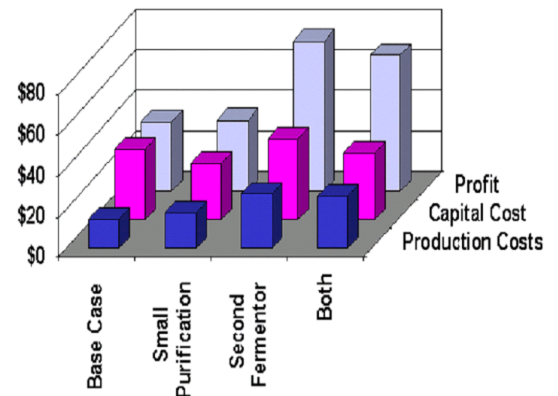


K-TOPS™ - Kinetics Total Optimization Plant Simulation

- K-TOPS – unlimited flexibility – unique effective solutions
- Millions of dollars in client savings
- Ensures that your facility is the right one
- A systematic approach to solving problems



product features

K-TOPS™ is our dynamic event-based simulation tool used to analyze and optimize client processes and facilities at any stage of a project. It was developed to enable quick and effective solutions to process/facility problems with varying levels of information. Its modular approach allows us to focus upon the problems, develop answers quickly, and easily modify and/or add more detail as more information is known.

Our industry-recognized team of engineers and architects has utilized K-TOPS successfully in a variety of scenarios. Some actual examples that demonstrate the incredible value this combination can provide are shown below.

New Facility

- One client desired a new facility with a high production capacity while minimizing capital cost and schedule.
- Based upon desired bioreactor capacity and operation time it was anticipated that two purification suites with associated buffer prep and hold areas were required.
- Through the use of K-TOPS and our engineering expertise, we were able to demonstrate the ability to run the facility with one purification suite, reducing the facility size by approximately 100,000 sq ft.

New Facility / Critique of Existing Design

- A start-up company relying upon venture capital realizes that the existing plant design will not produce the desired capacity.
- Our engineering/K-TOPS solution identified how the required capacity could be reached for a small incremental investment. By increasing the size of a few pieces of equipment and providing a few additional equipment, while eliminating some non-critical redundancy, the capacity could be achieved.
- In addition, we were able to show that an additional \$2 MM would increase capacity 50% allowing them to move forward.

Expansion of Existing Production Facility

- A client with an existing facility needed to increase production capacity.
- They had a study performed identifying the need for a significant amount of new equipment.
- Through the use of K-TOPS and our engineering expertise, we eliminated equipment by identifying schedules that allowed better utilization of existing equipment while meeting production requirements. This saved our client over \$30 MM in capital cost, reducing TIC by over 60%.

K-TOPS has been used effectively from the pre-conceptual phase of projects through to capacity evaluation and debottlenecking of existing facilities. A variety of times when it has been used are shown below:

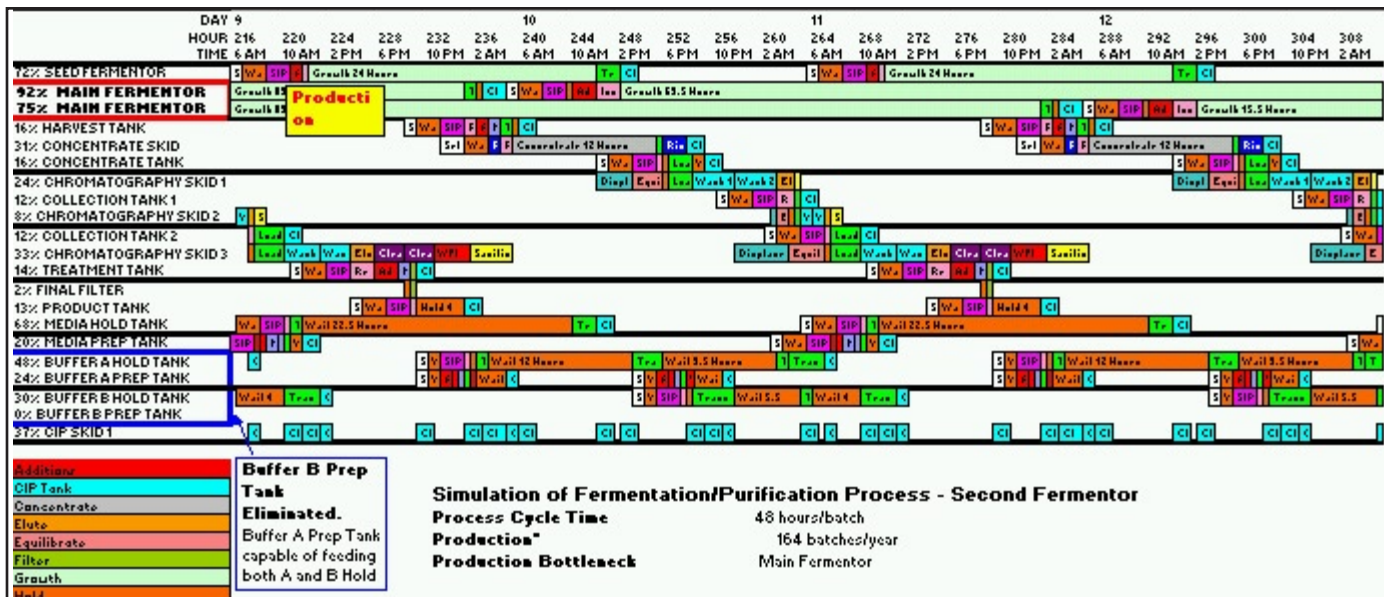
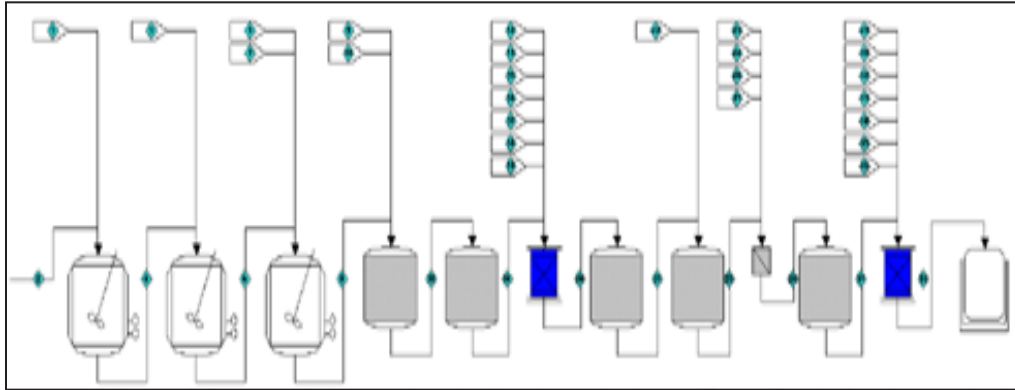
- Pre-conceptual design
- Conceptual/preliminary/detailed design
- Critique of an existing design
- Capacity evaluation and debottlenecking of existing facilities
- Evaluation of an existing facility under consideration for purchase or outsourcing.
- Central utilities planning
- Multi-product, multi-process facility design
- Robustness evaluation of multi-product, multi-process facilities
- Change implementation evaluation of existing facilities
- Preventative maintenance scheduling

We have the answer to your questions:

- How much equipment do I need?
- Is my facility robust enough for multiple products?
- What will be the impact of new products out of R&D?
- Do I have enough utilities?
- Do I have enough personnel?
- Where is my process or facility bottleneck?
- How do I get the biggest value for my investment?
- Is my outsourcing approach the right one?

K-TOPS Simulation Optimization can help

- Maximize Capacity
- Balance Capital versus Operating cost
- Quickly Identify Savings
- Analyze Multiple “What If” Scenarios



For further information or to schedule a demonstration please contact:

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