Welcome
To The
2021 AVEVA™ Americas Advisory Group Meeting
Day 3 – Simulation for Process Design

Hosted by

AVEVA Portfolio Management

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AMERICAS ADVISORY GROUP MEETING

Confidential

Day 3

Simulation for Process Engineering

- AVEVA PRO/II Simulation
  - Roadmap, Features
  - Aha Ideas Review
  - Guest Speaker
  - Open Forum
- AVEVA Process Simulation
  - Roadmap
  - Greenhouse Gas Emissions
  - Renewables for Green Hydrogen
  - Open Forum

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA™ PRO/II™ SIMULATION

Agenda

AVEVA PRO/II Simulation Roadmap & Release Highlights

Featured Speaker

Prof. Dr. Rafiqul Gani

CEO, PSE for SPEED Company Limited

Denmark-Thailand

Open Forum & Advisors' Input

Novel Uses of AVEVA PRO/II Simulation

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

Key New Features in version 2021

Rigorous Heat Exchanger

- Reflux condenser calculation option
- New temperature approach specifications
- Relative duty tolerance for rating exposed in GUI
- Right click access to HTRI file

Humidifier

- duty specification

Reactors

- Support for mixed phase reactions in CSTR and PFR
- Extended data entry dialogs
- Pre-defined combustion reactions for use with conversion reactor
- Reaction normalization

Ejector

- Real CpCv for stream
- Print option for design mode history

Output Upgrades - various

Columns

- Extension on vary trays functionality

Solid fuel characterisation

- Inclusion of fluorine & chlorine as additional components

Streams

- Stream estimate for dew and bubble point streams
- Conversion of assay streams to streams w/ petro-components

Usability

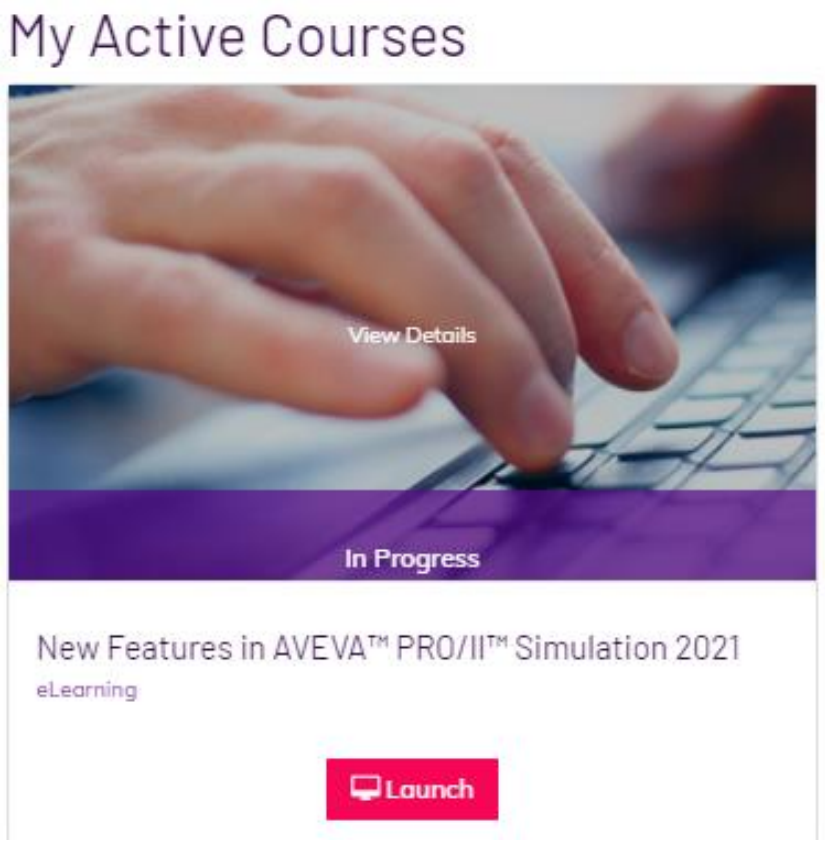
- Find stream enhancements
- Copy and paste between models
- Convergence plots
- Run and update estimates
- Convergence messages to include unit names
- P2View on Tools ribbon
- Control of location of temporary Excel file with Excel unit op and Excel calculator
- Import of incomplete keyword files
- Password enhancements
- Data review in Excel

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

New Features Video Presentation at AVEVA's eLearning Site

https://industrialtraining.aveva.com/globalcalendar

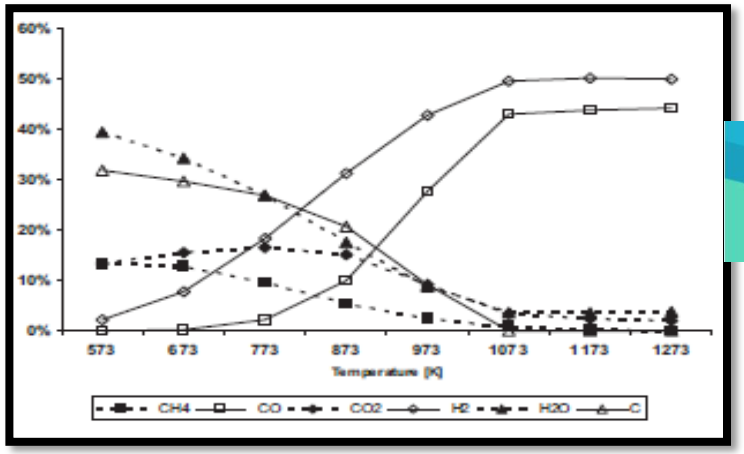
- **107 total online training offerings of which 47 are PRO/II**
- **Live Instructor-Led-Training (ILT or Virtual ILT) for PRO/II:**
  - Introduction to PRO/II (also available as Web-Based Training)
  - Flowsheet Control & Optimization
  - Simulating Refinery Processes
  - Process Thermodynamics
  - Custom classes
- **Online Training Offerings** (adding content regularly!)
  - 3-5 minute "how to" videos
  - Web-Based Training – 45-60 minutes of recorded content including hands-on exercises and knowledge checks
  - Webinars – recordings of live events



© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

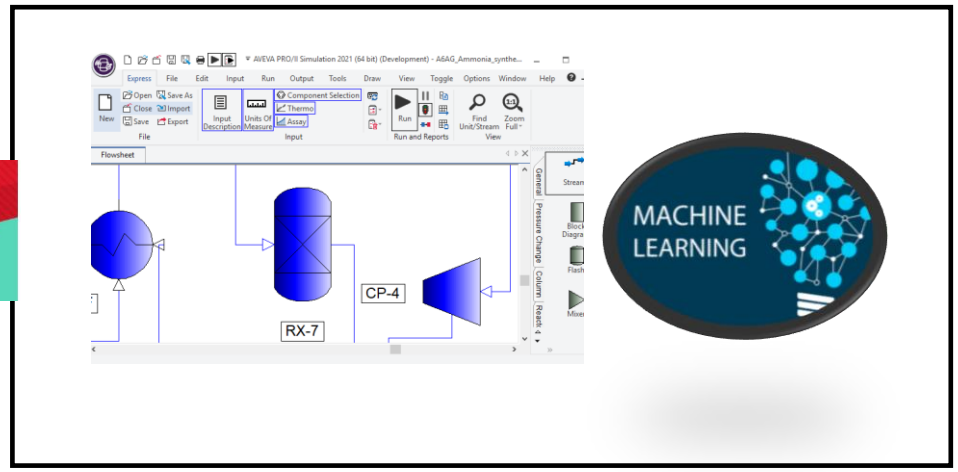
Python Unit Operation in PRO/II for Machine Learning

No Mathematical model-But
Data available





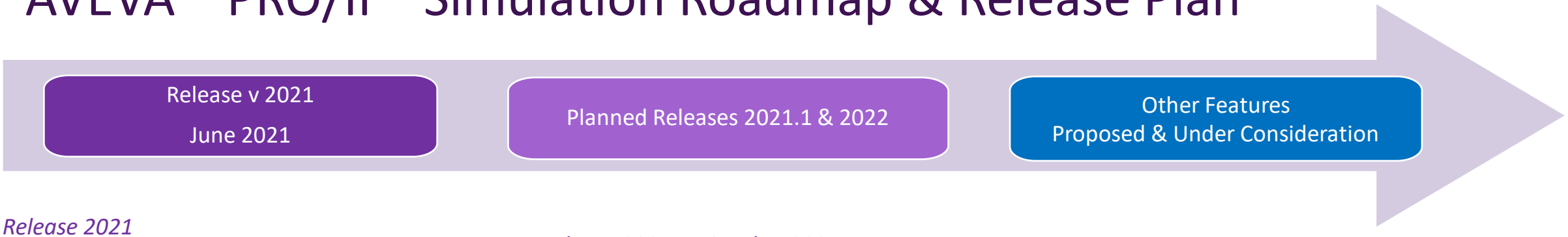
AVEVA PRO/II Simulation + Python Unit



Be sure to watch the Video provided in the Aha Portal

For Internal Use Only. ©2019 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA™ PRO/II™ Simulation Roadmap & Release Plan



Release 2021

Unit Operations
- Plug Flow Reactor Two-phase reactions
- Rigorous Heat Exchanger Improvements
- Ejector model enhancements
- LNG information improvements

Usability and Navigation
- User Experience Modernization
- Copy/Paste across simulations
- PFD input and summary display for quick audit
- Keyword input file importing enhancements
- Improvements in Error and Warning messages

Solvability
- Calculation changes to solve individual units if overall model does not solve
- Stream Bubble point initial estimate

Integration
- Case run link with modeFrontier

Release 2021.1 October 2021
- Python Scripting
- Thermo use function update

Release 2022 June/July 2022
- Standard Gas Turbine unit operation
- Yield specification for conversion reactors
- Integration with MySep
- Refining Reactor Models
  - Isomerization
  - Visbreaker
  - Delayed Coker
  - HS Alkylation
- HF Alkylation, FCC, Reformer
- Vapor Frac specs on Partial Condenser
- Heat transfer in pipe unit operation
- Divided Wall Column
- Excel view for stream calculator
- Calculation Sequencing
- Improved HXRIG&HTRI convergence
- Navigational access to data on objects, color coding
- New Distillation Shortcut method
- Distillation column auto-troubleshooting
- Depressurization Model

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

Aha Ideas Board Top Ten (*From Last Time*)

SimIdeas	Votes		Status	
I-45	4	CSTR/PFR reactor models to handle two-phase reactions	In Progress	**Done**
I-30	4	Standard Gas Turbine Model	In Roadmap	**Planned**
I-110	4	Change Numbering Scheme on PRO/II Columns	Submitted	
I-41	3	Import any keyword file with incomplete unit op data	In progress	**Done**
I-19	3	Provide more process detail fired heater combustion section	Considered	
I-70	3	New Short-cut Method for Distillation Column Study	Submitted	
I-102	3	Gas/Solid Cyclone	Submitted	
I-89	2	Enhancement HXRIG	In Progress	**Done**
I-80	2	Sequence Block	Considered	
I-109	2	Option to reset to base case solution between iterations of case study	Submitted	**Done**

© 2020 AVEVA Group plc and its subsidiaries. All rights reserved.

Aha Ideas Board Update, Top Votes

SimIdeas	Votes	Description	Status
I-110	8	Change Numbering scheme on the columns in PROII	Submitted
I-109	7	Option to reset base case solution between iterations of case study	**Implemented**
I-41	6	Import any keyword file with incomplete Unit Op data	**Implemented**
I-81	6	COM commands for running Case Study for PROII link with modeFrontier	**Implemented**
I-123	6	Calculator enhancement	Submitted
I-148	6	Use of DEFINE directly in a stream	Submitted
I-163	6	Enhancement of Ejector model	**Implemented**
I-30	5	Standard Gas Turbine Model	**Implemented**
I-38	5	Increase default timeout setting for HTRI	**Implemented**
I-45	5	CSTR and PFR two-phase support	**Implemented**

© 2020 AVEVA Group plc and its subsidiaries. All rights reserved.

slido



PRO/II: AVEVA strives to put priority on fixing defects and bugs. Aside from this priority, what functionality area do you believe PROII Development resources should mostly concentrate? (Please type your response)

ⓘ Start presenting to display the poll results on this slide.

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

slido



PRO/II: To modernize PRO/II further, what would you suggest? (Please type your response.)

ⓘ Start presenting to display the poll results on this slide.

AVEVA PRO/II Simulation

- Simultaneous Heat Integration Optimization
- Divided Wall Column Solution Approach

Presented by: Prof. Dr. Rafiqul Gani

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

Video

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

Open Forum

Novel Uses of AVEVA PRO/II Simulation

- Food Industry
- Mining Industry

Two Papers Presented by : David Earp

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

Design of a Recovery System for Organic Acids in a Banana Freezing Process

Study by Escuela Superior Politecnica Litoral, Guayaquil, Ecuador

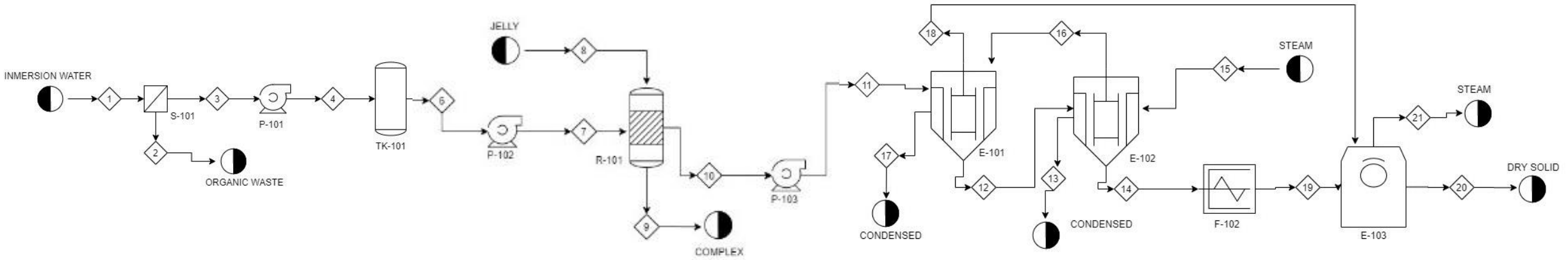
- Ascorbic and citric acid solutions are used to prevent oxidation of the bananas
- This results in disposal of large quantities of acid solution, which has:
  - An environmental impact
  - Cost implications of lost acid preservatives
  - Corrosion issues in the downstream equipment
- Potential recovery processes were simulated with PRO/II:
  - To generate mass & energy balances & evaluate the design
  - The potential designs were costed
  - ~67 wt % of acid is recovered

"Design of a Recovery System for Organic Acids in a Banana Freezing Process", Andrea Barcia, Kevin Ormaza Lissy Rodríquez, 19th LACCEI International Multi-Conference for Engineering, Education and Technology, Buenos Aires, Argentina, July 2021

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA

Banana PFD



© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

Simulation-Based Analysis of Hydrometallurgical Processes

Study by Escuela Superior Politecnica Litoral, Guayaquil, Ecuador

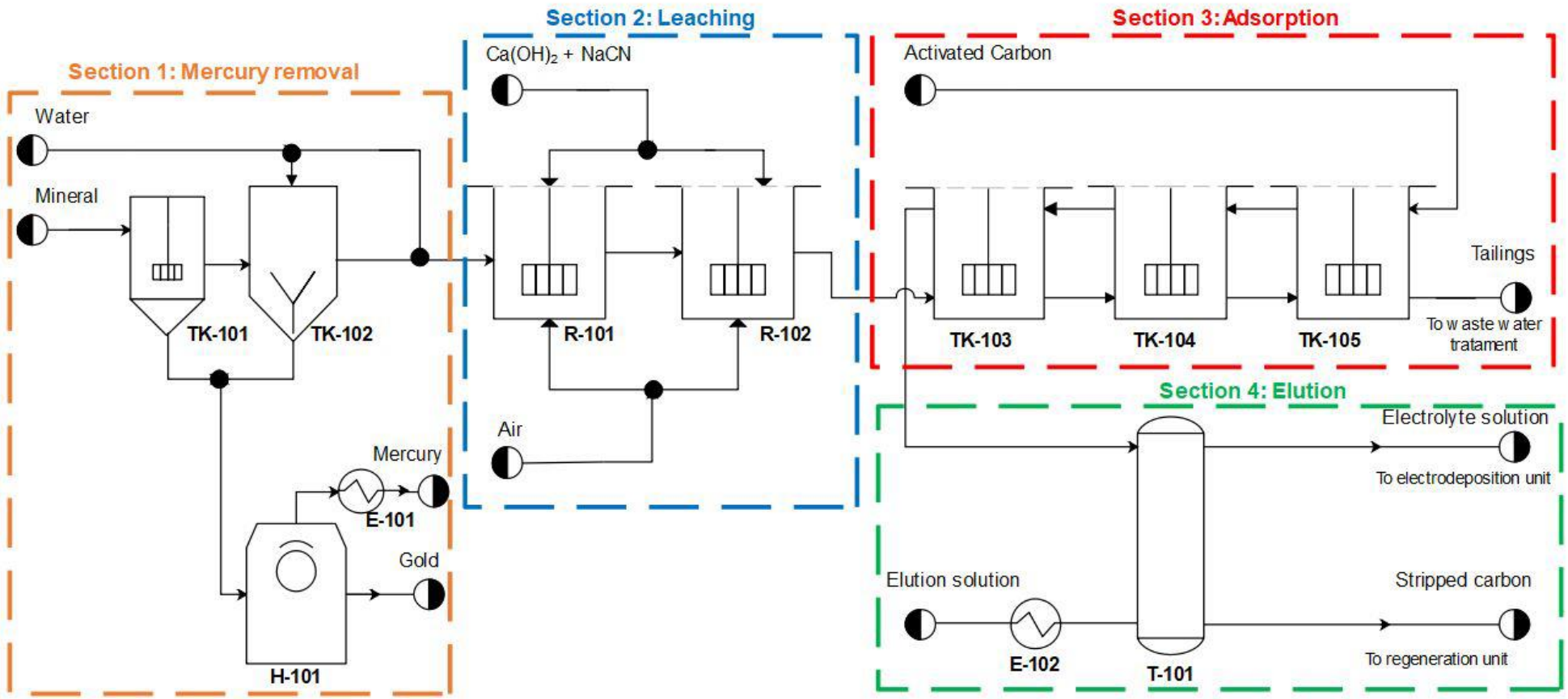
- Study of two hydrometallurgical process for gold recovery for small scale gold mining
  - Either using sodium cyanide and sodium thiosulfate as leaching agents
  - With & without sub-systems for mercury removal
  - Economic and environmental analysis
- Process modelled in PRO/II linked to Python for stochastic modelling
  - By directly data transfer by COM
- The systems using sodium cyanide coupled with mercury removal were most profitable
  - Cyanide processes gave better gold recovery
  - Sodium thiosulfate processes have environmental advantages

“Simulation-Based Analysis of Hydrometallurgical Alternatives for Small-Scale Gold Recovery under Uncertainty”, Santiago D. Salas, Yris González, Pamela Cango, Jean Carlos Gómez, Elízabeth Peña-Carpio, Hydrometallurgy, December 8, 2020

© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

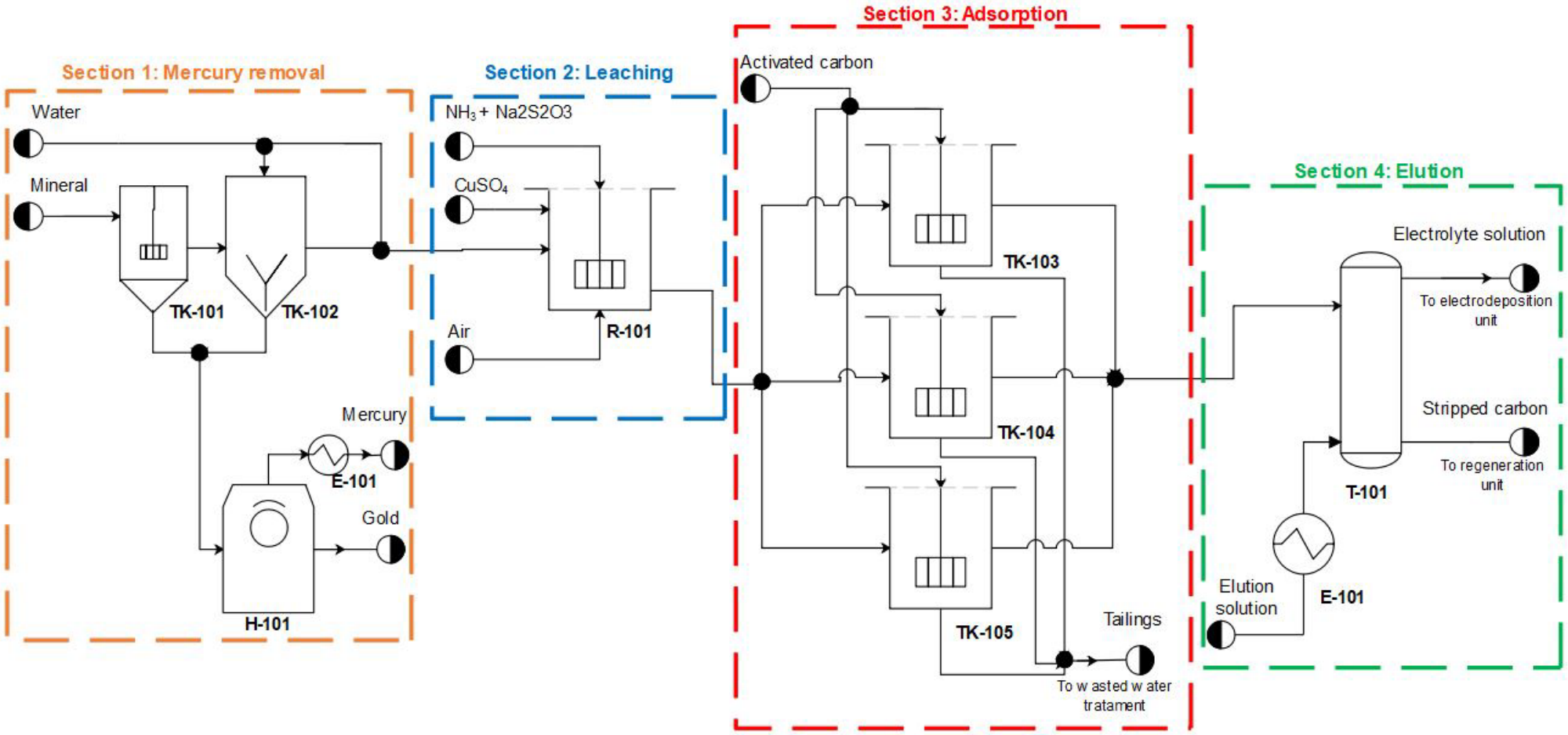
AVEVA

Cyanide Leaching Flowsheet



© 2021 AVEVA Group plc and its subsidiaries. All rights reserved.

Thiosulfate Leaching Flowsheet



© 2021 AVE

Thank you

AVEVA Process Simulation Polling

slido



How are sustainability industry trends affecting you?

ⓘ Start presenting to display the poll results on this slide.

slido



Is your company’s business strategy impacted either by changes to a hydrogen economy or a circular economy?
(Check all that apply, or are areas that your company is moving into)

ⓘ Start presenting to display the poll results on this slide.

slido



Are any of these areas being de-emphasized?
(Check what applies to you)

ⓘ Start presenting to display the poll results on this slide.

slido



With regard to sustainability, what key features are you most concerned about having in the software? (Please type your response).

ⓘ Start presenting to display the poll results on this slide.

Presentations will be posted in Aha Ideas Portal

https://aveva-simulation.ideas.aha.io



 For Internal Use Only. ©2019 AVEVA Group plc and its subsidiaries. All rights reserved.

Thank you