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BacTech
Environmental

Q4 2023

CORPORATE
PRESENTATION

**OUR BUGS
EAT ROCKS!**

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COMMERCIALLY PROVEN **CLEANTECH COMPANY**

Focused on sustainable mining and environmental remediation bioleaching technology



Commercially Proven

Over 30 years of R&D, millions invested, and 3 plants built across the world



Environmentally Friendly

Bioleaching plants remediate toxic concentrates and produce an EPA landfillable waste product



Favourable Macroeconomics

Ecuadorian artisanal and small miners are currently being paid <50 cents on the dollar for their high-grade concentrates



Large Market

The market for artisanal and small mines globally is US\$27B or approximately 20% of global gold production



Niche Opportunity

BacTech is one of the only companies with the expertise to chase high-gold and high-arsenic concentrates



Research & Development

Numerous ongoing R&D projects with the potential to make a large impact on the company's revenues in the coming years

SUSTAINABILITY AT OUR CORE

BACTERIA

The bacteria are naturally occurring and harmless to the environment and human health

HEAVY METAL RECOVERY

Toxic heavy metals, like arsenic, are converted into stable environmentally benign products that can be disposed of in a landfill

NO MERCURY & REDUCED CYANIDE

Reduction in use of mercury by artisanal miners. We will not buy pre-treated concentrates



WATER

Efficient recycling of water from the process

EMISSIONS

No toxic gaseous emissions (e.g., SO₂, As₂O₃)

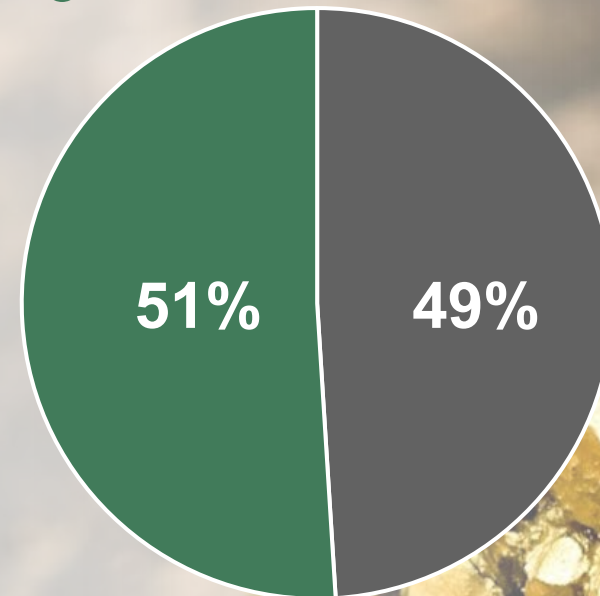
PERMANENT SOLUTION

Bioleaching is a permanent solution, not a Band-Aid fix

CAPITALIZATION STRUCTURE

Basic Shares Outstanding	185,360,333
Reserved for Issuance (Options & Warrants)	37,697,868
Fully Diluted	223,058,211
Market Capitalization (\$0.095)	C\$17.5M
Average Daily Volume	100,000+
52 Week Range	\$0.055 – \$0.10

- Insiders, Management and Strategic Shareholders
- Public



BACTECH TEAM

MANAGEMENT



Ross Orr
President and CEO



David Tingey
Chief Operating Officer



Louis R. Nagy
Chief Financial Officer



Dr. Paul C. Miller
VP Technology



Kate Castro
VP Environmental



Bernardo Brito
Country Manager,
Ecuador

BOARD OF DIRECTORS



Timothy Lewin
Chairman



Ross Orr
Director, President
and CEO



Walter Cimowsky
Director, Audit
Committee



Donald Whalen
Director



Jay Richardson
Director, Audit
Committee



Jay Naster
Director, Audit
Committee

THE ISSUES



Growing demand for resources

Humanity currently uses resources at a rate 50% faster than they can be regenerated by nature



Poor economic & social conditions at artisanal & small mines

The use of mercury and cyanide is unsafe, unhealthy and leads to poor gold recoveries leading to reduced value received



Lack of new REE & critical metal projects

Supply of REE's and critical metals is predominantly in China or outside of North America



Mining technology and practices have not modernized and decarbonized

Outdated and environmentally unfriendly methods are still used despite the need for innovation

THE PROBLEM

Sulfides are the **GLUE**
of nature...

Millerite
SPHALERITE
Arsenopyrite
COVELLITE
Chalcopyrite
PYRITE
Galena Molybdenite
MARCASITE
Pyrrhotite
Chalcocite

THE PROBLEM

...and the CAUSE of



Toxic Concentrates and Tailings

High arsenic concentrates are generally burned and pollute the air, and tailings cause acid rock drainage



Toxic Elements Released into Atmosphere

Pyrometallurgical processing releases arsenic trioxide and sulfur dioxide in the atmosphere



Expensive Reclamation and Remediations

Billions are spent every year on land reclamation and remediation without solving the problem – a band aid solution

THE SOLUTION

Bioleaching AKA Bacterial Oxidation

Our Bugs Eat Rocks!

BacTech Environmental is one of 2 companies worldwide with the expertise for vat bioleaching as an alternative to smelting/roasting.

How?

We like to use the analogy of a brick wall where the sulfides are the mortar holding everything together in the rocks. The bacteria we use break down and oxidize the sulfides.

Once the mortar is gone, the wall comes crashing down. The pH in the tanks is very acidic. Acid soluble metals such as iron, arsenic and copper dissolve into the solution. Gold and silver are now free for recovery in the solids.

OUR VERTICALS



Commercial

(Gold, Silver)

In process of building an owner operated 50 TPD bioleaching plant in Tenguel, Ecuador.



R&D

(Copper, Nickel, Cobalt)

Preliminary Patent for Bioleaching Process.

Targeting 80-100M tonnes of pyrrhotite tailings in Sudbury, Ontario area.



R&D

(Rare Earth Elements)

Interest from US Gov. for a sustainable domestic REE supply chain.

Only commercial bioleaching technology with R&D done on REEs.



Primary Ore	Metals Recovered
Arsenopyrite	Gold, Silver
Chalcopyrite	Copper, Nickel
Pyrrhotite	Nickel, Cobalt, Iron



ECUADOR BIOLEACHING FACILITY

THE FIRST DOMINO

Substantial Revenues within 12 months

TENGUEL PROJECT

BacTech is working to construct an owner operated **50 TPD** toll processing bioleach facility in Tenguel, Ecuador.

The project is at an advanced stage and expected to begin construction once financing is secured.

Assumptions: Gold \$1,798 | Silver \$18

Annual Gold Production	30,981 Ounces
Capital Cost	US\$16M
Operating Cost	US\$212 per Tonne
Purchase Price of Feedstock	65-70% of Contained Gold Value
After-Tax NPV 5%	US\$75.4M
After-Tax Payback	2.95 Years
Annual Revenue	US\$56,462,598

Project Milestones

✓ Bioleach Test Work
✓ Bankable Feasibility Study
✓ Land Acquisition
✓ Construction Permit Granted
✓ EIS Granted in 7 Months
Detailed Engineering Ongoing
Consultation Permit
Financing Discussions Ongoing

Primary Ore	Metals Recovered
Arsenopyrite	Gold, Silver

GREEN BONDS

- BacTech to issue US\$20M Green Bond for the Ecuador project
- US\$16M for plant + US\$4M for working capital
- Moody's has reviewed the proposed plant and technology and awarded an 80% rating for bonds issued by BacTech as "green" and "social"
- Engaged Quito-based broker Analytica Securities to market US\$20M to their clients
- BacTech "ticks all the boxes" with respect to green bond issuers



WHY ECUADOR?

- ✓ Providing environmentally friendly processing locally and with positive local economic impact as BacTech can offer much better prices to miners.
- ✓ Full support from the Ecuadorian Ministry of Artisanal and Small Miners and the Ministry of Mines.
- ✓ Potential to become a regional processing hub. Opportunity to expand **without** disrupting operations.
- ✓ **Access to green hydro power** and existing local infrastructure. BacTech Environmental owns the land that the plant will be built on.
- ✓ Capture majority of the local small miner production because of reduction in revenues due to Chinese arsenic import limits.



Project Site
Tenguel, Ecuador

Ecuador needs to generate investment into green resource development to grow their economy.


INVESTMENT PROTECTION AGREEMENT

- Historic agreement signed on April 28, 2022, with the Government of Ecuador.
- Covers up to US\$75M in investment into Ecuador extending to any plant and operations expansions.
- Under the IPA agreement specific protections relate to investor rights and guarantees such as:
 - Guarantee of non-discrimination;
 - Right to property;
 - Freedom of production and marketing of goods and services, free transfer abroad of profits, freedom of import and export operations; tax stability, **including exemption from Income Tax for 12 years**; and arbitration for dispute resolution.



Julio José Prado, Ecuador's Minister of Production, Foreign Trade, Investment & Fisheries & Bernardo Brito, BacTech's Country Manager.

ECONOMIC SENSITIVITY



Au Price	NPV (5%)	IRR	EBITDA
\$1,600 USD	\$60.7M	58.0%	\$10.9M Annually
\$1,700 USD	\$68.0M	63.6%	\$11.9M Annually
\$1,800 USD	\$75.4M	69.3%	\$12.9M Annually
\$1,900 USD	\$82.7M	74.9%	\$13.9M Annually
\$2,000 USD	\$90.1M	80.5%	\$14.9M Annually

TENGUEL PROJECT – PHASE 2

- Part of the IPA was BacTech's commitment to build a Phase 2 of the project
- The technology is modular, so expansion is straight forward
- Expected total production >100,000 oz. per annum
- Total market in Ponce area is **250 TPD** of concentrate
- Estimated CAPEX is US\$60M, in addition to the US\$15M for Phase 1
- Working capital will be provided by Phase 1



1 tonne mining sacks filled with arsenopyrite in Ponce Enriquez.



PYRRHOTITE TAILINGS TREATMENT

SECOND OPPORTUNITY

~\$15B of Nickel Ready for Recovery

RADIO HILL PILOT PLANT

- From 1997 to 1999, BacTech demonstrated that bioleaching was effective at liberating nickel, cobalt and iron from pyrrhotite tailings at the Radio Hill Pilot Plant.
- At the time, the economics of the metal prices led to the project not being pursued.
- BacTech is updating the technology to liberate billions of dollars of battery metals from tailings in the Sudbury Basin.

Metal Recovery from Radio Hill Pilot Plant

Metals	Recovery Rate
Nickel	98%
Cobalt	98%
Iron	99%

Metals Prices in 1995

Nickel	\$5,000/t
Cobalt	\$64,000/t
Iron	\$30/t

Metals Prices Today

Nickel	\$23,000/t
Cobalt	\$35,000/t
Iron	\$100/t

Primary Ore	Metals Recovered
Pyrrhotite	Nickel, Cobalt, Iron

SUDBURY BASIN TAILINGS

- BacTech has filed a provisional patent application for a novel bioleaching process relevant to the treatment of pyrrhotite tailings for iron, sulphur and nickel-cobalt recovery.
- From 1997-1999, BacTech demonstrated that bioleaching is effective in liberating nickel, cobalt and iron.

Metal Recovery from Radio Hill Pilot Plant

Metals	Recovery Rate
Nickel	98%
Cobalt	98%
Iron	99%

Project Milestones

✓ Provisional Patent Filed
✓ Stakeholder Identification
Research & Development Program
Technical Study
Economic Study
Pilot Plant
Commercialization

Primary Ore	Metals Recovered
Pyrrhotite	Nickel, Cobalt, Iron

SUDBURY BASIN MARKET OPPORTUNITY

In the Sudbury basin of Ontario, there is a vast resource of approximately 80-100 million tonnes of 0.8% Ni-bearing pyrrhotite tailings, which has been disposed of separately in shallow lakes since production began many years ago.

Assumptions: Nickel \$18,000

~US\$15B

In recoverable Nickel in the Sudbury Basin

Metal Recovery from Radio Hill Pilot Plant

Metals	Recovery Rate
Nickel	98%
Cobalt	98%
Iron	99%

Primary Ore	Metals Recovered
Pyrrhotite	Nickel, Cobalt, Iron

INVESTMENT SUMMARY



Market Position

- One of 2 companies worldwide with commercial applications for bioleaching
- Focused on high-arsenic gold concentrates produced by artisanal and small miners
- Environmentally friendly process



Economics

- EBITDA margin of 25-30%
- Low CAPEX to EBITDA ratio
- ~US\$60M annual revenue generated from US\$16M plant cost
- Internal Rate of Return of 57.9%



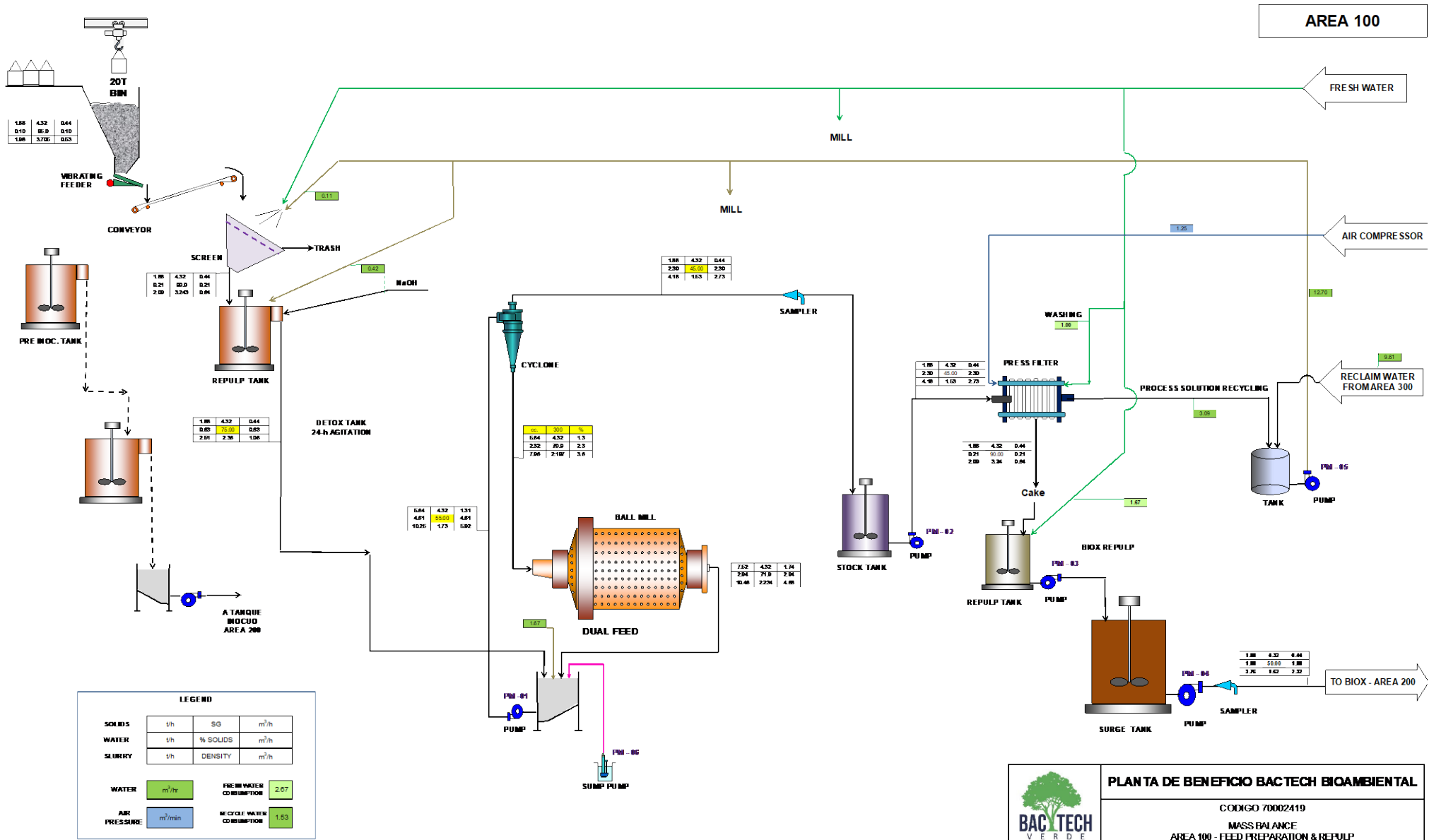
Milestones

- Bioleaching test work complete
- Bankable feasibility study complete
- Environmental impact study approved
- Construction permit granted



APPENDIX

TENGUEL, ECUADOR PLANT FLOWCHART



PLAN TA DE BENEFICIO BAC TECH BIOAMBIENTAL

CODIGO 70002419

MASS BALANCE

AREA 100 - FEED PREPARATION & REPULP

SCALE: NTS

DESIGN: []

DESIGNED: []

REVIEWED: []

APPROVED: []

CLIENT APPROVED: []

CLIENT APPROVED: []

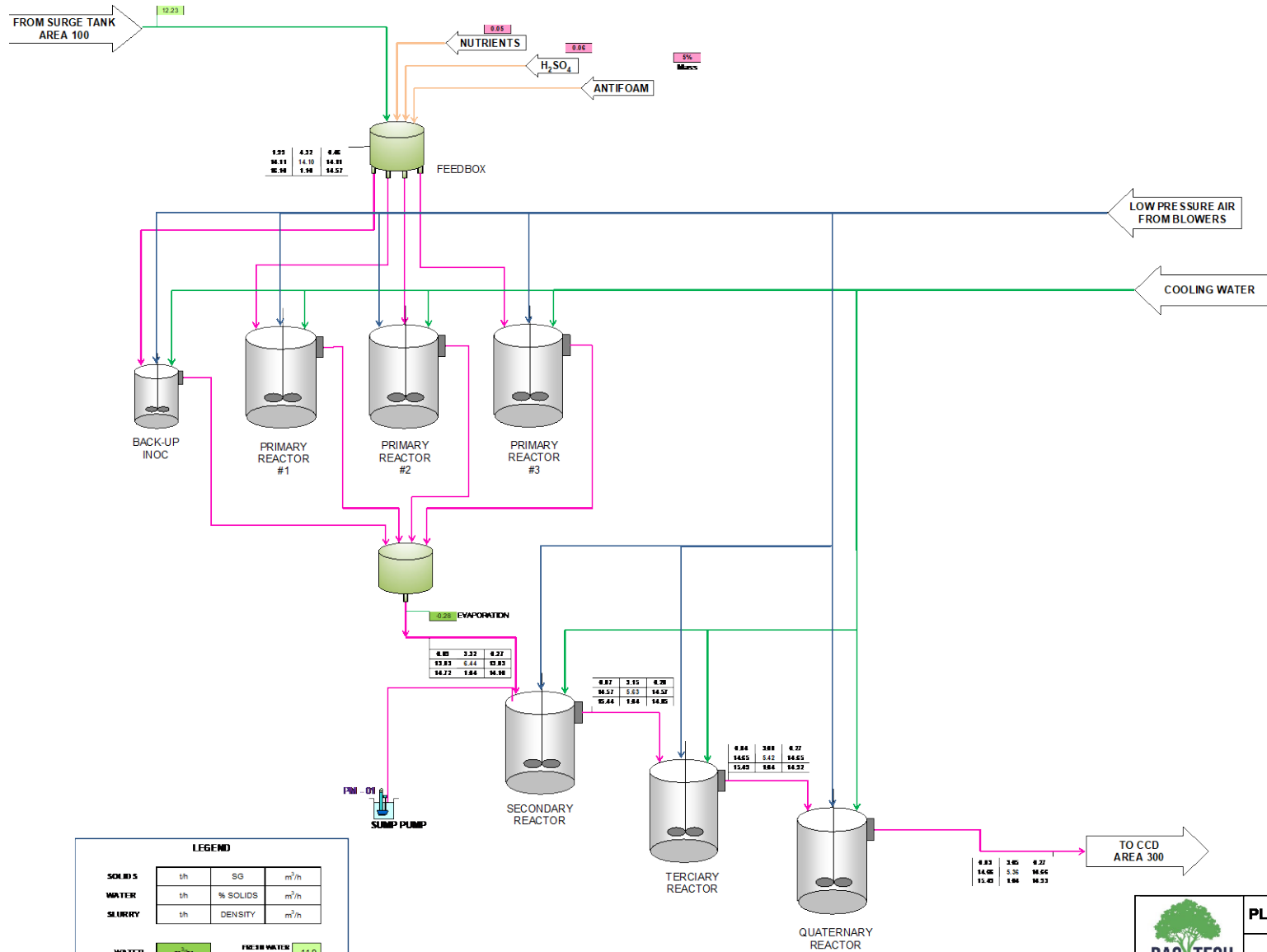
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SIGNATURES

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Rev. C



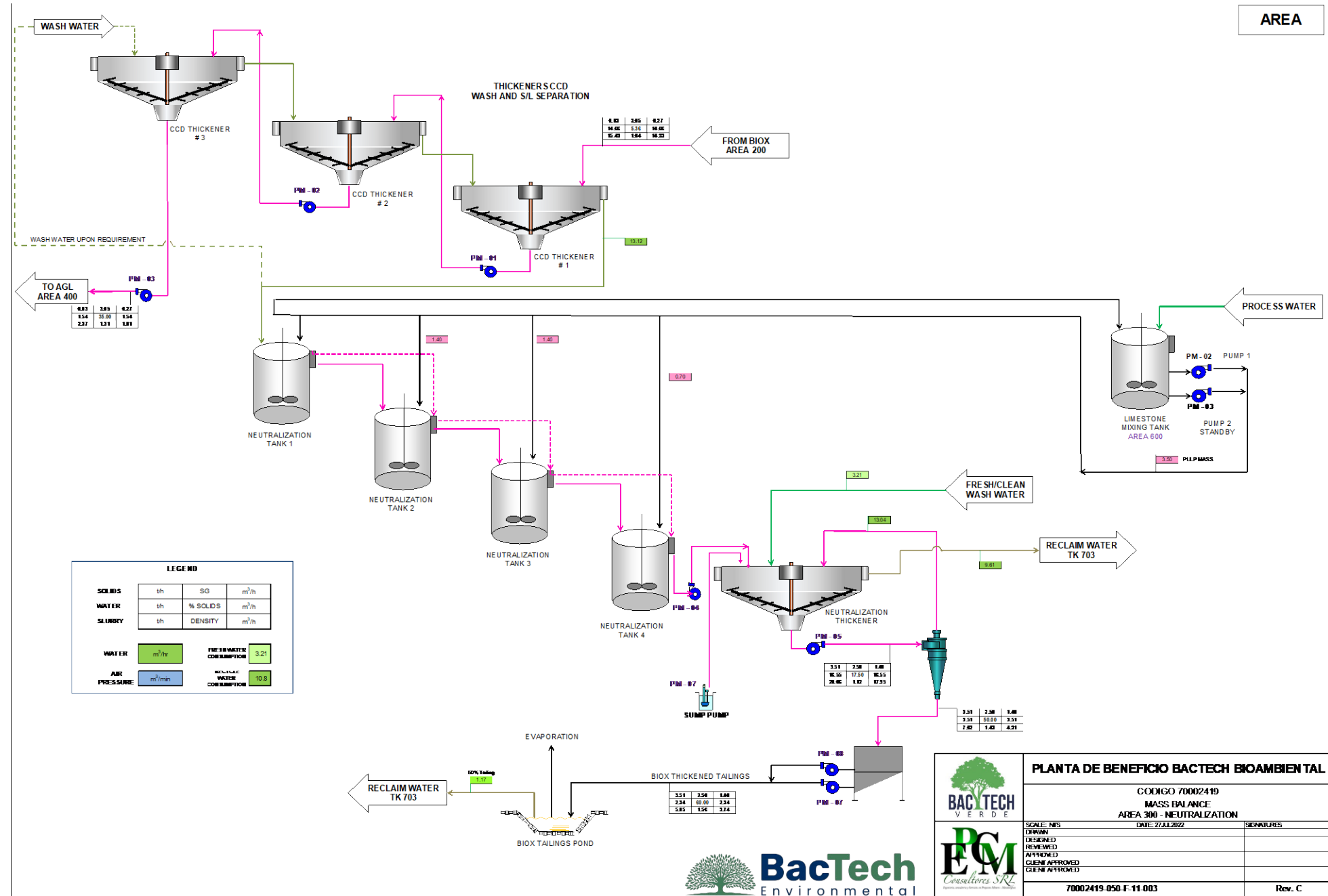


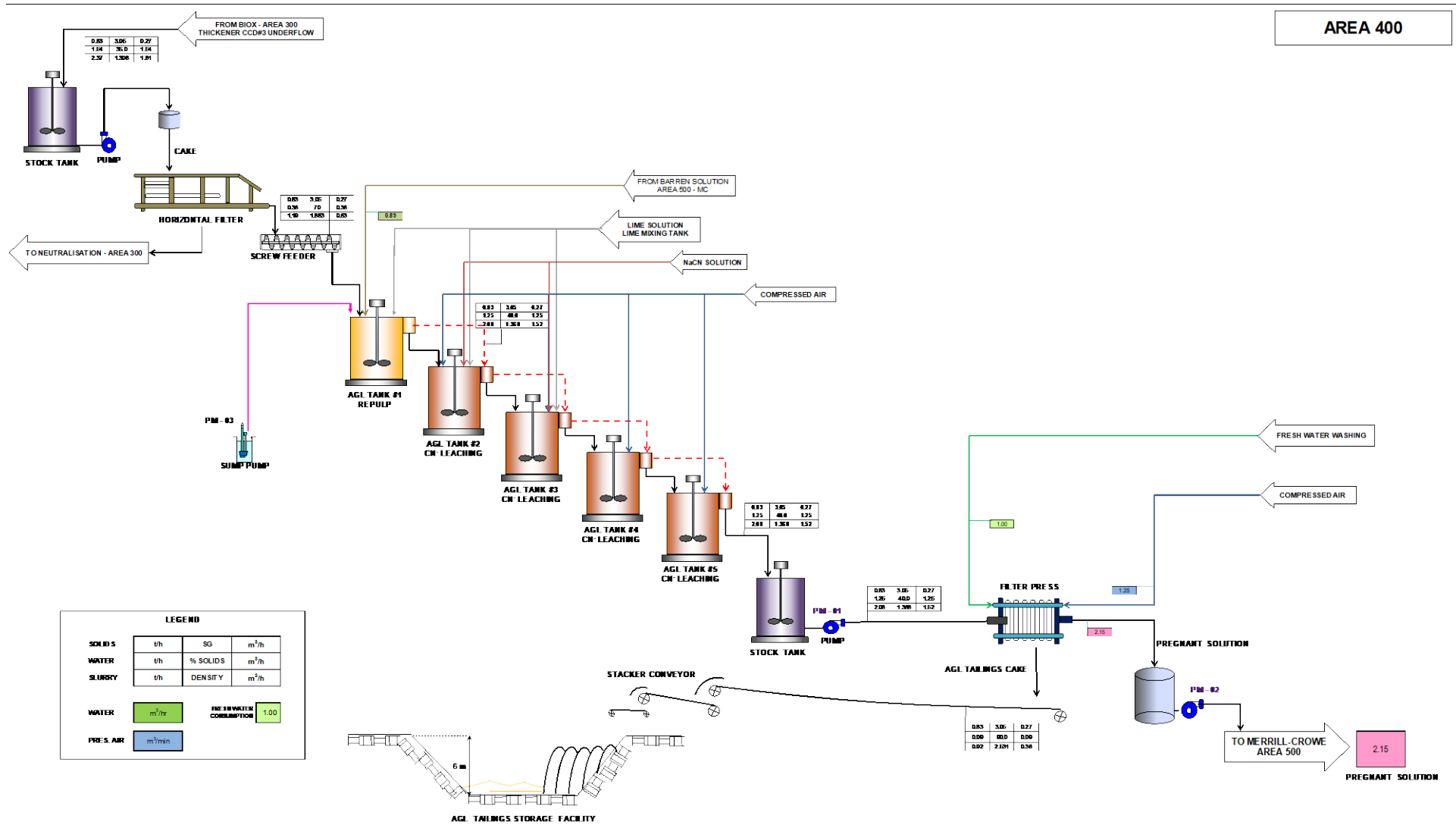
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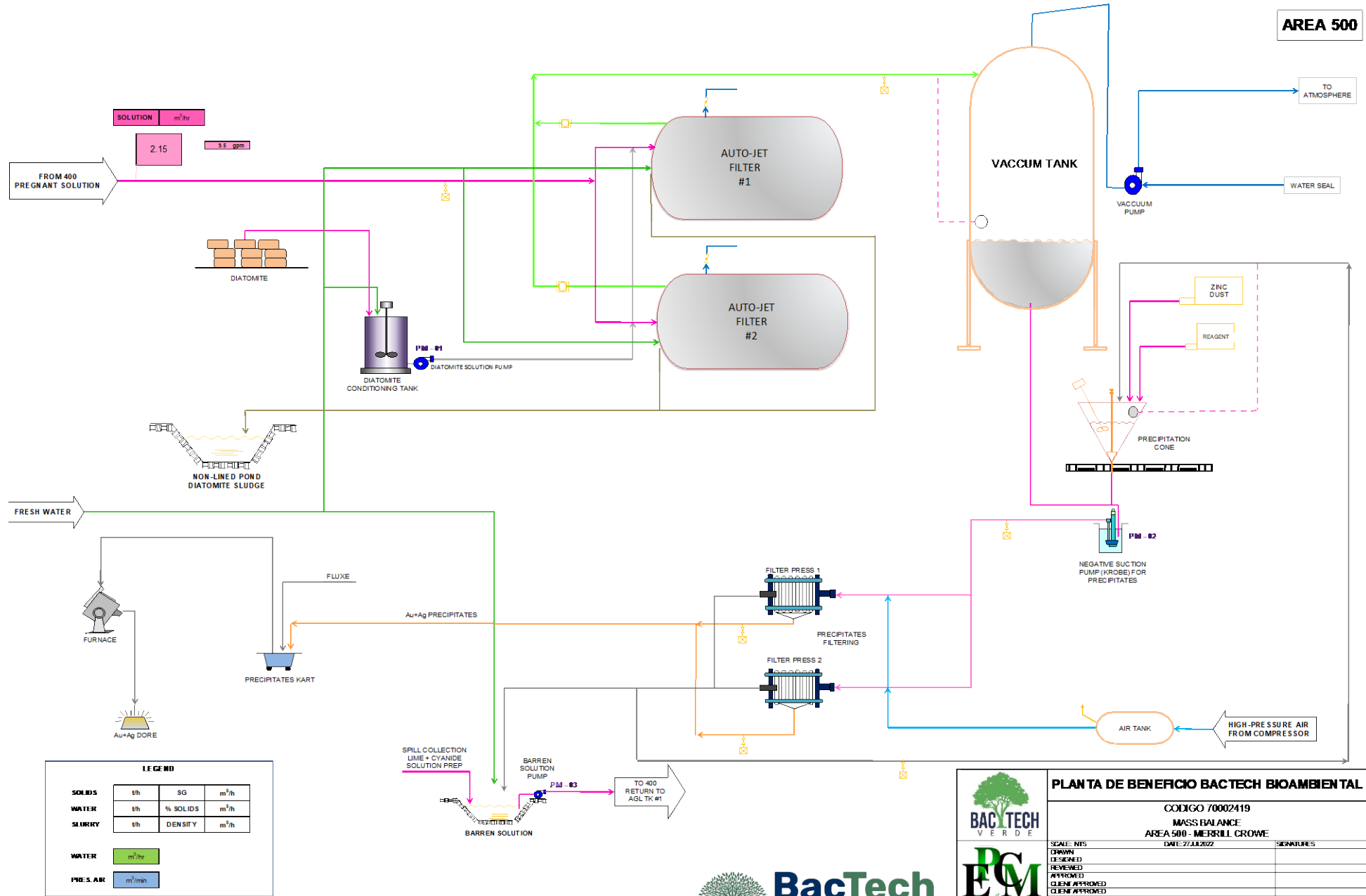
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WATER	th	% SOLIDS	m ³ /h
SURRY	th	DENSITY	m ³ /h
WATER	m ³ /hr	FRESH WATER CONSUMPTION	11.9
AIR PRESSURE	m ³ /min	MULTI-PHASE WATER CONSUMPTION	-

 BacTech VERDE	PLANTA DE BENEFICIO BACTECH BIOAMBIENTAL	
	CODIGO 70002419 MASS BALANCE AREA 200 - BACTERIAL OXIDATION	
SCALE: NTS DRAWN: DESIGNED: REVIEWED: APPROVED: CLIENT APPROVED: CLIENT APPROVED:	DATE: 27 JUL 2022	SIGNATURES:
70002419.050.F-11.002		Rev. C

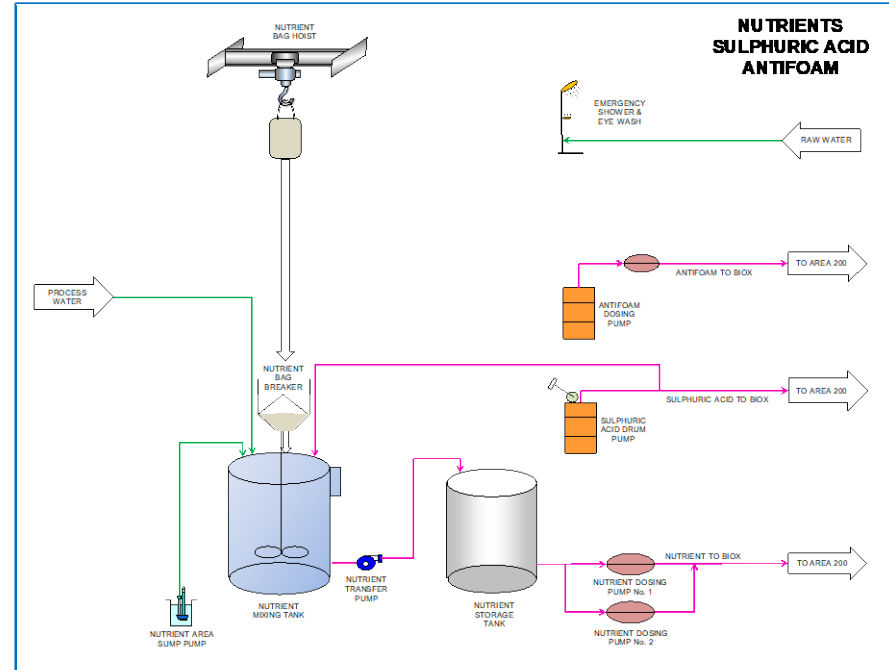
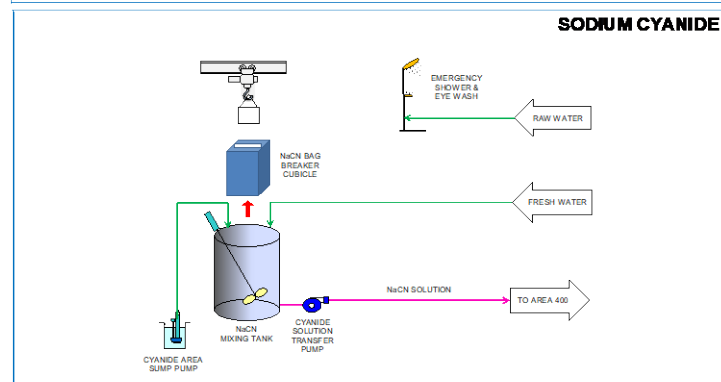
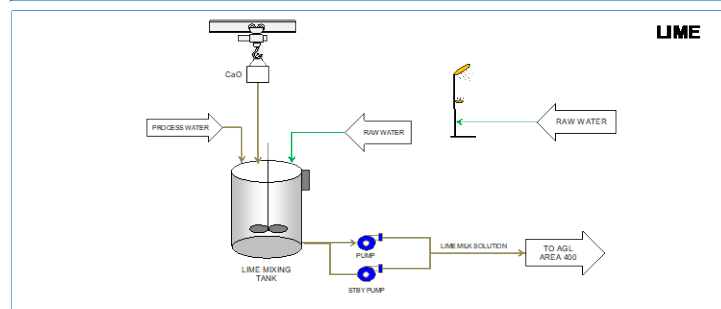
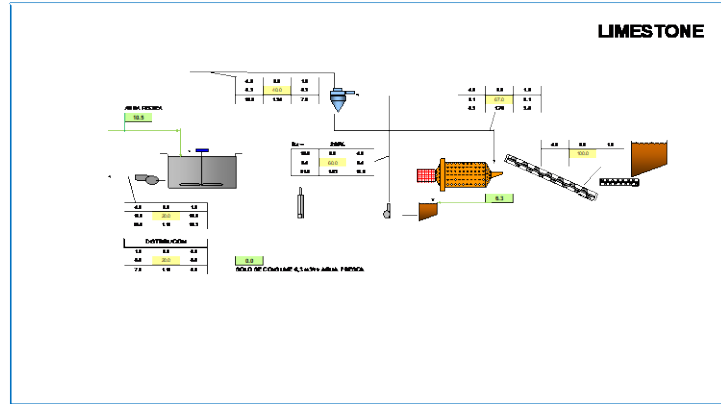


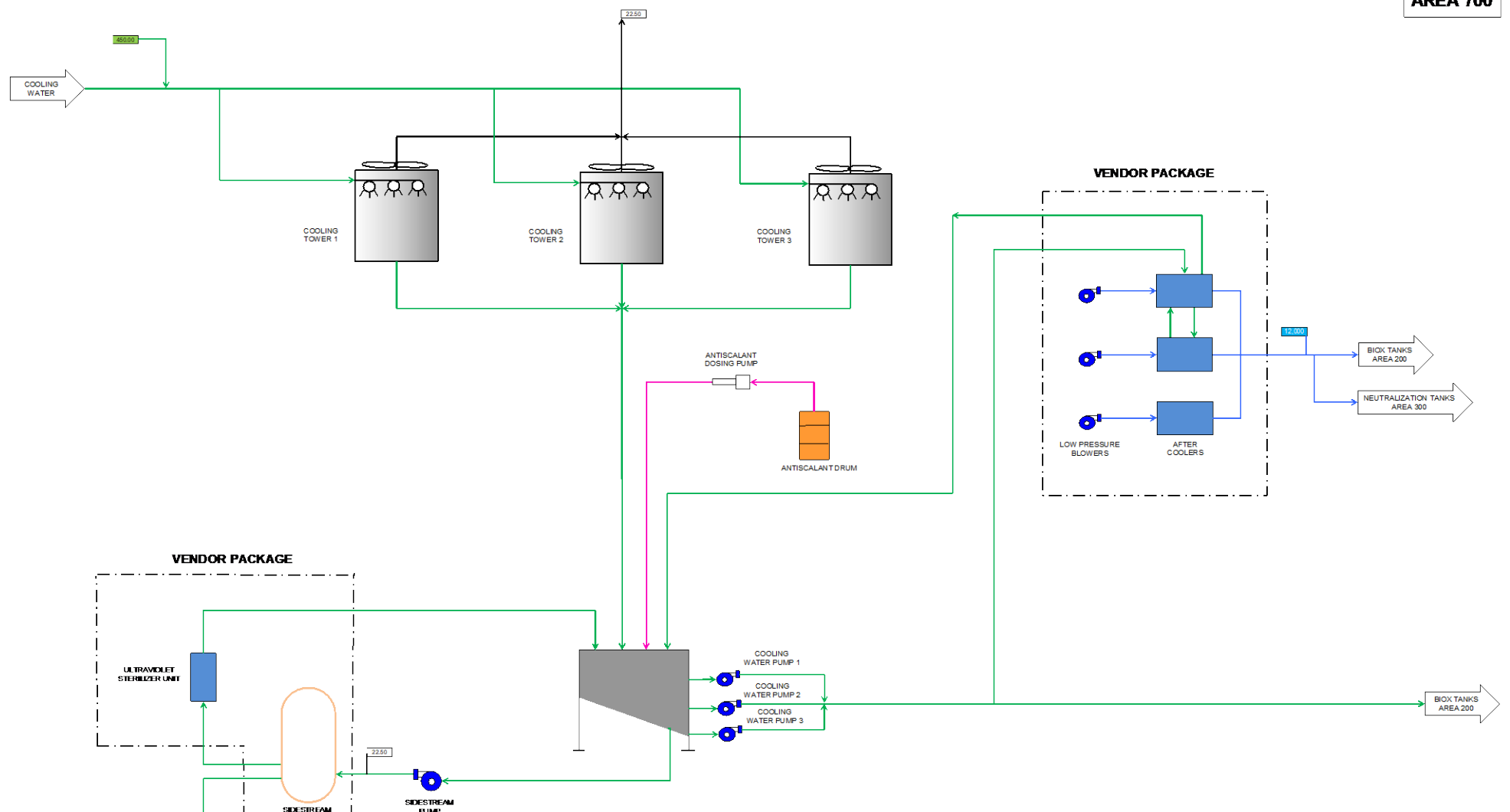






PLANTA DE BENEFICIO BACTECH BIOAMBIENTAL		
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DRAWN		
DESIGNED		
REVIEWED		
APPROVED		
CLEAN APPROVED		
CLEAN APPROVED		
70002419 050 F-11 005		Rev. 13





LEGEND

SOLIDS	t/h	SS	m ³ /h
WATER	t/h	% SOLIDS	m ³ /h
SLURRY	t/h	DENSITY	m ³ /h
WATER	m ³ /hr	FIRE WATER CONSUMPTION	450.0
AIR FLOW RATE (m ³ /hr)	12,000	RECYCLE WATER CONSUMPTION	405.0



 	PLANTA DE BENEFICIO BACTECH BIOAMBIENTAL	
	CODIGO 70002419 MASS BALANCE AREA 700 - COOLING TOWER & AIR SUPPLY	
SCALE: NRS	DATE: 27/11/2022	SIGNATURES:
DRAWN		
DESIGNED		
REVIEWED		
APPROVED		
CLIENT APPROVED		
CLIENT APPROVED		
70002419-050-F-11-007		Rev. A

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Environmental

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