Q&A

BR&E Makes Process Simulation a Buzzword in Engineering

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If we look at the major operating and engineering companies worldwide, process simulation is now an indispensable tool during the engineering and design process as well as for optimisation. In fact, the use of process simulation software is now mandatory on any new project design. We need process simulation due to the complexity and variability of the processes implemented, especially for complicated iterative calculations that cannot be done efficiently by hand. **Dr Jerry A Bullin, Professor Emeritus, Texas A&M University and President, Bryan Research and Engineering Inc** shares his views on Process simulation with CEW.

How is Process simulation relevant/important today?
Process simulation is increasingly important today for a number of reasons. For one, companies need to routinely take a closer look at the operation and design of their units in order to reduce capital, operating and utility costs as well as maximise product purity and output. This is especially true, as companies seek to eliminate waste and reduce expenditure. Also, from an environmental standpoint, as carbon capture and sequestration have become such a global concern, process simulation gives engineers a powerful tool to properly design and model processes to remove harmful pollutants such as CO2, H2S, BTEX, NH3, SOX and NOX.

How can process simulation contribute to the improved performance of process units?
Process simulation can debottleneck process units by pinpointing items that can be improved such as equipment upgrades/modifications, utility reductions (steam, water, electricity, etc.) as well as optimising operating conditions. Process simulation allows an engineer to determine what happens in a unit when certain specifications are changed. Armed with this knowledge, the engineer can then run case studies/parametric analyses to accurately determine the full set of operating conditions that would lead to the optimum performance of these units. Here at BR&E, since everyone from management to our technical support, training and sales staff have chemical engineering degrees and a strong process engineering background, we work closely with our clients to provide significant value to them. For example, we offer to build free initial simulation models for our operating company clients. This is a significant benefit that allows them to have their plant fully built by us in ProMax. Also, through the use of our Excel-based Scenario Tool, we can help clients seamlessly integrate their data transfer between ProMax and Excel in order to perform case studies and unit optimisation.

Do you see a significant contribution towards improving and upgrading of existing units with the help of process simulation softwares?
Yes, I do. In fact, a number of clients and users of ProMax have told us that they have simulated most of their process units and continue to be amazed on how closely they have been able to match actual plant conditions. The facilities that are using our simulation results are now running very close to the practicable theoretical capabilities and are achieving recoveries that were once thought unachievable.

Tell us a little bit more about Bryan Research & Engineering (BR&E) and the journey from TSWEET to the present day version of ProMax.
Our name is derived from the city where we are located, Bryan, Texas. The company began in 1974, and our first software was released in 1976 for sulphur plant design. It was called SPED. We then released TSWEET in 1978, which integrated our amine sweetening model and tray-by-tray calculations. In 1983, we released PROSIM, our first general purpose process simulator. In fact, we were the first company to release a process simulator with a graphical user interface (GUI) and were also the first simulator to handle BTEX

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(Benzene, Toluene, Ethylbenzene & Xylene) in dehydration units. We then wanted to expand the scope of our software and move away from being known as just a specialty simulation provider. We decided to combine TSWEET and PROSIM into a single programme, while taking advantage of the Windows platform. Thus, we released the first version of ProMax in January 2005 with Microsoft Visio as the drawing package utilised. Our development using Microsoft architecture ensures excellent integration with other Microsoft applications. Throughout the history of BR&E, we have always prided ourselves on the level of value we provide to our clients. In fact, we are known in the industry as having excellent technical support and customer service by clearly understanding the needs of our clients.

Number of simulation solution providers has increased significantly in a short span of time in the Indian market, how is BR&E positioned in this space and what are the challenges to operate in India's dynamically growing industry?

India is one of the fastest growing economies of the world and with a high GDP growth rate projected for the next few years, India will face some tough hurdles in terms of meeting domestic energy demands. Indian oil, gas and power industries are gearing up to meet these challenges. Indian refiners have shown foresight by configuring the refineries to meet and process heavier and more sour crudes. These crudes will require the use of sweetening, sulphur recovery, caustic treating, sour water stripping and other relevant units. In addition to crude oil, gas discoveries both onshore and offshore in India contain impurities that would need to be removed during treatment or processing. In addition, with environmental regulations expected to become more stringent, the power industry has a great need to treat the emissions from their power plants. BRE's process simulation software, ProMax, is uniquely positioned as we have been developing applications for these processes for the past 37 years. I do agree that there are a number of commercial software programmes available in the market. However, BRE's knowledge base, supported by R&D and a strong technical support team, will definitely make our customers in the Indian market see value in our process simulation capabilities. In addition, I believe Indian clients are starting to recognise our excellent customer service and support. We are also working constantly to add capabilities and improve ProMax. As an example of this, we are currently working to model the refinery reactors such as catalytic reformers, hydrocrackers, hydrotreaters, etc, which should be included in a future version of ProMax.

How long has the company been present in India?

Although BR&E has had clients in India such as Reliance, L&T and Shell for several years, we signed an agreement with our current representative, USPT&M - Energy Division in 2010 to increase our market presence in India as well as provide local support and contact for our customers. USPT&M - Energy Division is itself a process engineering driven company and through our partnership and joint efforts, we have been able to reach out to a greater number of companies, providing closer and more personalised support. Umesh Goel, Director of USPT&M - Energy Division, has been instrumental in helping us develop our market in India.

Please comment on criticality of training the user industry on using process simulation solutions and the training programs conducted by the company so far; how was the response?

We believe training is critical for continued success of our simulation software. A trained process engineer will be more efficient and be able to use ProMax more effectively for a wider range of applications. That is why, unlike some of our competitors, we provide these training classes free of charge for both users and non-users of ProMax all over the world. All of our classes include detailed process specific instruction to help attendees understand how to apply the available tools in ProMax to solve design and optimisation issues. The response in India has been fantastic and overwhelming. We conducted a class in April 2010 hosted by Indian Oil Corp. in Delhi and another session in April 2011 hosted by Larsen & Toubro in Mumbai. Both these sessions were full capacity classes with a number of people on the waiting list to attend. We are definitely looking to expand the number and location of our training classes in India in the near future. The next training session is likely to be held in Chennai in October 2011.

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ProMax has several proprietary thermodynamic property packages in its data base, why do you need proprietary property packages when you have the conventional equations-of-state like SRK, Peng-Robinson etc.?

Equations-of-state such as SRK, Peng-Robinson, etc. do a great job in predicting the behaviour of simple systems. However, when you encounter systems with complex behaviour and interactions, such as amine sweetening, sulfur recovery, caustic treating and sour water stripping, for instance, you need a more complex thermodynamic property package to accurately model these processes. These proprietary property packages in ProMax are based on years of research and have been extensively verified against public and private VLE and operating plant data. Thus, you can be confident of the level of accuracy in ProMax. ■

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