with minimal carbon emissions;
- Deploy Atmospheric Emissions Monitoring Program;
- Monitor the atmospheric emission sources through online measurements;
- Perform air quality monitoring periodically.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

According to the atmospheric dispersion study, the air quality in Indianópolis and Araguari will be little altered in function of the mill installation, showing pollutants

below the standards established by CONAMA n° 03/1990, as well as there will be odor perception (TRS) below the limit.

9.1.4.4.2 Biotic Environment

9.1.4.4.2.1 Aquatic ecosystems change

Potential environmental aspect

Treated effluent disposal at the river.

Potential impact generator factor

Effluent generation.

Technical reason

The effluents generated in the operation of the industrial unit, treated and clarified, will be launched through an effluent disposal pipeline in the waters of the Araguari river. These effluents will be in accordance with the emission standards set out in the CONAMA Resolution n° 430/2011 and COPAM Deliberation n° 1/2008.

It should be noted that at the LD Celulose mill it will be adopted the Kraft pulp production process based on best available technologies (BAT-Best Available Technologies), beyond the technology of TCF (Total Chlorine Free), i.e., entirely free of elementary chlorine, which will make it possible to minimize the generation of liquid effluent in terms of flow and organic load.

According to the simulations results, in order to the future effluents meet the quality standards of the river established by CONAMA Resolution n° 357/2005 and Normative Deliberation COPAM/CERH n° 01/2008, with regard to the DBO, color and total phosphorus parameters in the most critical conditions (minimum flow - Q_{7,10}) and in average flow conditions, the distances required for the mixing zone of LD Celulose pulp treated effluents in Araguari River ranges from 0.52 to 1,009.85 m.

The most critical scenarios consist of total phosphorus parameter, both in the minimum flow and in the average flow rate. At the minimum flow rate scenario, the plume length required to reach the river quality standard of total phosphorus (0.030 mg/L) was of 1,009.85 m.

According to the water quality campaigns results of the Araguari River performed for this EIA near the future pulp mill, the concentration of total phosphorus is already in discordance with the River quality standard for class 2 (lentic environment), set by Resolution CONAMA n° 357/2005 and Normative Deliberation COPAM/CERH n° 01/2008.

It can be considered based on the performed simulations in the effluent dispersion study that the BOD and the color present in the treated effluent from the LD Celulose mill will not impact on the Araguari River water quality, being demonstrated that the river quickly reaches the water quality standard set by the environmental legislation. In the case of total phosphorus parameter, it was found that it would take more than 1,000 m to the river achieves the total phosphorus (0.030 mg/L) quality standards, without considering the existing total phosphorus concentration in the Araguari river, which is already above the quality standard.

In terms of water supply to the future mill, it was found that downstream from the effluent discharge point, up to 2.5 km, there is no water intake to human, agriculture or animal watering supply. In this sense it is important to highlight that phosphorous does not present health problems in the water supply (VON SPERLING, 2007).

Still, with respect to the phosphorous parameter, it is known as an essential chemical element for the algae growth and, when in high concentrations in lakes and dams (lentic environment), it can lead to an overgrowth of these organisms, leading to the eutrophication process (VON SPERLING, 2007).

In the treated effluent Self-depuration study from the L.D Celulose S.A mill launched in the Araguari river, it was found assimilation capacity of this river (lentic) at the average flow of the River to the following studied parameters: dissolved oxygen, Biochemical oxygen demand, organic nitrogen, ammonia nitrogen, nitrate and total phosphorus. In the critical flow scenario (Q7,10), the parameter total phosphorus does not fit the CONAMA Resolution n°357/2005 and COPAM Deliberation n° 1/2008.

In this way, it can be concluded that the treated effluent from the L.D Celulose S.A dissolving pulp mill, will not significantly impact the water quality of the Araguari River, i.e. the effluent dispersion and self-depuration studies, even in the minimum conditions of the River flow, indicate that there will not be significant changes from its current quality.

Since there will not be changes in the Araguari river water quality, it is not expected to have any changes at the aquatic communities.

According to the biotic environment diagnosis, in general, the fish fauna community of this study resembles the expected for Neotropical region basins with predominance of Characiformes and Siluriformes orders (Lowe-Mcconnell, 1987). There were not found benthic macroinvertebrates in endangered species, endemic species or groups, not even sensitive species or groups. The zooplankton species found do not differ from species raised in secondary data, being registered the species *Daphnia gessneri* (Copepoda), *Notodiaptomus iheringi* (Calanoida) and the juvenile forms of Calanoida (Copepodito), found in greater abundance, as being filtering organisms and normally associated with oligotrophic waters, so one can infer that the Araguari River offers a good quality, for the water parameters classification. The phytoplankton community group of Cryptophyceae was found with greater abundance and they are found throughout the year in various aquatic environments, mainly in tropical regions lakes, the Cryptophyceae class organisms are opportunists and adapt to the turbulence conditions (Nabout et al., 2006). The Cyanophyceae group which presented one of the highest richness values did not present significant abundance values, being a good data related to the good environment water quality.

Any possible change in the aquatic communities structure due to the treated effluent disposal at the Araguari river water will be followed-up by aquatic fauna monitoring.

Impact characterization

Nature:	Negative
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Form of incidence:	Direct
Coverage area:	Local
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Type I
Magnitude:	Low
Importance:	Low
Mitigating possibilities:	Mitigable
Measures resolution level:	Medium
Area of influence:	AID

Mitigating measures

- Use in the production process the best available technologies (BAT) to minimize the generation of liquid effluents (flow and organic load);
- Properly operate the effluent treatment plant so that the treated liquid effluents disposal are in accordance with the legislation in force;
- Perform the aquatic fauna monitoring in Araguari River.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

Since there will not be changes in the Araguari river quality due to the LD Celulose treated effluents disposal, it is not expected to affect the aquatic communities. However any possible changes in the aquatic communities structure due to the release of the treated effluent in the Araguari river waters, it will be followed-up by aquatic fauna monitoring and it should be investigated and mitigated as soon as possible.

9.1.4.4.3 Socioeconomic Environment

9.1.4.4.3.1 Direct and indirect jobs' offer

Potential environmental aspect

Manpower hiring for the enterprise operation.

Potential impact generator factor

Need for manpower.

Technical reason

The total number of workers required for the dissolving pulp mill operation will be approximately 500 people.

The workday of employees from the industrial area will occur in 3 shifts of 8 working hours each. In the administrative area the workday will be 8 work hours and it will take place during office hours.

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

The job's offer must be done by the companies that provide this type of hiring service, and should give priority to hiring local manpower.

It is recommended that the LD Celulose articulates with the education organs and institutions for agreements and/or covenants aiming the professional training of the local population.

Impact characterization

Nature:	Positive
Form of incidence:	Direct and indirect
Coverage area:	Local, regional, extra regional and strategic
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Type III
Magnitude:	Medium
Importance:	High
Potential possibilities:	High
Potential level:	High
Measures resolution level:	High

Area of influence:	AID and AII
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Measures capable to potentialize

- Promote enterprise disclosure campaign to hire labor for the operation phase of the mill and shall give priority for hiring the local population;
- Articulate with education organs and institutions for agreements and/or covenants aiming the professional training of the local population.

Responsible for the measures implementation

The entrepreneur, in partnership with training system of labor.

Prognosis after the implementation of the measures

The LD Celulose will have a training program and employees training system, allied with the labor benefits, as established for CLT contracting system, which enable a high-level of job quality to be available in the municipalities of Indianópolis and Araguari.

9.1.4.4.3.2 Fomentation of economy

Potential environmental aspect

Demand for products and services.

Potential impact generator factor

Operational activities for the dissolving pulp manufacture.

Technical reason

Trade within the region tends to be benefited by the emergence of demand for products linked either directly as indirectly to the mill operation, through consumption of labors linked to the activity.

Similarly, there should be a rise of demand for products and services of the formal trade in the region. This economy fomentation may result in opening new small and mid-sized companies of products and services, as well as in the strengthening of the existing companies. The growth in the number of jobs in the region is a foreseeable consequence.

This local economy fomentation can be proven through indicators that can be the significant increase in public investment, from the increase in the taxes collection.

The informal economy also will increase due to the enterprise. The unqualified people, or who are unable to enter into formal activity services, tend to start informal activities, due to the demand generated by the presence of labors in the project's operation phase. The emergence of bars, food stalls, tobacco sellers and other consumer items to sell may occur in the area next to the enterprise.

The informal trade activities, in general, are not recognized. If there are no records, there is no way to assess the benefits that could be generated for the public coffers and there is no way to monitor the services quality.

On the other hand, such trade may be analyzed as positive, taking into account the income generation and economic activities that will promote money circulation in the municipalities and in the region.

Therefore, there will be local economy fomentation since the implementation phase and it will continue at the operation phase, the public authorities are responsible for supervising the informal activities and convert the taxes collected into improvements to the municipalities.

Impact characterization

Nature:	Negative/Positive
Form of incidence:	Indirect
Coverage area:	Local, regional and extra regional
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Type II and III
Magnitude:	Medium
Importance:	High
Potentialization possibilities:	Medium
Potentialization level:	Medium
Mitigating possibilities:	Mitigable
Measures resolution level:	Medium
Area of influence:	AID and AII

Measures capable to potentialize / Mitigating measures

- Give preference to companies, subcontractors and service providers from the studied region.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

The dissolving pulp mill will promote economy fomentation in the municipalities of Indianópolis and Araguari and in the Minas Gerais State through the inputs purchase and services from the local economy and taxes collection.

9.1.4.4.3.3 Increase in tax collection

Potential environmental aspect

Growth of goods and services producing activities.

Potential impact generator factor

Demand for products and services.

Technical reason

The dissolving pulp mill operation in the municipalities of Indianópolis and Araguari, as well as the creation of direct and indirect jobs will promote increased tax collection, which will provide State and local executives possibilities of investments in social and economic areas. This process is called a multiplier effect and is based on the economic theories to estimate the economic impact of the major initiatives.

Thus, the increase of taxes collection due to the enterprise is considered a positive impact of great importance.

Ask the contractors companies the invoices certificates from municipal, State and federal debt, payment of relevant taxes and taxes collection, preferably in Indianópolis and Araguari will empower the increase of tax collection in the region.

Impact characterization

Nature:	Positive
Form of incidence:	Direct and indirect
Coverage area:	Local, regional, extra regional and strategic
Period of occurrence:	Immediately
Temporality or Duration:	Permanent
Reversibility level:	Irreversible
Cumulative type:	Type II
Magnitude:	High

Importance:	High
Potentialization possibilities:	High
Potentialization level:	High
Measures resolution level:	Medium
Area of influence:	AID and AII

Measures capable to potentialize s

- Verify the tax obligations of the service provider companies.

Responsible for the measures implementation

The entrepreneur.

Prognosis after the implementation of the measures

The enterprise will generate an increase in tax collection in the municipal, State and federal spheres according to the tax regulations in force. Such increase may be converted into improving basic infrastructure, or the productive sector, or meeting the social needs of the municipalities of Indianópolis and Araguari.

9.1.5 General assessment table

Once identified and evaluated the impacts, a summary table - organized according to the environment affected and the respective enterprise phase - enabled to confront them with the attributes described above.

The environmental and social impacts assessment in the areas involved, and the mitigating measures or capable to potentialize proposition to be applied, were prepared on the basis of the environmental factors changes level.

The following tables present a summary of the impacts foreseen for the phases of planning, implementation, erection works deactivation and operation, respectively, for the dissolving pulp mill, in the municipalities of Indianópolis (mill site) and Araguari (water intake and treated effluent disposal pipelines), in Minas Gerais State.

Table 8 – Impacts from the Planning Phase.

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Medidas mitigadoras ou potencializadoras	Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora			
Socioeconômico	Disseminação de informações sobre a implantação do empreendimento	- Geração de empregos - Melhoria da qualidade de vida	Geração de expectativa na população	P	D e I	L, R, E e E	MP	T	R	S	M	G	-	A	- Efetuar divulgação do projeto, informando dados de capacidade, tecnologia a ser empregada, sistemas de controle ambiental, número de empregos, informações sobre os impactos do empreendimento, entre outras, através do Programa de Comunicação Social.	A	A divulgação do projeto com todas as partes interessadas (comunidade, funcionários, fornecedores, governo, clientes, etc.) e o esclarecimento das dúvidas que possam surgir, trará confiança e satisfação à população quanto à implantação do empreendimento, contribuindo pela boa imagem e transparência da empresa.

Table 9 – Impacts from the Implementation Phase.

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Medidas mitigadoras ou potencializadoras	Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora			
Físico	Atividades de terraplenagem e obras da adutora e emissário	Movimentação de terra e intervenções nas áreas terrestres próximas ao rio	Intensificação dos processos erosivos e de assoreamento	N	D	L	I	T	I	II	M	P	M	-	<ul style="list-style-type: none"> - Planejar a execução das obras de movimentação de solos e preparação do terreno de preferência fora de períodos chuvosos, a fim de reduzir a possibilidade de ocorrências erosivas devido à suscetibilidade do terreno; - Minimizar o tempo de exposição das áreas sem cobertura vegetal na fase de obras; - Estocar em local adequado a camada orgânica superior do solo, para reutilização posterior em projeto paisagístico; - Construir drenagens temporárias e caixas de sedimentação no entorno das obras de terraplenagem, para retenção de sólidos, evitando assoreamento do corpo de água. 	A	Não é esperada a alteração na qualidade das águas devido ao transporte de sedimentos, uma vez que o projeto contempla medidas para mitigar esse impacto.

Table 10 – Impacts from the Implementation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora		
Físico	Movimentação de veículos e máquinas	Geração de ruído	Incômodo à vizinhança	N	D	L/R	I	T	R	II	B	P	M	-	A	Não deverá haver incômodo à vizinhança com relação ao ruído gerado pela movimentação de veículos na fase de obras, visto que as medidas serão implementadas, além disso, a aglomeração populacional mais próxima se encontra a aproximadamente 20 km do <i>site</i> .
	Movimentação de veículos e máquinas	Geração de poeira e fumaça preta	Alteração da qualidade do ar	N	D	L/R	I	T	R	II	B	P	M	-	A	Não deverá haver incômodo à vizinhança com relação à emissão de poeira e fumaça preta geradas pela movimentação de veículos na fase de obras, visto que as medidas serão implementadas, além disso, aglomeração populacional mais próxima se encontra a aproximadamente 20 km do <i>site</i> .

Table 11 – Impacts from the Implementation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora		
Físico	Geração de resíduos sólidos	Disposição inadequada dos resíduos sólidos gerados	Alteração na qualidade do solo e/ou das águas superficiais e subterrâneas	N	D	L/R	MP	T R	III	M	P	M	-	<ul style="list-style-type: none"> - Seguir as diretrizes do Programa Ambiental da Construção – PAC, quanto às melhores práticas de Gerenciamento de Resíduos Sólidos conforme descrito na Lei Federal nº 12.305/2010, dentre as quais se destacam: <ul style="list-style-type: none"> Ø Minimização da geração de resíduos através da utilização do princípio dos 3R's (Reduzir, Reutilizar, Reciclar); Ø Segregação dos resíduos sólidos, de acordo o padrão de cores estabelecidas pela Resolução CONAMA nº 275/2001; Ø Coleta, acondicionamento, armazenamento e transporte dos resíduos sólidos, de acordo com as legislações vigentes; Ø Destinação final ambientalmente adequada (reutilização, reciclagem, compostagem, aproveitamento energético, etc.) e/ou disposição final ambientalmente adequada dos resíduos sólidos gerados no empreendimento. - Dispor os materiais (solo de escavação), caso necessário, em áreas de bota-fora devidamente licenciadas. - Implantar uma Central de Armazenamento Temporário de Resíduos Sólidos que será gerenciada por uma empresa especializada neste serviço. 	A	Não é esperada alteração na qualidade do solo e/ou das águas devido ao manuseio de resíduos, ou seja, os resíduos serão devidamente identificados, acondicionados, armazenados, transportados e dispostos adequadamente, seguindo rigorosamente as diretrizes do PAC, e, além disso, o material de empréstimo e as áreas de bota-fora, caso necessário, serão provenientes de locais devidamente licenciadas, não havendo comprometimento da qualidade ambiental da área.
	Geração de esgoto sanitário durante as obras	Disposição inadequada dos efluentes	Alteração da qualidade das águas superficiais e/ou subterrâneas	N	D	L	I	T R	II	B	M	M	-	<ul style="list-style-type: none"> - Tomar medidas para certificar que a empresa a ser contratada para coleta do esgoto sanitário dos banheiros químicos estará devidamente regularizada, e se estará destinando o esgoto de maneira ambientalmente adequada; - Seguir as diretrizes do Programa Ambiental da Construção – PAC, quanto ao Gerenciamento de Efluentes, que são: <ul style="list-style-type: none"> Ø Monitorar os efluentes líquidos; Ø Realizar auditorias e inspeções; Ø Atender aos padrões de emissão dos parâmetros estabelecidos pela Resolução CONAMA nº 430/2011 e Deliberação Normativa Conjunta COPAM/CERH-MG nº 1/2008. 	A	Não haverá alteração da qualidade das águas superficiais e/ou subterrâneas, uma vez que os esgotos sanitários gerados durante as obras serão devidamente tratados e utilizados como fertilirrigação nas florestas de eucalipto da Duratex.

Table 12 – Impacts from the Implementation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto												Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora	Medidas mitigadoras ou potencializadoras		
Biótico	Atividades de terraplenagem	Supressão da vegetação	Perda de vegetação e afugentamento da fauna	N	D	L	I	P	I	S	M	M	PM	-	<ul style="list-style-type: none"> - Seguir as diretrizes do Programa Ambiental da Construção – PAC, quanto aos critérios e controles operacionais a serem realizados na supressão de vegetação, que são: <ul style="list-style-type: none"> Ø Realizar o Inventário Florestal da área de interesse; Ø Iniciar a supressão somente após a obtenção da Autorização de Supressão junto ao órgão ambiental responsável; Ø Realizar piqueteamento para marcação da área a ser suprimida; Ø Utilizar equipe com experiência nesta atividade; Ø Dispor adequadamente os resíduos orgânicos e vegetação da atividade de supressão; Ø Estocar em local adequado, a camada orgânica superior do solo, para posterior reutilização; Ø Realizar compensação ambiental, conforme estabelecido na Autorização de Supressão; Ø Implantar o Programa de Monitoramento de Flora e Fauna; Ø Realizar supervisão e acompanhamento ambiental da obra; Ø Proibir o uso de fogo para a supressão da vegetação. 	M	Através da adoção das medidas mitigadoras, pode-se afirmar que, a supressão da vegetação será mínima, e devidamente compensada a remoção de vegetação natural com árvores nativas, especialmente com vegetação da região, não interferindo significativamente na biota local, uma vez que a área já sofre um alto grau de antropização.
	Implantação do sistema de captação de água e emissário de efluentes	Intervenções no leito fluvial e nas áreas terrestres próximas ao rio	Alteração nos ecossistemas aquáticos	N	D	L	I	T	I	I	B	M	M	-	<ul style="list-style-type: none"> - Empregar tecnologias que minimizem os impactos ocasionados pelas obras nas margens e no fundo do rio Araguaí na implantação da adutora e do emissário; - Monitorar a qualidade das águas superficiais na fase de obras. 	M	Uma vez que não haverá envio de sedimentos para as águas do rio Araguaí, não haverá alteração da qualidade do rio, tampouco se espera que afetem as comunidades aquáticas.

Table 13 – Impacts from the Implementation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Medidas mitigadoras ou potencializadoras	Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora			
Biótico	Movimentação de veículos	Aumento do trânsito de veículos	Aumento dos riscos de atropelamento de animais	N	D/I	L	I	T	I	S	B	P	M	-	- Informar e conscientizar os condutores de veículos quanto à direção defensiva, legislação de trânsito e sobre a legislação local.	M	Não deverá haver aumento dos riscos de atropelamento de animais devido à movimentação de veículos para implantação do empreendimento, visto que os funcionários próprios e terceiros receberão informações sobre direção defensiva, legislação de trânsito e sobre a legislação local.

Table 14 – Impacts from the Implementation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto												Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora	Medidas mitigadoras ou potencializadoras		
Socioeconômico	Atividades de terraplenagem	Possibilidade de afetar áreas de potenciais patrimônio histórico e arqueológico	Interferência ao patrimônio histórico e arqueológico	N	D	L	I	P	I	S	B	M	M	-	- Tomar medidas para que as atividades de implantação da fábrica de celulose solúvel não venham a impactar ou destruir os bens culturais considerados patrimônio dos brasileiros protegidos por tombamento.	A	Não deverá haver interferência ao patrimônio histórico e arqueológico devido à implantação do empreendimento visto que a área está significativamente antropizada, portanto o potencial de presença de vestígios arqueológicos é reduzido. Entretanto, todas as medidas serão tomadas para não haver interferências ao possível patrimônio histórico e arqueológico.
	Mobilização de mão de obra	Pressão sobre a infraestrutura urbana devido ao acréscimo de população representada pela mão de obra na implantação	Interferência na infraestrutura urbana	N	I	L/R	I/MP	T	R	II	M	M	M	-	- Promover a formação e qualificação de pessoas da região para o setor de celulose, de manutenção mecânica, elétrica e instrumentação, favorecendo a possibilidade de contratação para a operação da fábrica; - Implantar uma estrutura ambulatorial e serviços que minimizem a dependência da infraestrutura da região; - Acomodar os profissionais que vierem de fora da região em alojamentos a serem construídos, na rede hoteleira e em imóveis de aluguel já disponíveis na região providos de infraestrutura básica; - Implementar mecanismos de transporte de trabalhadores entre os municípios envolvidos e localização do empreendimento.	M	A interferência na infraestrutura urbana será mínima considerando a implementação das medidas e assim que as obras forem concluídas o impacto deverá normalizar.

Table 15 – Impacts from the Implementation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto												Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora	Medidas mitigadoras ou potencializadoras		
Socioeconômico	Implantação da fábrica, constituída por prédios, torres, chaminés, etc.	Alteração da paisagem e do uso do solo	Impacto sobre a morfologia urbana	N	D	L	I	P	I	III	B	P	PM	-	- Implantar o projeto paisagístico que favoreça a integração da fábrica com o ambiente, diminuindo o efeito do contraste dos prédios e estruturas com a paisagem natural.	A	A implantação da fábrica inevitavelmente irá alterar a paisagem e uso do solo local, entretanto o projeto paisagístico deverá minimizar este impacto.
	Mobilização de mão de obra	Contratação de mão de obra temporária	Geração de empregos temporários diretos e indiretos	P	D/I	L/ R/ EX/ E	I	T	R	III	A	G	-	A	- Promover campanha de divulgação para contratação de mão de obra para a fase de implantação, devendo dar prioridade para a população local; - Incentivar algumas empresas prestadoras de serviço a continuar os seus trabalhos durante a fase de operação da fábrica.	A	Este impacto pode se disseminar pela região pela inserção de outras empresas prestadoras de serviços para o empreendimento e pelos efeitos das migrações pendulares gerando postos de empregos indiretos.
	Demanda de produtos e serviços por parte do empreendimento e da mão de obra empregada	Crescimento do setor terciário	Dinamização da economia local	N/P	I	L/ R/ EX	I/ MP	T	R	II	M	M	M	M	- Dar preferência às empresas, prestadores de serviços e comércio da região.	M	Haverá dinamização da economia local desde a fase de implantação devido à demanda de produtos e serviços por parte do empreendimento e da mão de obra empregada, tendo o poder público a responsabilidade de fiscalizar as atividades informais e reverter os impostos recolhidos em benfeitorias aos municípios.

Table 16 – Impacts from the Implementation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto												Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora	Medidas mitigadoras ou potencializadoras		
Socioeconômico	Demanda de produtos e serviços por parte do empreendimento e da mão de obra empregada	Necessidade de imóveis para acomodação da mão de obra necessária para implantação do empreendimento	Valorização do mercado imobiliário urbano	N/P	I	R	MP	P	R	II	M	M	PM	M	- Acomodar os profissionais que vierem de fora da região em alojamentos a serem construídos, na rede hoteleira e em imóveis de aluguel já disponíveis na região.	M	A demanda de imóveis na região pela LD Celulose S.A e empresas terceirizadas gera movimento no setor, implicando em valorização do preço dos mesmos. Entretanto, deverá haver um controle quanto à superlotação dos imóveis.
	Demanda de produtos e serviços por parte do empreendimento e da mão de obra empregada	Crescimento das atividades produtoras de bens e serviços	Aumento na arrecadação tributária	P	D/I	L/ R/ EX/ E	I	P	I	II	A	G	A	A	- Potencializar a compra de serviço e bens na implantação do empreendimento, preferencialmente em Araguari e Indianópolis.	A	O empreendimento gerará um aumento na arrecadação de tributos nas esferas municipais, estadual e federal das demandas geradas pela implantação da fábrica. Entretanto caberá o poder público reverter os impostos recolhidos em benfeitorias aos municípios.

Table 17 – Impacts from the Erection Works Desativation Phase.

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Medidas mitigadoras ou potencializadoras	Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora			
Socioeconômico	Desmobilização da mão de obra temporária	Conclusão das obras de implantação do empreendimento	Redução do número de postos de emprego	N	D/I	L, E	I	P	R	II	M	M	M	-	<ul style="list-style-type: none"> - Incentivar o retorno da mão de obra utilizada na construção para seus municípios de origem; - Incentivar algumas empresas prestadoras de serviço a continuar os seus trabalhos durante a fase de operação da fábrica. 	A	Apesar de algumas empresas prestadoras de serviço poderem continuar suas atividades na fase de operação e de haver priorização de contratação de mão de obra local, a desmobilização de mão de obra é inevitável após a conclusão das obras. Ao realizar a desmobilização de acordo com os trâmites legais do regime de contratação, a insatisfação causada pelo impacto é minimizada.

Table 18 – Impacts from the Operation Phase.

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto												Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora	Medidas mitigadoras ou potencializadoras		
Físico	Geração de ruídos pelo empreendimento	Atividades operacionais para fabricação de celulose solúvel	Incômodo à vizinhança em relação ao ruído	N	D	L	I	P	R	II	B	P	M	-	<ul style="list-style-type: none"> - Adquirir máquinas e equipamentos próprios e de terceiros visando baixo nível de ruído; - Sempre que possível, enclausurar acusticamente equipamentos próprios e de terceiros visando baixo nível ruído; - Implantar o Programa de monitoramento de ruído. 	A	Não deverá haver incômodo à vizinhança em relação ao ruído gerado pelo empreendimento uma vez que as medidas de atenuação serão implementadas, além da presença mais imediata de aglomeração populacional se encontrar a aproximadamente 20 km no sentido sul da área do empreendimento, sendo a área urbana de Indianópolis.
	Geração de resíduos sólidos	Disposição inadequada dos resíduos sólidos gerados	Alteração na qualidade do solo e/ou das águas	N	D/I	L	MP	P	I	I e II	M	M	M	-	<ul style="list-style-type: none"> - Implantar as melhores práticas, conforme descrito na Lei Federal nº 12.305/2010 e outras legislações e normas aplicáveis, para o gerenciamento de resíduos sólidos; - Implantar o Programa de Gerenciamento de Resíduos Sólidos (PGRS); - Treinar funcionários para correta destinação dos resíduos gerados; - Operar adequadamente o sistema de compostagem e o processo de produção de corretivo de acidez de solo. 	A	A qualidade do solo e/ou das águas não será afetada visto que será implantado um Programa de Gerenciamento de Resíduos Sólidos contendo um conjunto de recomendações e procedimentos que visam traçar as diretrizes para o manejo, a disposição final e redução da geração de resíduos, de forma a minimizar os impactos ambientais.

Table 19 – Impacts from the Operation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Medidas mitigadoras ou potencializadoras	Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora			
Físico	Utilização de produtos químicos	Armazenamento e manuseio inadequado ocasionando vazamentos ou derrames de produtos químicos perigosos	Alteração da qualidade do ar, solo e/ou das águas superficiais e subterrâneas	N	D/I	L	MP	P	I	I e II	M	G	M	-	<ul style="list-style-type: none"> - Implantar sistemas de contenção, impermeabilização nas áreas no entorno dos tanques de produtos químicos, além de implantar plano de manutenção e vistorias; - Capacitar os profissionais envolvidos nas atividades de manuseio, estocagem e transporte de produtos perigosos; - Instalar de sistemas de combate a incêndio; - Implantar as recomendações do Estudo de Análise de Risco. 	A	Não deve haver alteração da qualidade do ar, solo e/ou das águas superficiais e subterrâneas devido à utilização de produtos químicos perigosos na fábrica visto que, será implantada uma sistemática voltada para o estabelecimento de requisitos contendo orientações gerais de gestão a prevenção de acidentes, através da antecipação, reconhecimento, avaliação e consequente controle da ocorrência de riscos ambientais existentes ou que venham a existir no ambiente de trabalho, tendo em consideração a proteção do meio ambiente e dos recursos naturais.

Table 20 – Impacts from the Operation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora		
Físico	Geração de efluentes	Lançamento de efluentes sem tratamento	Alteração da qualidade do rio	N	D	L	MP	P	I	I e II	M	M	M	-	A	<p>O uso das melhores tecnologias disponíveis que visa minimizar a geração de efluentes líquidos e o acompanhamento e monitoramento da eficiência da ETE servirão como controle para que não comprometam a qualidade das águas do rio Araguari que também será monitorada.</p>

Table 21 – Impacts from the Operation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Medidas mitigadoras ou potencializadoras	Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora			
Físico	Geração de emissões atmosféricas	Atividades operacionais para fabricação de celulose solúvel	Alteração da qualidade do ar	N	D	L	I	P	R	I e III	M	M	M	-	<ul style="list-style-type: none"> - Implantar equipamentos de controle de emissões de alta eficiência, tais como precipitadores eletrostáticos; - Instalar chaminé com altura definida na modelagem de dispersão atmosférica; - Adotar em seu processo produtivo matriz energética mais limpa, baseada no uso de combustíveis renováveis, produzindo celulose com a mínima emissão de carbono; - Implantar Programa de Monitoramento de Emissões Atmosféricas; - Monitorar as fontes emissoras através de medições on line; - Realizar monitoramento de qualidade do ar periodicamente. 	A	De acordo com o estudo de dispersão atmosférica a qualidade do ar em Indianópolis e Araguari será pouco alterada em função da implantação da fábrica, apresentando poluentes abaixo dos padrões estabelecidos pela Resolução CONAMA nº. 03/1990, bem como estarão abaixo do limite de percepção de odor (TRS).

Table 22 – Impacts from the Operation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Medidas mitigadoras ou potencializadoras	Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora			
Biótico	Geração de efluentes	Lançamento de efluentes tratados nas águas do rio	Alteração nos ecossistemas aquáticos	N	D	L	I	P	I	I	B	P	M	-	<ul style="list-style-type: none"> - Utilizar no processo produtivo as melhores tecnologias disponíveis (BAT) visando minimizar a geração de efluentes líquidos (vazão e carga orgânica); - Operar adequadamente a estação de tratamento de forma que o lançamento dos efluentes líquidos tratados estejam de acordo com a legislação vigente; - Implantar o monitoramento da fauna aquática no rio Araguari. 	M	<p>Uma vez que não haverá alteração da qualidade do rio Araguari devido ao lançamento de efluentes tratados da fábrica da LD Celulose, tampouco se espera que afetem as comunidades aquáticas. Entretanto qualquer eventual alteração na estrutura das comunidades aquáticas devido ao lançamento de efluentes tratados nas águas do rio Araguari terá acompanhamento através do monitoramento da fauna aquática e deverá ser investigado e mitigado ao mais brevemente possível.</p>

Table 23 – Impacts from the Operation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto											Medidas mitigadoras ou potencializadoras	Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora			
Socioeconômico	Necessidade de mão de obra para operação do empreendimento	Contratação de mão de obra para a operação do empreendimento	Geração de empregos diretos e indiretos	P	D/I	L/ R/ Ex/ E	I	P	I	III	M	G	-	A	- Promover campanha de divulgação para contratação de mão de obra, para a fase de operação da fábrica, devendo dar prioridade para a população local; - Articular com órgãos e instituições de ensino profissionalizante para celebração de acordos e/ou convênios visando capacitação profissional da população local.	A	A LD Celulose terá um programa de capacitação e treinamento de funcionários, aliado aos benefícios trabalhistas, conforme CLT, que possibilitam uma qualidade de emprego de alto nível a ser disponibilizado nos municípios de Indianópolis e Araguari.
	Demanda de produtos e serviços por parte do empreendimento e da mão de obra empregada	Atividades operacionais para fabricação de celulose solúvel	Dinamização da economia	N/P	I	L/ R e Ex	I	P	I	II e III	M	A	M	M	- Dar preferência às empresas, prestadores de serviços e comércio da região.	M	A fabricação de celulose solúvel provocará dinamização da economia dos municípios de Indianópolis e Araguari e do estado de Minas Gerais através da compra de insumos e serviços da economia local e da arrecadação tributária.

Table 24 – Impacts from the Operation Phase. (cont.)

Componente	Atividade (Fator Gerador)	Aspecto	Impacto	Caracterização do impacto												Grau de resolução das medidas	Prognóstico após implantação das medidas
				Natureza/qualificação	Forma de incidência	Área de abrangência espacial	Prazo de ocorrência	Temporalidade ou Duração	Reversibilidade	Cumulatividade	Magnitude	Importância	Possibilidade mitigadora	Possibilidade potencializadora	Medidas mitigadoras ou potencializadoras		
Socioeconômico	Demanda de produtos e serviços	Crescimento das atividades produtoras de bens e serviços	Aumento da arrecadação tributária	P	D/I	L/ R/ Ex/ E	I	P	I	II	A	G	-	A	- Verificar o cumprimento das obrigações tributárias das empresas prestadoras de serviço.	M	O empreendimento irá gerar aumento na arrecadação de tributos nas esferas municipais, estadual e federal, de acordo com a legislação tributária vigente. Tais aumentos poderão reverter em melhoria da infraestrutura básica, seja no setor produtivo, seja na área de atendimento das necessidades sociais dos municípios de Indianópolis e Araguari.

10 MITIGATING MEASURES, MEASURES CAPABLE TO POTENTIALIZE AND COMPENSATORY

Based on the impacts assessment, there are recommended measures to minimize, eliminate, compensate the negative impacts and, in the case of positive impacts, measures to maximize them, always with measures which should be implemented through environmental projects.

Follow the proposed measures:

Planning phase

- Project disclosure, reporting capacity data, technology to be used, environmental control systems, number of jobs, information on the enterprise impacts, among others to all stakeholders, especially through the Social Communication Program. (preventive)

Implementation phase

- Plan the soil revolving and cleaning field works execution preferably during dry periods in order to reduce the possibility of erosive events due to the soil slipping susceptibility in the rainy periods; (preventive)
- Minimize the exposure time of areas without covered vegetation; (preventive)
- Store in proper location the organic top soil layer, for its later reuse in landscape and gardening purposes in the project area; (preventive)
- Build temporary drainage system and sedimentation boxes around the excavation works, to retain solid, avoiding siltation of the water body; (preventive)
- Follow the guidelines of the Environmental Construction Program – PAC, for the noise generation, such as:
 - Ø Conduct activities predominantly during the day time; (preventive)
 - Ø Conduct regulating maintenance of machines, trucks and vehicles; (preventive)
 - Ø Monitor noise levels during the implementation phase. (preventive)
- Follow the guidelines of the Environmental Construction Program – PAC, to minimize the generation of dust and black smoke, such as:
 - Ø Conduct regulating maintenance of machines, trucks and vehicles; (preventive)
 - Ø Perform monitoring to control black smoke emission in diesel-powered vehicles; (preventive)
 - Ø Wetting the internal traffic routes and the work yard pavement during the execution of the services, when necessary; (preventive)
 - Ø Cover the trucks which transport soil, rocks and all powder material with canvas; (preventive)

- Follow the guidelines of the Environmental Construction Program – PAC, regarding the best practices for solid waste management as described in Federal Law n° 12,305/2010, among which stand out:
 - Ø Minimize waste generation through the use of the 3R's principle (Reduce, Reuse, Recycle); (preventive)
 - Ø Segregation of solid waste, according to the color pattern established by CONAMA Resolution n° 275/2001; (preventive)
 - Ø Collecting, packaging, storage and transportation of solid waste, according to the laws in force; (preventive)
- Disposing materials (soil excavation), if necessary, in send-off areas properly licensed; (preventive)
- Implement a Temporary Solid Waste Storage area to be managed by a company specialized in this service; (preventive)
- Take measures to ensure that the hired company to collect the sewage of the chemical toilets will be properly regulated, and will allocate the sewage in an appropriate environmentally way; (preventive)
- Follow the guidelines of the Environmental Construction Program – PAC, for the effluents management, which are:
 - Ø Monitor liquid effluents; (preventive)
 - Ø Conduct audits and inspections; (preventive)
 - Ø Meet the treated effluents emission standards of the parameters established by CONAMA Resolution n° 430/2011 and Joint Normative Deliberation COPAM/CERH-MG n° 1/2008; (preventive)
- Follow the guidelines of the Environmental Construction Program – PAC, as the criteria and operational controls to be carried out regarding the vegetation suppression, which are:
 - Ø Perform the forest inventory in the area of interest; (preventive)
 - Ø Start the suppression only after obtaining the Authorization of Suppression issued by the environmental organ responsible; (preventive)
 - Ø Perform picketting for marking the area to be suppressed; (preventive)
 - Ø Use a team with experience in this activity; (preventive)
 - Ø Dispose properly the organic waste and vegetation from the suppression activity; (preventive)
 - Ø Store in proper location, top soil organic layer, for later re-use; (preventive)
 - Ø Perform environmental compensation, as established by the Authorization of Suppression; (compensatory)
 - Ø Implement the Flora and Fauna Monitoring Program; (preventive)

- Ø Perform environmental monitoring and supervision of the Works; (preventive)
- Ø Prohibit the use of fire for the vegetation removal; (preventive)
- Employ technologies that minimize the impacts caused by the works on the bank and bottom of the Araguari River in the implementation of the water intake and effluent disposal pipelines; (preventive)
- Monitor the surface water quality during the implementation phase; (preventive)
- Inform and raise awareness for vehicles drivers about defensive driving, traffic law and local legislation; (preventive)
- Take measures to ensure that the dissolving pulp mill erection activities will not impact or destroy the cultural heritage of Brazilians considered protected by laws; (preventive)
- Promote training and qualifications of people from the region, to the pulp sector, to mechanical, electrical and instrumentation mill's needs, favoring the possibility of hiring them for the operation phase; (preventive)
- Install an ambulatory structure and first aid services that minimize dependence on the region's health infrastructures; (preventive)
- Accommodate professionals who come from outside the region in places to be built in the region, in hotels and in rental existing properties available in the area provided with basic sanitation infrastructures; (preventive)
- Provide mechanisms to transport the employees from the cities to the project's area; (preventive)
- Deploy the project encouraging the integration with the landscape and the environment area, decreasing the contrast effect of the buildings and structures with the natural landscape; (preventive)
- Promote the labor hiring disclosure campaign for the implementation phase, and give priority to hire local people; (preventive)
- Encourage some companies to continue providing service and work during the operation phase; (preventive)
- Give preference to companies, subcontractors and service providers from the studied region; (preventive)
- Potentialize the purchase of goods and services in the project implementation phase, preferably in Araguari and Indianópolis. (preventive)

Erection Works Deactivation phase

- Encourage the temporarily hired labors for the construction phase to return to their municipalities of origin; (preventive)

- Encourage some companies to continue providing their service during the mill operation phase. (preventive)

Operation phase

- Purchase machinery and equipment aiming the low noise level emission; (preventive)
- Whenever possible, cloister acoustically the equipment aiming the low noise level emission; (preventive)
- Deploy the noise monitoring program; (preventive)
- Deploy the best practices, as described in Federal Law nº 12,305/2010 and other applicable laws and regulations, regarding the solid wastes management; (preventive)
- Deploy the Solid Waste Management Program (PGRS); (preventive)
- Train employees to correct disposal of generated wastes; (preventive)
- Operate properly the composting system and the soil acidity correction production process; (preventive)
- Deploy containment, impermeable systems in the areas around chemical tanks, and deploy a maintenance plan and surveys; (preventive)
- Train professionals involved in handling, storage and transportation of dangerous products; (preventive)
- Install fire fighting systems; (preventive)
- Deploy the recommendations of the risk analysis study; (preventive)
- Use in the production process the best available technologies (BAT) to minimize the generation of liquid effluent (in terms of flow and organic load); (preventive)
- Install an effluent treatment plant that is based on best available practice technology (modern and safe) of activated sludge type; (preventive)
- Operate properly the effluent treatment plant so that the treated liquid effluents disposal are in accordance with the legislation in force; (preventive)
- Perform the Liquid Effluent Monitoring Program; (preventive)
- Perform periodic inspection in the effluent disposal pipeline system and its diffusers; (preventive)
- Perform surface water quality monitoring; (preventive)
- Install high efficiency emission control equipment, such as electrostatic precipitators; (preventive)
- Install chimney with height set in atmospheric dispersion modeling; (preventive)

- Adopt in its production process a cleaner energy matrix, based on the use of renewable fuels, producing pulp with minimal carbon emissions; (preventive)
- Deploy Atmospheric Emissions Monitoring Program; (preventive)
- Monitor the atmospheric emission sources through online measurements; (preventive)
- Perform air quality monitoring periodically; (preventive)
- Perform the aquatic fauna monitoring in Araguari River; (preventive)
- Promote enterprise disclosure campaign to hire labor for the operation phase of the mill and shall give priority for hiring the local population; (preventive)
- Articulate with education organs and institutions for agreements and/or covenants aiming the professional training of the local population; (preventive)
- Give preference to companies, subcontractors and service providers from the studied region; (preventive)
- Verify the tax obligations of the service provider companies. (preventive)

11 CONCLUSION

To analyze the environmental feasibility of the L.D Celulose dissolving pulp mill implementation in municipality of Indianópolis (mill site), as well as in Araguari municipality (water intake and treated effluent disposal pipelines), it was elaborated an Environmental Impact Study and its Environmental Impact Report (EIA/RIMA). This study made a systemic approach of the project, its main features, as well as the diagnosis scenario of the physical, biotic and socioeconomic environment. Later, in the environmental impacts assessment, there were pointed the possible impacts arising from the interaction between the future industrial unit operation and the physical, biotic and socio-economic elements.

The total capacity of the mill will be 540,000 t/year of dissolving pulp. The project contemplates the production of dissolving pulp (wood preparation, fiberline, drying and baling), chemical recovery (evaporation, recovery boiler, causticizing/lime kiln) and utilities (biomass boiler, Water Treatment Plant - ETA, Water Treatment Plant for Boilers - ETAC and Effluent Treatment Plant - ETE), fuel oil system, effluent disposal pipeline, water intake pipeline, laboratory and temporary solid waste storage area.

It will be installed a chemical area that will include the unloading, handling and storage of sodium hydroxide, hydrogen peroxide, sulphuric acid and magnesium sulphate, in addition to plants devoted to preparation of liquid sulfur dioxide and production of oxygen and ozone.

It will be installed a new cogeneration unit with a nominal capacity of 132 MW being consumed 63.5 MW in the pulp mill. There will be, therefore, a surplus, that will be available for selling.

It should be emphasized that in relation to the environmental control systems, the industrial plant will adopt the best available technologies (BAT), aiming the reduction, control and monitoring of liquid effluents, atmospheric emissions and solid waste generated.

In the environmental diagnostics studies there were held specific studies for the physical, biotic and socioeconomic environment, identifying the current environmental sensitivities and vulnerabilities.

The physical environment study there were covered aspects such as: climate and weather conditions, geology, geomorphology and pedology, water resources, air quality and noise levels. Among the studies held, the simulations to: treated liquid effluents dispersion at Araguari River; atmospheric emissions dispersion; and the risk analysis study should be highlighted.

In relation to the impacts arising from water consumption, the carried out studies confirmed the water availability of the Araguari River, which has a minimum historical flow (Q_{7,10}) of 40 m³/s and average historical flow of 430 m³/s. The water consumption for mill operation is estimated at 0.8 m³/s (representing 0.19% of the average river flow), and about 75% of that volume will return to the Araguari river as treated effluent.

With respect to the impact of river quality change by the treated effluents discharge, there were held effluent dispersion and self-depuration studies, which aim to meet the approximate distance that occurs the complete mixture of the effluent with the river waters and its assimilation capacity. It was verified in the studies, that the dissolving

pulp mill treated effluent will not significantly impact the water quality of the Araguari River, even the minimum conditions of the river flow, indicating that there will not be significant changes from its current quality.

Another important study is the risks analysis which after the identification of 37 possible dangers events, it was found that all of these dangers were classified as negligible, minor and moderate and none danger was classified as serious or critical. The 7 most dangers events were taken for simulation of the consequences by PHAST software version 6.7, where it was found that all the effects are restricted to the internal area of the mill, not reaching population outside the walls. Thus, it affirms that the project is feasible, comparing the results obtained with the recommended norm CETESB P4,261 reinforcing the attendance of the measures to be adopted, recommended in the Risk Analysis Study.

The air quality impact due to the operation of the L.D Celulose pulp mill will be minimized by the control of atmospheric emissions based on environmental management policy that consists in prevention of pollution through the use of latest uses technologies (generation sources control or "in plant control"), installation of high-efficiency electrostatic precipitators, collection and treatment of Non-Condensable gases concentrated and diluted and real-time gas monitoring and air quality monitoring. The atmosphere dynamics, at the proposed site for mill construction, offers favorable conditions for the atmospheric emissions dispersion, which was proven with the atmospheric dispersion study, that the values found were below the standards established by CONAMA Resolution n° 03/1990.

The biotic environment diagnosis studies covered the flora and fauna presented in the project areas of influence, being identified few important elements in the local environment. It is worth noting that the plant layout will be designed to minimize the removal of vegetation, minimizing the changes in landscape and in land use.

For the socio-economic studies there were characterized the demographic dynamics, the economic aspects, the urban structure and basic sanitation in cities and communities under the influence of the enterprise, in order to provide a broader picture of the context in which the enterprise will be inserted.

It should be highlighted that the manpower needed for L.D Celulose unit implementation, is considered as an important factor of direct and indirect jobs generation. During the peak of the implementation period phase, it is estimated that 6,500 employees will be working on the project erection, featuring a significant socio-economic impact in the region.

However, at the same time, it is known that there will be interference in the existing urban infrastructure in the municipalities involved. L.D Celulose should encourage the return of labors, who come from outside the region for the construction phase to their municipalities of origin, and should perform the awareness train to the employees and contractors, regarding defensive driving, health, hygiene and safety issues.

It was evaluated the legislation applicable to the project, and highlighting the most important devices to be observed by the entrepreneur and the environmental agency in permitting process of this enterprise.

There were also studied the Government plans and programs, in the implementation and planning phases of the project area of influence. In this sense, it was evaluated the compatibility of the L.D Celulose project with the government plans and programs (federal, State and municipal spheres), being concluded the compatibility feasibility of the L.D Celulose mill.

On the environmental impact assessment, based on the project characterization and on the environmental diagnosis, considering the synergistic and cumulative impacts, the consultant responsible for this study found that:

- In the planning phase it was found 1 positive impact on the socioeconomic environment;
- In the implementation phase there were found 5 negative impacts on the physical environment, 3 negative impacts on the biotic environment and 7 impacts on the socio-economic environment, being 3 negatives, 2 positives, and 2 as much positive as negative;
- In the erection work deactivation phase it was found 1 negative impact on the socioeconomic environment;
- In the operation phase there were found 5 negative impacts on the physical environment, 1 negative impact on the biotic environment and 3 impacts on the socio-economic environment, being 2 positives, and 1 as much positive as negative.

Most of the negative impacts identified are on the physical environment to which there were proposed mitigating measures, which actions will aim the reduction or mitigation of these impacts.

Among the mitigating measures, there were proposed programs in four phases of the project (planning, implementation, erection work deactivation and operation), presenting various levels of resolution.

All negative impacts identified in the dissolving pulp mill operation phase are mitigable.

On the other hand, there were identified positive impacts connected to socioeconomic environment and are related mainly to the increase of direct and indirect jobs, increase of tax collection and local economy fomentation, in the implementation and operation phases.

The positive impacts are extremely important in the social context of the Indianópolis and Araguari municipalities and will be marks in the development of the cities.

The presence of L.D Celulose S.A in the municipalities of Indianópolis and Araguari may increase the economic development of the region and of the Minas Gerais State, in environmentally responsible and sustainable manner.

According to the analyses carried out in this Environmental Impact Study, the project presents appropriate regarding the environment quality aspects. The aspects identified with greater vulnerability are mitigable being required that the environmental control measures provided in the design are properly implemented. On the other hand, the positive impacts will remain throughout the operation period of the enterprise.

Having said that, based on the presented study, it was not identified any impact which, in the opinion of this multidisciplinary EIA team, unable the environmental viability of the project.

For this reason, the L.D Celulose S.A mill for the production of dissolving pulp and its associated infrastructure, can be implemented in the studied region, because it is a sustainable project and viable on the economic, social, environmental, technical and legal points of views, contributing to the social and economic growth of the region, of the Minas Gerais State and of Brazil.

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IBGE | Cidades | Minas Gerais | <https://cidades.ibge.gov.br>

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Resolução CONAMA nº 03/1990. Dispõe sobre padrões de qualidade do ar, previstos no PRONAR.

Resolução CONAMA nº 275/2001. Estabele o código de cores para os diferentes tipos de resíduos, a ser adotado na identificação de coletores e transportadores, bem como nas campanhas informativas para a coleta seletiva.

Resolução CONAMA nº 307/2002. Estabelece diretrizes, critérios e procedimentos para a gestão dos resíduos da construção civil.

Resolução CONAMA nº 430/2011. Dispõe sobre as condições e padrões de lançamento de efluentes, complementa e altera a Resolução no 357, de 17 de março de 2005, do Conselho Nacional do Meio Ambiente-CONAMA.