1Point2

Constraints on water resource in a chemical process

⇒ ISSUES:

- Identifying the operations that could be enhanced regarding their water consumption
- Realizing an « on-line » model, while transferring basic knowledge to the user team!

⇒ SOLUTIONS:

A simulation model able to modify pumps capacity, tanks size, heat exchangers capacity, the number of centrifuges, and even the sequence of operations

⇒ ADVANTAGES:

- Water-saving production configurations were identified
- The customer obtained an easy-to-use model, offering results in MS Excel in order to refine the analysis

This chemical company has a production process consuming large quantities of water. Fortunately the process itself recycles part of the water needed for products transformation and the site owns a well that contributes a bit to the water supply.

The plant, however, has to buy water to the nearby city too often — this has to become an exception.

Depending on the process configuration and/or production schedule considered, the chemical site may have to buy the extra water required for production in the nearest city. This water source is not only costly, but it also reduces the drinking water supply for inhabitants and harms the brand image of the chemical company.
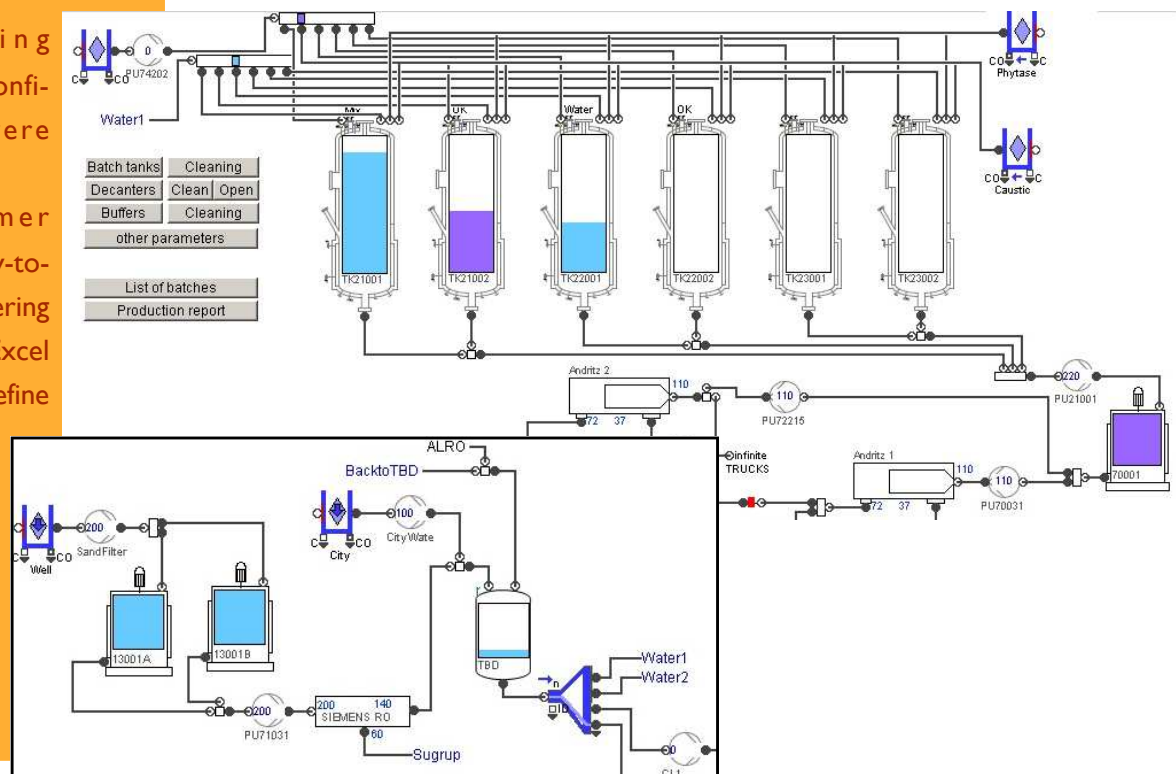
First, the model defined the maximum capacity of the plant and isolated some bottlenecks.

Then, several variations were tested both for the sequence of operations (taking into account equipment reliability aspects) and equipment dimensioning, and a fine adjustment of buffers size was made for the most water-consuming types of production.

Simulation brought to light the optimal size for equipments, validated sequences and scheduling plans that were more profitable than others. It also defined the plant ramp up capacity, which is linked to the bottlenecks previously identified.
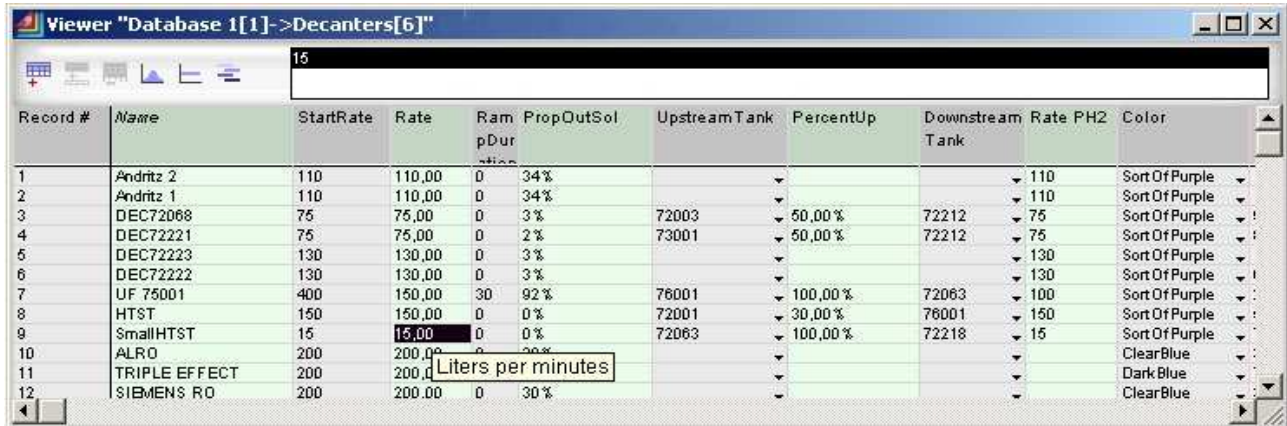
The customer was clear — he would choose **1Point2** and **ExtendSim** only if the model could be built in four weeks, remotely (plant located in Canada) and involving the team in the preliminary results. Technical communication and customer commitment were both perfect, thus validating the flexibility of such an approach!

Flow simulation is one of the most powerful tools used to analyze complex systems.

With discrete, continuous or batch systems, the benefits of a simulation study often go beyond the initial aims, enabling to:

♦ **Understand the system's dynamics.** How long does it take to empty a tank and clean it? How best to plan cleaning sequencing in order to minimize process inactivity?

♦ **Anticipate** the operation of a new system, or **improve** the functioning of existing systems. Simulation allows to avoid making small or big mistakes!

Viewer "Database 1[1]->Decanters[6]"   15

Record #	Name	StartRate	Rate	RampDuration	PropOutSol	UpstreamTank	PercentUp	DownstreamTank	Rate PH2	Color
1	Andritz 2	110	110,00	0	34%				110	Sort Of Purple
2	Andritz 1	110	110,00	0	34%				110	Sort Of Purple
3	DEC72068	75	75,00	0	3%	72003	50,00%	72212	75	Sort Of Purple
4	DEC72221	75	75,00	0	2%	73001	50,00%	72212	75	Sort Of Purple
5	DEC72223	130	130,00	0	3%				130	Sort Of Purple
6	DEC72222	130	130,00	0	3%				130	Sort Of Purple
7	UF 75001	400	150,00	30	92%	76001	100,00%	72063	100	Sort Of Purple
8	HTST	150	150,00	0	0%	72001	30,00%	76001	150	Sort Of Purple
9	SmallHTST	15	15,00	0	0%	72063	100,00%	72218	15	Sort Of Purple
10	ALRO	200	200,0							ClearBlue
11	TRIPLE EFFECT	200	200,0							DarkBlue
12	SIEMENS RO	200	200.00	0	30%					ClearBlue

Liters per minutes

A important number of parameters were tested to see their impact on water consumption— equipments capacities, rates, but also operation sequences, wasted water circuits— and in the end, production schedules were optimized after designs of experiment. All these parameters are stored in the database included in the model and which is also used for animating the model during simulation, for a more intuitive understanding of what is happening.