



RECONNECT

SYMPOSIUM 2022

KNOWLEDGE • OPTIMIZATION • INNOVATION



Stami Nitric Acid Technology

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Jaarbeurs, Utrecht

Stami Nitric Acid Technology

LAUNCH HNO_3 Nitric Acid Grass Root Plant

EVOLVE HNO_3 Debottlenecking Nitric Acid Plants

HNO_3 Status Wrap-up

Stamicarbon Nitric Acid Technology History

1960

Stamicarbon starts
licensing nitric acid
plants

More than 40 plants
licensed

Over 20 plants still in
operation

1988

Licensing of Nitric Acid
and Ammonium Nitrate
discontinued

1989

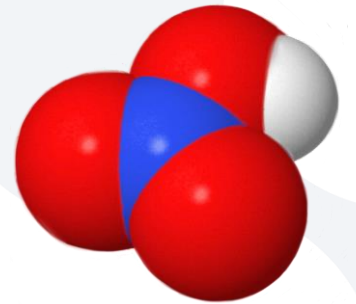
Commissioning of
1400 MTPD
dual pressure

2018

Relaunch of
Stami Nitric Acid
Technology
Reviving the tech and
the relations with
producers

2022

current nitric acid
activities of Stami



Nitric Acid Production Process

Feed Preparation

Ammonia evaporation
Air filtering, preheating
and compression

Nitric Acid Production Process

Feed Prep

Ammonia evaporation
Air filtering, preheating
and compression

NH3 burner

Pt/Pd gauzes
 NH_3 to: NO , N_2O , N_2

integrated waste heat
boilers and tail gas
heater

5 bar

Nitric Acid Production Process

Feed Prep

Ammonia evaporation
Air filtering, preheating
and compression

NH3 burner

Pt/Pd gauzes
NH₃ to: NO, N₂O, N₂

integrated waste heat
boilers and tail gas
heater

Gas cooling

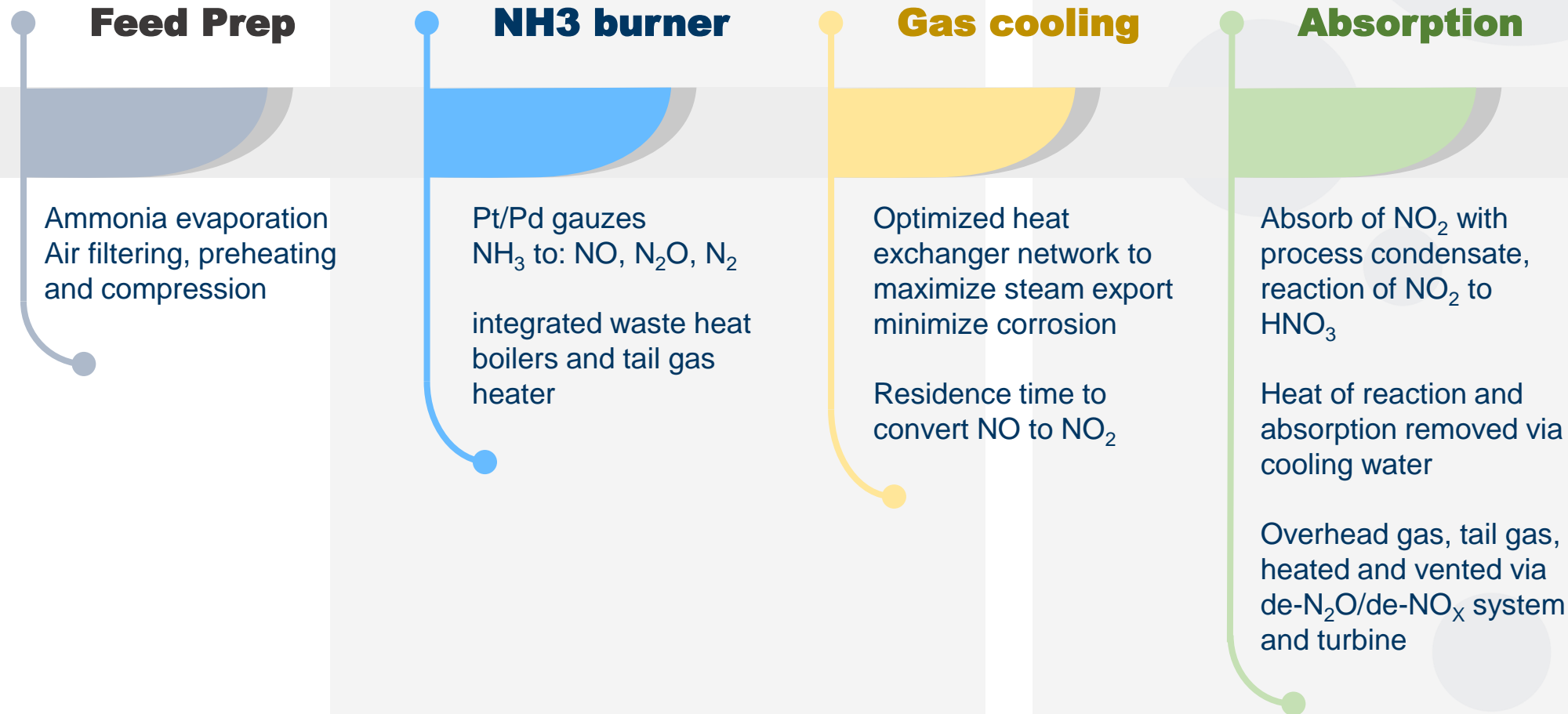
Optimized heat
exchanger network to
maximize steam export
minimize corrosion

Residence time to
convert NO to NO₂

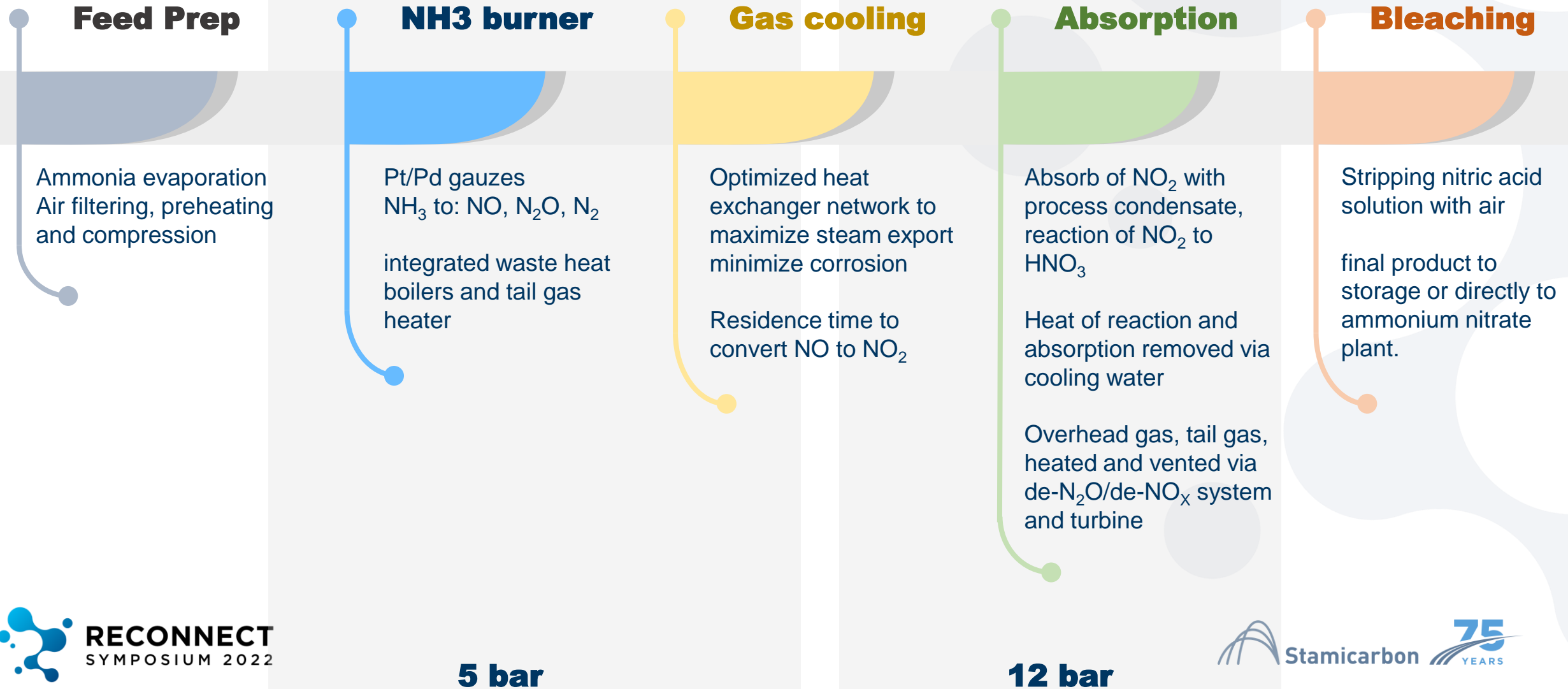
5 bar

12 bar

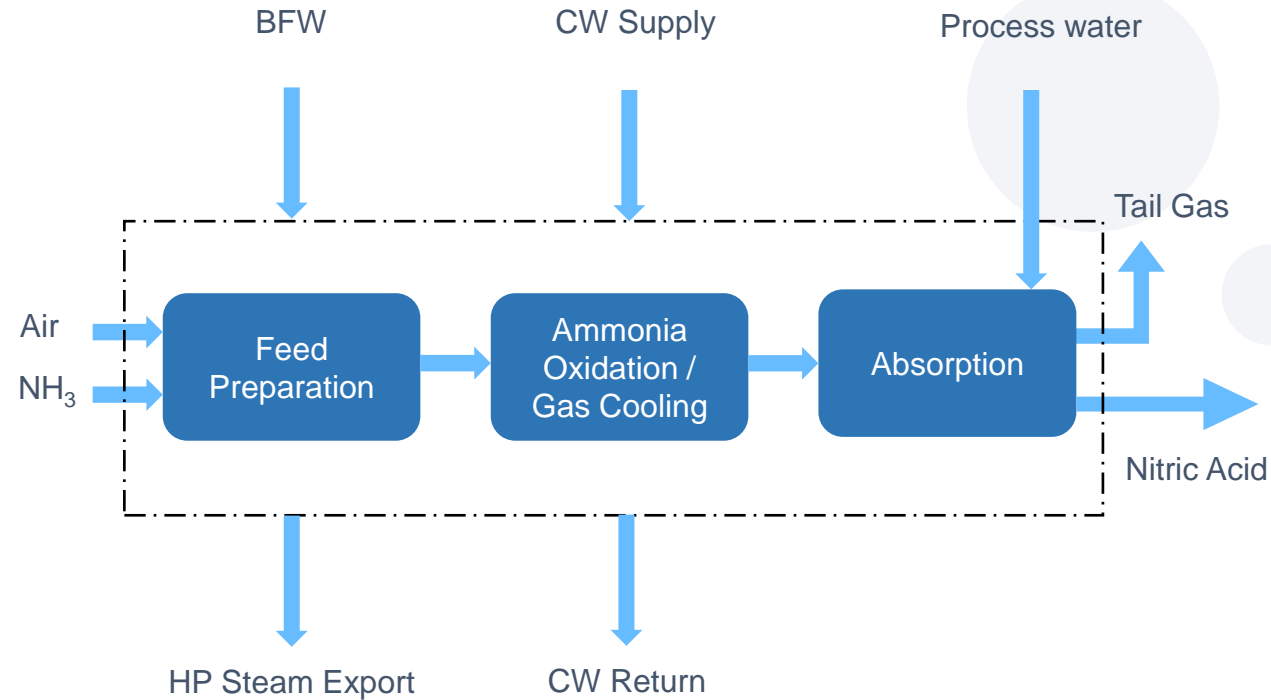
Nitric Acid Production Process



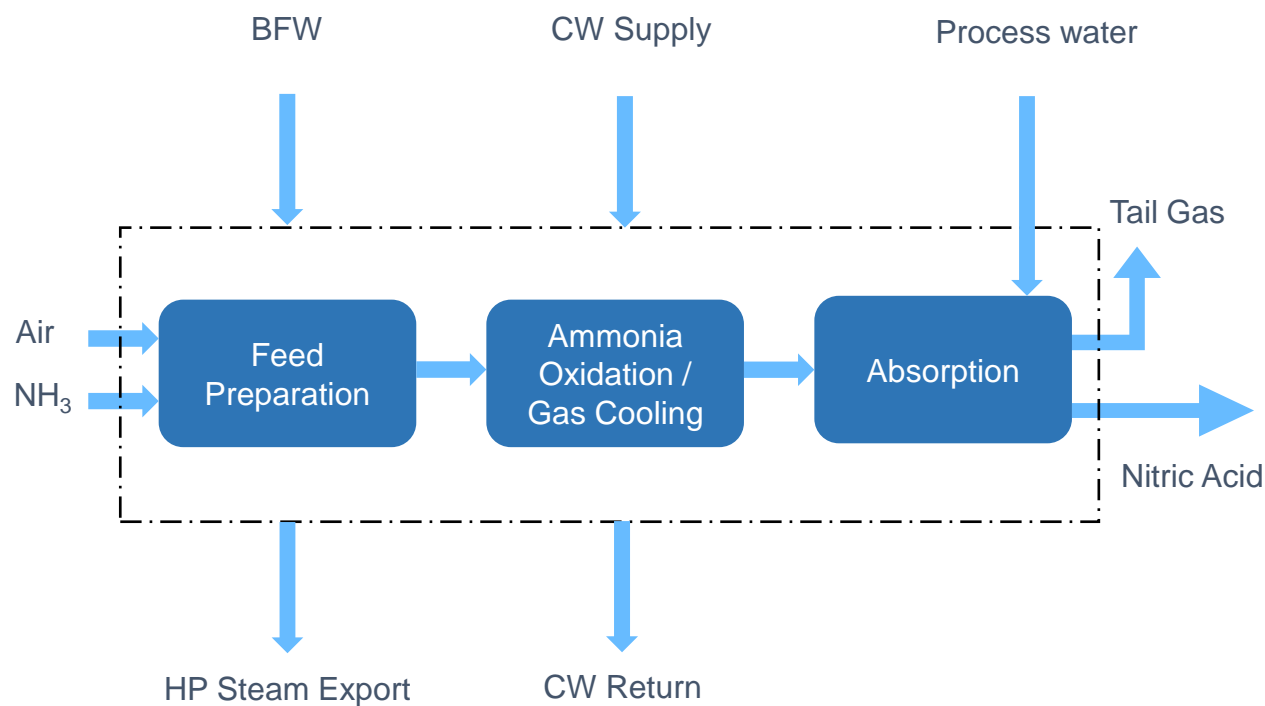
Nitric Acid Production Process



Nitric Acid Production Process



Stami Nitric Acid Process Highlights



High energy efficiency

Mild corrosion conditions

Low $\text{NO}_x/\text{N}_2\text{O}$ emissions

Safe start-up

Dual and mono pressure process

AN in collaboration with INCRO



LAUNCH HNO_3

First Nitric Acid Plant Licensed since 1986

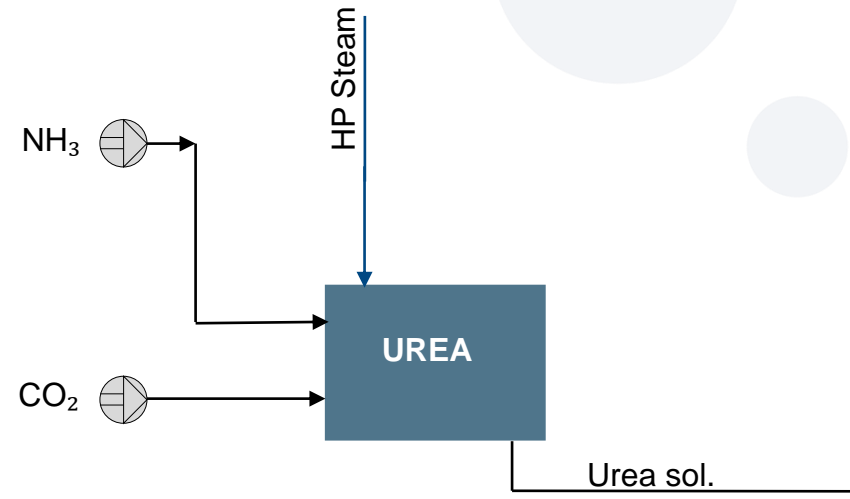
Mono pressure 350 mtpd as 100% HNO₃

Part of integrated UAN / DEF production

Process design package in the making

Integrated UAN/DEF plant

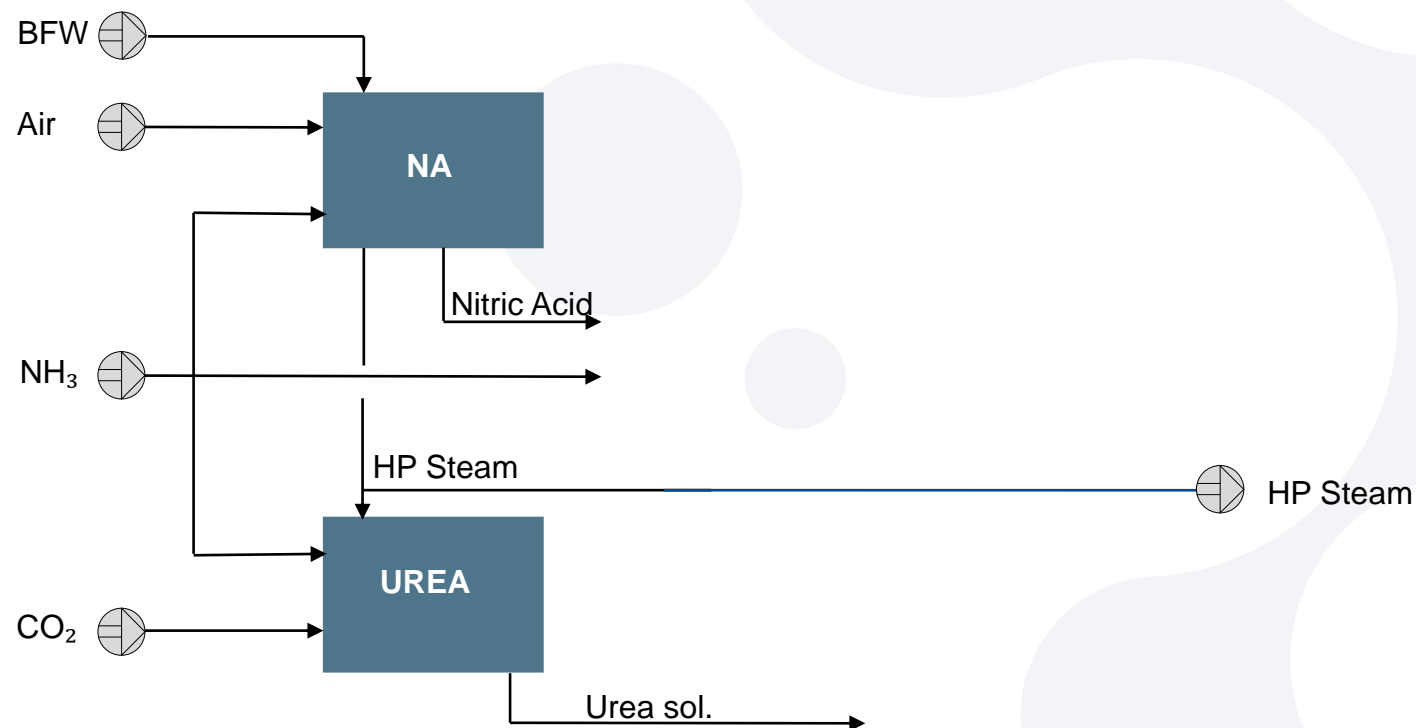
Urea



Integrated UAN/DEF plant

Urea

Nitric Acid

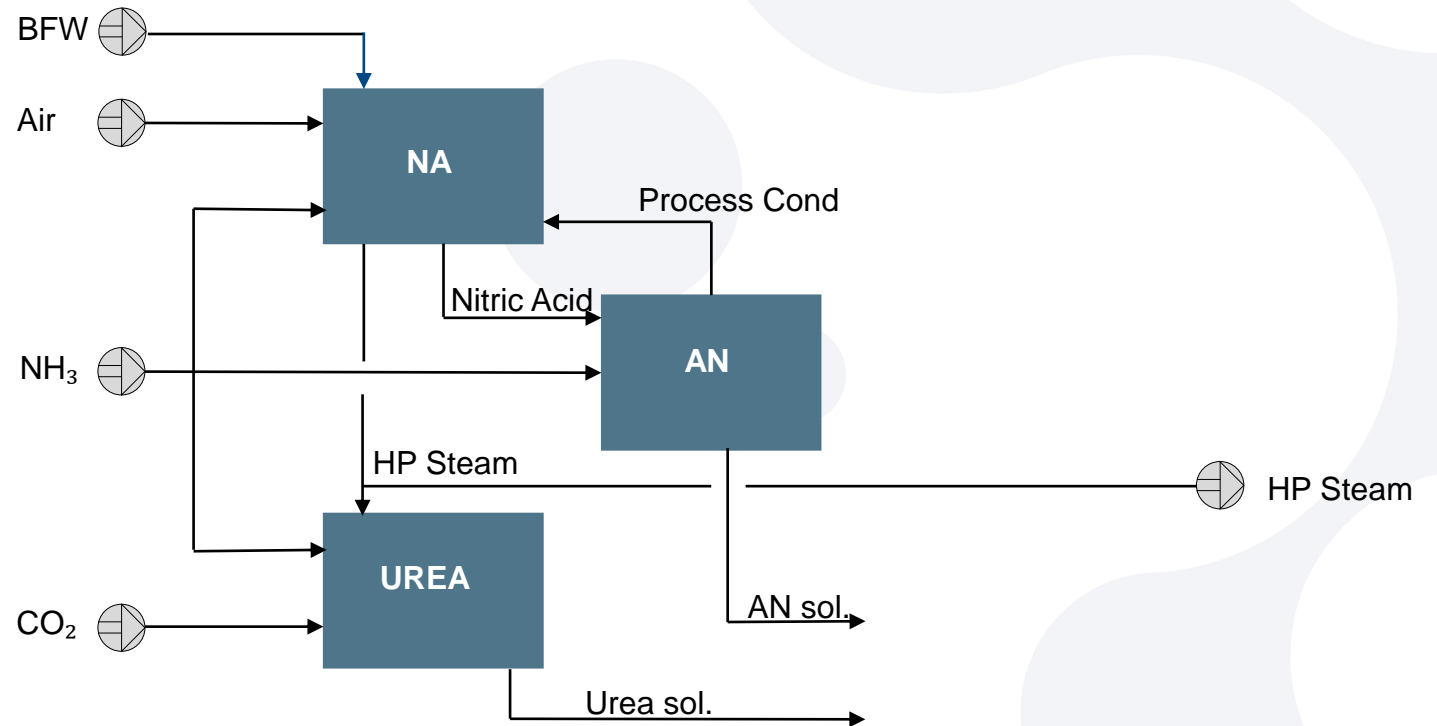


Integrated UAN/DEF plant

Urea

Nitric Acid

Ammonium Nitrate



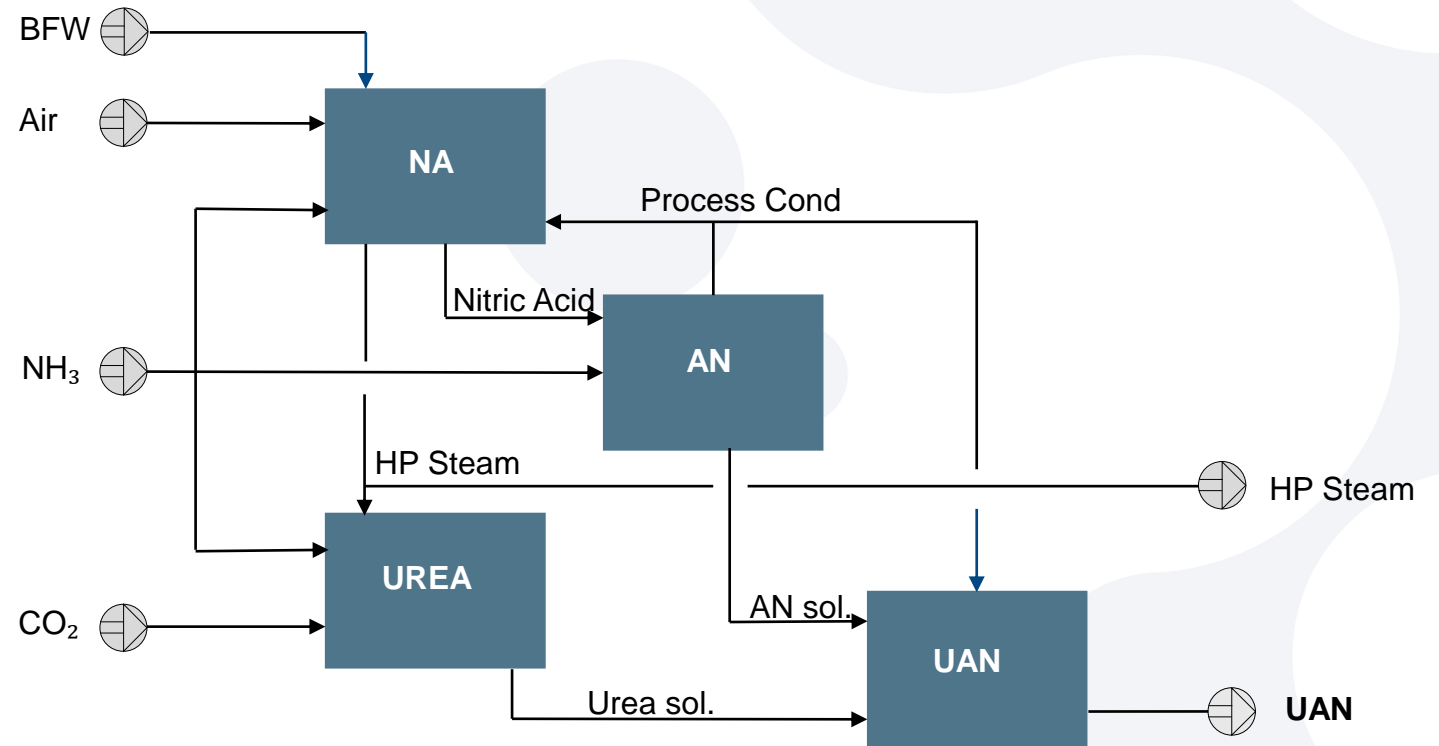
Integrated UAN/DEF plant

Urea

Nitric Acid

Ammonium Nitrate

UAN mixing



Integrated UAN/DEF plant

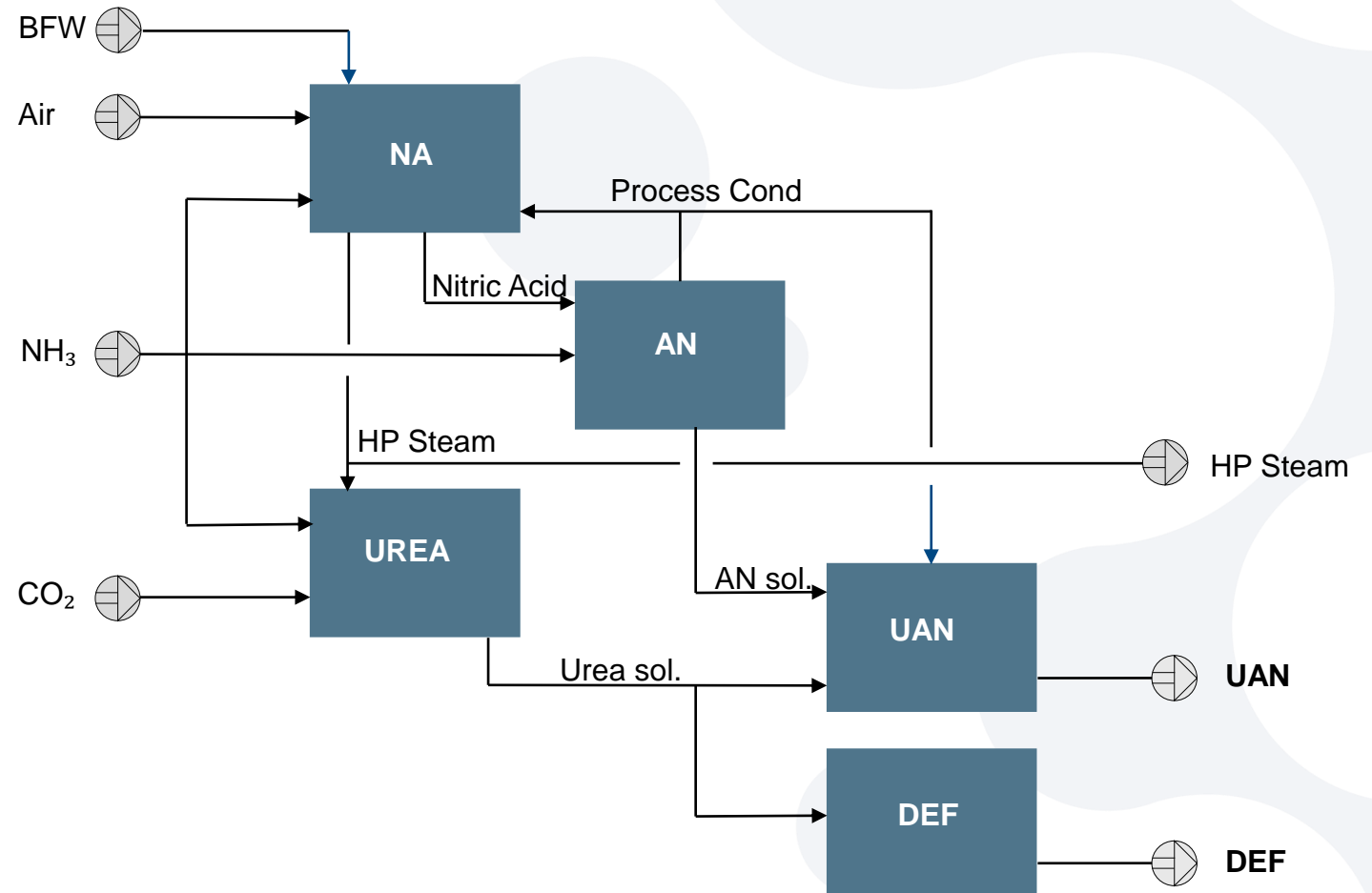
Urea

Nitric Acid

Ammonium Nitrate

UAN mixing

DEF production





EVOLVE HNO_3

Stamicarbon Nitric Acid Technology for revamping

Revamp study executed for Monómeros

Equipment replacement Project

Monómeros nitric acid revamp study

Licensed by Stamicarbon in 1968, Mono Pressure plant, 5 bar

Design capacity 225 mtpd as 100% HNO_3 as 55 %wt

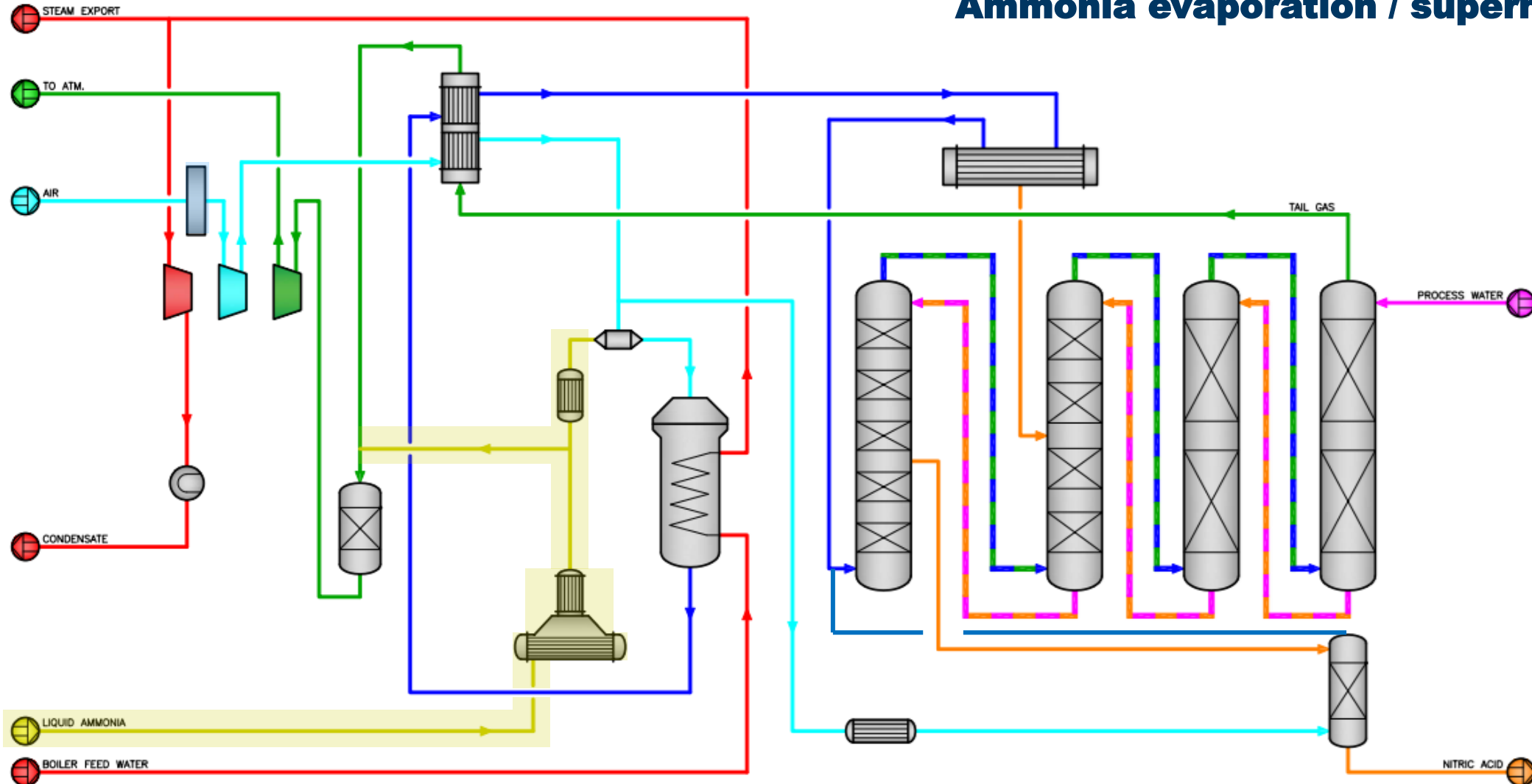
Improvements made resulted in a capacity of 275 mtpd as 100% HNO_3 as 50 %wt

Case 1: Target capacity: 300 mtpd as 100% HNO_3

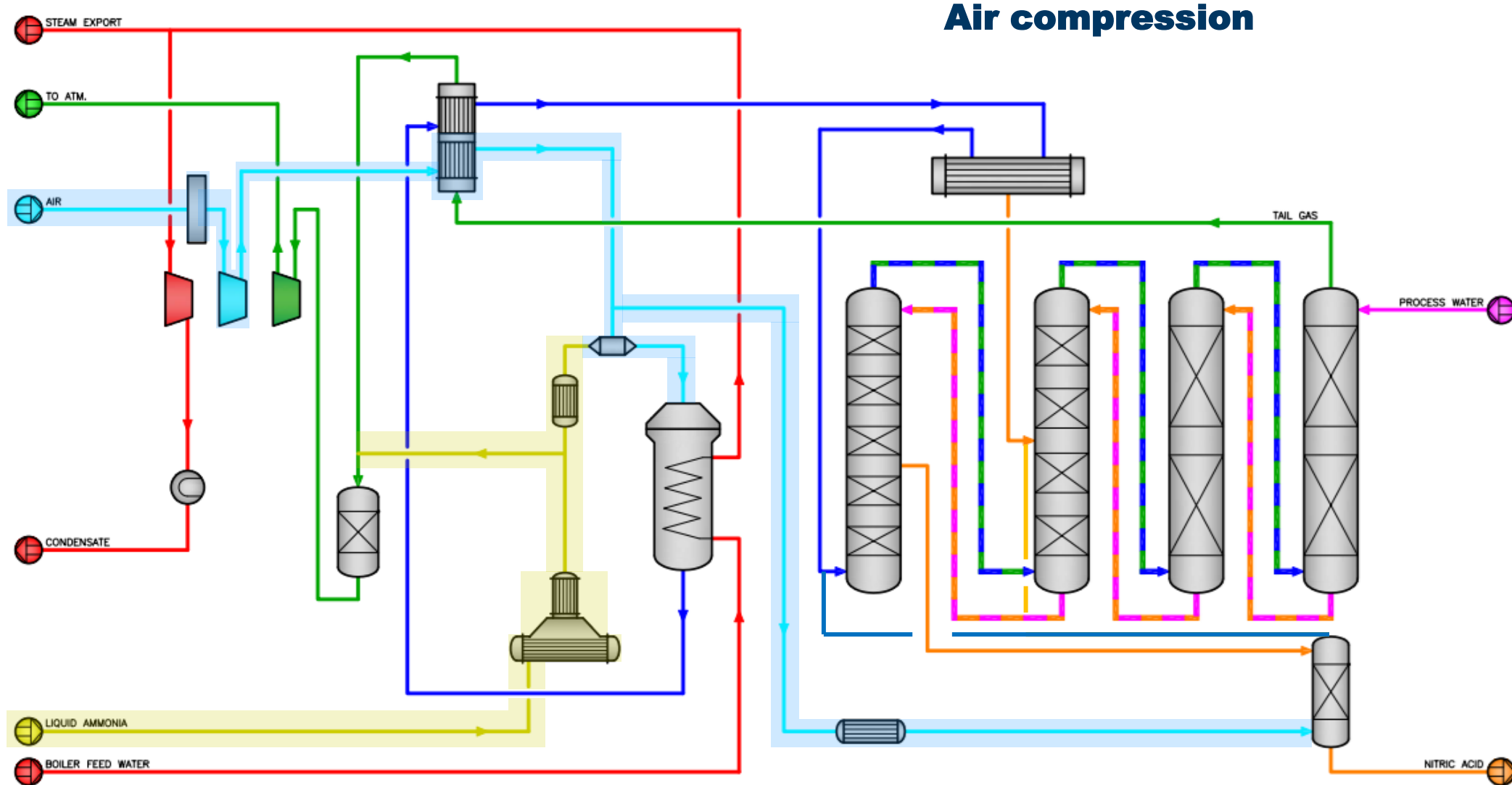
Case 2: Target capacity: 350 mtpd as 100% HNO_3

Monómeros nitric acid plant

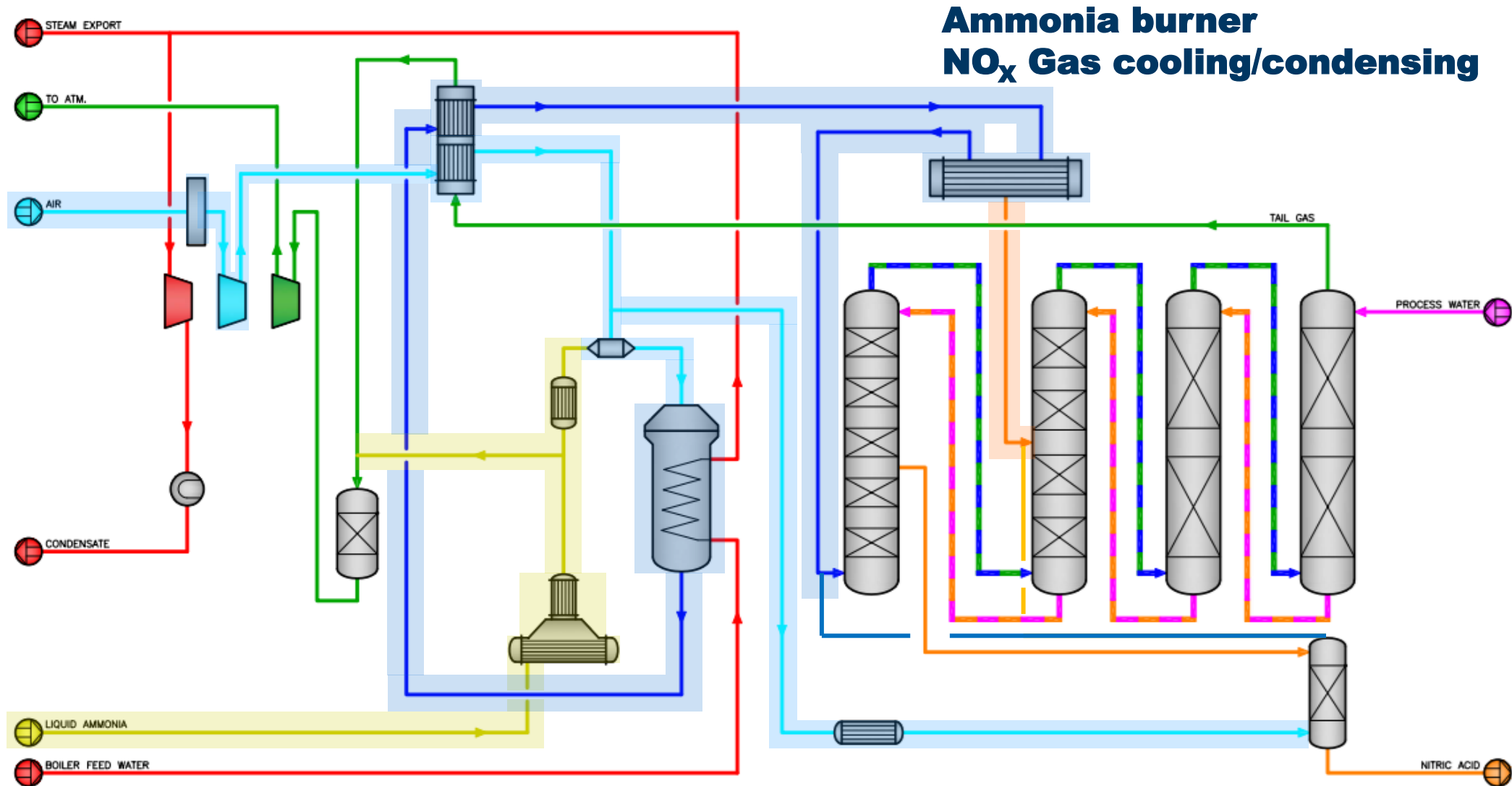
Ammonia evaporation / superheating



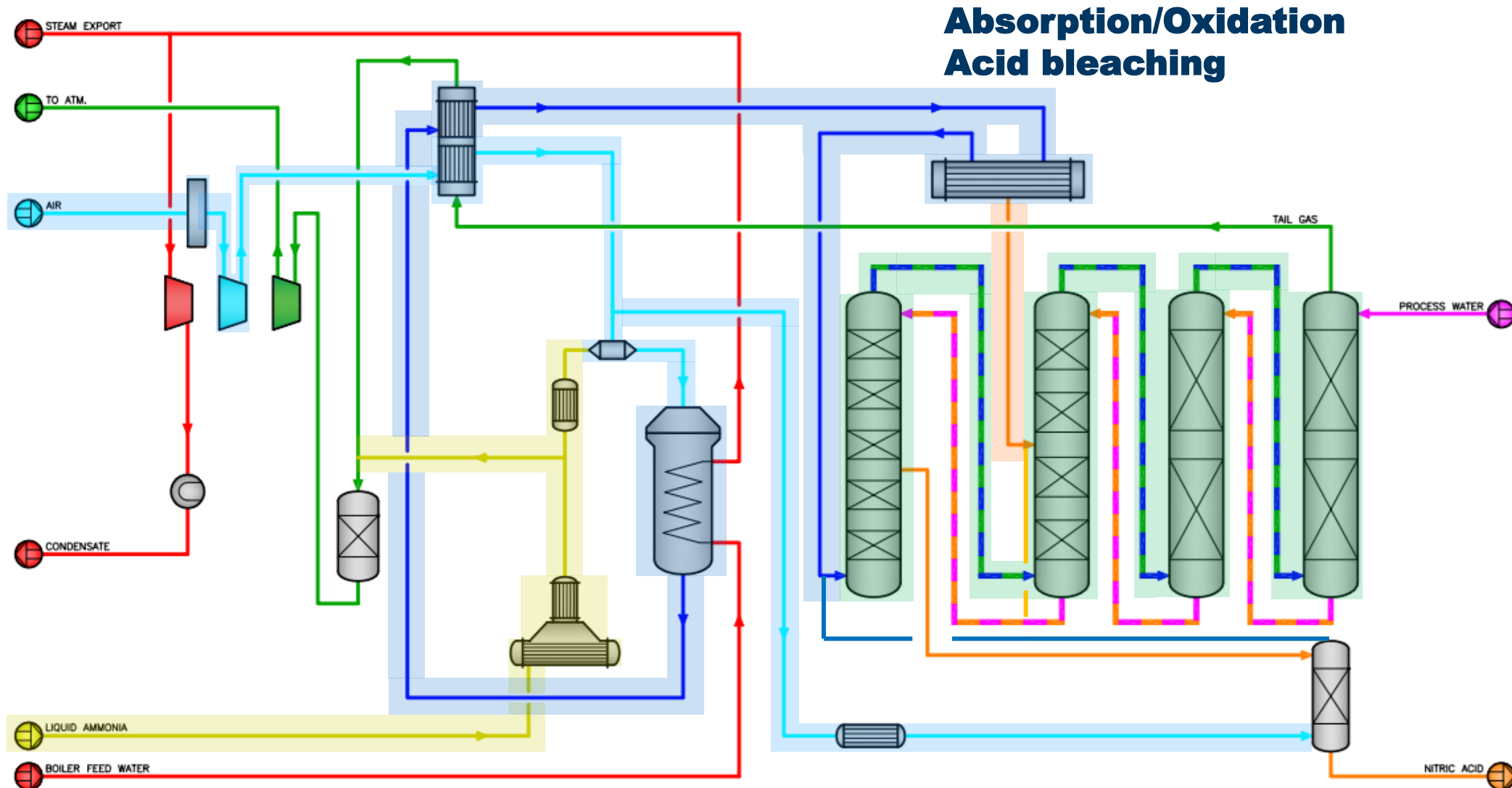
Monómeros nitric acid plant



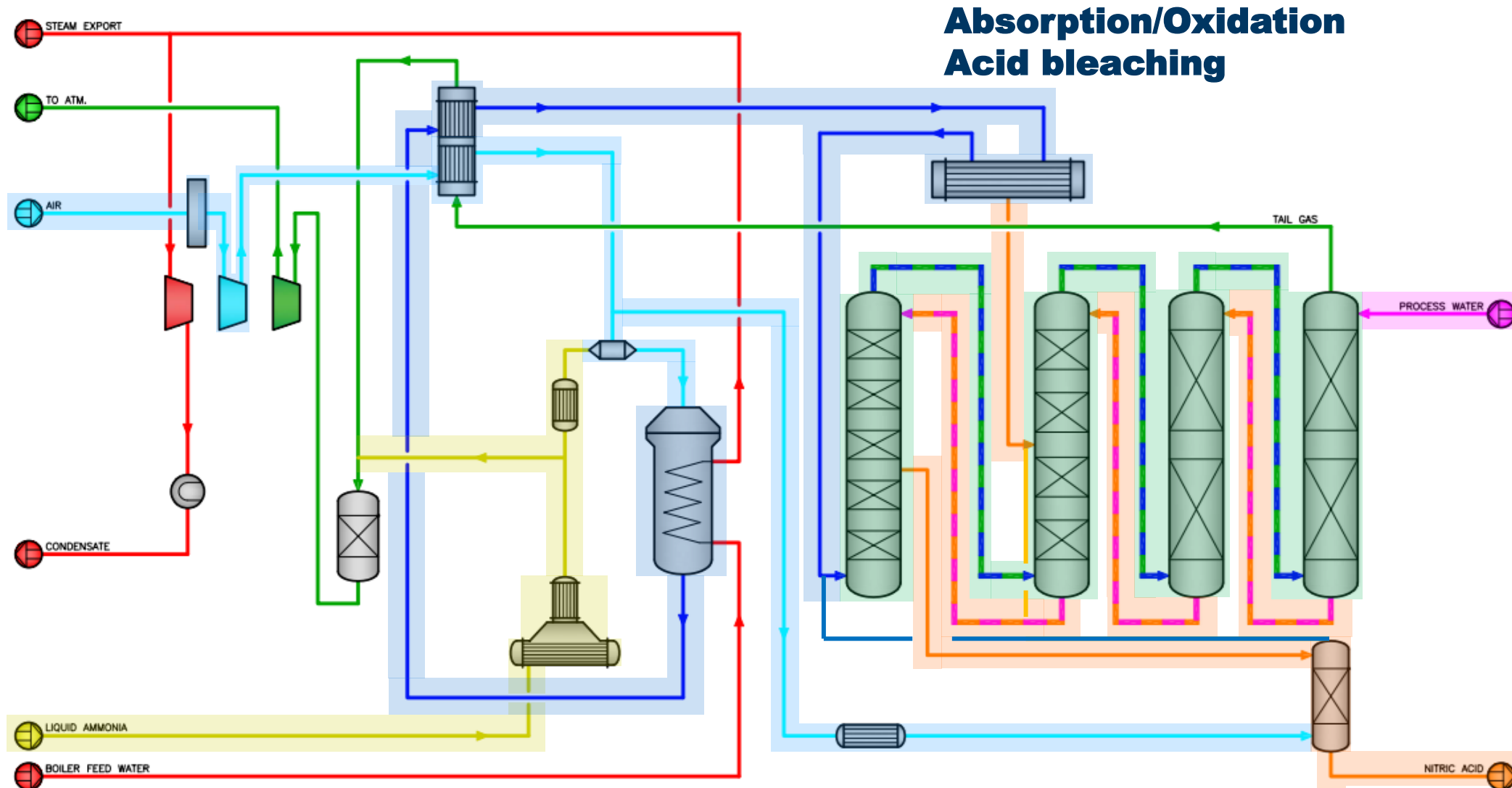
Monómeros nitric acid plant



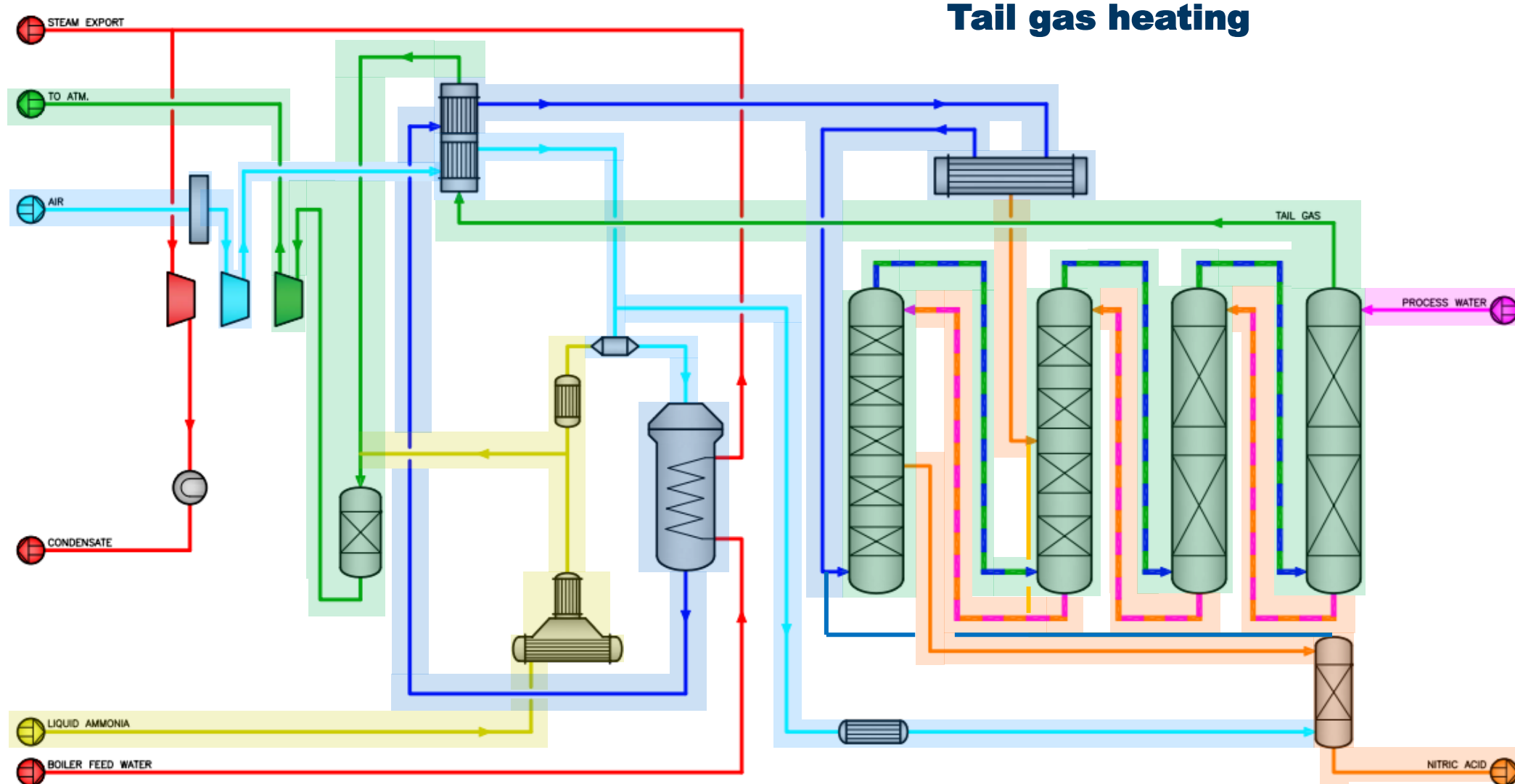
Monómeros nitric acid plant



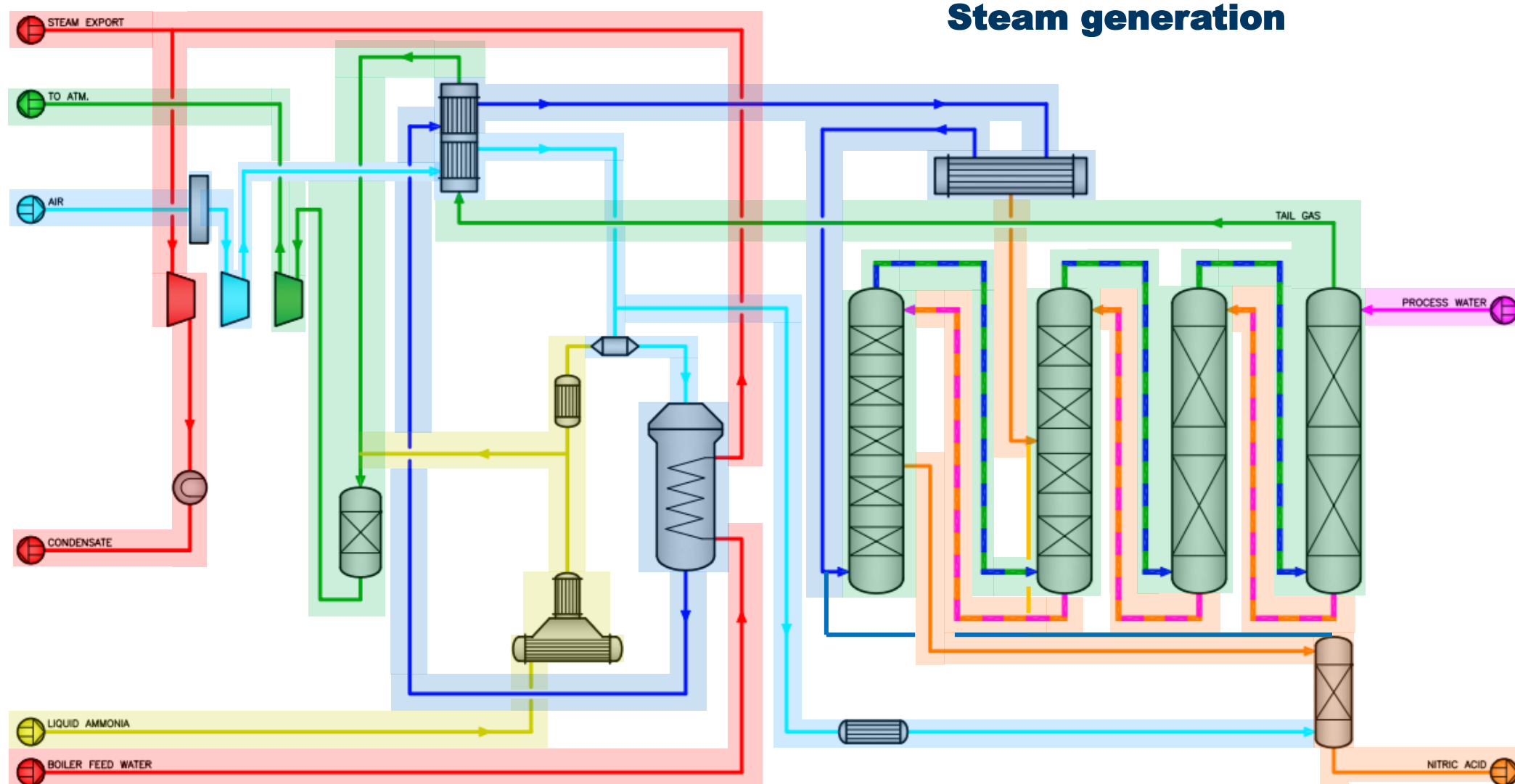
Monómeros nitric acid plant



Monómeros nitric acid plant



Monómeros nitric acid plant



Revamp Study Approach

Plant model

Detailed plant simulation is prepared based on plant data and discussions with operations

Revamp Scheme

Based on the model and the revamp goals process schemes are modelled and the best one selected

Equipment Rating

Existing equipment is modelled and checked for performance in the revamped situation

Equipment Design

New and modified equipment are designed and sized

Report

Results are presented for both options in final report

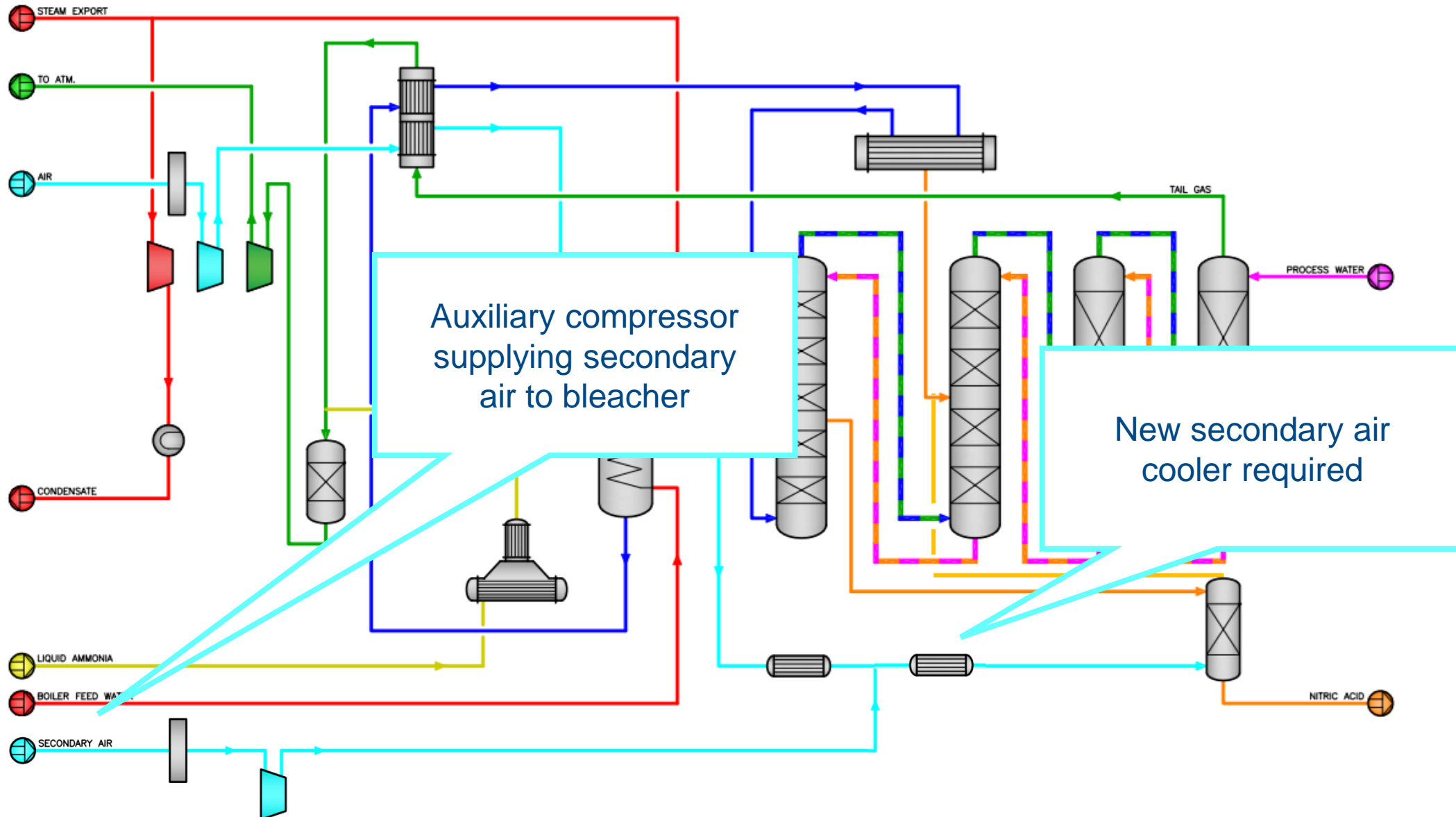
Revamp Study Deliverables

- As-is heat and mass balance with process flow diagram

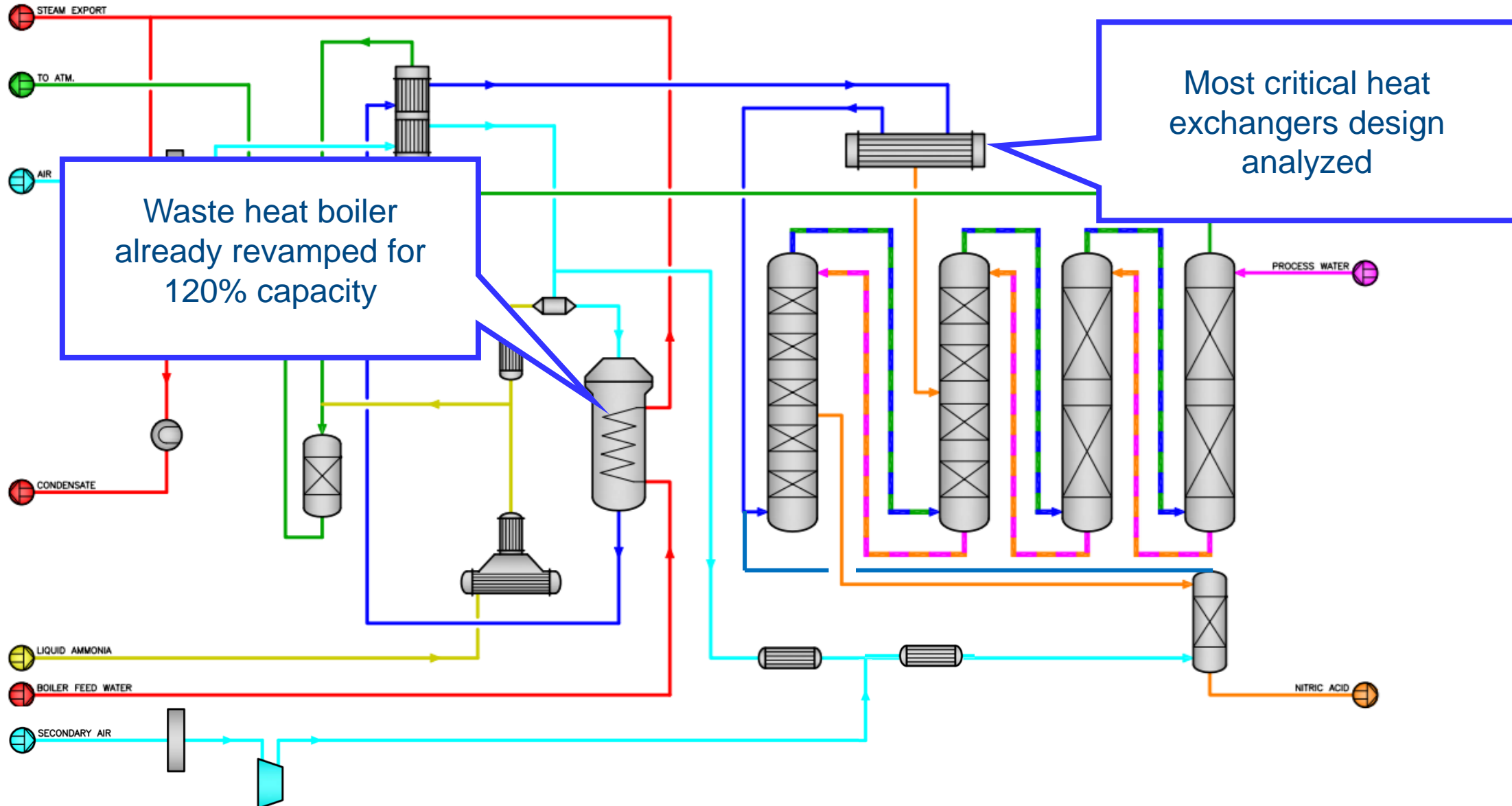
For both revamp options:

1. Study report: Plant capacity increase
2. Mass Balance
3. Process Flow Diagram
4. Equipment list with main sizes: New and modified equipment
5. Preliminary Plot Plan
6. Cost estimate

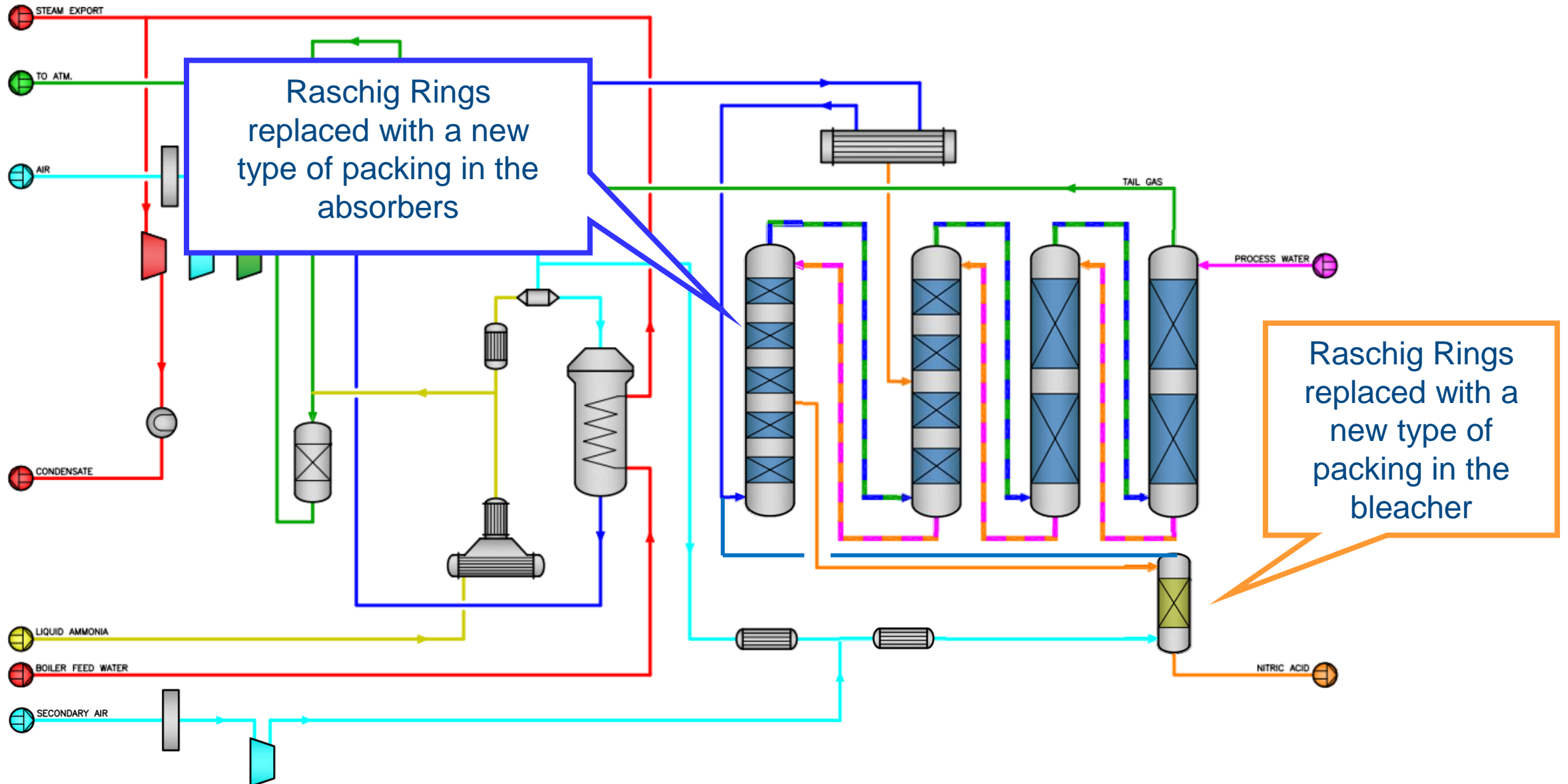
Monómeros Revamp Proposal



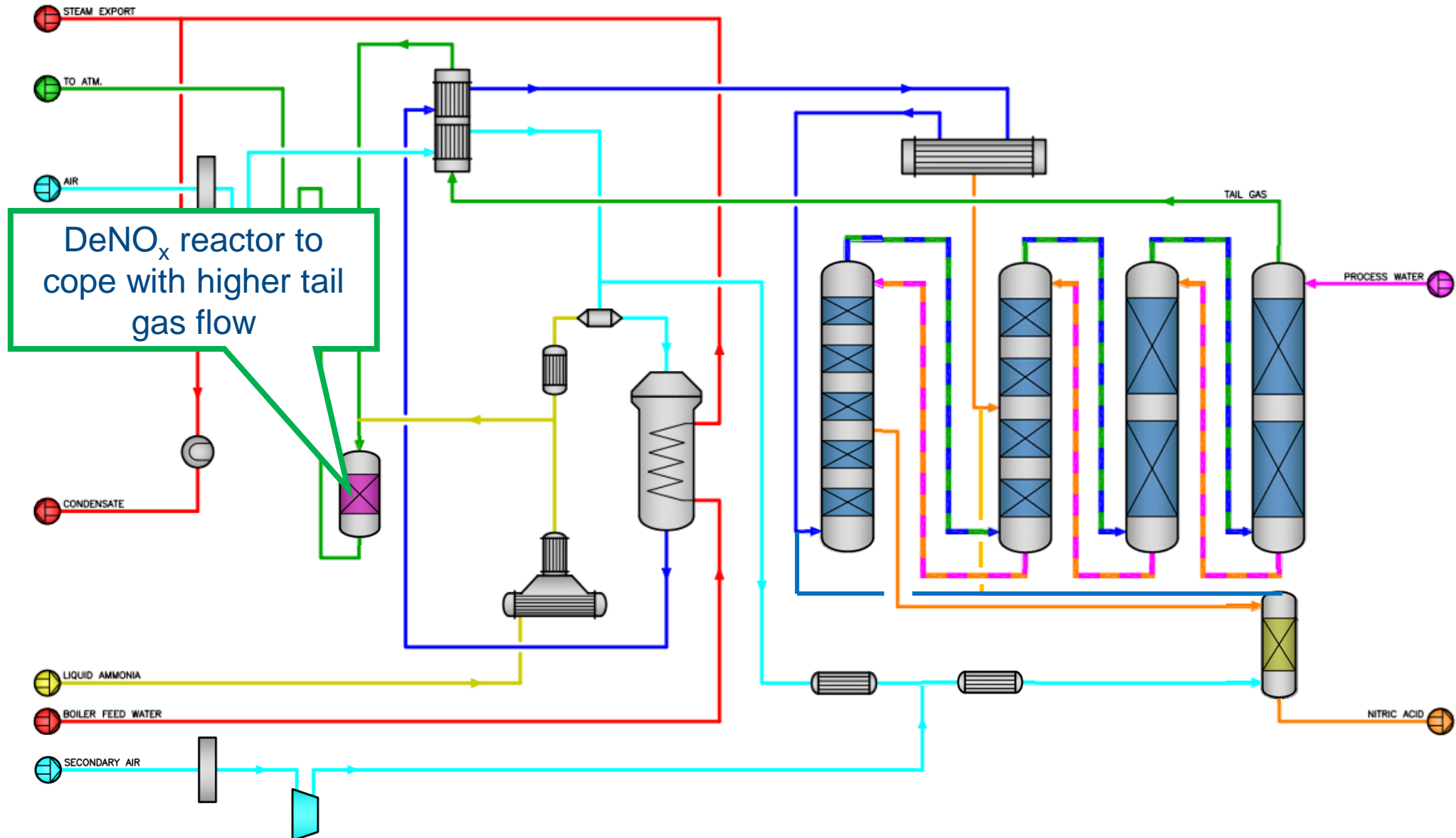
Monómeros Revamp Proposal



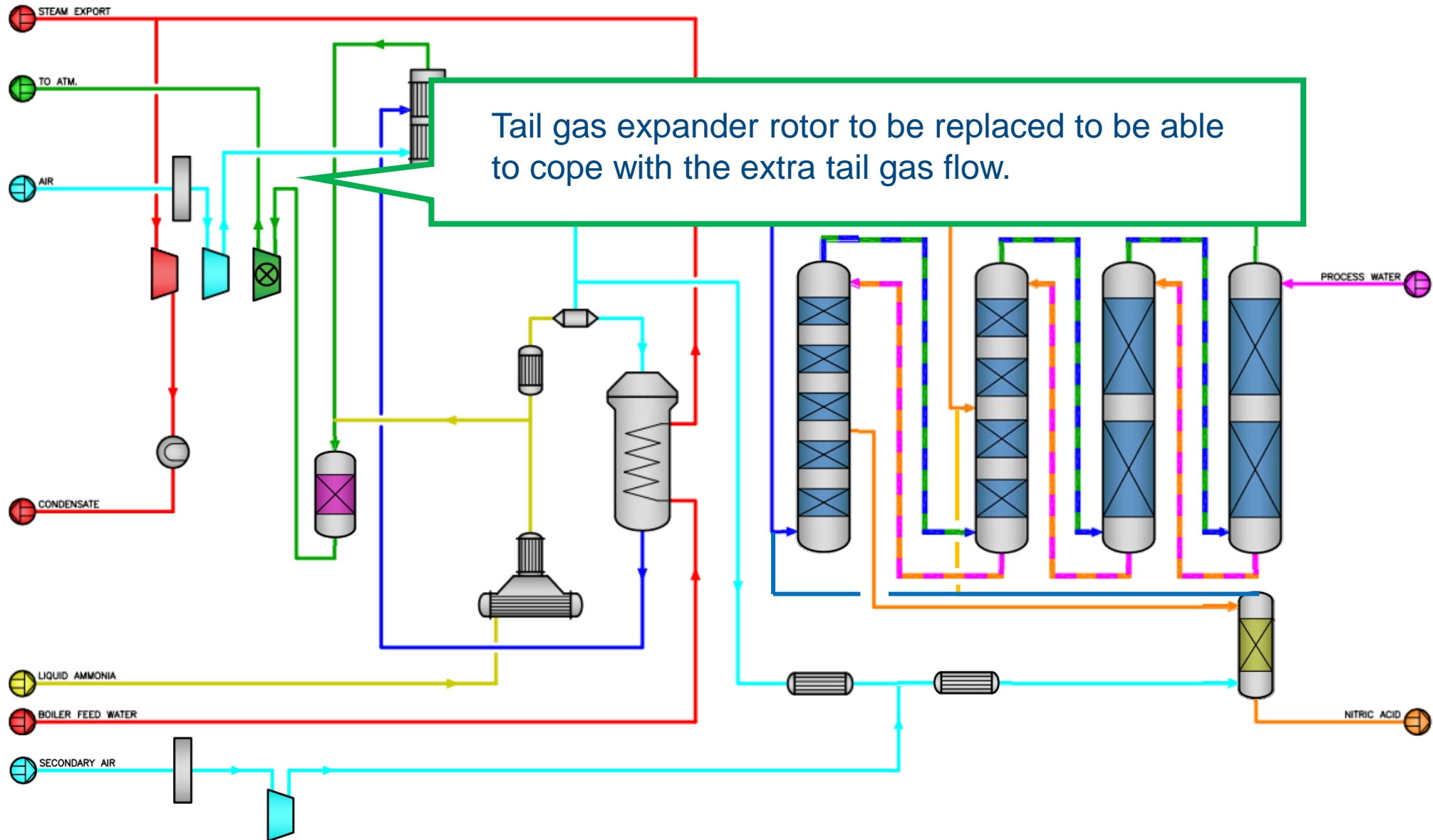
Monómeros Revamp Proposal



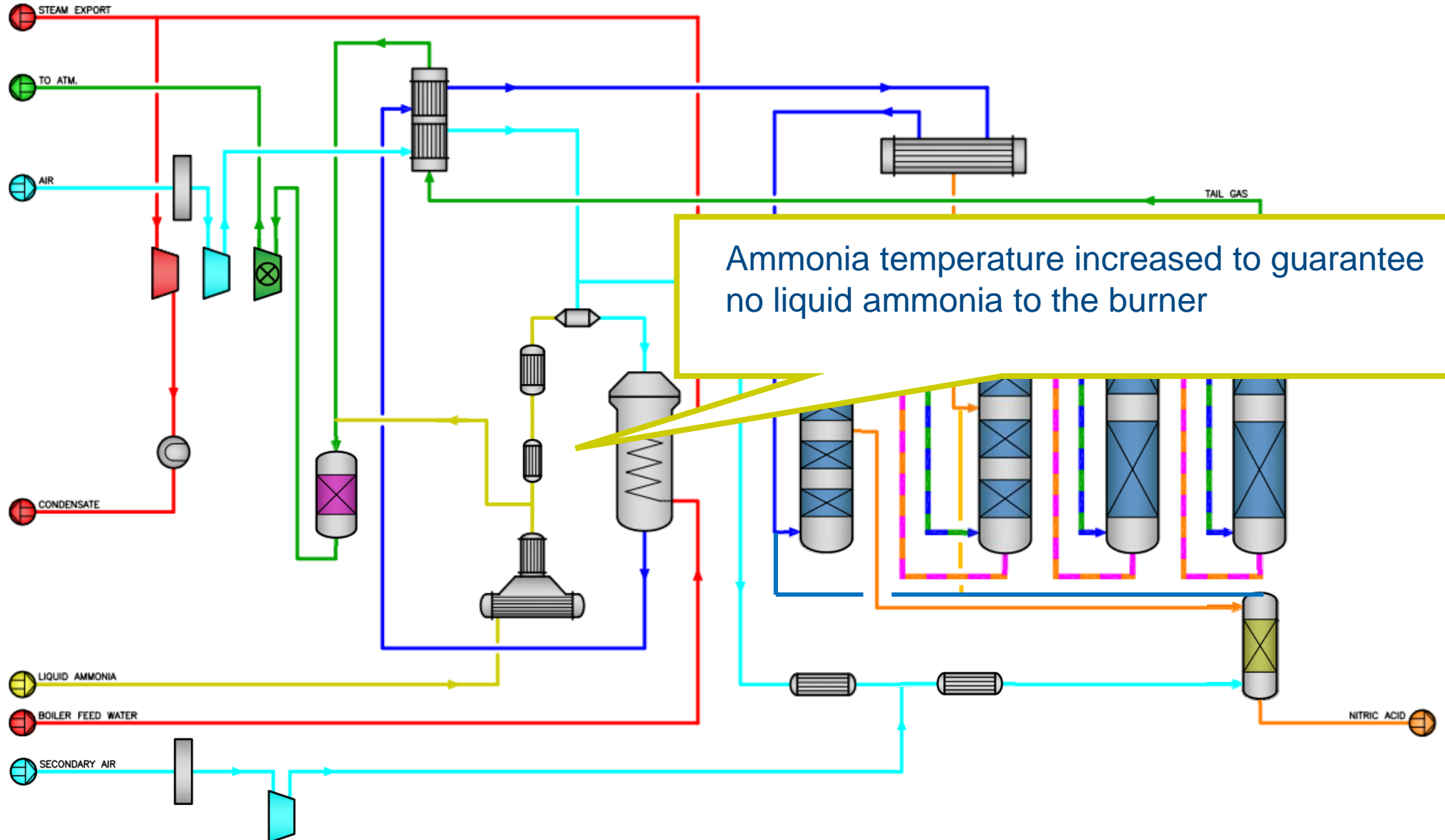
Monómeros Revamp Proposal



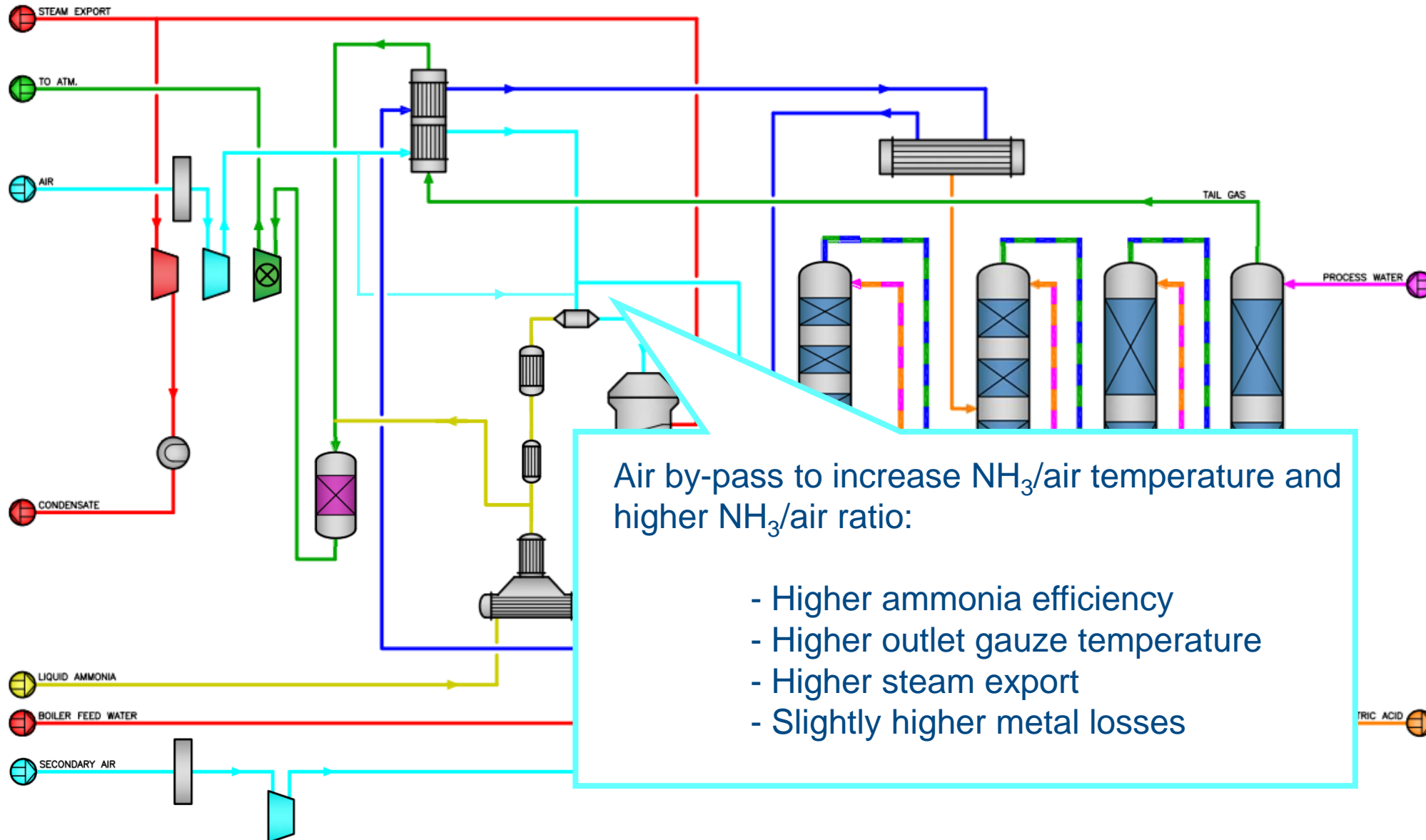
Monómeros Revamp Proposal



Monómeros Revamp Proposal



Monómeros Revamp Proposal



Current Status

- Monómeros received the feasibility study
- All revamp goals achieved AND increased energy efficiency
- First action: replace packing of the absorption and bleaching columns is scheduled
- Discussions with rotating equipment vendors are on-going to validate modifications
- To be continued. . . .

Equipment replacement project

Stamicarbon Nitric Acid plant commissioned in the 1980's

2 parallel cooler condensers in operation for more than 30 years

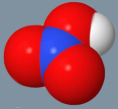
Replaced with 1 new cooler condenser

In production

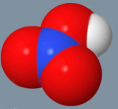


Conclusion

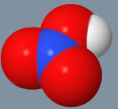
Conclusion



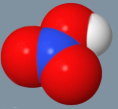
Stamicarbon is BACK in nitric acid



We can/will deliver LAUNCH/EVOLVE/ADVANCE projects



Full scope from green ammonia to UAN



small scale CAN plants with stami green ammonia together with INCRO

That's all Folks!



THANK YOU!!