Optimization and Tuning

Success Stories

Assembled by Mona Henderson

Valmet

General “problem” descriptions

- Low delignification in O_2
- High chemical consumptions
- High viscosity loss

Symptoms

Key Steps in Bleach Plant Optimization

Define the problem to be solved

Consider the entire fiberline

Understand the chemistry and relationships

- A problem generated upstream can (usually) not be undone later!
- What is the root cause? Addressing the symptom may not solve the problem.

Key Steps in Troubleshooting

- **Map the existing operation**
  - Cooking
  - Washing
  - O_2 Stage performance
  - Bleach plant
    - Chemical distribution and pH

- **Define the problems**
  - Compare “normal” with “current”
    - E.g. design conditions, literature, best practices

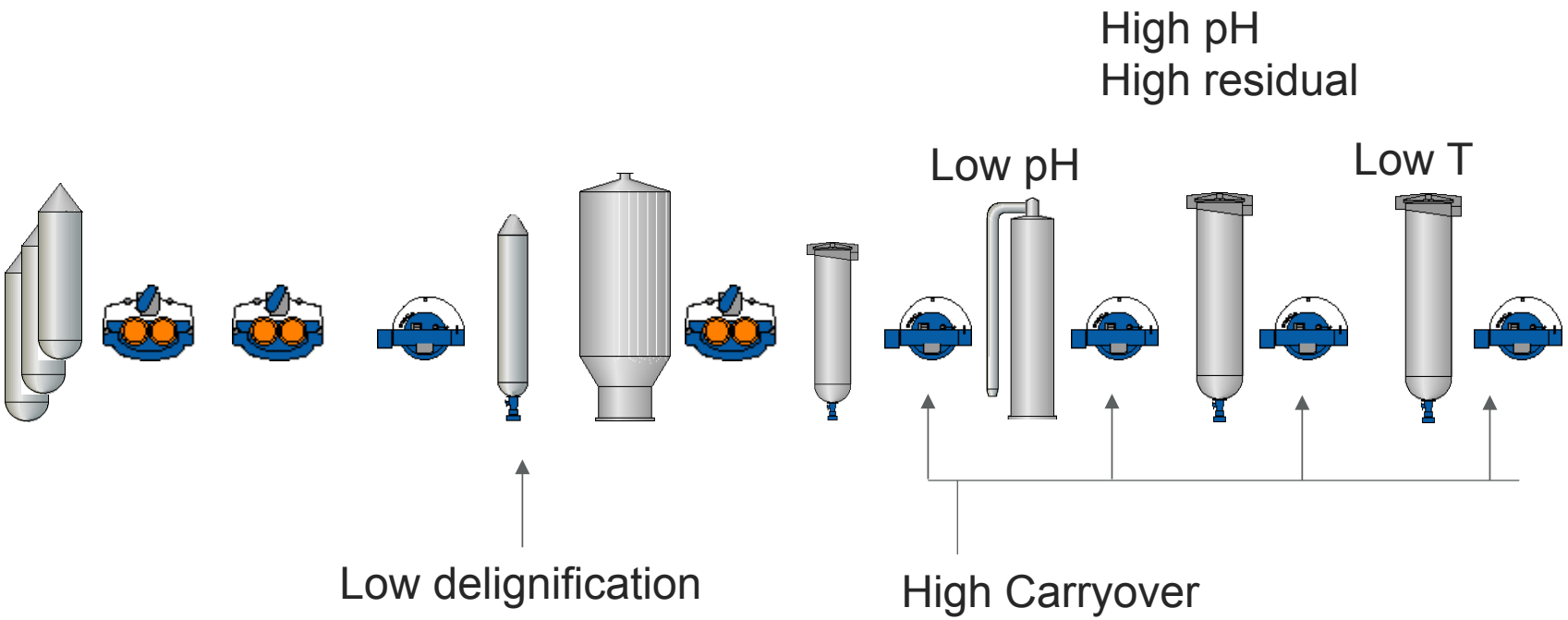
- **Identify system limitations and gaps in information**
  - Pumping, steam, or chemical availability
  - Missing or broken analyzers
  - Poor calibration

Case 1:
High chemical usage in bleach plant

Case 2:
High carryover to bleach plant

Case 3:
High chemical usage in bleach plant;
Low final viscosity

Case 1: Mapping the system

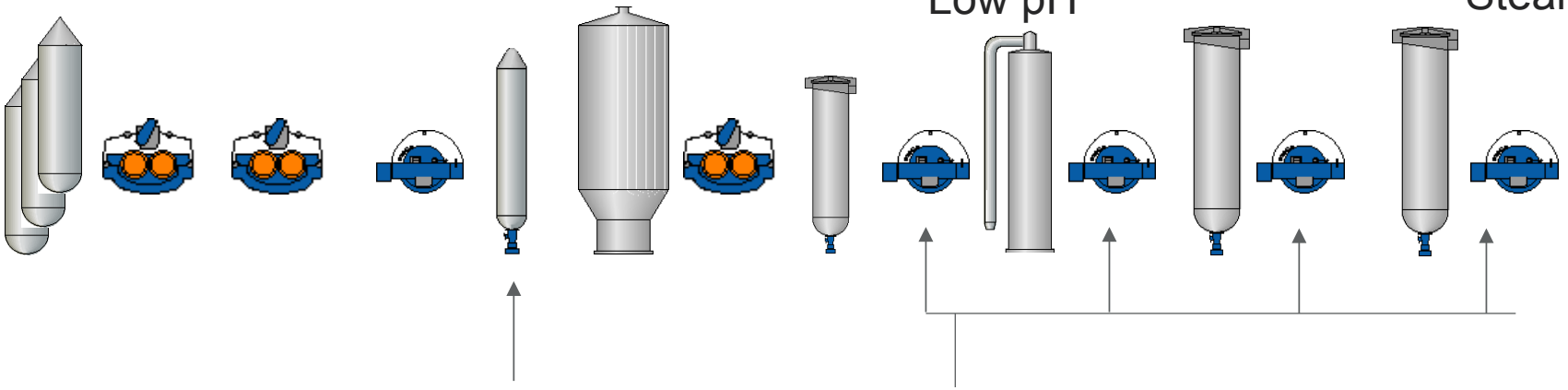


Case 1: Defining the problem(s) + Identifying limitations

High pH
High residual
Channeling
No acid addition

Low T
Steam limit

Low pH

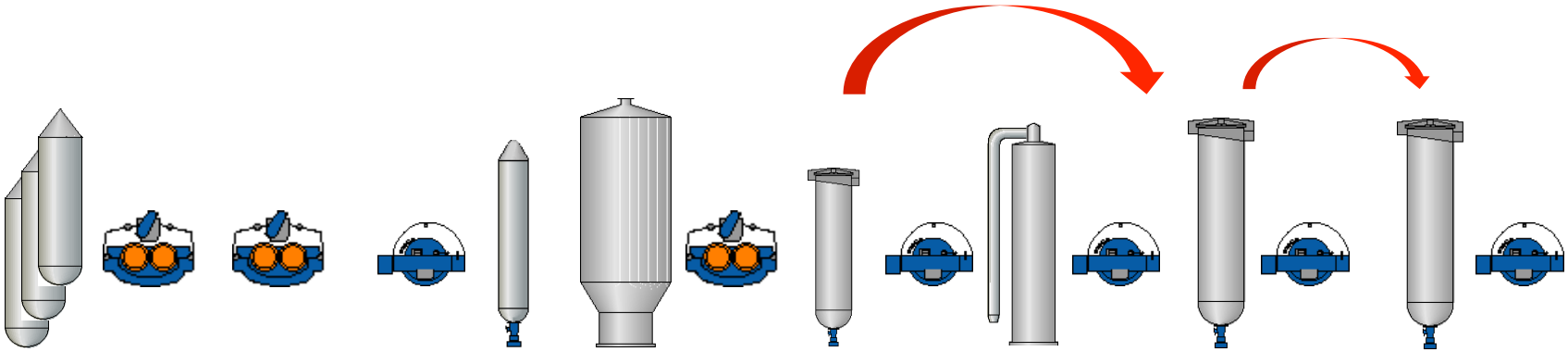


Low delignification
Low consistency

High Carryover
Overloaded filters
Negative DF

Case 1: Make changes

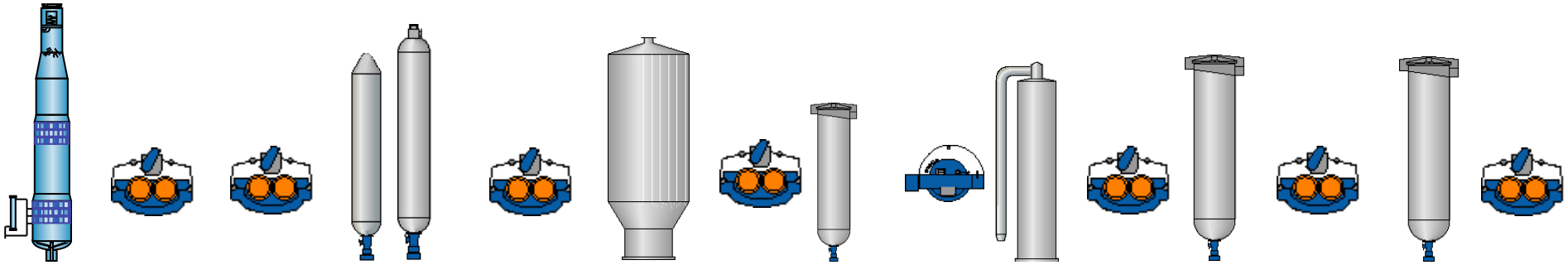
Shifted ClO2 from D0 to D1 and D2:
Do more in later stages
Reduced pH in D1+D2 stages



Reduced total ClO2 charge by 20%, maintained final brightness

Case 2: Mapping the system

Decent, but not optimal,
chemical consumption



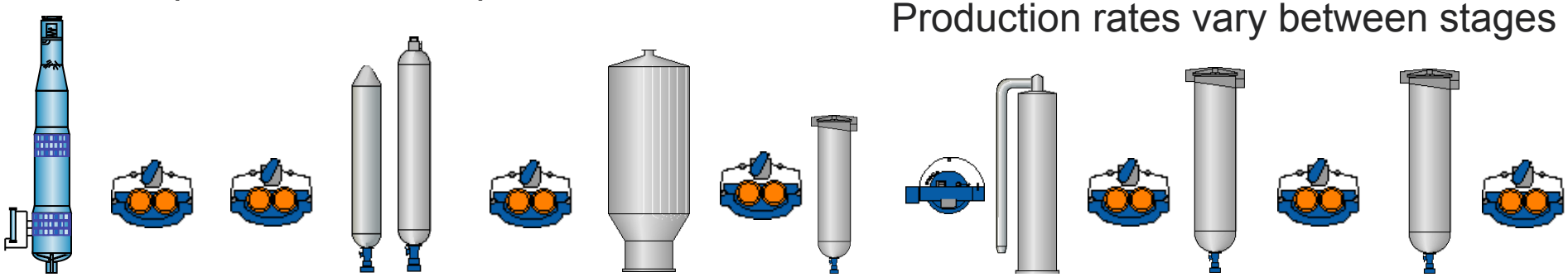
Occasional
low % delig

High carryover

Case 2: Defining the problem(s) + Identifying limitations

Chemical consumption
No residual information
Non-optimal brightness targets
Non-optimal temperature settings
Production rates vary between stages

Not optimal control on presses in BSW



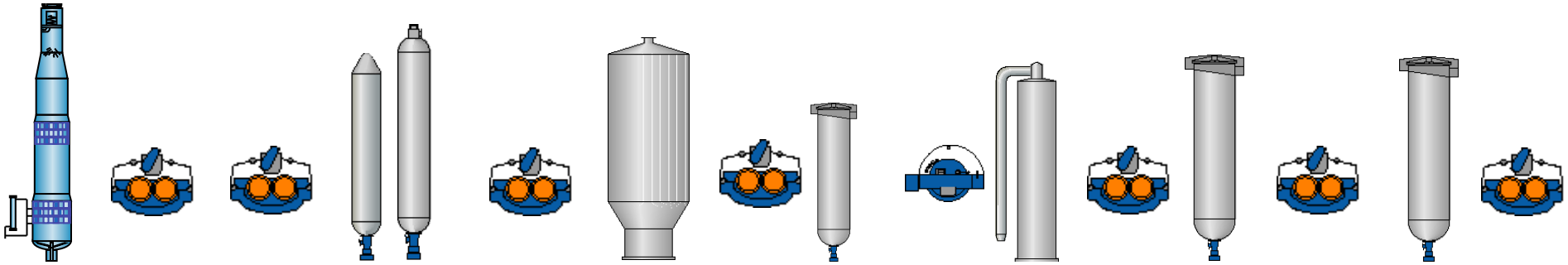
Low DF/bypass
Channeling

Occasional
low % delig
Correlated to
high carryover

High carryover
Wash water limitation

Case 2: Make changes

Changed settings on presses for
increased discharge consistency



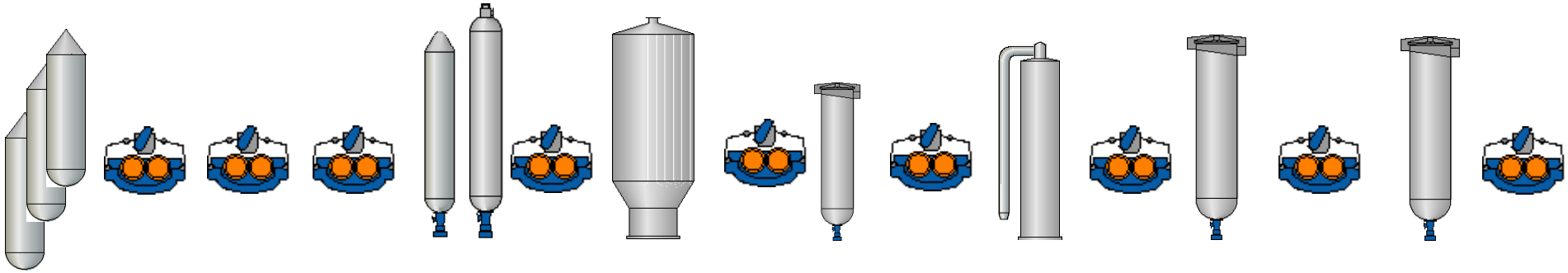
Stabilized digester operation
>> increased the DF

Reduced carryover to O2 and bleach plant > 25%
Improved delignification

Case 3: Mapping the system

Outlet kappa variability

High chemical consumption



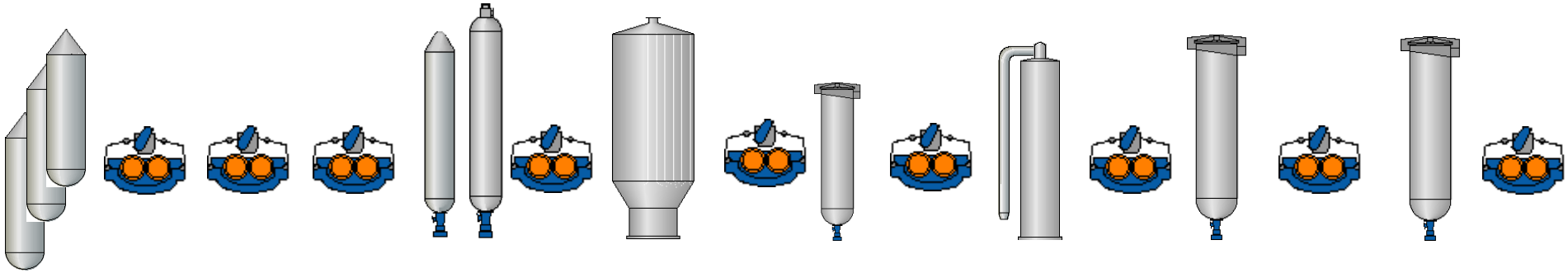
Low viscosity

Case 3: Defining the problem(s) + Identifying limitations

Kappa
Mixed HW cooks differently;
varying chip quality

Outlet kappa variability
Control strategy
Final kappa target

High chemical consumption
Chemical splits
pH control



No ability to add acid

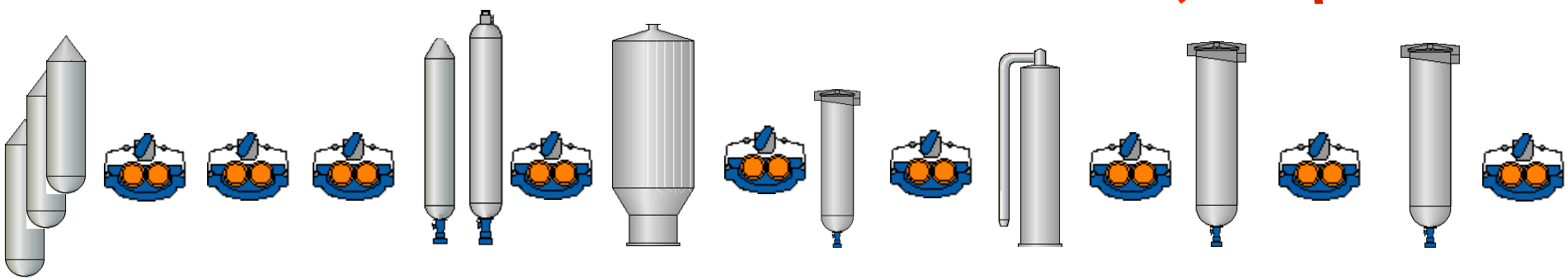
Low viscosity
Chemical splits
Kappa variations

Case 3: Make Changes

Lower kappa target

New control strategy (Advanced controls) Raise kappa target

Shift ClO2 charge
Target optimal final pH



Viscosity after O2 and after D2 increased ~8% with

- New digester and O2 kappa targets
- Reduced kappa variability from O2
- Shifting chemical charges and optimizing pH in bleach plant

Lowered ClO2 consumption by 19% with less kappa variability, optimized chemical application profile, and pH control

Make your own success story!

- Good equipment and instrumentation is the foundation for good performance.
- Define and address the root cause, not the symptom.
- Recognize that sometimes the problems begins upstream.
- Good operation (correct kappa targets, pH levels, chemical applications, retention times) are necessary for optimized performance.


Valmet
FORWARD