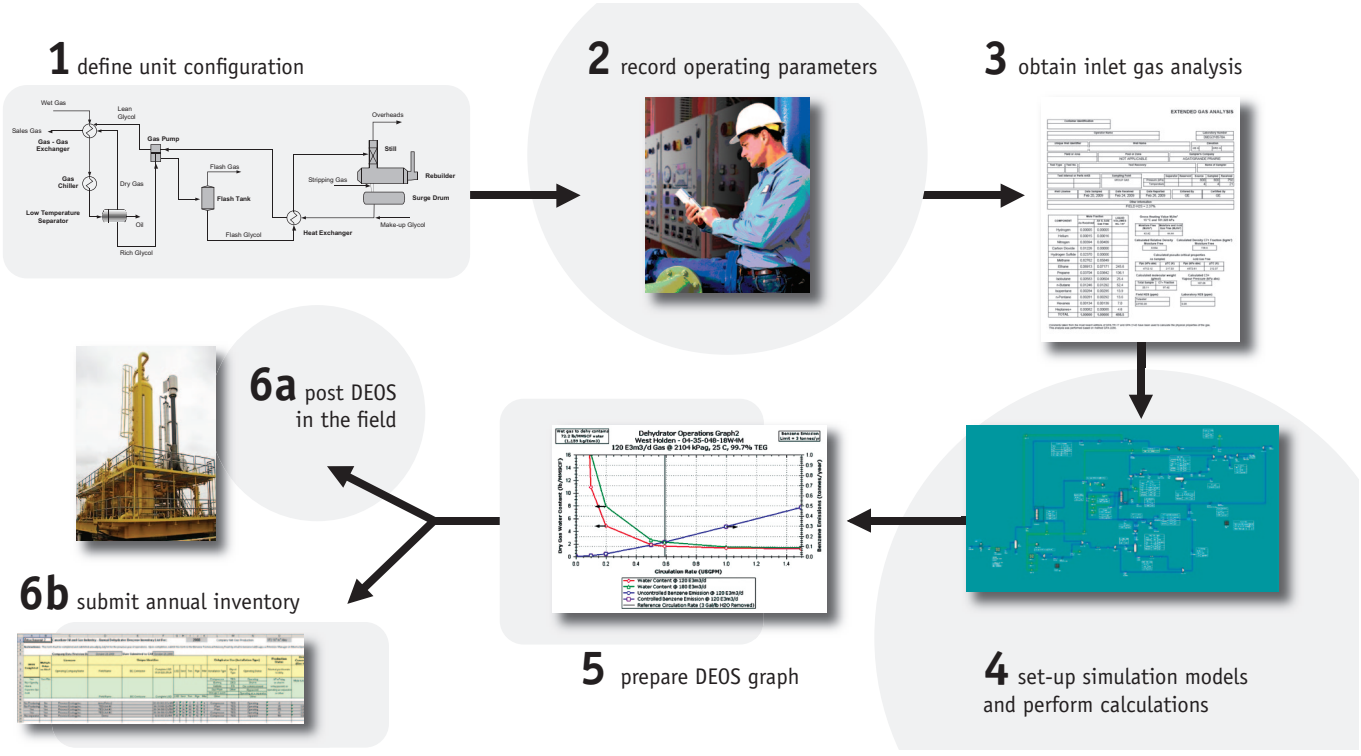

ENVIRONMENT

Drying Up The Benzene

Calgary-based company's software and service save energy, time and money

WHILE IT HAS THE NOBLE aim of protecting public health from a known carcinogen, Alberta's oil and gas industry regulator created a lot of work for some operators when it decided that any company with a glycol dehydrator had to start reporting benzene emissions.

As of Jan. 1, 2007, the Energy Resources Conservation Board (ERCB)'s Directive 39 ordered licensees to complete a dehydrator engineering and operations sheet (DEOS) for each and every glycol dehydrator, which must be revised annually, upon relocation or after a change in status.

The DEOS must be posted at each dehydrator for operators and the ERCB to see, and licensees must complete and submit an annual inventory of all their "dehys."

To help, Process Ecology Inc., a small Calgary engineering company, has devised a comprehensive online system to calculate, report and manage benzene emissions from dehys. Its combination of software and service, called Benzene Emissions Advisor, is designed to not only make dehy operators' jobs easier, but cut costs through energy savings, too.

Benzene Emissions Advisor captures clients' data, reviews that information and feeds it into simulation models. It then runs those models for a few cases and the results from the simulation are put back into Process Ecology's database, which clients access through its website.

Alberto Alva, Process Ecology's project manager and company principal, estimates there are 4,000 glycol dehydrators in Alberta — found at natural gas plants, compressors stations and wellsites — where the glycol, a viscous liquid, removes water and benzene from the gas. Water removal has several purposes. One is to avoid the formation of hydrates in pipelines, which can block the lines and cause production problems.

The rich glycol is heated, boiling off the water, which is usually vented to the atmosphere. The rich glycol is regenerated and reused. "It's a bit of a closed loop system. Of course there is some glycol makeup and some losses but it's a circuit of glycol," says Alva.

The problem is the benzene also enters the atmosphere and that is the point at which the Emissions Advisor calculates the benzene coming out with the water. Operators can add a condenser, flare, incinerator or vapour recovery system to reduce or eliminate the benzene.

Alternatives to glycol dehydrators include molecular sieves that capture water. "I don't think they're as cost-effective as glycol, although glycol has its own problems," he says.

Benzene Emissions Advisor has been on the market for almost three years, since shortly after Directive 39 came into being. It was created by Alva and two other process engineers, James Holoboff and Mohammad Khoshkbarchi.

The three of them met while working at the wildly successful Calgary-based Hyprotech Ltd., which developed HYSYS, a process modelling tool. Hyprotech has since been acquired by a United States-based company and Alva's company has grown to eight engineers.

Originally Process Ecology's software was designed for natural gas producers, but it's no longer just for benzene reporting; it can also report emissions of greenhouse gases such as methane and carbon dioxide as well as be used for energy optimization purposes.

There are 10 to 15 companies of various sizes operating about 900 units so about 25 per cent of the market is using the Emissions Advisor.

Its closest competition, a similar product from the U.S., is "a good little piece of software," but it's only for benzene emissions, whereas Process Ecology's software is flexible, rigorous and robust, says Alva. It allows the engineers to modify parameters and make sure they're matching the experimental numbers, giving them the flexibility to make as accurate a prediction as possible, he says.

"What we're saying is, look, if we're going to ask our clients to gather data, go to the effort of sampling their gas and everything, there is so much more we can do with this."

Also, some products can underpredict the amount of water in gas, says Alva. It could be saying the gas is dry and it isn't, off by a good 50 per cent in some cases according to some of Process Ecology's comparisons, he says. That's when it can get dangerous. People might think they can use less glycol and start having operating problems, he says.

When Process Ecology does its simulation to calculate benzene emissions, its model predicts how much energy the plant will need to vapourize the water so it has a measure of the energy the plant is using. Engineers can compare that to best practices and then quantify the gap.

"Some companies are operating hundreds of these units, and I think for them it's valuable to know where their top-10 opportunities for savings are," says Alva.

Many of these plants, if not most, are using more glycol than they need, he says, because operators want to be on the safe side. "But we're telling them they can use less glycol and still be OK. It would be a simple matter to go to the site and turn the pump down and start saving energy."

For Devon Canada Corporation, Directive 39 requires a big data-gathering exercise, says Troy Halsall, Devon's environmental advisor. The company has about 200 dehydrators in Alberta and British Columbia using Process Ecology's Emissions Advisor, with its readily available electronic database streamlining much of that work, he says.

Being process engineers, Process Ecology's principals are very familiar with the upstream oil and gas process, plus they use HYSYS, a program Devon considers better than its competitors' models, says Halsall. "We're quite happy with the accuracy of the data we're getting back, and with their knowledge and understanding of the data they're able to identify the misinformation that may be coming back from the field," he says.

On the data management side Devon is now "years ahead of where we were before," he adds. And the company has been able to recognize some operating savings, although he couldn't put a number on it. "It may be just as easy as turning the circulation rate down on your glycol pump, not only to reduce your benzene emissions but also your operating costs," says Halsall.

Instead of just a big table of numbers, the system also features graphs and maps, which Halsall appreciates because they allow Devon to prioritize reductions at units that are near where people live.

"I can talk for days about this program," says Halsall. "I'm a big promoter because I think the data analysis they do and the service they provide have been second to none. They've been very good." •

Lynda Harrison

CONTACT FOR MORE INFORMATION

Alberto Alva, Process Ecology,
Tel: (403) 690-0550,
Email: alberto@processecology.com