

THE SPEC SHEET

Third Quarter 2002

CONNECT TO YOUR PLANT!

New tools allow plant data exchange



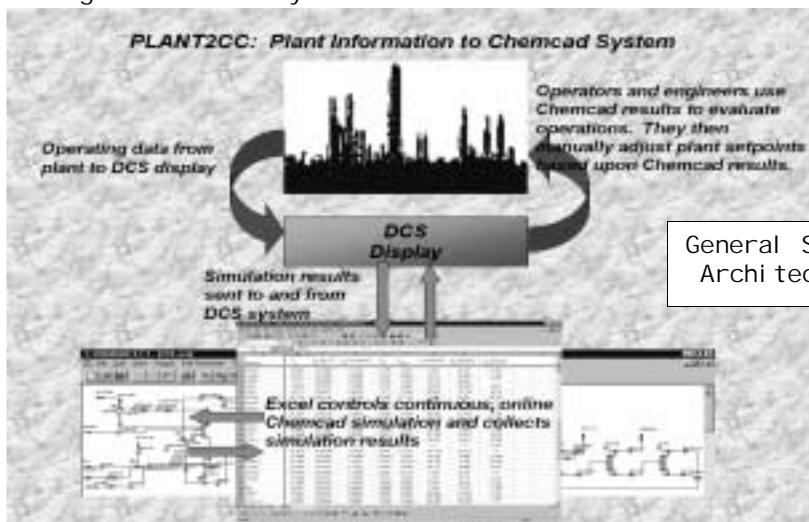
CHEMCAD ONLINE: The EKA Chemicals Story

EKA Chemicals is a \$900M/year division of AKZO-NOBEL. It produces primarily bleaching and paper chemicals at 44 locations around the world. In 1991 EKA asked a Chemstations' partner company, Norpar AS, to integrate CHEMCAD with the Human Machine Interface (HMI) software running their distributed control system. Out of this project grew our latest product, PLANT2CC. PLANT2CC is a utility program which makes it easy to integrate CHEMCAD with any HMI software using Excel as a "dispatcher". The result is an extremely valuable online management tool for chemical plants.

When the system is online, Excel periodically (once every 10 seconds in the case of EKA) reads the real-time process data from the HMI, passes it into the CHEMCAD model, executes CHEMCAD, and transfers the relevant simulation results from CHEMCAD to the HMI to compare to or augment instrument readings. Thus the operators and engineers continuously know how actual results compare to intended results.

Development and implementation of a CHEMCAD Online management system is a three step process:

1. Develop a process model in CHEMCAD.
2. Create an Excel workbook to read and write to the HMI. Modern HMI/SCADA software has mature facilities to make this step straightforward.
3. "Plug" the CHEMCAD simulation model into Excel. This can be done using conventional VB and OLE technologies alone, but the PLANT2CC utility is available to simplify this process. EKA Chemicals invested six man-months in experimenting with and specifying an intuitive, engineering oriented interface designed to enable the average process engineer to build a system.



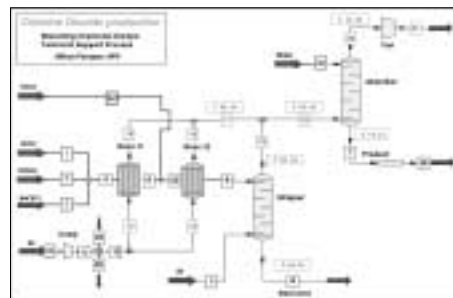
EKA's first implementation was a chlorine dioxide production unit. Chlorine dioxide is used as a bleaching agent by pulp and paper companies and is

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manufactured onsite at the mill. EKA has several outsourced plants that need to be supervised online. This surveillance is conducted at the mill and at a central location in EKA called FoU.



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When the system is online the plant and simulation results can be presented on the DCS display and in a customized Excel workbook display. In addition, CHEMCAD can be instructed to execute offline calculations, such as sensitivity analysis, to assist the engineers and operators in keeping the plant on spec. These displays can at any time be simultaneously monitored by operators, engineers, sales people, managers or any other authorized personnel, from any place in the world. The benefits to EKA, by their own admission, have been enormous.

(con't on next page)

Benefits to EKA Chemicals:

Just how well does it work? Well in the early stages of the project, EKA's lead engineer, Haakon Person, wrote to us:

"So far, I'm very impressed with the new interface of DCS2CC (Distributed Control System to CHEMCAD)...The benefits are

considerable for our company. I can already now, despite the project not being completely finished, recommend this tool."

EKA has now implemented the system at both their Chlorine Dioxide and their Hydrogen Peroxide plants.

• Estimation of non-measurable results – The Soft Sensor

EKA now has a continuous read out (computed by CHEMCAD) of values that previously could only be measured infrequently and at great cost. Among these variables are the ClO₂ concentration in the product, electrolyte concentrations in the reactor, concentration profiles in the hydrogen peroxide column, and contaminants in the effluent air. At their HP plants, EKA has reduced lab work by 95%, from six analyses per day to three per week (per plant). At \$50 per lab test this is a savings of over \$100,000 per year per plant. In addition, since their models have been calibrated so accurately, they now use eight fewer instrument loops per plant for new plants, a savings of about \$50,000 per plant.

• Fault diagnosis and data reconciliation

- (i) Fouling can be continuously monitored and errors in measurement identified, telling operators when it is time to clean and/or calibrate instruments and equipment.
- (ii) Declining performance of high cost equipment, such as compressors, can be pinpointed early, saving money by keeping such equipment at rated efficiencies nearly all the time.
- (iii) Data reconciliation can improve the understanding and significance of the reading themselves.

• Troubleshooting

Plants "drift" and people foul up. Early warning of troubles helps keep the plant on spec. In addition, it is important for the operators to know "which way to turn the valve". EKA Chemicals does rapid, offline sensitivity analysis on the plant model with current operating data to provide this information.

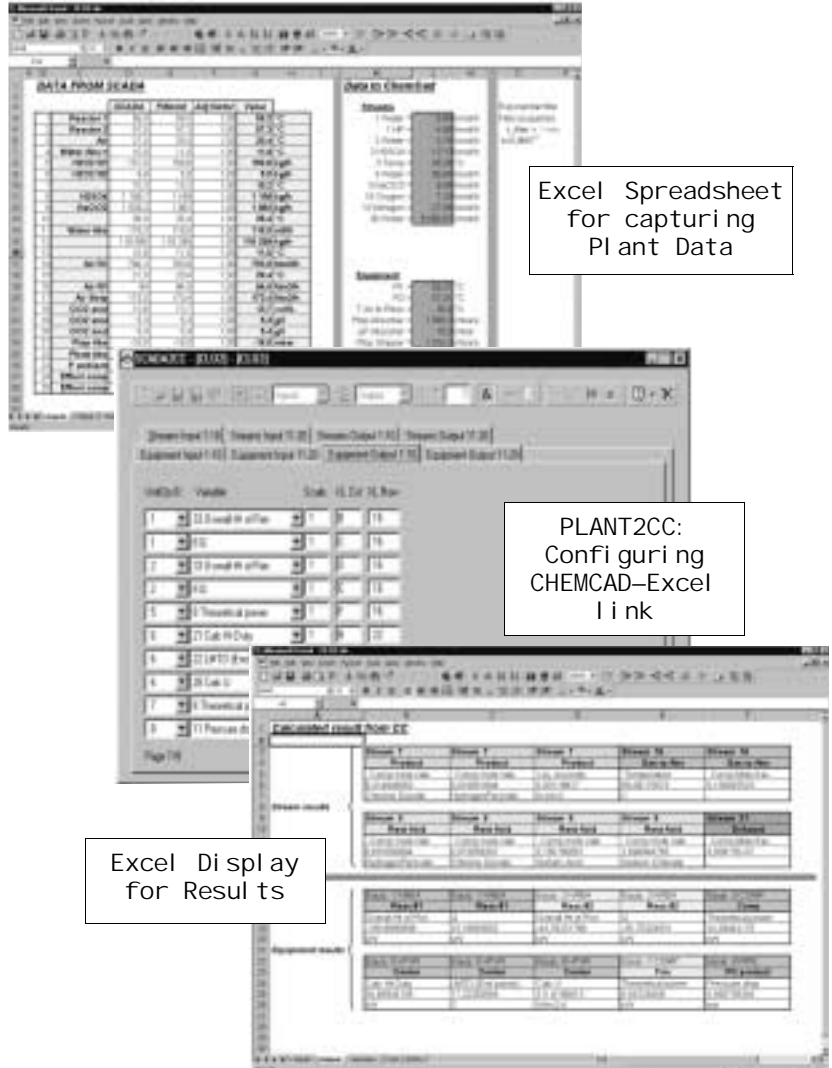
• Improve the process model

Good diagnostic tools must be accurate. Nothing improves the accuracy of a process model more than running it online and having its results sitting side by side with operating results.

• Online optimization

CHEMCAD Online provides EKA with a systematic method for

achieving continuous improvements in their process. Use of the CHEMCAD sensitivity and optimization facilities augment this process. In the six months since their systems have been operational, EKA claims to have reduced overall utility costs by 2% or 600 MWh/year/plant. This is about \$20-25,000 per year per



plant and they now have five plants on the system, for a total savings of \$100-125,000 per year so far.

Over a three year evaluation period, EKA's software investment is approximately \$28,000 per plant (\$20,000 upfront cost plus \$4000 per year maintenance fees). Hard cost savings alone (energy savings, reduced lab tests, lower instrumentation requirements, etc.) indicate a benefits-to-cost ratio of 8/1 or greater for the chlorine dioxide units and 15/1 or greater for the hydrogen peroxide plants and that assumes no further gain in productivity over the next two years. Including "soft" benefits such as reduced off-spec time, improved trouble shooting, etc., these ratios probably double.

Have an Idea or an Article? Share!

If you would like to have a short article added, have a process simulation success you would like to share with others, or just have an idea for a useful article, please email Mary Hiatt at maryh@chemstations.net

default icon for Tower on the main palette, in addition to the 6 icons on the alternate icon palette, your new icon will appear on a user added icon palette.

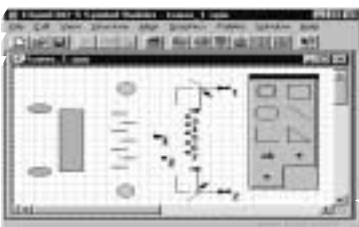
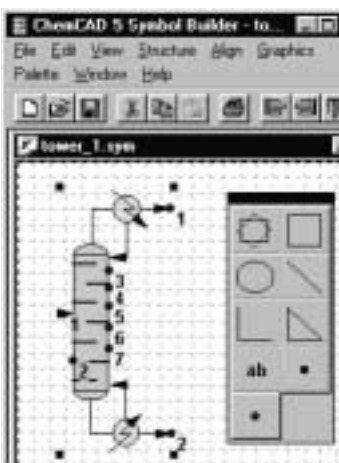
For more information on user added icons, don't hesitate to contact our tech support department by phone, fax, or email.

-FCJ

How-To: Customize Icons to Clean Up Your Flowsheet

When complex feeds or recycle streams seem to require routing "around the block" to avoid crossing other streams a simple revision to an icon can clean up a flowsheet. More important are those instances where icon revisions are needed to make the engineer's process intentions clear.

To access the symbol builder, click on Edit / Symbol Builder, and a blank workspace and a drawing tool palette opens. To start with an existing icon, browse the folder /CC5/Import/Symbols and select a file such as tower_1.sym. Enter Ctrl-H or the command Structure/Ungroup to separate the icon into each of its sub-elements. The tower_1 icon has two inlets and seven outlets including five side streams.



If a partial condenser is required, a liquid product must be drawn off from tray 1 (the condenser). However, all of the outlets are in the column proper, so another outlet is needed.

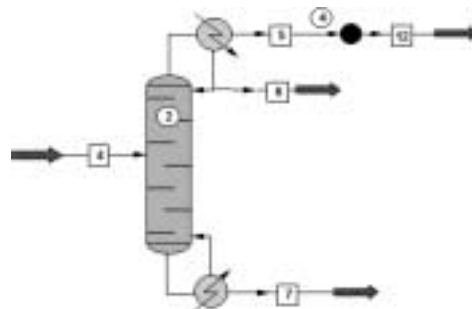
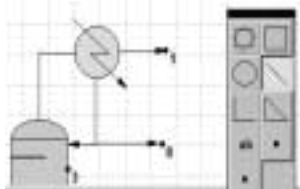
After ungrouping, you may select View/Zoom/Custom and 250% to help increase accuracy of the drawing, and to place new elements with more precision, turn off View/Snap to Grid.

Select an outlet (red dot) from the palette and position it below the distillate at the level of the reflux arrow. Next, select an arrow pointing right (under Graphics/Arrowheads); use the line icon from the palette to anchor the start of the line at the intersection of the vertical and horizontal reflux lines and draw it to the outlet dot (#8)

Select Edit/Select All (or Ctrl-A) and Structure / Group. You can then save the icon as a new file (tower-1b.sym for example).

The final step is to select Palette / Insert as CHEMCAD Palette to link the icon to the unit operation it represents by selecting Tower from the alphabetical menu.

Now, when right-clicking the



Did You Know?

You can now edit text in text boxes on the flowsheet! When in Edit Flowsheet mode, simply right click the text box and select **Edit Text**. Keep your feedback coming!

Success Story:

Process Engineering Associates

We'd like to share a letter we received regarding our software and services:

Chemical process engineering is our only business. As such, the selection of a computer process simulation software company after company startup was one of the most critical decisions we had to make. After carefully evaluating all the leading software, we came to the conclusion that Chemstations' CHEMCAD had equivalent or better capabilities than the others at a better price. It was also our perception that the Chemstations' technical service responsiveness and performance would be much better than their competitors'.

There is no doubt in my mind that CHEMCAD has been highly instrumental in our company's 150% growth in sales since purchasing our first software license in late 1998, and the Chemstations technical support staff performance has exceeded even our expectations.

Our company has extremely high standards for both ourselves and our suppliers. Chemstations is one of our few, maybe our only, supplier that has met our standards in every way.

L.H. (Hop) Boyd, Jr., P.E.
Managing Partner
Process Engineering Associates, LLC
<http://www.processengr.com>

Thanks, Hop, and we wish you continued success!

Did You Know?

Our website has a bulletin board where you can share information with other software users and our technical support staff. Visit www.chemstations.net, click Support, then click Bulletin Board.

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What's inside:

Your third quarter 2002 issue of THE SPEC SHEET has arrived! Look inside for the latest features, tips, tricks, and information about Chemstations software. Read how to make the most of your investment in process simulation!

Dave's Bag o' Tips & Tricks...



- ◆ Need a quick reminder about how to do something in CHEMCAD? From the **Help** menu select **Coach**. The Coach interface gives brief step-by-step instructions for common tasks in CHEMCAD.
- ◆ Want to see how a single variable affects your results? Select **Sensitivity study** from the **Run** menu. You can have CHEMCAD run several scenarios while changing a variable. You then review (or plot) the results for analysis.
- ◆ You can send tabular data from a plot to Excel. From the Graph menu select "Data to Excel .CSV"
- ◆ You can regress temperature dependent properties (vapor pressure, density, etc.) for components that you created. From the **tools** menu, select **Pure component regression**. You will need to have temperature dependent data for the property you wish to regress.
- ◆ The enthalpy reported for a stream is the relative enthalpy, not absolute enthalpy. The absolute value for enthalpy cannot be measured, so the property is relative to a reference state. Don't use the enthalpy of a stream to compare CHEMCAD with hand calculations, compare the enthalpy difference of the stream at two different conditions.

-Dave Hill