

Innovative Approaches to Resource and Environment Management in Pulp & Paper Manufacturing

A Case Study of Andhra Paper Limited

Agenda

1. **Current Condition & Innovative Solution**
2. **Ash Leaching & Reject Handling**
3. **Foul Condensate Stripping & Methanol system**
4. **Non-Condensate Gases Management**
5. **Conclusion**

Overview of Andhra Paper Limited



One of the largest integrated Paper & Pulp manufactures in India. The company produces writing, printing and copier papers for foreign and domestic markets.

Products



Writing & Printing



Copier Paper



Speciality



Andhra Millenium Copier

Sustainability Policy

We are committed to:

Go beyond compliance with the laws and regulations by adopting international standards in the area of Sustainable Development.

Develop sustainability strategies, goals, Key Performance Indicators (KPIs), set definitive targets, benchmark with best practices and establish monitoring mechanism for continual improvement.

Reduce air emissions, greenhouse gas emissions, enhance energy efficiency, promote renewable energy use, conserve water and reduce waste at our operations.

Promote technologies and innovation for achieving efficient production and resource conservation.

Andhra Paper strives to do the RIGHT THINGS, in the RIGHT WAY, for the RIGHT REASONS

Current Environmental Footprint

Because of pressure from regulatory body and environmental groups, the pulp and paper industry is facing growing pressure to continuously reduce its **environmental footprint**. A positive outcome of this pressure is that new and better technology are embraced. Reducing the emission into the atmosphere, waste streams and power consumption continues to be a key concern for the pulp and paper industry. Condensate reuse, total reduced sulphur (TRS), SO₂, Methanol, BOD & COD levels, power & fuel management and water consumption are the most important values indicating the **environmental friendliness** of the process.

Challenges Faced by APL

01

Recovery Boiler Plugging

02

**Foul Condensate Stripping &
Methanol Generation**

03

Non-Condensable Gases Handling

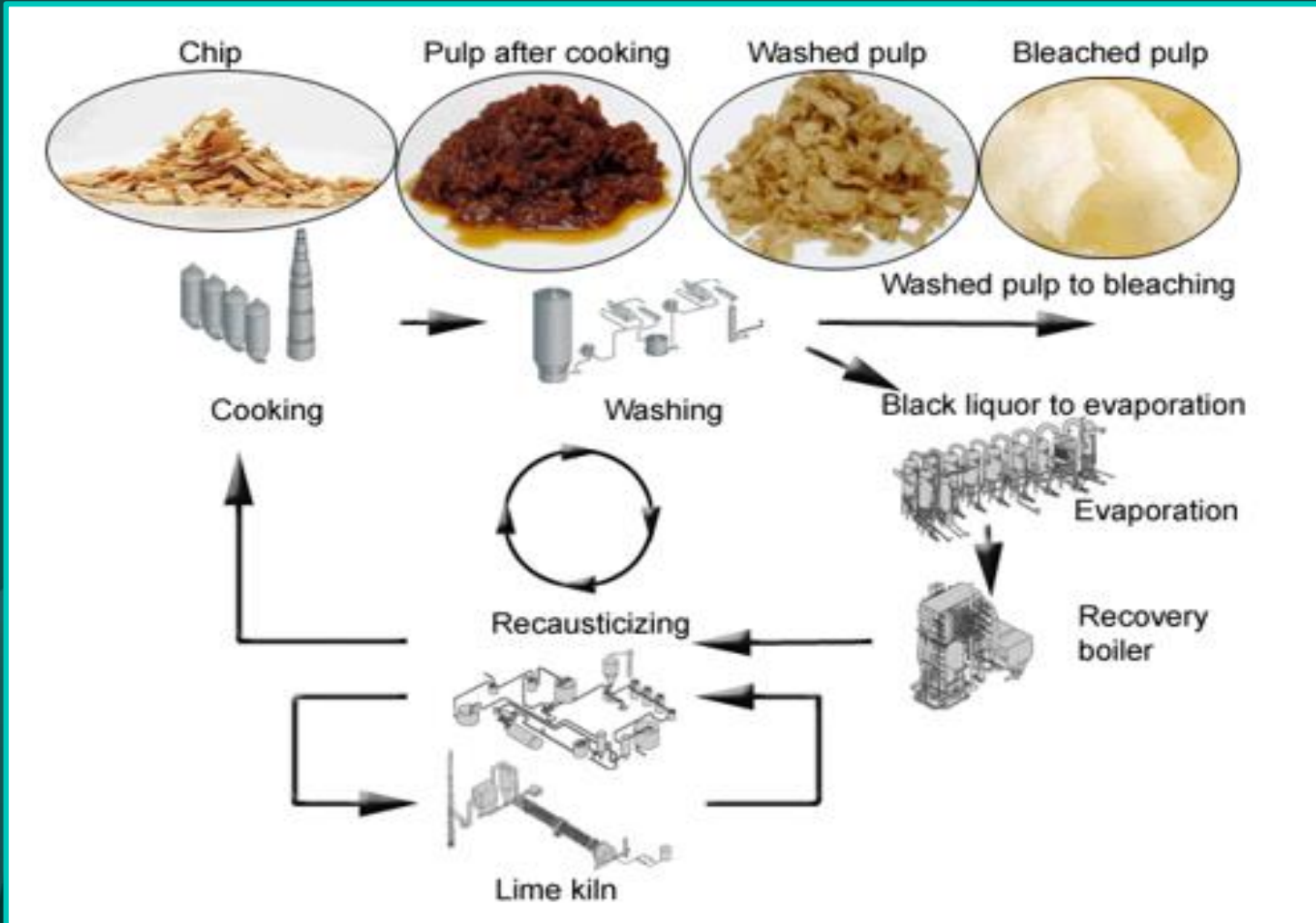
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TRS in Rotary Lime Kiln Flue Gas

05

Water Consumption

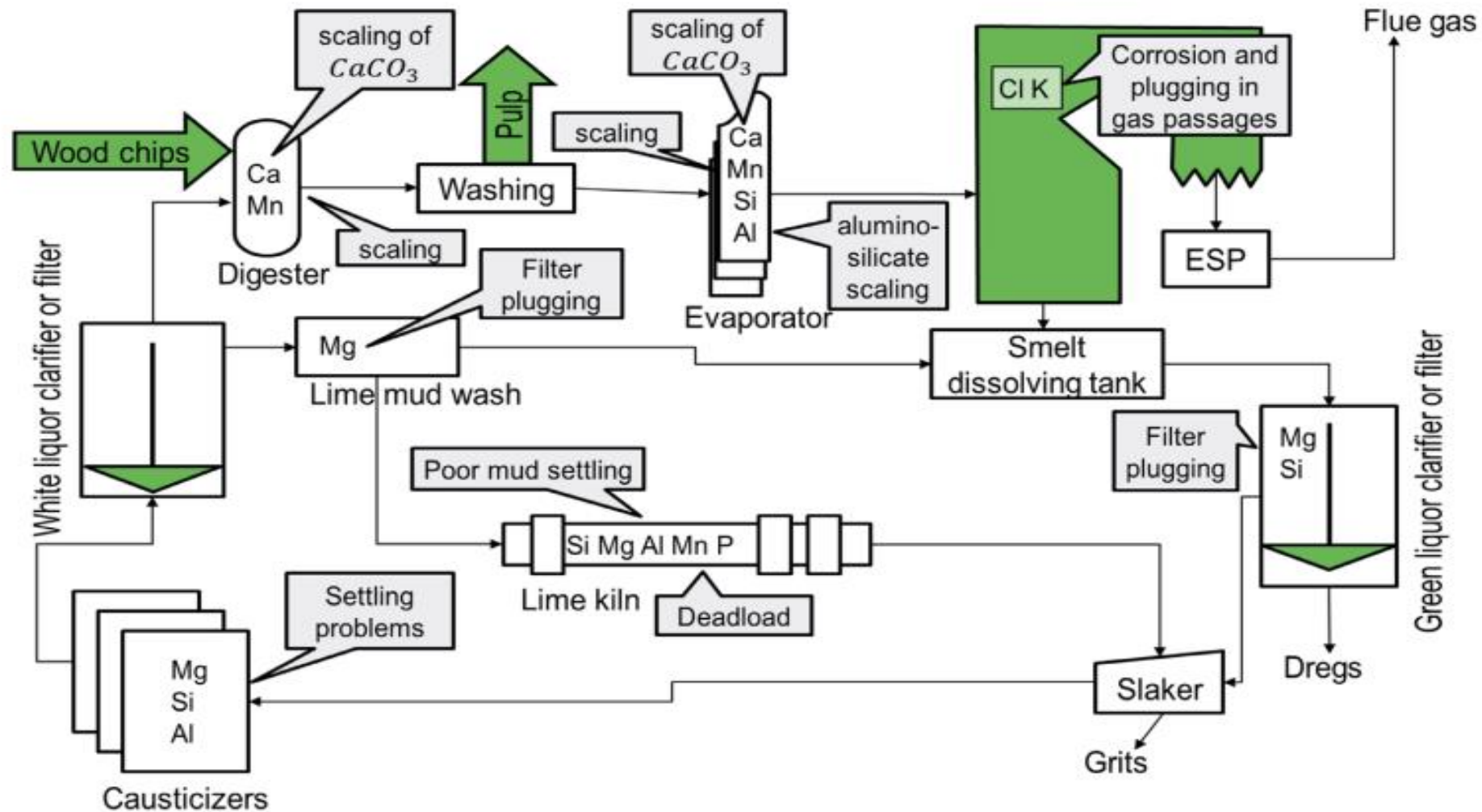
1. Kraft Pulping Process & RB Plugging issue



Non-Process Element Definition

- A non-process element is any element that is not required for pulping in the kraft process or those elements produced by the decomposition of organic material.
- Process elements are: Na, S, O, H, & C
- All other elements are identified as non-process elements
- Pulp wood , Make up alkali, make up lime, fuel used in lime kiln are the most significant intake sources of NPEs.

Problem Associated with Non-Process Element



Possible Purge Locations in the Recovery Cycle

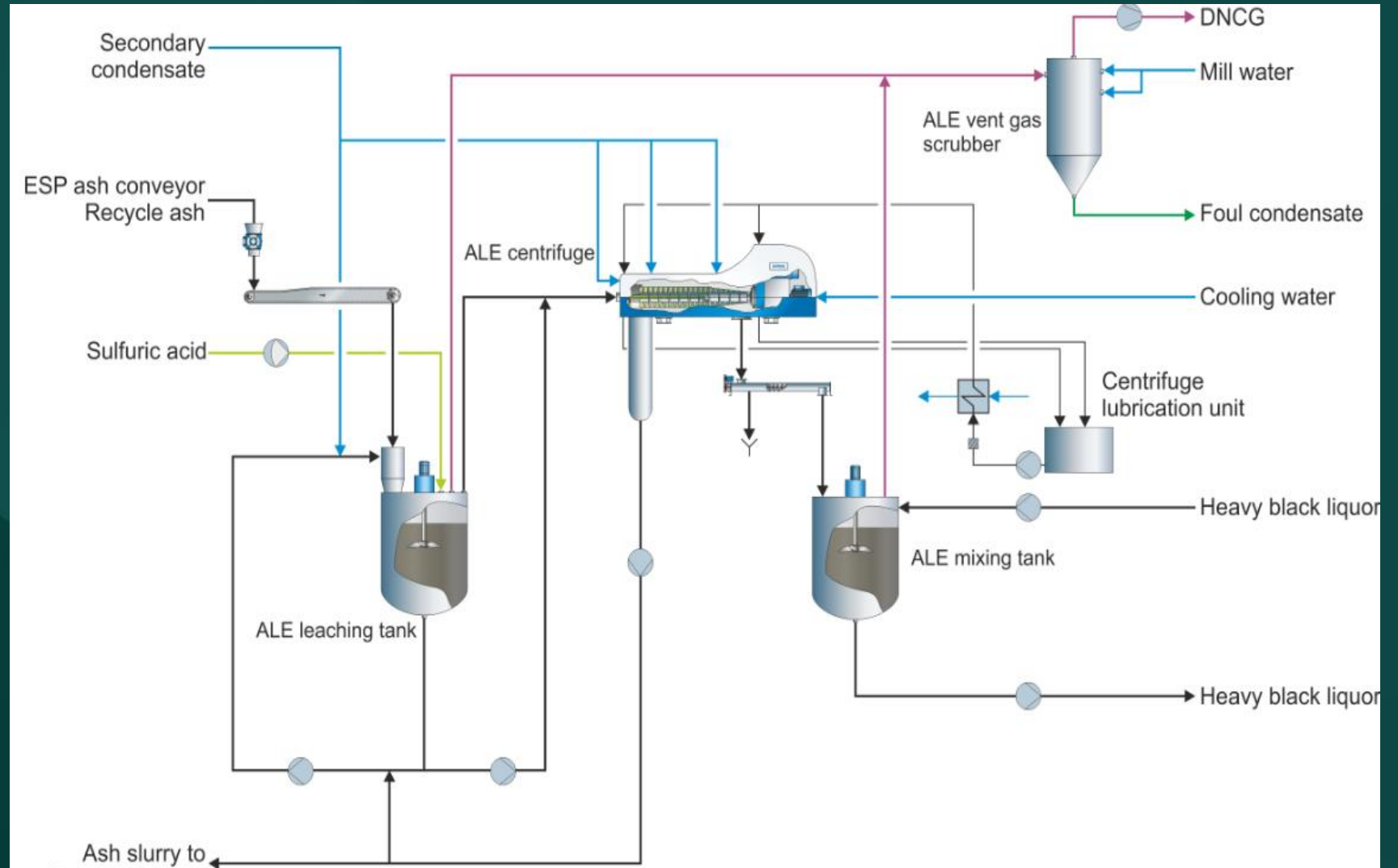
- Liquor spills – all elements
- Precipitator/Economizer Dust – Cl/K (metals)
- Dregs – Si/Al/Ca
- Grits – Si/P/Ca
- Lime mud – Mg/Al/P/ (Mn, Fe, Si)
- Recovery Boiler Stacks – Cl (as HCl gas)
 - When SO₂ is also emitted
- Other: pulp & effluent

Methods of Control

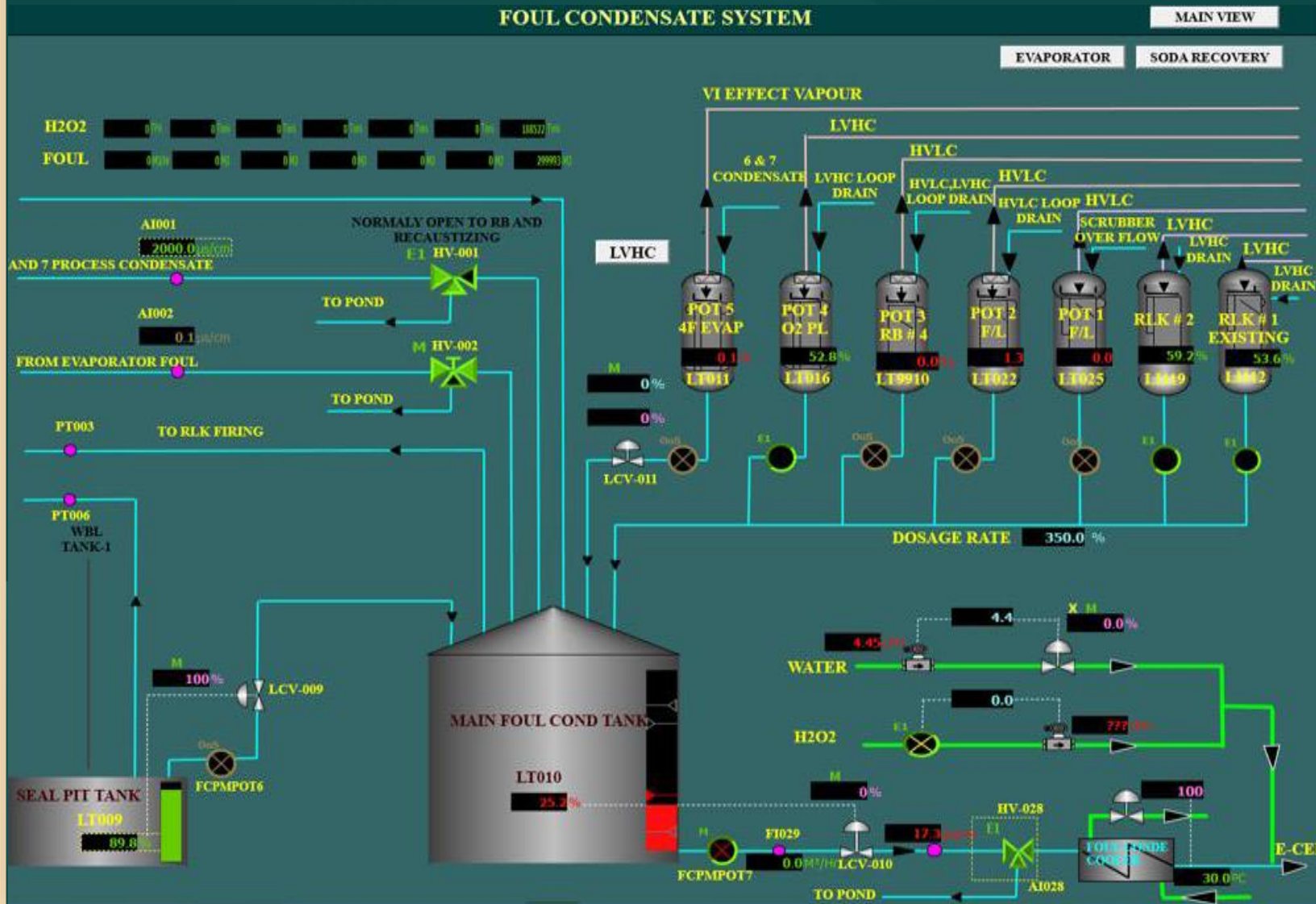
- **Controlled dump of RB precipitator ash (K/Cl)**
- **Treatment of RB precipitator ash (K/Cl)**
 - Crystallizer
 - Leaching
 - Ion exchange
- **Reduce percentage of Ca that is soluble by**
 - High digester cooking temperatures
 - Optimize with respect to digester heater scaling and pulping conditions
 - Insure all digester liquors pass through high temp. zone
 - Minimize use of synthetic white liquors with little carbonate
- **Efficient dregs removal (Al/Ca/Mg/heavy metals)**
- **Efficient grits removal (Si/P/Ca)**
 - Excess Ca(OH)_2 remove in slaking, to extent possible

Ash Leaching Project in APL

- The Leaching system decreases the chloride and potassium content of ESP ash.
- The removal efficiency is about 80% of the chloride and potassium in the ESP ash.
- The sodium loss is 25%.
- K & CL emission reduce.
- Steam generation increased. So, that coal-fired boiler load has been reduced.
- Not disposed to ETP.

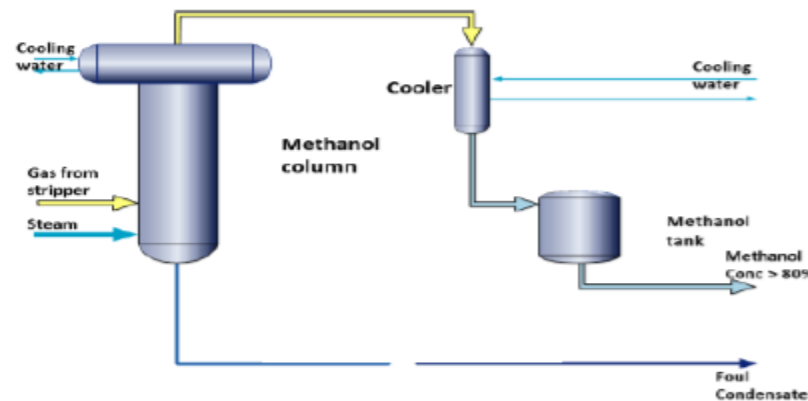
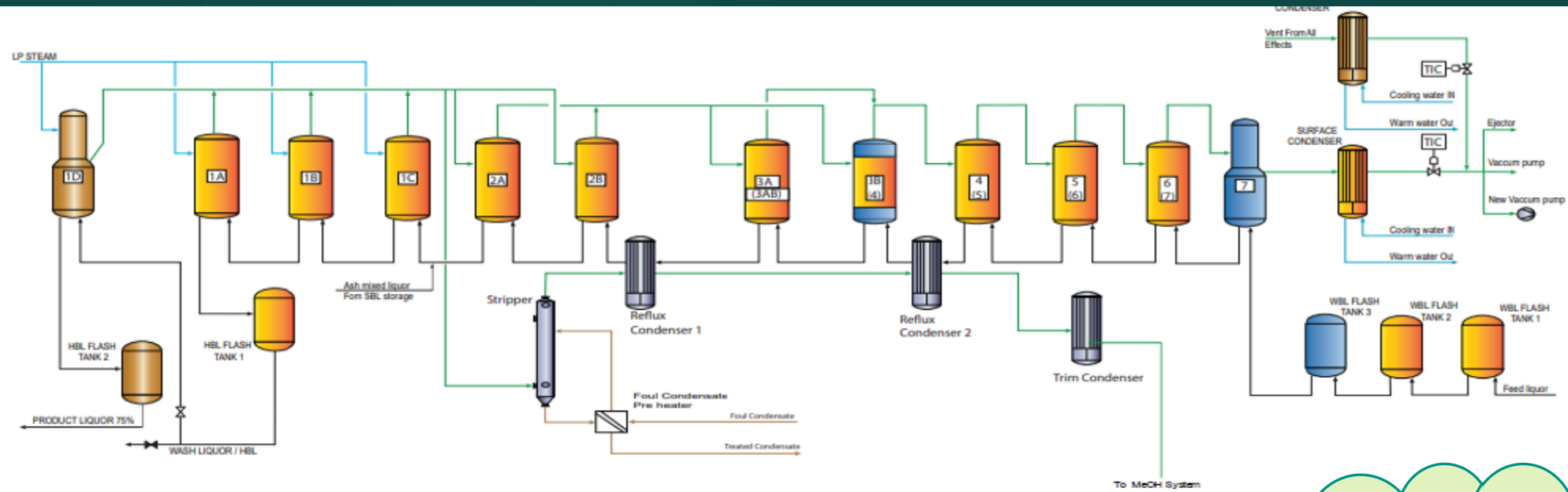


2. Foul Condensate Stripping & Methanol System



- Foul condensate stripping is a process that removes contaminants from foul condensate, primarily methanol, using steam distillation.
- At Present in APL, foul condensate treated with Hydrogen Peroxide.
- This treatment is more effective on TRS (H₂S), less in Methanol.
- Waste to Wealth

Methanol Generation Process



This project was initiated for Methanol removal from foul condensate and the efficiency is 95%. Reduce the Effluent BOD level.

3. Non-Condensable Gases Handling

- ❑ Non condensable gases (NCGs) are a by-product of the kraft pulping process that are toxic, foul smelling, and potentially explosive. They are also known as Total Reduce Sulphur (TRS) compounds.
- ❑ These gases are mainly generated unwantedly during the Cooking of wood, Washing of Pulp, Operation of Evaporator.
- ❑ NCG vented to the atmosphere can cause injury, environmental damage, and nuisance odor.

❑ **TRS compounds**

TRS: **T**otal **R**educed **S**ulphur

- Hydrogen Sulfide (H_2S)
- Methyl Mercaptan (CH_3SH)
- Dimethyl Sulfide ($(\text{CH}_3)_2\text{SH}$)
- Dimethyl Disulfide ($(\text{CH}_3)_2\text{S}_2$)

❑ **Turpentine**

❑ **Methanol**

❑ **Nitrogen**

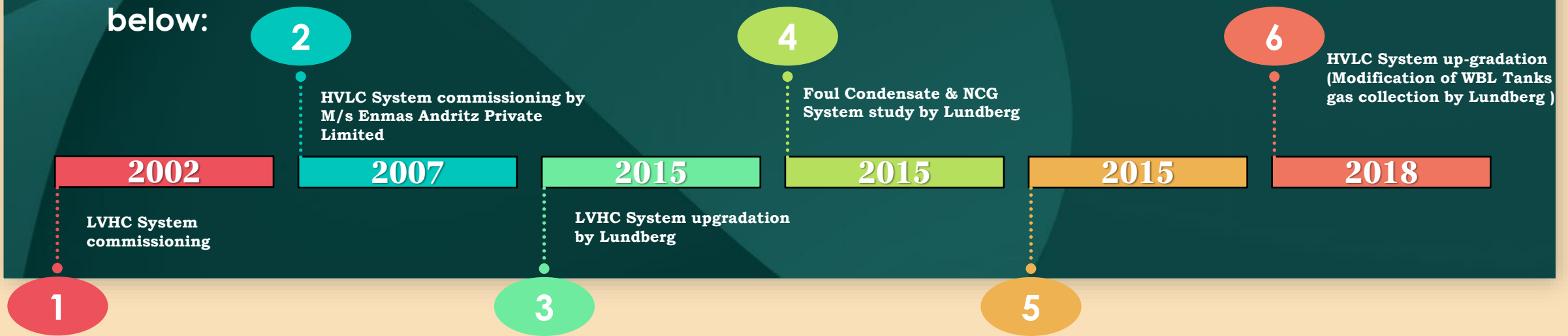
❑ **Oxygen**

❑ **Water Vapors**

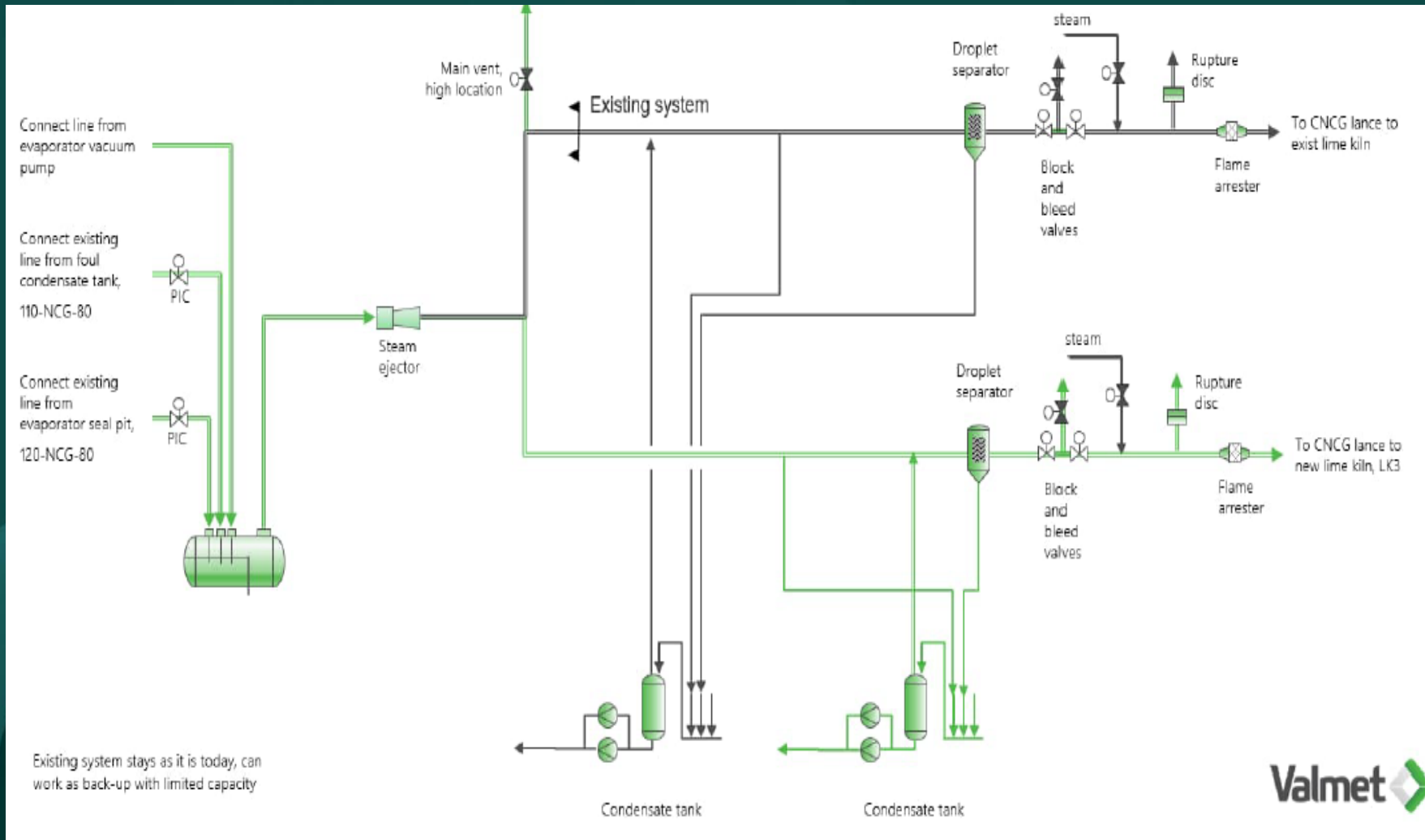
NCG System at APL

- CNCNG & DNCNG both systems operated.
- CNCNG system typically collected gases from Evaporator, Foul condensate tank.
- CNCNG is high in combustibles, low in Oxygen.
- DNCNG system collect gases from Blow tank, Filtrate tank, Chip bin etc.
- DNCNG is low in combustible, high in oxygen.
- NCG system equipped with all safety equipment i.e Flame arresters, Rupture discs, PVR, etc.
- Safety interlocks protect the system.
- The NCG handling system 1st of kind started in APL in 2002 and details of modification are as

below:

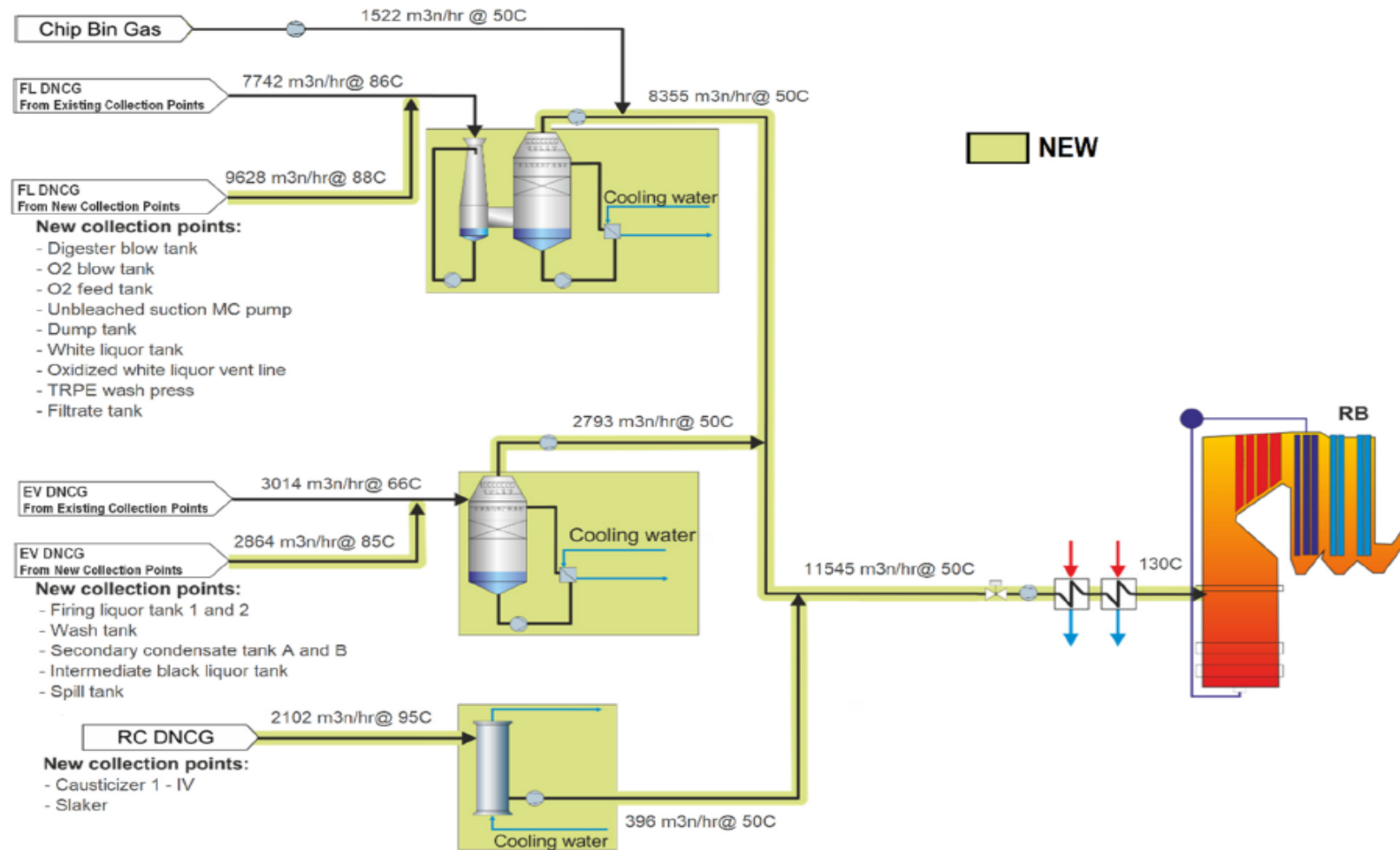


Upgradation of CNCG system



Due to the Pulp Mill upgradation, CNCG upgrade project has been initiated.

Upgradation of DNCG system



Due to APL's "No Venting Policy" rebuild of DNCG Project has been initiated.

Conclusion

- Some initiatives taken by APL in past are:-
- Reduction of Carbon Footprint by Installation of Advance Process Control (APC) in Rotary Lime Kiln.
- Management and disposal of solid waste: used of wood dust and bark with coal in Boiler.
- Consume of Lime sludge partially with PCC as filler.
- APL minimizes any possible negative impact on the environment through targeted measures and continuous improvement.
- APL commitment to the environment makes the workplace as well as its surroundings safe and hygienic.

Thank You