

Training Manual

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Chapter 1 Overview

1.0 Overview of TrueChem

This chapter describes the structure of the TrueChem software and introduces the features of the program.

1.1 What is TrueChem?

TrueChem is a PC or server based windows application designed for chemical process laboratory analysis and management. It provides a facility with the framework and functionality to implement a process control system. TrueChem helps manage the collection and automates the analysis of laboratory data. The features of the program provide improved process control for the facility by making logic based decisions on the data collected. TrueChem's features are very useful in organizing, tracking, and analyzing process changes and to enhance process control. TrueChem also provides the facility the ability to schedule process analyses, and to certify through "sign offs" that the activities were completed. TrueChem can also track chemical usage. The inventory and dashboard module provide system enhancements to TrueChem. The inventory module allows users to track and manage chemical stores with usage information collected directly from the analyses performed. The dashboard module presents the facility an interactive webpage that can be accessed by any facility computer designated with access to the company server. This allows the user to observe the status of the various processes without having the full TrueChem program running on their computer.

1.2 TrueChem History

The first version of TrueChem was developed in the early 1980's, at Texas Instruments' Austin, Texas facility. In the 1980s a DOS version of the software was developed for use on personal computers. The first commercial version of TrueChem was delivered to Continental Circuits in 1988. Without much serious advertising, TrueChem reached approximately 120 printed circuit board (PCB) manufacturer labs worldwide by the end of 1999 and had captured roughly15% the market share. In the late 1990's after requests from PCB customers, a Windows-based TrueChem application was released. In 2000 TrueLogic Company acquired TrueChem and facilitated the further development of the Windows version of TrueChem.

1.3 Who Uses TrueChem

TrueChem is specifically tailored to assist manufacturers who utilize chemical baths for production of materials such as electroplating, surface finishes and printed PCB

manufacturing. These users are broken into four major categories: (1) Aerospace, (2) Automotive, (3) General Decorative/Household, and (4) Military. These manufacturers generally detail quality requirements that demand that their laboratory functions, methods, rules and reports must be strictly maintained. Without stringent control of these chemical processes, the company can experience serious consequences including; loss of process solutions from production mistakes, product loss from quality failures, replacement costs for defective products and the potential for a loss of the company reputation. Proper process control is important to the manufacturer as it can identify problems before product assembly. Identifying problems early reduces the cost of troubleshooting and implementing a corrective action. For example, a TrueChem client reported a 65% chemical yield with \$2MM in rejected parts in 2001 and was forecasting \$4MM in returned parts prior to implementing TrueChem in 2002. According to the client, the 2002 rejects ended up being less than those in 2001 and the yields have improved into the 90% range. This example illustrates the degree of improvement possible by implementing the type of control TrueChem provides.

TrueChem is very valuable to the facility in reducing labor and materials while increasing quality and simplifying compliance to standards with its traceability. Perhaps TrueChem's best attribute is that it can approach an expert system by incorporating logic rules to make decisions. The design is thorough and it is easy-to-use. This makes data collection easy, simplifies data analysis, and the embedded statistical functions simplify data interpretation. Many basic functions such as process solution make-up, solution additions and maintenance are handled automatically. TrueChem's variety of features allows the facility to document and store facts about any given process thereby saving that knowledge for training and troubleshooting purposes.

1.4 TrueChem Features

TrueChem is very intuitive and the basic functions can be learned easily. Common computer use and windows navigation skills allow the user to access the various screens and enter data with little formal training. Facility set up, scheduling and developing simple logic rules requires a higher degree of computer mastery similar to using some of the more advanced features of Excel.

Building the facility into the database constitutes a large portion of the set up work. This requires the user to create process tanks, evaluate laboratory analysis procedures and transfer those procedures into the calculations that define the parameters in TrueChem. Facility set up also requires the creation of schedules, users profiles and the creation of rules to govern situations the data identifies (for example when additions are required, out of spec conditions etc.) The calculations in the equations used by TrueChem are actually visual basic scripts. One can use visual basic to develop, test and implement complex logic scripts to customize TrueChem into a highly effective laboratory/process management tool that approaches an expert process control tool.

1.5 TrueChem's Layout

The process layout is in standard WindowsTM "tree view" format. The screens for the various features in TrueChem are accessed by selecting menu buttons from the top tool bars or by selecting a tank in the process tree.

1.5.1 TrueChem's Main Screen

The main TrueChem screen is laid out with a tree view down the left side of the screen. A process line can be expanded down to select any of the various process tanks making up the process. Pull down menus and a graphical button tool-bar allows selection of the desired program function or activity. The bottom status bar displays current states. Certain activities will cause additional windows to open with fill-in boxes to complete. Failure to complete the required boxes prevents closing of the window and the required areas are highlighted in pink.



Figure 1: TrueChem Main Screen

The largest area shown in Figure 1 is the "working window". This is the area on TrueChem's screen where most of the application specific work will be done. The default view of this area is a HTML browser that can be pointed at any web page on the Internet, intranet, or local hard drive.

1.5.2 Graphic Button Tool-bar

The graphical button tool-bar allows direct access to commonly used features. (Hold the cursor over the icon to display the icon title). These buttons allow the user to quickly access features including Perform Tests, View Graphs, View Data log, Access Tank Setup, User Login, View Addslip Log, Print, Email, View Schedule, Access System Setup, View Corrective Action Log, Event Log, Create Reports, Access the Inventory Module, User Setup, User Logout and Access the Help System.



Figure 2: Main Screen Graphic Tool Bar

1.5.3 Tree View

The Tree View is made up of processes and tanks that are user created to represent the user's facility. Like any standard windows menu clicking on the item or the + sign expands the tree and clicking on the – sign collapses the tree. Most metal finishers assign group names as processes and assign object names as individual process elements (tanks) within the process. To select a particular tank simply click on the tank of interest to highlight it. This activates the features related to that tank so that the data is available.



Figure 3: Main Screen Tree View

1.5.4 Pull Down Menus

The pull-down menus are standard WindowsTM-style menus for accessing all of TrueChem's functions. Access to the pull down menu items may be limited to specific users. If the current user tries to access an area their login is not set up for, a TrueChem *User Login Pop-up* will appear to login to an account with the proper rights. This account may or may not be available to the user attempting to login (more on this later in User Setup)

1.6 Creating a Facility

The bulk of the work required to set up a facility is associated with creating the processes and scheduling the testing of the parameters used to control those processes. Most facilities organize their processes into process lines composed of the processing elements (tanks). Organizing into processes helps facilitate accessing particular tanks in the tree view and makes the dashboard more readable. Process chemistries often contain multiple ingredients or require physical testing. TrueChem can easily handle either of these situations

1.7 Setting up Processes

A process is composed of one or more steps in the processing sequence. For example, in a chrome plating line composed of a cleaning step, an etch and the plating tank forms a process. Rinse tanks are not generally included unless some sort of chemistry is added

🖉 TrueChem - Your Company N	ame							EPX
File Edit View Inventory Tools H	elp							
1 2 2 2 1		:	8	1	2 🗈 🂐	. 🎎 🔒 🚮	0	
M 4 2	Process	Demo Proces	s					Tank Setup
Your Company Name	Tank	01. Conditione	er					
😑 🧄 Processes	General	Notes	Test	Add Sheet	Schedule	Make-up	Docs	HMIS
 		Conorol				- Physical Dimonsio	n c	
01. Conditioner 06. Demo Tank		Name	01. Conditioner			Shap	e Rectangle 👻	
- 👗 12. Cleaner X		Other 1	ABC Chemistries, In	5.		Unit	s inch 🔹	
- 👗 13. Copper		Other 2	Wet Area 1	More		Length \ Widt	h 0 10	
+ 🧟 Desmear Process		Type	Pre-Plating Tank			Heigh	nt IO	
🗉 🧸 Electroless Ni/Au		Size	240 gallon	-		From ton	10	
Bectrolytic Copper		Responsible	(Nono)			Coloulat		
aver Clean Process		Work location	((4011e)			Calculate	evolume	
😨 🍓 Quality Assurance		WORKIDCABOIT	- Same as Process	<u> </u>		Advanced vol	ume options	
		Status						
		Created On	4/16/2010 1	:13 AM				
		Remade On						
		Changed On	1/26/1980 1	2:00 AM				
01. Conditioner		Status	Active	9				
Other 1 - ABC Chemistries, Inc. Other 2 - Wet Area 1 Size - 240 gal Type - Pre-Plating Tank			-	~	1			
.ogged In System Administrator			Add	Sheet Past Due	Schedule P	ast Due Correctiv	e Action S	amples 13

Figure 4: Process Setup Screen

that needs to be tracked or if measurements like conductivity or pH are tracked. A chemical formulation process like adhesive mixing would be a single tank with the addition of each of the ingredients. Once the process is created then process elements

(tanks) are created within that process. *Tanks are objects that can have tests performed on them.* Using this thinking then a tank can be many things in a facility and using TrueChem to control process elements is not limited to metal finishing process tanks. Other process steps such as cure ovens, machine lubricant, scrubber operation and wastewater treatment are a few examples of other processes that can be controlled using TrueChem.

1.8 Setting up Tanks

Tank set-up is where the bulk of the effort to set up TrueChem is expended. Tank set-up leads to creating the library of chemicals used. During set-up, the calculations used for makeup and solution maintenance are entered. Set up is also where the various tests are scheduled and the circumstances that generate activities (additions, decants, maintenance etc.) that appear in the logs are created. Accessing tank set up begins by selecting a tank and clicking the tank set up button on the tool bar. There are several tabs that then appear in the main window. These include General, Notes, Test, Addslip, Schedule, Make-up and Docs. Each tab will be discussed separately.

1.8.1 General Tab Setup

The first tab is the General tab and lists basic information about the process tank. In the

🧭 TrueChem - Your Company Name		
File Edit View Inventory Tools Help		
👗 🛓 🏁 🔊 📶	i 🗸 🖓 🖉 🕵 👘 🧃 🗾 😂 😩 📀	
M -> =	Process Demo Process	Tank Setup
Your Company Name	Tank 06. Demo Tank	
- Inventory	$\dot{\gamma}$	Y
Processes	General Notes Test Add Sheet Schedule Make-up Docs	HMIS
Acia Acia		
E A Cupric Process		
🖃 \overline 🌉 Demo Process		
📥 01. Conditioner	Name 06 Demo Tank Shape Restance	-
12 Cleaner X	Other 4 Remo Chamberl Commons	
13. Copper		<u> </u>
🔤 🍝 16. Etch	Other 2 Wet Area 1 More Length 1 Width 110 1 24	
🗄 🍓 Desmear Process	Type Plating Tank	
Electroless NI/Au	Size 560 gallon 👻 From top 💌 6	_
🖬 🍓 Electrolytic Gold	Responsible Matt Akin Calculate volume	
🗉 🍓 Layer Clean Process	Work location & Rama as Process	
Tabl Calibration	Advanced volume options	
🗉 🍘 Yields		
	Statue	
	Created On 4/20/2010 1:13 AM	
	Remade On 4/7/2003 12:24 AM	
06. Demo Tank		
Other 1 - Acme Chemical	Status Active	
Company Other 2 - Wet Area 1		
Size - 560 gal		
Type - Plating Tank		
Logged In System Administrator.	Add Sheet Past Due Schedule Past Due Corrective Action	Samples 13

Figure 5: General Tab in Tank Set up Window

working window the tank name and the tank chemistry name are shown along with the tank volume in the units desired. The window also allows calculation of the tank volume by entering the tank dimensions in the area on the right of the screen. At the bottom right

of the window the status of the tank is shown indicating when the tank was created, when the last remake occurred, when the last time any changes to the set up were made, and if the tank is currently active.

1.8.2 Notes Tab Setup

The next tab listed in Tank Set-up is the **Notes** tab. This tab allows the user to enter text that will be displayed to anyone performing a test on this tank. Addslip Notes can be entered that will be included on all Addslips created for this tank. One useful way to employ the notes section is to keep a history of actions and events associated with a tank. Tank make-ups can be noted, strange behavior, the result of trouble shooting activities or solution maintenance activities can all be entered here so there is a running log of activities relating to the tank.



Figure 6: Tank Setup Notes Tab Screen

1.8.3 Test Setup

The **Test** tab is where the calculations used to control the various process solution parameters or product physical tests are defined. Items are added to a list from top to bottom that make up the necessary elements for testing this chemistry by clicking *Add*. Existing items can be modified or deleted from this screen. The choices are Test Description, Input Value, Result Calculation and Adjustment. Items are added by pressing the add button.

Ta	iss Demo Process ink 06. Demo Tank			Tank Setu
General	Notes Test Add Sheet	۲ e	Schedule Make-up Docs	HMIS
Test	ABC CONCENTRATION		ABC Test Procedure	۲
Input	Input mI of Thiosulfate	INP1	4	۲
Input	Enter Normality	INP2	0.1	۲
Result	[INP1] * [INP2] *4	RST1	g/L ABC Concentration	۲
Adjustment	Add to: 2.40 Start at: 2.30 Add	ADJ1	Ib ABC	۲
Test	XYZ CONCENTRATION		XYZ Test Procedure	۲
Input	Input ml of Hydrochloric Acid	INP3		۲
Input	Enter Sample Size (mis)	INP4	50	
Result	((INP3) * (INP4)) / 2000	RST2	g/I XYZ Concentration	
Adjustment	Add to: .1 Add	ADJZ	gal XYZ Concentrate	
Innut	PH Enter pH Reading	INDE	pH restProcedure	
Pocult		DOTO	24	
Adjustment	Add to: 7 Start at 7.1 Add	AD.14	nal Sulfamic	
Adjustment	Add to: 7 Start at 6.9 Add	AD.IS	Ib Nickel Carbonate	<u> </u>

Figure 7: Test Tab Screen in Tank Setup

1.8.4 Add Sheet Setup

The **Addslip** tab allows for the setup of Addslips. Standard Addslips are built into TrueChem. Custom formats can be imported. If desired, the time allotted to complete the addition can be modified from the system wide standard time.

Help	
Process Demo Process	Tank Setup
Tank 06. Demo Tank	
General Notes Test Add Sheet Schedule Make-up Docs	HMIS
Use system defaults Print Add Sheet Add Sheet template Store image PrinttStore options PrinttStore only Add Sheets with adjustments Track Add Sheet Lock if not Signed Off Allotted Time 8 hours Send an email when a Add is late to Require Add Sheet review before signoff Image content Only results tested Image content Only additives with adjustments Test summary template Test summary template	
Add Sheet Schedule Corrective Action Sar	mples 13

Figure 8: Add Sheet Setup

1.8.5 Schedule Setup

Scheduling is a powerful feature of TrueChem. Schedules can be created for each test result item listed. Schedule frequencies are customizable from several times per shift to once a year, depending on the process requirements and facility needs.

1.8.5.1 Scheduling Tests

Each Result item created in the test screen creates an item that can then be scheduled on the **Schedule** Tab and is shown in the figure. In addition non test items such as filter changes or timed dumps can be scheduled in the **"Other Schedules"** section. Nearly any frequency imaginable can be created in the schedule screen. Once a frequency has been created it is available in the pull down menu for reuse. To schedule a test, the result item is selected and the *Modify* button pressed to reveal the schedule set up dialogue. The dialogue box shown in Figure 9 appears. Several decisions must be made including the priority of the test and if this is the normal, accelerated or decelerated schedule. For new items schedule the normal frequency first.

1			-						_	Truk Cr	
	Process	Demo Process	_							i ank Se	tup
	Tank	06. Demo Tank									
ſ	General	Notes	Test	Add Sheet	Schedule	Mal	ke-up	D	005	HMIS	
ŀ	Contraine Indico Fort Addenier Schedule Marcup Docs Finne										
	Test Schedule:	s	,								
	Item Descripti	ion	Schedule Freque	ency			Frequen	cy level	Start dat	e\time	
	g/L ABC Conc	entration	Daily, Every day o	on Mon, Tue, Wed, '	Thur, Fri, 7:00 AM		Normal		7/24/201	2 8:05 AM	
	g/I XYZ Cond	Schedule setup									
	рн	- Scheduled Item									11
		- Conceasion norm							- _	<u>0</u> k	
		-								Cancel	
			Priority 3								
			🖵 Ca	n NOT be deactivat	ted					<u>H</u> elp	
			Type Test			-					
			in proor						1	Last Done	
	<u>M</u> odify										
	- Other Schedu										E
	Item Descrip		Effort 10 m	inutes							
	Makeup	-Frequency	1								
		☑ Normal	Di	aily. Every day on M	lon. Tue. Wed. Thur	. Fri. 7:0	0 AM				
		Accelerated	Sa	ame as Normal							
		Decelerated	i Sa	ame as Normal							

Figure 9: Schedule Set up

At the right of the normal frequency is a pull down with all the currently defined schedules listed. One of the choices is to add a new frequency. Selecting add new frequency opens the popup frequency selection box of Yearly, Monthly, Weekly, Daily or by Shift. Selecting a frequency type will open a dialogue similar to Figure 10. Scheduling details will appear, e.g., if Shift were selected, the number of times per shift would be defined. In addition the start time can be set, as well as the time needed to perform the task. One other important item is if a sample is needed.

Add frequency	
Schedule Selection C None C Yearly C Monthly • Weekly C Daily C Shift Use custom frequency description	<u>O</u> k <u>C</u> ancel
Description Short description	
Schedule Times Start Time Allotted Time None	
Pull sample None before start	
Every 1 week(s)	
On TSun TMon TTue TWed TThur TFri TSat	

Figure 10: Schedule Screen

Filling in details in the sample section creates an additional time period for gathering and processing the sample. This timeframe can be used for sending the sample out for analysis or if special sample preparation is required.

1.8.5.2 Other Schedules

In the lower section of the Tank Setup **Schedule** tab is **Other Schedules**. In this section, schedules for activities not covered by the calculations can be established. Items such as filter changes, carbon treatment, dummy plating, calibrations, etc are scheduled here. This function can be used for any event that might occur to a tank at any frequency.

🖉 TrueChem - Your Company N	Name	
File Edit View Inventory Tools I	Help	
1 2 2 2 2	i 🔽 🖨 🤣 🖉 🗽 🕵 📦 🦸 🗾 🗟 🏖 🙆 📀	
	Process Demo Process Tank	Setup
Your Company Name	Tank 06 Demo Tank	
Inventory		
🖃 🧄 Processes	General Notes Test Add Sheet Schedule Make-up Docs HM	is)
🕀 🎎 Chromic Acid	7.400	
🕀 🍓 Cleaners	lest Schedules	
🗄 🍓 Cupric Process	Item Description Schedule Frequency Frequency Frequency Ievel Start date time	-
😑 🎎 Demo Process	git ABC Concentration Daily, Every day on winn, rue, wed, mur, rn, ruo aw Normal 7/24/2012 8:05 AW	-
- a 01. Conditioner	privide concentration Daily, every day on wont, ney word, mut, m, no kaw Normal 7/24/2012 6:05 AW	
- A US. Demo Tank	pri Dany, Every day on wort, "de, vied, "hdt, "it, ".do Xw Protinan 1724/2012 0.05 Xw	
12. Cleaner X		
16 Etch		
Desmear Process		
🛱 🧏 Electroless Ni/Au		
Electrolytic Copper		
🗄 🧟 Electrolytic Gold		
🕀 🍓 Layer Clean Process		
🕀 🍓 Quality Assurance		
🕀 🎎 Tool Calibration	Modify Options	
🕀 🎎 Waste Treat	Other Schedules	
庄 🎯 Yields	If the Description Schedule Frequency Frequency Evenuency level Start dateltime	
	Makeup Monthly First Sat of every 3 months 7:00 AM Normal 8/16/2012 7:01 AM	
	Participante and a participante	-
06. Demo Tank 🔤		
Other 1 - Acme Chemical		
Other 2 - Wet Area 1		
Size - 560 gal		
Type - Plating Tank	<u>Aaa Moany Delete Options</u>	
) Langed In Oustany Educinistation	Add Obact Oshadula Oshadula Osmaliya Adam Osmala	42
Lugged in System Administrator.	Add Sneet Schedule Corrective Action Samples	13

Figure 11: Other Item Scheduling

Since these activities are not based on a calculation, each item must be created. Selecting the Add a schedule in the *Other Schedules* section brings up the pop up shown in Figure 12. A description of the activity must be entered and the *Print* section must also be constructed by selecting or creating from the print menu pull down. These instructions will show up on an Addslip that is printed when the item comes due.

Schedule setup		
- Scheduled Item		1
Descripti	ion Carbon Treatment	
	Cance	el
Prio	rity 3 Action Print library	
	Can NOT be deactivated <u>H</u> elp	·
Ту	pe Other	
Work locati	on * Same as Tank	one
Allotted Tir	me 8 hours	
P	rint Equipment Requirements	
Ff	Safety Precautions for Handling Alkaline Material	
- Frequency	Container information	
✓ Normal	Storing Procedures for acids	
Accelerated	Solution Make-Up and Operation	
Decelerated	How to Add ABC Chemical	
	<add library="" new="" type=""></add>	
Schedule Selection		
C None C	Yearly C Monthly C Weekly C Daily C Shift	
Use custom frequ	ency description	
Description Monthl	y, First Wed of every 6 months, 8:00 AM Short description Monthly	
Schedule Times		
Start Tirr	ne 8:00 AM	
Allotted Tim	1e 8 hours	

Figure 12 Other Schedules Setup Window

1.8.6 Make-up Setup

The Make-up tab opens a window in Figure 13 to define the chemicals (additives) and

🖉 TrueChem - Your Company N	ame				E	ex
File Edit View Inventory Tools H	elp					
1 2 2 1	📔 💌 🖨 ờ 🖉 🐌 🕵 👘 🧃 🗾 🍭	28 🔒		0		
	Process Demo Process				Tanl	k Setup
Your Company Name	Tank 06. Demo Tank					
-4 Inventory	· · · · · · · · · · · · · · · · · · ·	~ <u> </u>				
🖻 🧄 Processes	General Notes Test Add Sheet Schedule	Make-u	6	Docs	HM	AIS .
🗄 🎇 Chromic Acid	Chemical Name	Amount	Linite	Type	Calculated	-
Cleaners	Deionized Water	0.8	gallon	By Vol.	448.0 gal	
Opric Process	XYZ Concentrate	0.1	gallon	By Vol.	56.0 gal	
01. Conditioner	ABC	0.1	pound	By Vol.	56.0 lb	
		-75 - 2	××	8		
- 💰 12. Cleaner X						_
-ā 13. Copper						
á 16. Etch						+
Sector Process						
A Electroless NIAu A Electrolytic Conner						
Rectrolytic Gold						
🗐 🧟 Layer Clean Process	100 000 1000					
🗉 🍓 Quality Assurance	Add Modify Delete					
🗉 🎎 Tool Calibration	New Makeun notes					
🗈 🎎 Waste Treat						1
🕀 👹 Yields						
	- Drain the tank and scrub out.					
	- Oil pumps.					
	- Refill with chemicals in the order listed below.					
	- Mix thoroughly.					
	- riear to operating temperature.					
Other 1 - Acme Chemical						
Company						
Other 2 - Wet Area 1						
Size - 560 gal Type - Plating Tank						
Logged In System Administrator.	Add Sheet Schedule	Co	rrective Ac	tion	Samples	13

Figure 13: Tank Setup Make up Tab Screen

the amounts of each chemical needed when making up a particular process tank. The bottom half of the window has space to enter instructions that will print out on the Makeup Addslip. As shown, the make-up procedure instructions can be added here.

The top half of the window shows the additives (chemicals) used in the make up of the process solution. Chemical ingredients are added by clicking on the add button in the middle of the window that opens an additional pop up. Each chemical additive is selected from a list. The additive list initially contains no additives. As processes are defined, chemicals are added to the list and may be selected for other tanks using the same materials. Defining a chemical requires the input of data about how the chemical is ordered and stored, and forms the basis for tracking chemical usage.

	parroa
Make-up	
 Item Additive Select From List> Units Select unit> Volume based Total Add Amount Decimals Include in Bailout	<u>O</u> k <u>C</u> ancel <u>H</u> elp
Production Add Standard Add Amount Production Factor Wednesday Thursday Friday Saturday	

Figure 14: Tank Make up Pop up

1.8.7 Docs (Document) Setup

The **Docs** tab allows the user to import documents directly into TrueChem for reference or to create links to external documents. On the Document tab, multiple documents can be attached to the tank. There is no limit to the number or types of documents that can be attached. The attached document will be available to anyone performing a test on this tank or with rights to access tank data. Specifications, material MSDS sheets, procedures and work instructions are often attached. Another great use of the document tab is to attach training videos. A video of the operating procedure, a titration end point color change or a safety video are all commonly attached files as well.



Figure 15: Document Screen

2.0 TrueChem Functions

TrueChem comes equipped with a number of functions that assist the user with accomplishing activities. Many of these functions are accessed from the graphic tool bar. Some of these functions are introduced in this section.

2.1 Performing a Test

Tests are performed to transfer raw data from the laboratory into TrueChem. To perform a test on an existing tank, select the tank by clicking on it in the tree and click on the **Perform Test** button.



This will display the Perform Test window. Data can be entered into any, or all, of the blue highlighted boxes. TrueChem can perform all the necessary calculations. The calculations are initiated by pressing the enter key after entry. This also prepares the data for saving into the database. Data can be reviewed for accuracy or recalculated. And then one further step is required to save the data to the database.

TrueChem - Your Company No	ame								
🎉 🛐 🌌 🔊 🕢		▼: 🖴 🏈 🐼	.	1				0	
M & 2	Proce	ess Demo Process 🗖 Show	Debug						Perform Test
Your Company Name	Ta	ank 06. Demo Tank							
-4 Inventory	Sample D	ate 7/24/2012 9:35 AM						Test Status	
Processes	Notee	Teet log	Dace	Output		General	Schedule	Makeun	LIMIC
	140165	Test Date 7/24/2012 12	:58 PM	Output		Ceneral	Junedale	Manerup	Recall last test
🗄 🌉 Demo Process		ř	AB		ATION		ABC Test Proc	- oduro	
- 👌 01. Conditioner			li	put ml of Thios	sulfate		ADD TESTFICE	COUTO	
a 06. Demo Tank				Enter Nor	rmality	0.1			
12. Cleaner X	Due	Range: 2.1 - 2.7 Optimum: 2.4			Ĵ		g/L ABC Conce	entration	
16 Etch			Add to: 2.40	Start at: 2.30	Add		Ib ABC		
+ 🧟 Desmear Process	2		XY	Z CONCENTR/	ATION		XYZ Test Proc	edure	
🕂 🧸 Electroless Ni/Au			Input m	l of Hydrochlori	ic Acid	50			
🗉 🍓 Electrolytic Copper	Due	Banac: 0 25. Ontimum: 4.	Ent	er sample size	e (mis)	50	all W7 Conco	ntration	
主 縄 Electrolytic Gold	Due	Range, 035 Optimum1		Add to: 1	Add		gal XYZ Conce	ntration	
🗉 🍓 Layer Clean Process	2	2		7100 101	nH		pH Test Proce	dure	
🗄 🎇 Quality Assurance	1	5		Enter pH Re	ading				
Tool Calibration	Due	Range: 6 - 8 Optimum: 7			1		pН		
H Maste Treat			Add to: 7	Start at: 7.1	Add		gal Sulfamic		
+ man tields			Add to: 7	Start at: 6.9	Add		Ib Nickel Carb	onate	
06. Demo Tank Other 1 - Acme Chemical Company Other 2 - Wet Area 1	Message								
size - 560 gai Type - Plating Tank ogged In System Administrator.			Add Sheet	Past Due S	chedu	le Past Due	Corrective A	ction	Samples 13

Figure 16: Performing a Test

Alternately, a test can be initiated from the *Edit* pull-down menu. Also tests can be initiated by selecting an item from the schedule. The current schedule can be accessed by selecting the schedule button.



This button brings up the schedule log in the main screen. The log lists scheduled items according to the following hierarchy; past due (late), due and not yet due. "Other"

🖉 TrueChem - Your Company f	Name							EPZ
File Edit View Inventory Tools	Help							
1 2 2 1 1			🖶 🏈 🔗) 🛃 🕷	1	2 🕰 🎎 🔒	2	
M -	4							Schedule
Your Company Name	⊻iew	Currently S	Cheduled Items 👻	Work location	*All wor	k locations 👻		
Inventory	Time	All Schodu	la Types	C Show tin	nalina ara			
E 🧠 Processes	1300	Al Scheud	ie Types	1 Onow an	Tennie Mid			
🖬 🚜 Chronic Acid	Drag colur					2 2	8 9 = 4	r 🛥 💏
🛓 🧸 Cupric Process	Status	Туре	Due By	Remaining	Priority	Item Description	Tank	
😑 🎎 Demo Process	Past Due	Test	7/23/2012 1:05 PM	(1-00:05)	2	Copper Content	01. Conditioner	Demo
- a 01. Conditioner	Past Due	Test	7/23/2012 3:05 PM	(0-22:05)	2	Normality	01. Conditioner	Demo
12 Cleaner X	Due	Test	7/24/2012 3:55 PM	0-02:45	5	%/volume Developer Concentration	Cleaner 2	Clean
- Å 13. Copper	Due	Test	7/24/2012 3:55 PM	0-02:45	6	pH Value	Cleaner 2	Clean
👗 16. Etch	Due	Test	7/24/2012 3:55 PM	0-02:45	6	Differential between pH readings	Cleaner 2	Clean

Figure 17: Schedule Log

scheduled items, such as maintenance, can only be seen from the schedule log. The view of the schedule log can be changed by clicking on any of the column headings allowing the user to sort by process, type, due date, etc. A given task can be performed by clicking on the item and then clicking the "Do Now" button or by double clicking on the item. Once a test has been performed the data is ready to be saved. In order to add the data and calculated results into the database, the **Output** tab is selected. This begins the action of saving the data. Data can only be saved on a computer with a software key installed. The installed key activates the **Print/Save** button, and clicking that button completes saving the data into the database.

🖉 TrueChem - Your Company N	ame										- F 🛛
File Edit View Inventory Tools H	lelp										
🏂 🗴 🐼 🖉 🜌	6			6	1		1	l 💐 🎉		2	
	- F	Process C	emo Proc	ess 🗖	Show De	bua				1	Perform Test
Your Company Name		Tank 1	3. Copper								
Inventory	Comr	la Data 7	10 4/201 2 1	12 DM	1					Toot Status	
🗄 🧄 Processes	Janip		124/2012 1		<u> </u>	-97.00	v	~		Test Status	
👳 🌉 Chromic Acid	Note	s	Test	Log	1	Docs	Output	General	Schedule	Make-up	HMIS
E 😹 Cleaners	☐ Start	up Test		T Nev	v Makeup		🔽 Signoff r	required	🗁 Will prin	t	PrinttSave
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🔓 🧴 01. Conditioner	4 A	<u> </u>	<u> </u>		i- 3- 3						Store
🛁 🍝 06. Demo Tank	com	ments abo	ut the test	can be e	ntered he	rell					Cancel
12. Cleaner X											
16 Etch											Preview
+ 🧟 Desmear Process											
🖃 🧟 Electroless Ni/Au											
🕀 🎎 Electrolytic Copper											_
🗄 🍓 Electrolytic Gold	Action	Amount	Units .	Additive							
E A Layer Clean Process	Add	4	gallon	Deionized '	++ Water						
Galibration	Add		pound	Cataprep 4	04 Salts						
+ 🦓 Waste Treat											Override
🛨 🍘 Yields	Rehodule	1 /2									ł
	Item Des	, acrintion		Missed	Nevt Tes	t	Frequency		Te le	requency level	-
	Catalyst	Concentrat	ion	10	7/26/201	2 2:00 PM	Twice a week	on Tues and Thur	s (9)	lormal	
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											Set next
N	Samples										
13. Copper	Sam	ple Numbe	r	Due By		Sam	ple Date	Received	Date Le	evel Notes	
Other 1 - Acme Chemical Co. Other 2 - Wet Area											_
Size - 240 gal											
Type - Plating Tank										11 100	
×	1										
Logged In System Administrator					۵	dd Sheet	Sc	hedule	Corrective	Action	mnles 13

Figure 18: Output Screen

2.2 Graphing Tools

Several different graphs are available in TrueChem, including X-bar, run charts, moving run charts and histograms. Multiple process solution components can be displayed (as long as each is tested for). In addition, TrueChem has built-in statistical calculations to evaluate mean, standard deviation, Cpk and other relevant quantities. Also by clicking on a data point on the run chart, comments relating to the test can be added. Individual graphs can also be displayed. Multiple sets of control limits can be displayed. The graphs of multiple components can be overlaid from the current tank or from other tanks to show relationships. The graphs functions are accessed by pressing the graph icon in the button bar.



The figure below shows the graph overview that displays all the different graphs. At the top of the graph window are five tabs that allow the selection and enlargement of the individual graphs.



Figure 19: Graph Screen



Figure 20: X-Bar Individual Graph

The X-Bar chart in Figure 19 is expanded to the full working window in Figure 20 by selecting the "X-bar" tab. That chart shows calculated control limits that are statistical

quantities indicating the natural process limits based on the current operation. Each of the other graphs can also be expanded by selecting the appropriate tab.

TrueChem also has the ability to overlay multiple components from the same graph (figure 21). Although the units are removed, this graph can still show common trends in the data.



Figure 21: Graph Component Overlay

2.3 Data Log

Pressing the scroll icon accesses the data log for the particular tank selected at the time.



The data log presents all of the stored data in a tabular format. The columns match the test screen result and adjustment rows rotated 90 degrees. Items at the top of the test window appear at the left on the Data Log. The data log screen for the tank will display. Data displayed is color coded depending on whether it is in specification or not and by actions required that have not been completed. The coding key is shown in the bottom right of the window.

Edit View Inventory Tools I	Help				1		1	1						
2 2 2 1			V 🖏 🕼		1) 🂐 🏅	6			0		
		Process Demo F	rocess										E	Data L
Your Company Name		Tank 13. Cop	per											
L Inventory		For Dates 1/6/201	2 2:49 PM - 7/24/201	12 2:49 PM										
Processes		1				-	-	_	_	_	-			- 0
+ 🚜 Chromic Acia	Dra											S 8		-
+ 🧟 Cupric Process		Sample Date 🖷	Test Date	Elapsed	User	S	Н	44 Conc.	44		N.	g/I S. C.	PPM CU.	DIM
- 🧕 Demo Process	•	7/22/2012 1:22 PM	7/22/2012 1:57 PM	4-23:31	14			96.25	1	It	0.45	6.64	44	
🦾 👌 01. Conditioner		7/17/2012 1:51 PM	7/17/2012 2:26 PM	1-06:40	4			100.63			0.51	7.77	53	
🛁 🧴 06. Demo Tank		7/16/2012 7:11 AM	7/16/2012 7:46 AM	0-17:10	26									
12. Cleaner X		7/15/2012 2:01 PM	7/15/2012 2:36 PM	4-23:02	26			98.00	1	It	0.51	6.92	40	
13. Copper		7/10/2012 2:59 PM	7/10/2012 3:34 PM	2-01:42	14			96.25	1	It	0.53	6.64	60	
Desmear Process		7/8/2012 1:17 PM	7/8/2012 1:52 PM	4-23:31	24			100.63	2	It	0.50	7.58	80	
🧏 Electroless Ni/Au		7/3/2012 1:46 PM	7/3/2012 2:21 PM	1-22:48	24			98.00	2	It	0.48	7.58	20	
😹 Electrolytic Copper		7/1/2012 2:58 PM	7/1/2012 3:33 PM	5-00:28	24			100.63	2	It	0.48	7.39	50	
🔏 Electrolytic Gold		6/26/2012 2:30 PM	6/26/2012 3:05 PM	1-22:24	13			101.50	1	It	0.53	7.87	16	
Layer Clean Process		6/24/2012 4:06 PM	6/24/2012 4:41 PM	5-02:09	24			100.63	2	It	0.52	7.58	10	
Tool Colibration		6/19/2012 1:57 PM	6/19/2012 2:32 PM	2-06:36	4			96.25	3	It	0.46	5.31	40	
Waste Treat		6/17/2012 7:21 AM	6/17/2012 7:56 AM	5-19:38	4			100.63			0.50	7.58	30	
Yields		6/11/2012 11:43 AM	6/11/2012 12:18 PM	5-19:55	14			109.38			0.48	7.58	6	
		6/5/2012 3:48 PM	6/5/2012 4:23 PM	2-00:42	13			99.75	2	It	0.50	7.58	20	
		6/3/2012 3:06 PM	6/3/2012 3:41 PM	4-22:19	24			100.63	2	It	0.53	8.06	6	
		5/29/2012 4:47 PM	5/29/2012 5:22 PM	2-00:06	4			100.63	2	It	0.48	7.39	12	
	1	5/27/2012 4:41 PM	5/27/2012 5:16 PM	5-00:14	26			98.00	2	It	0.48	7.58	4	
		5/22/2012 4:27 PM	5/22/2012 5:02 PM	2-02:14	4			105.00			0.48	7.58	6	
opper 🔄		5/20/2012 2:13 PM	5/20/2012 2:48 PM	4-19:24	14			100.63	2	It	0.55	7.58	4	
r 1 - Acme Chemical Co. r 2 - Wet Area		5/15/2012 6:49 PM	5/15/2012 7:24 PM	0-04:11	13			100.63	2	It			10	
240 gal		5/15/2012 2:38 PM	5/15/2012 3:13 PM	0-18:10	26						0.48	6.16		
- Plating Tank	-								_	12				
~	27	7 items displayed								Lege	nd	1.0 1.0		

Figure 22: Data Log

Advanced features in TrueChem allow the user to customize the display and save the customized view and return to each time the Log is accessed. This customization feature is available for all of the logs in TrueChem

2.4 Sampling Module

The sampling module is part of the standard TrueChem package. The sampling icon appears next to the perform test icon



The sampling module allows the facility to separately record and track samples used for monitoring processes. The sample feature is used by clicking on a process line or a tank in a process line and then pressing the sample icon. A list of all of the tests used in that process line appears in the working window and the tests desired for the sample are selected by checking the check boxes. TrueChem then assigns a unique tracking number for the sample and assigns the current date and time as the start time. TrueChem tracks the time until the sample results are entered.

🖉 TrueChem - Your Company I	Name					
File Edit View Inventory Tools	Help					
1 2 2 2 2	<u>_</u> <u>_</u> _ _ _ _ _ _ _	8	1	2 🗈 🍭 🙈 🤷	٠	
M 49	Process Demo Process	-				Log sample
Your Company Name	Sample Date 7/24/2012 2:00 B	M				
	Jampie Date 1724/2012 3.031	NY Canal				
- A Processes	Due date 7/27/2012 3:09 P	M				
🕂 🧏 Chromic Acid	Notes					1
🛱 🧸 Cleaners						
🗐 🧸 Cupric Process						
🚽 🧟 Demo Process						
🗍 🗍 🔬 01. Conditioner						
🔄 👗 06. Demo Tank						
🛛 👗 12. Cleaner X						Y
- 💰 13. Copper						
🔓 16. Etch		10				
🗉 🎎 Desmear Process	Process Tanks (Demo Process)	Sample Number	Tank size	Other 1	Other 2	Current level
🗉 🍓 Electroless Ni/Au	01. Conditioner		240 gal	ABC Chemistries, Inc.	Wet Area 1	
😐 魏 Electrolytic Copper	06. Demo Tank		560 gal	Acme Chemical Company	Wet Area 1	
😐 🎎 Electrolytic Gold	12. Cleaner X		315 gal	Acme Chemical Company	WET AREA 1	
🗄 🍓 Layer Clean Process	13. Copper		240 gal	Acme Chemical Co.	Wet Area	
🗄 🍓 Quality Assurance	16. Etch		240 gal	ABC Chemistries	VVet Area 1	
🗄 縄 Tool Calibration						
😐 ِ Waste Treat						
🕂 🎯 Yields						
12 Conner						
3. Copper Other 1 - Acme Chemical Co						
Other 2 - Wet Area	<					
Size - 240 gal	E Print honch workshoot					
ype - Plating Tank	r mit bench worksneet					
	Add Clear					Import
ogged In System Administrator		Add St	eet	Schedule Co	rrective Action	Samples 13

Figure 23: Sample Module Main Screen

The Sampling module is included in the base version of TrueChem. If the sampling module has not been requested and the facility decides it would be useful, simply contact TrueLogic and we will activate the module for the facility.

The sample module was designed for chemical suppliers that receive samples from their customers, and needed the ability to track the processing of these samples and to report the status of the analysis to their customers. This feature is also very useful for metal finishing facilities that want to track samples sent offsite for analysis. Offsite for the purposes of this discussion is out of the lab where TrueChem users enter data. Thus, "offsite" includes labs in another part of the facility or outside labs that are contracted to perform specific testing. The sample module can be used to initiate the gathering of a sample for processing or it can be used to track the sample sent offsite. A time window for completing the sample processing provides clear tracking of when the sample was gathered/received and when the analysis results are recorded.

Many facilities choose not to use this feature especially when samples are gathered and immediately analyzed. If the sampling module is not utilized, TrueChem assigns the sample time to be the time when the results are entered.

2.5 Inventory Module

The Inventory Module is an optional add-on TrueChem feature that provides TrueChem users with additional features to better manage chemical and material usage. Through the

inventory module, users are able to expand on the ability to track chemical usage that is available from the Add Amount Report. The Add Amount Report can be used to estimate chemical usage by tracking chemical additions and make ups. The Inventory Module allows the facility to track chemical usage more effectively and also control inventory quantities. Basic TrueChem tracks usage of chemicals tested for and through tank adjustments made. The inventory module expands on this to allow the tracking of inventory levels, and chemical age by tracking lots. Also, items not included in tests, such as laboratory materials, filters, and anodes can be tracked and inventoried by using "manual transactions". The inventory module can also be used to generate purchase orders automatically based on inventory levels and predefined order points. Even if the facility has a purchase order system, the inventory module still helps optimize chemical inventory as it can be used to generate emails to buyers based on the inventory levels and order points. The inventory module works best if TrueChem is installed on the facility computer network so that the TrueChem users performing chemical tests, the inventory manager, and shipping and receiving staff can all enter their data into TrueChem. The inventory manager and the shipping and receiving staff do not require software keys to enter inventory data.

The inventory module is accessed by clicking the Inventory icon on the tree structure.



On clicking the Inventory icon, the icons above the Tree view window are replace as shown in the Figure 24. These buttons access the major features; Enter Transaction (manual transaction), Enter Purchase Orders, Receive Lots and Inventory Reports. Tracking material usage occurs by TrueChem deducting chemical usage from additions, manual transactions and lot management from the chemical inventory created during setup. Items are added to the tracked inventory by entering inventory lots, creating a tank make-up or an adjustment test. The inventory reports provide lists of the chemicals and supplies on hand. Inventory creates maximum and minimum set points, allows the tracking of material lots, can receive new material into inventory and can even generate purchase



Figure 24: Inventory Module Active Buttons

orders automatically. The usage of materials that are called for in tank make ups and additions are automatically tracked by the inventory module. Materials in stock can also be tracked by expiration dates or by lot number. Manual Transactions can also be entered. The inventory module is tied to the testing of process components so items not tested are not tracked automatically. A manual transaction can be used to track these non-tested items by making inventory adjustments. Items routinely tracked via manual transactions can include laboratory chemicals and supplies, anodes, anode bags, filters and maintenance materials like activated carbon. Manual transactions are created by selecting the **Inventory** pull down menu and then **Create Manual Transaction**.



Figure 25: Create Manual Transaction

Several different inventory reports are available as well. The various reports are accessed by pressing the fork truck icon in the tool bar and then selecting the desired inventory report from the pull down list under View. The inventory report appears in the main window. The standard reports available track Active Lots, Expired Lots, Retired Lots, All Lots and purchase orders.

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lelp							
<u></u>	1	100 100	1		A 26		
4						Inventor	y Management
View Active lots	-						
Active lots			_				
Drag or Expired lots	re to group by						
Lot Lab Retired lots		Qty balance U	Jnit	Price per unit	Received Date	Vendor	Manufact 🔺
001-06- Requisitions	Water	36 g	allon	\$0.15	5/7/2012	On Site	On Site
001-06-06-002 Deioniz	ed Water	900 g	allon	\$0.15	5/20/2012	On Site	On Site
006-02-01-006 3313 Ne	eutralizer	206.75 g	allon	\$3.20	6/19/2012	Acme Chemical Company	Verifine C
021-05-01-001 SMT Re	pl	81.56 li	ter	\$1.25	1/15/2012	Acme Chemical Company	The Best
022-05-01-001 SMT Re	p II	97.56 li	ter	\$1.25	1/15/2012	Acme Chemical Company	The Best
010 00 00 001 0			- 11-14	#0.50	0400040		

Figure 26: Inventory View Pull Down Menu

Inventory reports are easily accessed either by icon or pull down menu. The screen in Figure 27 will appear and is the default view showing *Chemical Balance*. The entries are color coded and the legend is in the bottom right corner of the screen. Other

Edit View Inventory Tools	Help							
			1		Q 26			
1	4						inven	tory Repo
Your Company Name	View Chemical balance	-	Type Vi	ew all	-			
a Inventory			2				E E Leval	n [[
Processes	Drag column headers here to group by						₩ 🕶	* -
🕂 🎆 Chromic Acid	Consumable 7	Part number	Unit	Qty in stock	Qty usable	Qty unusable	Qty on order	Qty max
T 🍓 Cupric Process	3308 A	į.	gallon	77.25	11.75	65.5	0	100
🛛 🧕 Demo Process	3308 B		gallon	109	100	9	0	150
🦾 🧴 01. Conditioner	3313 Neutralizer		gallon	206.75	206.75	0	0	21:
🚽 🧕 06. Demo Tank	ABC		pound	211.25	171.25	40	200	100
- a 12. Cleaner X	Accelerator 19		gallon	71	0	71	0	15
- A 13. Copper	Acid Cleaner 5002		liter	38.13	38.13	0	0	20
Resmear Process	Ammonium Hydroxide		liter	429.68	378.54	51.14	0	45
Electroless Ni/Au	Antifoam		gallon	9.79	0	9.79	20	5
📲 🧟 Electrolytic Copper	Aurolectroless SMT Replenisher		liter	206.19	206.19	0	0	21
🍓 Electrolytic Gold	Boric Acid		pound	10	10	- 0	0	5
🔏 Layer Clean Process	Cataposit 44		liter	158.41	44.84	113.56	0	30
Guality Assurance	Cataprep 404 Salts		pound	1340	0	1340	0	160
Waste Treat	Chromic Acid, Cr03		kilogram	191.81	2.85	188.95	0	22
Yields	Cleaner PC-454		gallon	43.5	0.5	43	0	10
	Conditioner 1175		gallon	16	16	0	0	6
	Conditioner 211		gallon	20.5	20.5	0	0	7
	Copper 328 A		gallon	15	15	0	0	2
	Copper 328 L		gallon	15	15	0	0	2
	Copper Sulfate		gallon	186	0	186	0	30
~	Cuposit Y		gallon	75	0	75	0	15
	Cuposit Z		liter	245.9	0	245.9	0	30
	Deionized Water		gallon	936	936	0	0	100
		1	Seloc					_
9	59 items displayed					Legen	L L	

Figure 27: Inventory Reports

views are available, and sort the inventory based on the *Lot Balance*, material *On Order*, by *Transactions* and by *Expiration* date.

2.6 User Setup

User access rights are an important part of TrueChem. Establishing user rights helps define facility roles and responsibilities, as well as protects the integrity and access to the data. Each user is required to log in to use the program, and TrueChem then assigns the tasks completed to the user. In addition, email notifications can be sent to specific users or user groups. To manage TrueChem users, select the Setup Users button from the graphic tool bar.



TrueChem comes preloaded with two users, Admin and Default. These users have special functions and cannot be deleted. The Admin user is TrueChem's Super User and can do anything within TrueChem. This user's password should be changed and maintained by the highest level TrueChem user. Individual users and groups can be created to manage access, and to grant rights to certain TrueChem features. Once created, a user cannot be deleted as any data or signoffs they completed would be compromised.

our Company Name	-						Lleev
our Company Name L Inventory			The second secon				User
Processes	-	View Active	users \ Groups 💌				
and the second		User	First Name	Last Name	Department	Title	Users\Groups
Acid		Admin	System	Administrator	TrueChem	Admin	
Cleaners		Default	Default	User	TrueChem	Default User	
Cleaner 1		Roger	Roger	Smith	TrueLogic	Engineer	Techs
Cleaner 2		Sonia	Sonia	Campos	Lab	Lab Tech	Techs
Cleaner 2		matt	Matt	Akin	TrueLogic	Sales	
Cupris Process		dcollins	Dan	Collins	Management	Director	Techs
Domo Broscos		tobin	Tobin	Alexander	TrueLogic	Sales	Manufacturing
Dennor Process	8	Techs	Lab Technicians	3	30	N.	dcollins, Sonia, John, Sally, Rob
Desmear Process	8	Eng	Process Engine	ers		22	aHickman, jamie, Jessica, Rano
Electroless Ni/Au		John	John	Smith	Lab	Tech	Techs
Electrolytic Copper		Sally	Sally	Johnson	Lab	Tech	Techs
Electrolytic Gold		Robert	Robert	King	Lab	Tech	Techs
Layer Clean Proces		Randal	Randal	Babcock	Engineering	Engineer	Eng
Guality Assurance		Jessica	Jessica	Moore	Engineering	Engineer	Eng
a loor Calibration		George	George	Suarez	Manufacturing	Technician	Manufacturing
vvaste i reat	8	QA	Quality Assuran	ce	10. 	W.	jamie, Chris
ields	8	Manufacturin	ng				George, tobin
		jamie	Jamie	Brandenburg	QA	QA Engineer	Eng, QA
		Micheal	Micheal	Carr	Maintenance	Technician	
		Bill	William	Shaw	Lab	Lab Tech	Techs
		Frank	Frank	Williams	Lab	Lab Tech	Techs
		Lisa	Lisa	Herdale	Lab	Lab Tech	Techs
		Debbie	Debbie	Burke	Lab	Lab Tech	Techs
		10/2401 21/24 / 21/27			10.0	Our and a su	Ol Tesha

Figure 28: User Set up

New users can be added by pressing the *Add User* button. The information added defines the user name, password, job title, etc. One other very important piece of user information is the email address. If the email address is filled out, then that address becomes part of TrueChem's email address book and can be used in other features. User rights are defined in the Function Rights section. An extensive list of functions that can be performed in TrueChem is found in the rights section. Access to the function can be *On All, On None,* or *On Select* which allows for the selection of tank(s) the right is granted to the user. Rights can be assigned to individual users or user groups.

User ID	Jeff	Password		verify	<u>O</u> k
User information –					Cancel
First Name					
Last Name	,				Help
Laoritanio				-	Status
Departmen	tj			More	Active User
Title					Created
Phone	0.		Pager ()		7/25/2012 11:50 AM
E 14-1			i agoi [()		Disabled
E-Mai	JL@truechem.	com			
Address	3				🖵 Locked
~	·		~		
Rights	Group	Advanced			
Function rights				-Us	er rights
< ALL FUNCTION	S>	Users	Group	🔼 🔼 🖸)n none
General) n all
Run TrueChem		All	+		211 001
Create Processes	3	All		0.0)n select
Rename Process	oc	All	+		Select
Rename Tanks	60	All		_	
Delete Processes	3	None			Import rights
Nalata Tanke		None	1 1		
User can rename	Tanks				^
-					

Figure 29: User Rights Set up

2.7 User Log In



By selecting the log in key, which is the unlocked padlock button, a login screen will be displayed which allows the entry of the User ID and the Password. If the authentication is successful then the user's name will appear in the lower left hand corner of the main TrueChem screen.

TrueChem User Login	
Please Enter A User Name and Password	Qk
	<u>C</u> ancel
User ID	Help
Password	Change password

Figure 30: TrueChem User Login

3.0 Dashboards

The Dashboard Module is an optional add-on feature of TrueChem that provides the ability to present an overview of the facility analysis status in a "real" time fashion to both TrueChem users and other facility personnel. The dashboard creates a PLC-like facility status display that can be made available to anyone in the facility and does not require TrueChem to be installed on their computer. Personnel such as managers, engineers, process planners and maintenance can access TrueChem information through the Dashboard. The dashboard displays the important elements of the database in a web page format. In order to use this feature, a network must be available so that a short cut to this webpage can be copied to each computer needing access to the dashboard. The dashboard files query TrueChem periodically and update the status of the processes displayed. Figure 30 shows the top level display of the dashboard.



Figure 30: Dashboard Process Line View

Three conditions are displayed; in specification (green), outside shop limits (yellow) and out of specification (red). Clicking any of the buttons displayed allows the viewer to "drill" down first into the line view and then into the tank view of the dashboard and view the information on that level. For example clicking on the Electrolytic copper (preceded by an asterisk) is shown in Figure 31. The deepest level is the tank level shown in Figure 32.



Figure 31: Line Dashboard View

Other information about the processes and tanks is also available including whether the tank is active or inactive, and when the next analysis is due. As shown in the figure, the dashboard can also be configured to track the status of samples. Figures 31 and 32 show additional information accessed by drilling down into the dashboard. The gray asterisk seen next to the electroless copper line button in Figure 30 indicates the line contains a deactivated tank. Figure 31 shows the process level, and lists all tanks in the Electrolytic Copper process line. Figure 32 shows the tank level dashboard view of the demo line.



Figure 32: Tank Level Dashboard View

4.0 Rules

The ability to create logic rules is one of the features that sets TrueChem apart from other process control data programs. Simple spreadsheet programs have limited ability to incorporate logic based rules that help transfer decision making to the process control program. Creating rules in TrueChem allows the user to "train" TrueChem to become more expert and make decisions based on the test results. Rules tell TrueChem what you want to do when certain conditions exist. Rules can be applied directly to a result or adjustment item as a custom rule, or they can be created in the TrueChem system setup as a rule set. Rule sets can be applied to multiple results and/or adjustments. Basic rules help with "mistake proofing" data entry and analysis results. More complex rules can look at data trends or changes from previous calculations to determine if additional tests are required. Rules can also activate visual basic scripts that perform complex functions. Rules are either defined at the process tank level or as system rules that are applied to tanks.

4.1 Custom Rules

A rule can be added to any result or adjustment item by selecting the result or adjustment while working in the *Tank Setup* window under the *Test* tab for a particular. To set up a rule, select the result or adjustment item and then click *Modify* at the bottom of the window. Under *Apply Rules* in the new window, the *Add* button will open the window shown in Figure 33. This window contains fill-in boxes for simple If/Then statements. The majority of rules can be covered with the If/Then statements. The result of a rule can cause a number of different actions to occur; from a pop up message to sending emails to creating corrective actions requiring sign off. The versatility of the rule functions is one way TrueChem is very unique.

Rule Setup	
C System Rule Set Custom Rule	<u>O</u> k
_ lf	<u>C</u> ancel
(Result)	Help
C Out of the Last Results	
And Or =	
Then	
Action to Take	<u> </u>
🗖 Display Message	
Protection	=
Scheduling options	
Log Event	
Print message on Add Sneet	
	×

Figure 33: Rule Setup Screen

4.2 System Rule Sets

System Rule Sets allow the creation of the rules, or groups of rules, under the same heading. The rule set can then be applied to any result or adjustment in the TrueChem system. Rule Sets may be applied to the entire facility (all results), to selected tanks or even to a single result in one tank. Rules are assigned separately to results and adjustments.

To create a system rule you must have rights to the *System Setup*. Once the System Setup window has been opened, go to the *Rules* tab to define the rule set (shown in Figure 34). Directly beneath the tabs you can add new rules that will be members of that set. Once you define a rule set, click the *Add* button to create a new rule (shown in Figure 33). After the rule has been created, the lower section is used to assign the rule to the facility, process, tank component tests results or adjustments. To assign the rule, click the check box at the level desired (facility process, tank or component). Results are in the left hand column, Adjustments on the right hand column.



Figure 34: System Setup Rule Set

5.0 Sign off Requirements

Another powerful feature of TrueChem is the use of Sign off requirements. Several activities can be set up that require the user to sign off that the activity has been accomplished. In addition, TrueChem can also require that a reason be given at the sign off. The sign off feature helps provide traceability for completion of activities and for changes to the database.

Adding data into TrueChem through the *Print/Save* button automatically signs off the data acquisition activity or begin the process of performing an "other" schedule item. Additions automatically have a sign off requirement. Rules can be used to create Corrective Actions or Events. These activities can require Sign Off.

5.1 Add Sheet Log Sign Off

An example of the sign off requirement is shown in Figure 35. Here, a past due add sheet is accessed by going to the addslip log and double clicking on the red entry shown. The pop up Sign off box appears. Selecting sign off assigns that activity to the user signed in to TrueChem (they must have rights to complete this activity).



Figure 35: Add Sheet Sign off

In the add sheet sign off dialogue, the list of add amounts that were called for in the initial test are displayed with a check box to the left. These can be altered if the user has

the rights to do so. For instance, perhaps there was not enough material on hand to make the full add called for.

5.2 Corrective Actions

It is important to note that <u>Corrective Actions are only</u> defined by rules. Rules can be created for any result or adjustment. Corrective actions create a condition, or set of conditions, that, if true, require some additional action. The "True" condition might be when a result is outside of its specification limits. Figure 36 shows the dialogue screen for a rule setup on a result. By checking the **Require Corrective Action Sign Off** check box, you are saying that this condition should be flagged for sign off and tracked for its completion. In the Require corrective Action Signoff section at the dialogue box bottom, the type can be selected. These types are user defined. The corrective action can be viewed and tracked by this type. The description will help identify the details of the Corrective Action. Allotted time is used to determine how much time should be allowed for the signoff to occur. At the expiration of this time, an email could be sent.

Rule Setup	
C System Rule Set 🛛 🕫 Custom Rule	<u>O</u> k
_ If	<u>C</u> ancel
(Result)	<u>H</u> elp
O Out of the Last Results	
And Or =	
Then	
Action to Take	<u> </u>
Print message on Add Sheet	
Require New Makeup	≡
Require Corrective Action signoff	
Send E-Mail	~
Compating Action signoff	
Description	
Allotted Time None	

Figure 36: Corrective Action Setup

5.2.1 Corrective Action Log
To view the list of corrective actions requiring sign off, select the Corrective Action log button on the graphical menu bar. The Corrective Action Log can also be accessed from the *View* pull down menu as shown in Figure 34.



The Corrective Action Log screen will be displayed. The initial view is always All Corrective Actions Not Signed Off. Any Corrective Action listed in this view is awaiting sign off. By highlighting any item and pressing Sign Off, the sign off screen is displayed, and information about the cause can be added. When the sign off is completed, the item will be removed from the screen after clicking *Refresh* or exiting the screen. Note you must have rights to sign off corrective actions to complete the sign off function.



Figure 37: Corrective Action Log

5.3 Event Log

The event Log is accessed by pressing the Event Log icon shown below. It is located on the top menu bar.



TrueChem's event log is much like an audit log entry. However, <u>it cannot be edited or</u> <u>deleted</u>. Event log entries are created when an event has occurred that TrueChem was told to track, or, when a user defined rule was true and had an action attached which specified creation of an event log entry. Some general items such as changing tank set ups changing data and a few others can be selected during setup on the Tracking tab to create events.

🖉 TrueChem - Your Company	Name					
File Edit View Inventory Tools	Help					
🏂 🛓 🚧 🔊 🜌		4 🕹 🐼 🕼	S 👘 🧃 🗾	🂐 🍰 🙆 🚮	0	
M &	4					Event Log
Your Company Name	For Dates 6/25/2012	11:30 AM - 7/25/2012 1	1:30 AM			
-4 Inventory						
😑 🧄 Processes	Drag column headers her				이 국 님 님	≕ 💠 = 💏
🗄 🎎 Chromic Acid	Date	Process	Tank	User	Workstation	Event Type
E Cleaners	▶ 7/25/2012 11:08 AM			Roger Smith	LIFEBOOK	Data Editing
Cleaner 1	7/25/2012 11:06 AM	Demo Process	06. Demo Tank	Roger Smith	LIFEBOOK	Data Editing
Stripper	7/25/2012 11:03 AM	Demo Process	06. Demo Tank	System Administrator	LIFEBOOK	Data Editing
🕀 🎎 Cupric Process	7/25/2012 11:02 AM	Demo Process	06. Demo Tank	System Administrator	LIFEBOOK	Data Editing
🕀 🍓 Demo Process	7/25/2012 11:02 AM	Demo Process	06. Demo Tank	System Administrator	LIFEBOOK	Data Editing
🕀 🎎 Desmear Process	7/25/2012 10:52 AM	Cessna Demo Tanks	2227 - Hekel Alodine 1600 / 1660	System Administrator	LIFEBOOK	Setup Changes
Electroless NI/Au	7/25/2012 10:51 AM	Cessna Demo Tanks	2220 - A45 Etchant	System Administrator	LIFEBOOK	Setup Changes
Electrolytic Copper	7/25/2012 10:51 AM	Cessna Demo Tanks	2220 - A45 Etchant	System Administrator	LIFEBOOK	Setup Changes
🛱 🎎 Layer Clean Proces	7/25/2012 10:51 AM	Cessna Demo Tanks	2225 - Deoxidizer 6/16	System Administrator	LIFEBOOK	Setup Changes
🖬 🧸 Quality Assurance	7/25/2012 10:51 AM	Electrolytic Gold	14. Orosene Gold	Roger Smith	LIFEBOOK	Setup Changes
🗄 🍓 Tool Calibration	7/25/2012 10:49 AM	Cessna Demo Tanks		System Administrator	LIFEBOOK	Setup Changes
🕀 🎎 Waste Treat	7/25/2012 10:48 AM			Default User	LIFEBOOK	TrueChem Log
🕂 🍘 Yields	7/25/2012 10:41 AM				LIFEBOOK	TrueChem Log
	7/25/2012 10:40 AM			Default User	ROGERVAIO	TrueChem Log
	7/25/2012 10:39 AM	Cessna Demo Tanks	2220 - A45 Etchant	System Administrator	LIFEBOOK	Setup Changes
	7/25/2012 10:39 AM	Cessna Demo Tanks	2225 - Deoxidizer 6/16	System Administrator	LIFEBOOK	Setup Changes
	7/25/2012 10:39 AM	Cessna Demo Tanks	2227 - Hekel Alodine 1600 / 1660	System Administrator	LIFEBOOK	Setup Changes
	7/25/2012 10:39 AM	Cessna Demo Tanks		System Administrator	LIFEBOOK	Setup Changes
< >	7/25/2012 10:38 AM			Default User	LIFEBOOK	TrueChem Log
Cleaner 1 🛛 🔠	7/25/2012 10:35 AM			Default User	LIFEBOOK	TrueChem Log
Other 1 - XYZ	7/25/2012 10:35 AM				JEFF	TrueChem Log
Other 2 - Wet Area 1	7/25/2012 10:34 AM			System Administrator	ADAMH	Data Editing 👻
Size - 1100 gal	<u>.</u>			1.8%	11. 	l III
Type - Cleaner	553 items displayed					
Loggod In Ovetom Administrator			Add Shoot Root Dug Cahadul	Bact Dug Correct	vo Action	Pampias 12
Logged in System Administrator.			Auguaneer Fast Due Schedur	e Fasibue Conecin	ACTION	oampies 15

Figure 38: Event Log Screen

There are several event types that TrueChem will automatically track. This tracking is turned on in TrueChem's *System Setup* under the **Tracking** tab.

<u>Track Add Sheet Status:</u> This will cause TrueChem to require add sheets be signed off. <u>Track User Activity:</u> This will cause TrueChem to log events related to user rights such as invalid password attempts, changes to user rights or changes to user status.

<u>Track Setup Changes</u>: This option will cause TrueChem to log changes to the setup of processes, tanks and Rules.

<u>Track Add Sheet Override</u>: This causes a required reason be given for any changes to add amounts.

<u>Track Schedule Override</u>: This will log events describing changes when a schedule has been overridden.

<u>Track Data Editing</u>: This will cause TrueChem to log any editing or deleting of test data from any tank.



Figure 39: Set up Screen Tracking Tab

6.0 Reports

The report section is accessed by pressing the Report icon shown below. It is located on the top menu bar.



Several standard reports are available covering the processes, materials testing and results generated by TrueChem. These reports are defined by creating a "scope" and selecting a time frame that the report is run over. In addition, custom reports can be created that evaluate specialized facility requirements. The Reports screen allows for running predefined reports. In the report description window, select the report to be run and the format in which the report should be issued. In the scope description, selecting "All" will have the report run against all items on your TrueChem tree. Using the custom scope allows the use of specific items. Adding and defining individual scopes are then saved and become a part of the scope description list. Shown in the Figure is a scope to look at

the tests performed on the facility gold plating tanks. The For Dates box requires data range the report will scan.



Figure 40: Reports Screen

One important report is the Add Amount Report. It can be used to estimate chemical usage by tracking chemical additions and make ups and various scopes can be defined and is very useful for facilities without the Inventory Module.

Chapter 2 Setting up TrueChem

1.0 Setting up TrueChem

TrueChem is relatively easy to install. However coordination with the facility IT department is essential for smooth installation of the program and insures that the user computers have the system rights to access the program on the company network. In addition, some assistance is generally needed to set up the email portion of the program.

1.1 Program Installation

TrueChem can be easily installed and set up on a single computer or on a network server. TrueChem is available in both Microsoft Access or Sequel versions.

Server

For an Access 2000 Database: 200 MB of disk space on a file share.

For SQL Microsoft SQL 2000 or greater

Client PCs

	Minimum Required	Recommended
Operating System	Windows 98, NT 4.0	Windows 2000, XP
Processor/Speed	PII/450 MHz	P4/2.0 GHz
Memory	128MB	512MB
Video	800 x 600	1024 x 768 or greater
Software	MS IE 5.5	MS IE 5.5 or better

License Keys

There must be at least one Sentinel Pro key installed on the computer (normally the computer in the lab) to allow TrueChem to save test data. USB Port Key goes on any available USB port on the client computer but should not be installed until after TrueChem has been loaded on the computer.



Figure 1: USB Port Key

1.2 Types of TrueChem Installs

TrueChem can be installed in several different manners depending on the user's desired mode of operation.

Stand Alone

Installation where the access database and client software are both installed on the computer's local hard drive. In this configuration a local network can specify one computer as the server.

Server with Access

Installation where the access database is installed in a file share, on a file server, or peerto-peer network and the client software is installed on one or more computer local hard drives.

Server with SQL

Installation where the database is created on a Microsoft SQL and client software is installed on one or more computers local hard drives.

1.3 The Installation Process

Place the install CD in the CD Drive. Wait for auto run. If auto run is enabled the TrueChem install should start automatically. If it does not, select the drive that contains the install CD and execute the setup program go to *My Computer* and manually select the disk.

1.4 Starting Up TrueChem

Start TrueChem by clicking on the TrueChem icon on the desk top or choosing *Start*, *Programs*, *TrueChem*, and *TrueChem*.

$\langle \rangle$

On a stand alone install, TrueChem will start right up.

On an install with a server, the first time a new client starts up TrueChem, the database location must be set up. The dialogue box shown comes up and the user must navigate to the location of the database (.mdb) file.



Figure 2: TrueChem Database Connection Window

2.0 TrueChem Layout

TrueChem's system is designed to be very intuitive and user friendly. As with most Windows applications it is based around the "tree" view file organization scheme. In TrueChem's case the folders are process lines and the files are process tanks. Figure 3 shows the layout of the TrueChem screen. The main TrueChem screen is laid out with a tree view down the left side for selecting the Process and Tank of interest. The pull down menus and a graphical button tool-bar allow for quick selection of the action to be taken. The bottom of the window has a status bar to display current states. Selecting an action from the menu bar or the button bar opens a screen in the working window for the selected tank highlighted in the tree view.



Figure 3: TrueChem Main Screen

2.1 Graphic Button Tool-bar

The graphic button tool-bar allows direct access to commonly used features. Holding the cursor over any icon will display the icon title. These buttons allow the user to quickly access features including; Perform Test, View Graphs, Data Log, Tank Setup, Login, Addslip Log, Printer, Email, Schedule, System Setup, Corrective Action Log, Reports, Event Log, Manage Inventory Lots, User Setup, Log Out and Help. The left four buttons

(Perform Test, View Graphs, Data Log and Tank Setup) apply to the selected tank in the Tree View. The remaining buttons are system level buttons and display data about the facility as a whole. For example, clicking the beaker (Addslip Log) displays all of the outstanding Addslips for the facility.



Figure 4: Main Screen Graphic Tool Bar

2.2 Tree View

The Tree View is made up of items that are user created to represent the user's facility. Like any standard Windows menu, clicking on the item or the + sign expands the tree and clicking on the – sign collapses the tree. Most users divide the facility into process lines (processes) and assign individual process elements (tanks) within the process. From a practical standpoint, the process/tank organization will minimize the space required to view the entire facility in the Tree View. The width of the Tree View can be adjusted by placing the cursor over the boundary between the Tree View and the working window. A double arrow appears left clicking and holding allows the user to drag the boundary making the Tree view area larger or smaller. In Figure 5 scroll bars are present because expanding the anodizing line causes the tree view to be larger than the window.



Figure 5: Main Screen Tree View

The horizontal scroll bar is present because the names in the Tree View are too wide for the window. To select a particular tank simply click on the tank of interest to highlight it. This activates the features related to that tank so that the data is available.

2.3 Status Bar

The status bar is located at the bottom of the window and displays current information on the following items.

- 1) Logged In: shows the name of the user currently logged into TrueChem
- 2) Add Slip: displays *Past Due* if there are add sheets that have not been signed off within the allotted time and the *Past Due* will blink to draw attention.
- 3) Schedule: displays *Past Due* when tests or other scheduled items are not completed within their allotted time and the *Past Due* will blink to draw attention.
- 4) Corrective Actions: displays *Exist* if there are corrective actions that need to be signed off.
- 5) The number of Samples outstanding from the Sample Module.

Logged In Default User.

Add Sheet Past Due Schedule Past Due Corrective Action Samples 13

Figure 6: Main Screen Status Bar

2.4 Working Window

The working window is the area on TrueChem's screen where most of the application specific work will be done. The default view of this area (Figure 6) is the TrueChem



Figure 6: The Default Working Screen

logo. This area is an HTML browser that can be pointed at any web page on the Internet, intranet, or local hard drive. The default setting is to take the user to the TrueChem help website.

When a tank in the tree view has been selected and a command from the pull down or button bar has been selected, the action opens a new screen in the working window. In the case shown in Figure 7, the *Perform Test* button has been selected. Notice that the name of the screen open in the working window is shown at the top right of the window (*Perform Test*). In addition some information about the tank selected will appear in the top left of the working window.

File Edit View Inventory Tools Help	
The war field whiteher tell	
<u>▶ \$?? 1/ > ? 1/ </u> <u>> 2</u>	
Process Chromic Acid Show Debug	Perform Test
Your Company Name Tank Chromic Acid	
Inventory Sample Date 7/25/2012 2:00 PM Test Status	
Processes	HMIS
Chromic Acid Test Date 7/25/2012 2:00 PM	Recall last test
B & Cupric Process	
B and Process Input a of Chromic Acid. Cr03 Lot. 057-01-02-001	
B & Desmaar Process Not Due Range: 30 - 35 Optimum: 32.2 oz/gal Cr03	
Add script Add kg Chromic Acid, Cr03	
A Layer Clean Proces Guality Assurance A Tool Calibration A Waste Treat Waste Treat Yields	
Chromic Acid Other 1 - ABC Chemistries, Inc. Size - 531.26 gal Type - Plating Tank	

Figure 7: TrueChem Working Screen

The system level buttons cause information about the facility as a whole to be displayed in the working window. For example clicking the fire extinguisher (*Corrective Action Log*) displays all of the outstanding corrective actions present.



Figure 8: System Level Buttons

Hint: Holding the cursor over a button as shown in figure 8 (Document Manager) will cause a description of the button to pop up.

2.5 Pull Down Menus

The pull-down menus are standard Windows-style menus for accessing all of TrueChem's functions. The following is a complete set of the pull down menus and shows each of the functions available under each heading. Access to the pull down menu items may be limited to specific users by "rights" selection made in User set-up. If the current user tries to access an area that their login is not set up for, a TrueChem user login pop-up will appear to login to an account with the proper rights. This account may or may not be available to the user attempting to login (more on this later in User Setup).

2.5.1 File Pull down

File pull down menu shows several standard activities. The first item under *File; New* expands further to add either a *New Process* or a *New Tank. Print* allows the user to print

1	rueC	hem	- Your	Com	ipany
File	Edit	View	Invent	ory	Tools
N	ew			F I	
Pi	rint		Ctrl+P		
Pt	rint Sel	tup		è	2
E	-Mail			Ī	
E	xport				
U	ser Log	g-out	Ctrl+O		
U	ser Log	g-in	Ctrl+I	ic	1
D	elete				
R	ename				
E	xit				
	1 5				55

Figure 9: File Pull Down Menu

the contents of the working window. *Email* and *Export* take the contents of the working window and convert them to html format for emailing to a colleague or to save as file.

2.5.2 Edit Pull Down

Under *Edit* are the familiar *Cut*, *Copy* and *Paste* commands. The last two items under the *Edit* heading *Perform Test* and *Tank Setup* are only active if a particular tank in a process has been selected.



Figure 10: Edit Pull Down Menu

2.5.3 View Pull Down

The items under the *View* heading will switch the view in the working window to the screens identified.

🖉 TrueChem - Your Company Name						
File	Edit	View	Inventory	Tools	Help	
TR		Ad	d Sheet Log		Ctrl+R	10
1		Sch	nedule		Ctrl+S	1Ë
		Sar	mple log			F
		Co	rrective Actio	on Log	Ctrl+E	Pro
	Your	Eve	ent Log		Ctrl+L	
	🔍 In	Gra	aph		Ctrl+G	
	b Pr	Tes	st Data Log		Ctrl+D	iple

Figure 11: View Pull Down Menu

2.5.4 Inventory Pull Down

The *Inventory* pull down is only visible for users that have purchased the Inventory module and provides the same features as the inventory buttons.

🖉 TrueChem - Your Company Name						
File Edit View	Inventory Tools Help					
	Create requisition	Ctrl+A	4			
🥭 🔊 🖗	Receive A Lot	Ctrl+B	:			
	Ctrl+Y	E				
	View Inventory Reports	Ctrl+Z	С			
Vour Company Name Tank						

Figure 12: Inventory Pull Down Menu

2.5.5 Tools Pull Down

The *Tools* pull down accesses functions that largely require administrator rights to activate. This pull down can take you to *System Set up*, *User Set up* and *Reports*. The *Manage* choice expands further and provides a number of options. Each of the items shown in *Manage* is a list created by other activities. For example the Additive list is created by setting up process tanks and contains the entire list of chemicals used by the facility in TrueChem. Using the *Manage* button allows the user to edit these lists to correct spelling errors or change the details of the items. TrueChem will not allow

certain changes if they affect processes. For instance, the user cannot delete a chemical from the *Additive* List that is used in a tank make-up.



Figure 13: Manage Tools Pull-Down Expansion

Note: To delete a chemical from the Additive list it must first be removed from use in each tank it is used in.

2.5.6 Help Pull Down

The *Help* pull down provides access to TrueLogic Company's help functions, and provides access to their website if the computer has web access.



Figure 14: Help Pull Down

Clicking the *About TrueChem* choice displays version information about TrueChem. This information is useful when trying to solve problems that occur.

About TrueChem				
📝 TrueChem				
Program version 4.8.44				
Program location C:\TCDDE	NTrueChem.exe			
Database type Access				
Database version 4.8.41				
Database size 15.8 MB				
Database location C:\TCDDB\TrueChem.mdb				
Notice to users: Use of this software Agreement.' Do not use this software	is subject to the 'Software License e unless you agree to its terms.			
TrueLogic, TrueChem and their logos are trademarks of TrueLogic Company LLC. © 2001 TrueLogic Company, LLC and its licensors. All rights reserved				
Check for updates	System Info			

Figure 15: About TrueChem Screen

2.6 Window Resizing

Both the main window and the width of the tree view window can be adjusted if desired.

2.6.1 Main Window Resizing

The main TrueChem window can be resized by selecting any edge and dragging. To change any of the window edge sizes, hold the cursor over the desired edge until a double ended arrow appears then click and hold while moving the cursor to shrink or expand the edge. On machines with Windows XP, the icon in the bottom right hand corner of the window has a resize grip point and resizes the window symmetrically.



Figure 16: Window Resizing

2.6.2 Hiding Tree View

Inside the working window in the upper left corner is a button with an arrow on it. This button can be used to cover the tree view and allow the working window to take up the full TrueChem area. To recover the tree view, press the arrow button again. Without the tree view, it is located below the Graphic button tool bar on the far left side.



Figure 17: Hiding Tree View

3.0 Initial Setup after Installation

There are a several settings that should be reviewed first on a new TrueChem system



setup. Select the System Setup icon from the graphical tool bar. The group of tabs shown below will appear in the working window. The user should familiarize themselves with the tabs and the variety of features they access.

TrueChem - Your Company I	Name				
e Edit View Inventory Tools	Help				1
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	4				System Set
Your Company Name	Add Sheet	Test Recall	Labels	Inventory	Dashboard
Inventory	Schedule	Library	E-Mail	Corrective Action	Database
Processes Chromic Acid Chromic Acid Cleaners Cleaners Cupric Process Cupro Process	Terms	Tracking	Graphs	Rules	Colors
🗉 🧟 Desmear Process 🖅 🍓 Electroless Ni/Au		Default terms	User defined term	s	
🗄 🎎 Electrolytic Copper 👘		Company	Your Company Na	me	
🛓 🎎 Electrolytic Gold		Groups	Process		
🛓 🍓 Layer Clean Proces		Objects	Tank		
🕫 🚜 Quality Assurance		Items	Component		
🗄 🎎 Tool Calibration		TestReport	Add Sheet	× 1	
🛞 Yields		Terms allows user-defin: TrueChem.These terms: 'Objects' and 'Group' insti- edit these terms. Company Company. The name of and on some printouts	able nomenclature for describi should be singular nouns. Use sad of 'Groups'. Highlight a row your company. This will appea	ng the terms used in e 'Object' instead of and press enter to r on the tree view	
e - 531.26 gal be - Plating Tank					

Figure 18: TrueChem System Setup Screen

Most of the setup under the System Setup only needs to be completed once for the entire system: Occasionally some setting may need to be revisited and adjusted. However, once the system has operated in the facility for a few months almost nothing in the system setup tab will need adjustment.

The default tab that appears when the system setup button is pressed is the *Terms* tab.

Terms define the terminology that your TrueChem system will use. These items can be changed at any time, and the system will update the headings they are used in. The terms relate to items that may have specific meaning for your facility. As the user goes through the list of terms, highlighting each term will enable a description in the "hints" area to assist with defining the term for the facility. To change a term, highlight the row, press return, change the term, and press return again.

Fill in your company name in the top box shown

The other tabs should be reviewed. There are some initial set up activities under each of the tabs listed below.

Schedule Tab: There are many items that need to be reviewed on the schedule tab. The shift definitions must be filled out, and they should reflect the way your company operates. Defining other scheduling options can also be accomplished by going through the list. These options can be revised later.

Library Tab: No initial work is required.

E-mail Tab: set up the e-mail server settings. If the computer handling TrueChem is not going to be attached to the internet, this needs to be disabled. For users in a larger company you may need assistance from your IT department in determining the proper email settings.

Defendence a	Line and a first and have a				
Default terms	User defined terms	<u></u>			
Company	Your Company Name				
Groups	Process				
Objects	Tank				
Items	Component				
TestReport	Add Sheet	4			
Hints					
'Objects' and 'Group' instead of 'Groups'. Highlight a row and press enter to edit these terms.					
Company					
Company: The name of your company. This will appear on the tree view and on some printouts					

Figure 19: Facility Defined Term List

Corrective Action Tab: Allows the locking of a tank and sending of an email when corrective actions are generated.

Database Tab: This tab shows the file path to the data base, and tools for backing up the database. No initial set up required.

Addslip: set up the way that Add Slips will print. Also, you can opt not to print on Print/Save command.

Test Recall: No initial work is required.

Graphs: Define the default graph settings.

Tracking: Select the TrueChem items that should be tracked in the event log. *Rules*: No initial work is required. More discussion later

Colors: Adjust the colors that appear in various places. No initial work is required. *Labels*: Used to print inventory labels if this feature is to be utilized in the inventory module. You must define a printer for the labels even if you don't intend to use them. *Inventory Tab*: Reviews a variety of settings and email condition relative to

controlling inventory.

Dashboard: This tab is used when activating the dashboard.

3.1 Creating the Facility

Some thought needs to go into setting up the facility processes. Many facilities organize their processes into process lines composed of elements (tanks). Some processes might be an individual element (tank) where multiple ingredients are added. TrueChem can easily handle either of these situations.

Note: One of the key aspects of setting up a facility is to organize the tanks by identifying the identical or very similar (e.g. cleaners are often similar) tanks throughout the facility. Identical and similar tanks should be completely created once with the makeup, tests and schedule are created and then copied to minimize effort.

3.1.1 Process Hierarchy Setup

In TrueChem, Groups are containers that hold Objects. Groups can be used to define Processes, Lines, Shop Areas, Customers, etc. Most metal finishing shops identify process lines and their component process steps as process tanks. The arrangement often mimics the physical set up the shop but that is not required. The organization should present a logical organization of the facility to the user that facilitates quick navigation to enter and evaluate data. The tree view will be mimicked on the dashboard.

3.1.2 Creating a Process

To create a process, right click on the factory icon on the tree and select *New*, then *Process*. A new process with the name <New Process> will be created. You may type any name you like for the process in the description area (Figure 20) and click *OK*. Activating and Deactivating processes will be discussed later.

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File	Edit	View	Inventory	Tools	Help		
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		🍝 C	Deactiv	ate All	- H		
	÷	Clea	New			Process	
	Ξ	0					-

Figure 20: Creating a Process

Note: Create all the process names and review the process tanks in your facility that will belong to each process. If you change your mind on the organization, tanks are easily copied.

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		🤣 🐼 😺 💂		1		23
Your Company Name	Add Sheet	Test Recall		Labels		
Inventory	Schedule	Library	Ţ.	E-Mail	Ţ.	Corre
🖶 🧄 Processes	Terms	Tracking	γ	Graphs	γ	Ri
🕺 < New Process >						
Chromic Acid						_
Chromic Acid	Add Process					
THE Cleaners						
E Cupric Process		Name < New F	process >		<u>c</u>	2k
E Remo Process					-	
Desmear Process		Other 1			<u>C</u> a	ncel
Electrolese Ni(Au		Other 2				
Electrolytic Conner		-				
		Type (None)				
	т	urn around time Default	(3 days)	*		
H Clean Proces			(0 00,0)			
👔 🐨 🐺 Quality Assurance						

Figure 21: Add Process Pop up

Once the process is created, the process setup function is accessed by pressing the setup icon below or by right clicking on the process in the tree view.



In the working window, the Process Setup window will be displayed. There are four tabs in that working window; General, Notes, Distribution and Addslips. These tabs relate to how addslips will be managed and allow the user to add general information that will be printed on each addslip generated. Shown is the distribution Tab which allows the facility to distribute addslips to the named individuals.



Figure 22: Process Setup Screen

3.1.2.1 General Tab

The "Responsible" field tells TrueChem who to notify when issues arise within this Process. Designating a responsible individual (or user group) can facilitate communication from TrueChem when emails are generated. More on this later.

NOTE: Only users defined in User Setup can be selected here. User Set up will be discussed in detail later.

In the "Type" field, the facility can distinguish between process types. For example, wet processes and dry processes like shot peening and grit blast. The Notes tab allows "Process Display Notes" to be viewed by anyone testing any tank within this process. You can also create "Addslip Print Notes" which are added to all Addslips created from testing any tanks within this process.

3.1.2.2 Distribution Tab

The distribution tab allows the set up a distribution list if multiple personnel need to be informed about additions. Email addresses can be added and the addslip sent immediately on generation.

3.1.2.3 Addslips Tab

The facility can choose to generate process line level addslips by checking the box. The type of report (Addslip) that is created for any tank in this process can be defined. By default, Addslips are created by tank. That is, each Addslip represents a test of one tank. Notifications (emails) can also be set up, however these are discussed in detail later after users are discussed.

3.2 Creating Process Elements

After the processes are created, the process elements (tanks) are created within that process. For the purposes of TrueChem a tank is any process element that requires testing. So in addition to process tanks that have chemicals added to produce the desired effect, a tank could also be created that represented the physical testing of a particular process. A tank can also be created to track a non-chemical process such as the temperature of cure oven, control of a salt spray booth or a process ventilation scrubber. Rinse tanks are not generally included unless some sort of chemistry is added that needs to be tracked or parameters like conductivity or pH are tracked.

Creating a process element (tank) is similar to creating a process. Click on the process where you are adding a tank select *New* and then *Tank*. A popup similar to the new process pop up will appear where you fill in the name of the tank (Figure 23)



Figure 23: Creating a New Process Tank

Note: When creating a facility where there are several similar tanks. Create the first tank completely and then copy it as all of the work done in the tank setup will also be copied.

The *Add Tank* pop-up also allows the user to define some additional information about the tank. The Vendor and Location entries are not required, but a volume must be entered before the screen will allow you to close. The volume units are selected from the pull down list next to the volume. If you are unsure of the volume it can be changed later without affecting any work done to create the tank.

Note: Throughout TrueChem when required fields are not filled in clicking OK will result in a message that some required fields were left blank. These fields will be highlighted in pink.

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M & Z -	Process < New Process >		
Your Company Name	General	Notes	Distribution
Processes 	Add Tank	Name KNew Tank >	<u>O</u> k
⊕ 🏽 Cupric Process ⊕ 💐 Cupric Process ⊕ 💐 Demo Process ⊕ 💐 Desmear Process		Other 1 Other 2	<u>Cancel</u>
 		Type (None) Size 0 gallon	
🕀 🍓 Layer Clean Process 🗄 🗄 🚓 Quality Assurance		Other 1	

Figure 24: New Process Tank Popup

3.2.1 Renaming a Processes and Tanks

The name of any process or tank can be easily changed. Right click the Process item to be renamed and select *Rename* from the pop-up menu. Type the new name and click *OK*.

Note: Sorting is numeric and alphabetical. To have numerically numbered tanks in the proper order, single digit numbers must be preceded by a zero.

3.2.2 Deleting a Processes/Tanks

Right click the Process/Tank items to be deleted and select *Delete* from the pop-up menu. You will be asked to confirm.

WARNING: deleting a process from the tree will delete all items within that process. This fact becomes very important after the process has been in use and the database contains operating data. Deleting the process will delete all associated data. At this point it is better to create a new process and deactivate the old in order to preserve the archival data from the old process.



Figure 25: Deleting a Process

3.2.3 Copying Tanks

Once a tank has been created with all the dimensions, make up, schedules, and documents, copying the tank can provide a great time savings if there are similar tanks in the facility. For example the same cleaner may be used in different process lines with the same analysis. Copying this tank to the new line would only require modification of the tank size to the new line and perhaps modification of the schedule for the analysis.



Figure 26: Copy Tank

To copy, right click on the tank in the tree and select *Copy*. Then select the new line where the copied tank belongs, right click and select *Paste*. A pop up will appear to confirm the copy to the selected line. The *Copy* and *Paste* commands can also be accessed from the *Edit* pull down menu.

Note: You cannot change the name of a tank or copy it if it is the tank selected (maybe you are in tank set up or looking at the data log). You must be working in another part of the program to copy/paste. One way to do this is to first the select the <u>Home</u> button from the button bar prior to changing the name or copying.



4.0 Setting up Process Elements

The tank setup activity requires the bulk of the effort to create a facility in TrueChem. It is at the tank level that the tank size, make-up, analysis tests, physical tests, scheduling of tests and the attachment of documents is completed. Tank set up also leads to creating the library of chemicals used.

Note: TrueChem's basic structure examines the facility on a tank by tank basis. This means that if the user wants to compare data relating to a particular measurement with the operation of the tank, that data must be located in the tank data. A new feature of TrueChem allows the user to overlay graphical data from other tanks and allows comparison of selected data. The data can also be exported from TrueChem and analyzed externally by the creation of a custom report or in Excel.

The process setup function is accessed by first selecting the tank to work on and then pressing the *Setup* icon below or by right clicking on the process in the tree view.



In the working window, the *Tank Setup* window will be displayed. There are eight tabs appearing in the working window; General, Notes, Test, Addslips, Schedule, Make-up, Docs and HMIS. Each of the seven Tabs in the working window will be discussed.

4.1 General Tab

During the *Tank Setup*, the default view opens the *General* tab. On the *General* tab, you must fill in the tank volume so that TrueChem can properly calculate additions. Tank volume can be entered directly in the size field on the top left side of the window. The units must be selected first from the pull down menu to the right of the size field. Alternately the volume of the tank can be calculated by entering the dimensions into the **Physical Dimensions** area on the right side of the window. In order for the tank volume

to be calculated, you will need the freeboard height as well. When all the dimensions have been entered, press the *Calculate* button and the volume will appear on the left side.

The **Vendor** field can be used to store the chemistry vendor's name. The **Location** field can be used to identify where the tank is placed within the facility. The bottom part of the window (**Safety Equipment**) can be used to define the personal protective equipment (PPE) when working at the tank. In addition, the right side on the bottom lists tank **Status** information including:

- When the tank was created
- When it was last remade
- When the setup was last modified
- Whether the tank is active or deactivated (more on activation later)

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😑 🧄 Processes	General Notes	Test Add Sheet	Schedule	Make-up	Docs	HMIS
🕀 🍓 Chromic Acid						
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🕀 🌉 Waste Treat	Created On	4/23/2010 1:05 AM				
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	Remade On	1				
<u><</u>	Changed On	1/26/1980 12:00 AM				
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Size - 93 gal						
Type - Cleaner						
•		NAMES OF A DESCRIPTION OF A DESCRIPTION OF A DESCRIPTIONO			S10.02 1	00 /2 1 000

Figure 27: Process Setup Screen

4.2 Tank Setup Notes Tab

Selecting the *Notes* tab allows the user to enter text that will be displayed to anyone performing a test or with granted rights on this tank. Addslip notes can be entered that will be included on all Addslips created for this tank. Special instructions needed for adding chemicals can be added. There is no limit to the amount of text that is entered. In

the upper-left hand corner of the *Notes* tab is a check box that allows the *Notes* tab to be the first tab that shows up when a test is being performed. One effective way to make use of the notes section is to keep a history of actions and events associated with the tank. Tank make ups can be noted, strange behavior, the result of trouble shooting activities or solution maintenance activities can all be entered here so that there is a running log of activities relating to the tank.



Figure 29: Note Tab Working Screen

4.3 Make-up Setup

The *Make-up* tab provides a way to define what add amounts and additives will be needed when making up a Tank. The bottom half of the window has space to enter instructions that will be printed on the Remake Report (it will look identical to an addslip). As shown, the make-up procedure instructions can be added here. The top half of the window shows the additives (chemicals) used in the make up the process solution. Chemical ingredients are added by clicking on the *Add* button in the middle of the window. This brings up a *Make-up* pop up (Figure 30). Additives are selected from a list. The additive list initially contains no additives. As processes are defined, chemicals are added to the list and may be selected for other tanks using the same materials (see Figure 30). In defining additives, information such as its unit of measure is entered and a vendor can be entered.

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File Edit View Inventory Tools H	elp			
<u>10 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2</u>		<u>8</u>	۲	
	Process Demo Process			Tank Setup
😧 Your Company Name	Tank 06. Demo Tank			
😑 🧄 Processes	General Notes Test Add Sheet Schedule	Make-up	Docs	HMIS
🕀 🚊 Chromic Acid				
🗄 🍓 Cleaners	Dejenized Water	Amount	Units Type	Calculated
🗉 🧝 Cupric Process	WZ Comparison	0.8	gallon By Vol.	448.0 gai
😑 🎎 Demo Process	ARC ARC	0.1	pound By Vol.	56.0.lb
- a U1. Conditioner		10.1	podila [by voi.	30.0 10
12 Oleanary				
12. Cleaner A				
16 Etch				
Resmear Process				
H A Electroless Ni/Au				
+ 🧏 Electrolytic Copper				
🕂 🧸 Electrolytic Gold				
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🗉 🚊 Quality Assurance	Add Modify Delete			
🕀 式 Tool Calibration	New Makeup pates			
🗄 🏯 Waste Treat				1
🗄 🎯 Yields				
	- Drain the tank and scrub out.			
	- Change filters.			
	- On pumps. - Refill with chemicals in the order listed helow			
	- Mix thoroughly.			
<	- Heat to operating temperature.			
06. Demo Tank				
Other 1 - Acme Chemical				
Company Other 2 Wet free 1				
Size - 560 gal				
Type - Plating Tank				
Logged In System Administrator.	Add Sheet Past Due Schedule Pa	st Due Co	rrective Action	Samples 13

Figure 30: Tank Setup Make up Tab Screen

ž	arranto				process
	Make-up				
	Item				Ok
	Additive	<select from="" list=""></select>	-		<u></u> ^
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	V	3308 A 3308 B 3313 Neutralizer	-		
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			U vvednesday		
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			□ Saturday		

Figure 31: Additive List

Once a chemical is selected from the list the make-up information can be entered. For example, if the process solution concentration is 0.1 lb/gal, the unit selected would be pound. By clicking the *volume based* check box the program will access the tank volume

and determine how many pounds are needed for the tank. To complete the makeup calculation, 0.1 is entered into the *Per unit of Tank Volume* field and the desired number of decimal points. When complete, click *OK* and the additive, the concentration and the amount required for make-up appear on the *Tank Set-up* screen (Figure 33).

Make-up	
Item Additive 3313 Neutralizer Units gallon Volume based Percentage of New Makeup 0.1 Decimals 0 V	<u>O</u> k <u>C</u> ancel <u>H</u> elp
Production Add Standard Add Amount 0 Monday Production Factor 0 Tuesday Wednesday Thursday Friday Saturday	

Figure 32: Tank Make up Pop up

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M & 2 .	Process	Demo Process							Tai	nk Setup
Your Company Name	 Tank	06. Demo Tank								
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2000	~	~	~				
🖻 🧄 Processes	General	Notes	Test	Add Sheet	Schedule	Make-	ib [	Docs	H	HMIS
E 😤 Chromic Acid	Chemical Nam	1e				Amount	Units	Type	Calculated	1
Cupric Process	Deionized Wat	er				0.8	gallon	By Vol.	448.0 gal	-
Remo Process	XYZ Concentra	ite				0.1	gallon	By Vol.	56.0 gal	
A 01 Conditioner	ABC					0.1	pound	By Vol.	56.0 lb	
A 06 Demo Tank	3313 Neutraliz	er				0.1	gallon	By Vol.	56 gal	20
- 12. Cleaner X						62	12.00	12/08	10 - 90	
										1100
16. Etch										

Figure 33: Additive added to Tank Make up

Warning: once a tank has been activated and used with a particular chemistry, TrueChem will not allow the changing of the additive for that tank. So if the chemistry is changed at some point a new tank must be created.

#### 4.3.1 Additive Set up

The additive list is used to create the library of chemicals used by the facility. During *Make up*, if an additive not on the list is needed, selecting < New additive > (located at the very top of the list on the additive pull down) will display the pop up in Figure 34. The **Additive Type** can be defined." Chemical" is the default. The **Name** and **Short Name** of the chemical is added along with **Stock Units** of measure. These units should match up to how the chemical is added to the tank (i.e. weight or volume).

Chemical Chemical type	Chemical	▼ <u>k</u>
<u>N</u> ame		<u>C</u> ancel
Short name		
Stock units	<b></b>	
Internal part number		
FIELD2	Mo	ire
General	HMIS	Docs
Unit class conversion	ICALNAME> equais	entory Controlled
Chemical Properties Minimum quantity	<unit></unit>	
Maximum quantity	<unit></unit>	
Inventory lots requ	re an expiration date	

Figure 34: New Additive Pop up

If the facility has not purchased the Inventory Module, then the bottom portion of the screen showing minimum and maximum inventory levels and expiration dates will not be seen.

## 4.4 Test Setup

The **Test** tab is where specific details of the test for this a are defined. Tests can include chemical analysis of the solution components, physical test results or process parameters such as temperature or pH. Items are added to a list from top to bottom that make up the necessary elements for testing this chemistry by clicking *Add*. Existing items can be modified or deleted from this screen. The choices are **Test Description** (highlighted in gray), **Input Value**, **Result Calculation** and **Adjustment**. Each new item added goes to the bottom of the list. The order is important as it can affect how calculations are done during a test (more on that later). In general, each input, result and adjustment for a particular additive should be grouped together as this allows the individual tests to be completed without testing the rest of the tank items.

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Your Company Name	L Ta	06 Demo Tank	
Inventory			
🖻 🧄 Processes	General	Notes Test Add Sheet Schedule Make-up Do	cs HMIS
🗄 🍓 Chromic Acid	BODE V.C.		
🕀 🧟 Cleaners	Test	ABC CONCENTRATION ABC Test Procedure	<u>•</u>
🕀 🍓 Cupric Process	Input	Input ml of Thiosulfate INP1	•
😑 🎎 Demo Process	Input	Enter Normality INP2 0.1	•
- 🔬 01. Conditioner	Result	[INP1] * [INP2] *4 RST1 g/L ABC Concentration	
💰 06. Demo Tank	Adjustment	Add to: 2.40 Start at: 2.30 Add ADJ1 Ib ABC	
— 👗 12. Cleaner X	lest	XYZ CONCENTRATION XYZ Test Procedure	
- 🔬 13. Copper	Input	Input mi of Hydrochioric Acia INP3	
📥 16. Etch	Recult	(INP21 # INP 4) (2000	
🕀 🎎 Desmear Process	Adjustment	Add to: 1 Add AD 12 gr X12 Concentrate	
🕀 🌉 Electroless Ni/Au	Test	nH nH Test Procedure	
Electrolytic Copper	Innut	Enter nH Reading INP5	
Electrolytic Gold	Result	(INP5) RST3 nH	
+ 3 Custitute an Process	Adjustment	Add to: 7 Start at: 7.1 Add AD.14 gal Sulfamic	
+ M Guality Assurance	Adjustment	Add to: 7 Start at: 6.9 Add ADJ5 Ib Nickel Carbonate	
H Maste Treat			
H Maste Treat			
tielus			
<u>×</u>			
06. Demo Tank 🛛 🕺			
Other 1 - Acme Chemical			
Other 2 - Wet Area 1	1		
Size - 560 gal	1		
Type - Plating Tank	Add		
Logged In System Administrator.		Add Sheet Schedule Corrective Action	Samples 13

Figure 35: Tank Setup Test Tab Screen

The arrows on the right side of the screen can be used to re-arrange the test items. Simply click the item and then click the arrows to move the item up or down. Holding the shift key down and selecting a group of items allows movement of the entire highlighted group.

Double clicking the eye-shape on the right allows the line to be hidden. This is useful for intermediate calculations.

Warning: Changing an input value, result calculation or adjustment calculations will eliminate or invalidate all the data stored in TrueChem related to that item. If a new method must be incorporated and the old data must be retained, then a new tank must be created to use the new method.

#### 4.4.1 Adding a Test Item

Choosing the *Add Test Item* dialog displays the choices listed. From this dialog you can select:

- *Test Description*: these items are simply title bars that help separate sections of the test.
- *Input Value*: these items allow input of raw test values such as mls of titrant, concentration of titrant or physical test items such as number pits in a salt spray coupon. Any data recorded for a test can be input.
- *Result Calculations*: these items are used to calculate the value that is being tested for (e.g., oz/gal of Metal, pH, etc).
- *Adjustment*: these items are used to calculate the amount of additive to be added to the Tank to adjust a result item.

dd Test Iten	1				
Item Type	C Test Description	C. Input Value	C Result Calculation	C Adjustment	<u>O</u> k
district in the second	, taste compren	inpar varas		, Adjustitent	<u>C</u> ance
					Help

Figure 36: Add Test Item

## 4.4.2 Adding a Test Description

By selecting *Test Description* this screen will display:

Add Test Item	
tem Type	<u>O</u> k
C None 🖲 Test Description C Input Value C Result Calculation C Adjustment	
Test Description	<u>C</u> ancel
Description	Help
Short description	
Test instructions	
Description	
Ͳ 🔊 Β Ζ 및 ≣ ≣ ≣ Ξ Ξ Ξ ⊈ 🗐 🥮 🗒	
Body	
Revision Revised by Revised on	
, , , , , , , , , , , , , , , , , , , ,	

Figure 37: Add Test Description

When adding a test description, simply type the **Description** or name of the test in the description field and click *OK*. Once the *Test Description*, or any test item, has been added, it will be listed in the window on the **Test** tab. The left-hand side of the row created will indicate the type of test item added. Clicking *Add* again will allow more test items to be added.

Note: The items in the Test tab of the Tank Set-up window can be rearranged by clicking on the item and then clicking on the arrows at the right of the screen (see Figure 33) to move the item up or down.

#### 4.4.3 Adding an Input Item

By selecting *Input Value* option the screen in Figure 38 will display. Selecting the **Prompt text** field allows a description, direction or prompt that will ask the testing personnel to input the data. For example, "Please enter mls of HCl used to titrate". The **Default Input** field is optional and can be used to pre-fill the input field with a value that can be modified at test time.

Add Test Item		
Item Type	C Result Calculation C Adjustment	<u>O</u> k
······································		<u>C</u> ancel
Input Value	C Inventory Controlled	<u>H</u> elp
Prompt text	Short prompt	
Default input	Input value restrictions	
Value	Lowest	
🗖 Save changes	Highest	
Log changes		
☐ Save input data as text		

Figure 38: Input Value

Additional check boxes are provided to save the changes so the new value appears as the next default value and to log changes. **Input value restrictions** can limit the **Lowest** and **Highest** (also optional) input values and can be used to set the lower and upper limit of acceptable inputs. When all the fields are complete, click *OK*.

## Note: the Save input as text is used when an alpha numeric text is needed to be input such as a part number.

Once the *Input Value* item has been added, it will be listed in the window on the test tab. TrueChem assigns a number to the variable created by the input item (INP1) as the name of this input item. This variable name is then used in other calculations.

lank Mv	New Tank					
General	Notes	Test	Add Sheet	Schedule	Make-up	Docs
Fest		My My Raw Test V	/ First Test alue Input INP1			_

Figure 39: Test Screen With Added Items Displayed.

This is the variable name that will be used to access the input value in the *Result Calculation* item. Clicking *Add* again will allow more test items to be added.

#### 4.4.4 Adding a Result Item

When the *Result Calculation* option is selected, the screen in Figure 40 is displayed: In the Calculation field enter the formula that will be used to calculate the result item. In this example INP3 and INP4 have been entered with square brackets [] around them. The square brackets are <u>required</u> and their function is to tell TrueChem that you want it to translate the variable name in the brackets to the actual value it represents. The equation reports the calculation result as "g/L XYZ" which has been entered in the Result Description field. Notice that an equals sign is not required and that the formula syntax is similar to ExcelTM. Both ExcelTM and TrueChem operate in Visual Basic and the syntax is the same.

The **Short Name** is used in the log book view to label the column. Decimals should be set to the number of decimals with which the result is to be stored. Result specification limits should be entered in the **Upper, Optimum**, and **Lower** Spec fields. The **User 1** limits fields are typically used to establish shop limits or "action levels" that require a change to the tanks to prevent them from going outside the specification limits. **User 2** limits can be used to refine that further. The Bailout section is used for solutions that become too high in concentration, usually from contaminant growth. Set points calling for a decant can be set along with the target level used to calculate the bailout.

Modify Test Item	
Result Calculation       Test       Result Description            • Calculation           Test           g/I XYZ Concentration             • Script           Spec.           Decimals             Result=         ([INP3] * [INP4]) / 2000           Short Name           Decimals             Script           Limits           Spec.           User 1             Optimum         .1           Custom           Lower           .01             Bailout           If         Above           .34           Adva	Ok Cancel 2 ▼ Help er 2 ■
Apply Rules       Add       Use Rule Set       Modify       Delete	

Figure 40: Result Test Item Screen

The *Apply Rules* section allows *custom* or *global* rules to be attached to this result item. For more details on using rules see the Using Rules section of this document. When the result item is completed, click *OK* to save it. Notice that the result item is now added to the test window.

Note: A calculation can be changed after the tank has been in operation (data has been entered). However changing the calculation may invalidate any previous data recorded with that result. If saving the old data is important, a new tank should be created for the changed calculation and the old tank de-activated.

#### 4.4.5 Adding an Adjustment Item

Adjustments are additions to bring the solution ingredient concentration to a predetermined set point. Adjustments can be set up two different ways. Most adjustments can be handled by using the standard adjustment form. An example is displayed in Figure 41. The other option is a custom adjustment shown in Figure 42. The adjustment calculation follows the basic form in the equation below.

Adjustment (g) = (set point conc(g/L)-current conc (g/L)-) x tank vol(L)

Setting up the adjustment involves selecting the additive, the unit of addition (pounds, gallons, grams, etc.) and supplying set points. The standard adjustment allows you to select and/or fill in these items to create the equation. The first step is to select the Adjustment.

In the Add pull down box, select the additive to be used.

NOTE: If the additive is not in the pull down list, select the item in the list <New Additive> (refer to next image for adding a new additive to the list). NOTE: Once an adjustment is created with an assigned additive it cannot be changed. If the chemistry is changed and a new tank is not created, the adjustment must be deleted and a new one created to allow the new reference additive.

In the example shown, the equation reads as follows:

"<u>ABC</u>" is added *in the amount of* **1 pounds** *to adjust* <u>RST1 g/L ABC</u> concentration by **1.2 g/L ABC** *for every*_**100 gallons of volume to obtain a value** of **2.4** (g/L). In the sentence above the items in parenthesis are understood. Of course, if the concentration is in oz/gal or grams/Liter then the entries would be changed to reflect the actual method of addition. In addition, the Increment of the addition can be specified as well as the starting point.

If the advanced button is pressed, the screen in Figure 42 appears and the minimum or maximum add can be set.

Modify Test Item	
~ Adjustment	<u>0</u> k
Calculation type: 🙃 Standard C Custom	<u>C</u> ancel
Add ABC	Help
To Adjust RST1 - g/L ABC Concentration V By 1.2 g/L ABC Concentration	
For Every 100 gallons of volume  To obtain a value of 2.40	
Start making adds at 2.30 Increments .25 Advanced	Test
Apply Rules	
Add	
Modify	

Figure 41: Standard Adjustment Screen.

The same adjustment could also be accomplished using a custom calculation as shown in Figure 42. Here, the additive is selected as well as the unit of measure and the minimum increment. The equation is entered as shown. The difficulty with the custom calculation is that all the data must be entered into the calculation. Variables have been used for the

	Modify Test Item		
	Adjustment Calculation type: C Standard C Custom		<u>O</u> k Cancel
	Add ABC   Units pour	id 🔽	
	Script =(([rst.opt]-[rst])*[obj.volume]*3.79)/454		<u>H</u> eip
•			
	Increments 25	Advanced	Test
ţ	Apply Rules		
)	Add	1	
	Modify		
	Delete	•	

Figure 42: Sample Custom Calculation

optimum value ([rst.opt]) and for the tank volume ([obj.volume]). Notice that the variables are not capitalized.

Note: TrueChem variables are not case sensitive. A complete list of TrueChem variables is found at the end of the Training Guide. The most up to date list is found on TrueLogic's help website. Decants are handled in the Result item. Many users find it more useful to define a minimum add amount. This is accomplished by pressing the *Advanced* button. The screen in Figure 43 will appear. The **Minimum** field is used to identify the minimum add amount allowed, meaning that any adds smaller than the minimum will not be issued. The **Maximum** field is used to set a maximum amount that will be added for any one given test.



**Figure 43: Advanced Options** 

Once the calculations for the adjustment (either standard or custom) are completed, clicking OK will add the adjustment to the test tab in Tank setup.

Note: TrueChem makes all calculations in a step fashion. This means that in order to analyze and adjust only one component, all calculations pertaining to that item should be grouped together. Grouping all the adjustments at the end then forces the calculation of all items before an adjustment is calculated.

## 4.5 Addslip Setup

The *Addslip* tab allows for the setup of Addslips. By default, all tanks use the settings defined on the *Addslip* tab in the System Setup. By clicking on *Use System Default* you can disable the fields allowing customization of the Tank Add Sheet. Even if the addslip is not being customized, the allotted time fields can be adjusted if special circumstances require a different than standard time for signoff (completion of adds) of the addslip for this tank.

With the *Use system defaults* box unchecked, the Print Addslip (add sheet Template), Store Image (Print/Store Options) and Track Addslip fields are activated. A standard addslip template is loaded, but facility custom ones can be loaded into TrueChem. In addition, TrueChem allows a paperless operation where addslips are viewed and not printed. There are a number of options to choose from, such as, time allotted to complete an add and what information will be placed on the Addslip. Each item has pull down menus to assist with decisions.

Note: When establishing the times allotted for various activities, it is important to provide sufficient time to complete the tasks. Exceeding the time allotted requires sign off and creates additional activity to explain why things were not completed as planned.

🙋 TrueChem - Your Company N	ате		
File Edit View Inventory Tools H	lelp		
1 2 2 1 2 1		: 🚔 🛷 🖉 🕵 🍿 🧃 🗷 🕋 🎎 🤮 🍙 📀	
M & 2 .	Process	Demo Process	Tank Setup
Your Company Name	 Tank	06. Demo Tank	
Inventory			
E 🌰 Processes	General	Notes Test Add Sheet Schedule Make-up Docs	HMIS
Chromic Acia			
+ R Cupric Process			
🗄 🍓 Demo Process			
- a 01. Conditioner		Ise exstem defaults	
12 Cleaner V			
		Print Add Sheet	
🚽 👗 16. Etch		Add Sheet template Standard Add Sheet	
🕀 🍓 Desmear Process		🔽 Store image	
Electroless Ni/Au		PrinttStore options PrinttStore only Add Sheets with adjustments 👻	
+ & Electrolytic Gold		✓ Track Add Sheet	
🛓 😹 Layer Clean Process		Lock if not Signed Off	
🕀 🍓 Quality Assurance			
⊕ 🎎 Tool Calibration		Allotted Time   8 hours	
		☐ Send an email when a Add is late to (None)	
Linega Correct		Require Add Sheet review before signoff	
		Image content	
		Only results tested	
		Only additives with adjustments	
06. Demo Tank		Test summary template Test record summary	
Company			
Other 2 - Wet Area 1			
Type - Plating Tank			
Logged In System Administrator.		Add Sheet Past Due Schedule Past Due Corrective Action S	Samples 13

Figure 44: Add Sheet Setup

## 4.6 Schedule Setup

On the **Schedule** tab, tests and maintenance frequencies can be defined. In the top section, any result item created under the **Test** tab will be listed. Each item can be scheduled. You may not want to schedule items that are created as intermediate results of multi-step calculations. It is sufficient to schedule the final result of the calculation. When the screen is initially opened, none of the items listed will be scheduled. Schedules are established by clicking on the item and then selecting *Modify*. In the lower section (*Other Schedules*), activities such as tank maintenance, solution bleed and feed, remakes, filter changes, calibrations, etc. can be added and scheduled.
🧭 TrueChem - Your Company N	ame				
File Edit View Inventory Tools H	elp				
1		2000	2 3 4	8 🔒 🔹 🥝	
	Process Demo F	rocess			Tank Setup
Your Company Name	Tank 06 Den	no Tank			
Inventory	runk j eer een				
😑 🧄 Processes	General Not	tes Test Add Sheet	Schedule	Make-up D	ocs HMIS
🕂 🍓 Chromic Acid	a destas con escara en				
🗐 🚠 🧟 Cleaners	Test Schedules				· · · · · · · · · · · · · · · · · · ·
🕀 🍓 Cupric Process	Item Description	Schedule Frequency	1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 -	Frequency level	Start date\time
😑 🎎 Demo Process	g/L ABC Concentration	Daily, Every day on Mon, Tue, Wed	I, Thur, Fri, 7:00 AM	Normal	7/30/2012 6:59 AM
- 🍝 01. Conditioner	g/I XYZ Concentration	Daily, Every day on Mon, Tue, Wed	, Thur, Fri, 7:00 AM	Normal	7/30/2012 6:59 AM
🙆 06. Demo Tank	PH	Daily, Every day on Mon, Tue, Wed	, Thur, Fri, 7:00 AM	Normal	7/30/2012 6:59 AM
– 👗 12. Cleaner X					
🙆 13. Copper					
16. Etch					
Electrology NVA					
Electroless NIAU					
Electrolytic Copper					
Aver Clean Flocess					
Tool Calibration	Modify Options				
Waste Treat					
The Marker Hour	Other Schedules				
E cas house	Item Description	Schedule Frequency		Frequency level	Start date\time
	Makeup	Monthly, First Sat of every 3 month	hs, 7:00 AM	Normal	8/22/2012 5:55 AM
< >					
06. Demo Tank					
Company					
Other 2 - Wet Area 1					
Size - 560 gal					
Type - Plating Tank	Add Modify	<u>Delete</u> Options			
		2011/02/21 14		1 221 12 2000	
Logged In System Administrator.		Add Sheet	Schedule	Corrective Action	Samples 13

Figure 45: Schedule Set up

🧭 TrueChem - Your Com	Schedule setup	
File Edit View Inventory	Scheduled Item Description pH Priority 3  Can NOT be deactivated Type Test Last Done	Tank Setup
01. Conditione	Effort 20 minutes	7/30/2012 6:59 AM
- 3 13. Copper	🗹 Normal 🛛 🛛 Daily, Every day on Mon, Tue, Wed, Thur, Fri, 7:00 AM 🔍	
🚽 🧕 16. Etch	Accelerated Same as Normal	
⊕ 🧸 Desmear Process     ⊕ 🏂 Electroless Ni/Au     □ 🦉 Electroless Ni/Au	Decelerated Same as Normal	

Figure 46: Test Frequency Set Up

Initially, a result item will show "Not scheduled" in the frequency box. If the frequency listed is selected, a pull down arrow on the far right of the "normal" frequency will list each frequency already used. Any previously created frequencies can be selected by highlighting the desired frequency from the list. When an existing frequency is selected, the details of the frequency cannot be modified. They are shown grayed out. If these

conditions do not meet the current schedule requirement, then a new frequency must be created.

To create a new frequency, select <New Frequency>. When a new test frequency is requested the pop up below opens. The schedule selected depends on how the frequency is used. Pick the increment needed. A few rules will assist in selecting the proper base frequency. If the desired frequency is every two days select "daily" for the frequency. If three times per week is desired pick "weekly". The schedule is further refined as described on the next figure. The same rational is used for biweekly, once per month or once every six months - or for testing required several times per day.

Add frequency	
Schedule Selection           Schedule Selection           Image: None         C Yearly         C Monthly         C Weekly         C Daily         C Shift           Image: Use custom frequency description         C Security         C Shift         Shift         C Shift         C Shift         Shift </td <td><u>O</u>k <u>C</u>ancel</td>	<u>O</u> k <u>C</u> ancel
Description Short description	

Figure 47: New Test Frequency Set Up

The frequency selection opens another window with more details to select. Shown in

Add frequency	
Schedule Selection C None C Yearly C Monthly  Weekly C Daily C Shift Use custom frequency description	<u>O</u> k <u>C</u> ancel
Description Short description	
Schedule Times Start Time	
Allotted Time None before start	
Weekly Schedule	
Every 1 week(s)	
On 🗖 Sun 🗖 Mon 🗖 Tue 🔽 Wed 🔽 Thur 🦳 Fri 🔽 Sat	

#### Figure 48: New Detail Frequency Set Up

Figure 48 is the window for weekly testing. There are several decisions to make for the new frequency. When the choices are made, click *OK* to save and exit.

Note: Required items not completed will result in the window remaining open and the required items highlighted pink.

Note: When establishing the times allotted for various activities, it is important to provide sufficient time to complete the tasks. Exceeding the time allotted requires sign off and creates additional activity to explain why things were not completed as planned.

## 4.6.1 Other Schedules

In the lower section of the Tank Setup **Schedule** tab is **Other Schedules**. In this section, schedules for activities not covered by the calculations can be established. Items such as filter changes, carbon treatment, dummy plating, calibrations, etc are scheduled here. This function can be used for any event that might occur to a tank at any frequency.



Figure 49: Other Item Scheduling

Since these activities are not based on a calculation, each item must be created. Selecting the Add a schedule in the *Other Schedules* section brings up the pop up shown in Figure 50. A description of the activity must be entered, and the *Print* section must also be constructed by selecting or creating from the print menu pull down. These instructions will show up on an Addslip that is printed when the item comes due. Other schedules are completed by going to the schedule window by clicking the schedule icon. The default display is for all currently due items. Other schedule items will be mixed in.

Schedule setup	
Scheduled Item	<u>O</u> k
Description	
Priority 10 - Action Print library	Cancel
☐ Can NOT be deactivated	<u>H</u> elp
Type Other	1
Work location * Same as Tank 🗸	Last Done
Allotted Time None	
Print <select from="" list=""></select>	
Frequency     Normal     Select From List>     Standard acid handling instructions     How to Add Sulfuric Acid     Handling instructions for 748 salts     Select Proceeding Alkeling Material	
Accelerated Reagents	
Decelerated Container information Storing Procedures for acids	
Schedule Selection © None O Yearly O Monthly O Weekly O Daily O	Shift
Vse custom frequency description	
Description Not Scheduled Short description	

#### Figure 50: Other Schedules Setup Window

Since there are no calculations associated with these items, selecting an Other Schedule item in the Schedule and clicking "Do Now" opens the output screen for printing and saving. Items from the print menu will be printed on the Addslip form as instructions to complete the task. Sample instructions are shown in the Figure 51. Changing the instruction of a Library item requires going to the System Setup button and the Library tab. The selected item can be updated as desired.

Note: Other schedule item addslips will show no addition due and appear blank when opened in the Addslip Log

Name	
Fed 	1 🎎 🔒 🖈 🕑
<u> </u>	System Setup
Terms       Tracking       Graphs         Add Sheet       Test Recall       Labels         Schedule       Library       E-Mail         ID       Description       1         Standard acid handling instructions       2         How to Add Sulfuric Acid       4         Modify Library Note       6         6       Type         7       Description         9       10         10       Acid Handling         11       Acid Handling         1.       Normal precautionary measures for handling corrosive acidic materials should be observed.         2.       Avoid contact with skin, eyes, and clothing. Use safety goggles, trubber gloves and protective clothing when handling the material.         3.       Never adl water to acid. Always add acid to water.         4.       Never allow sulfuric acid to come in contact with metal. The reaction causes very flamable hydrogen gas to be released.	Rules     Colors       Inventory     Dashboard       Corrective Action     Database       Type     Library       Library     ary       ary     ary

Figure 51 Print Library Instructions for an Other Schedule Item

#### 4.6.2 Sample Module

The sampling module is part of the standard TrueChem package. The sampling icon appears next to the perform test icon



The sample module allows the facility to separately record and track samples used for monitoring processes. The sample module was designed for chemical suppliers that receive samples from their customers and needed a way to track the processing of these samples and report to their customers the status of the analysis. This feature is also very useful for metal finishing facilities that want to track samples sent off site for analysis. Offsite for the purposes of this discussion is out of the lab where TrueChem users enter data. Thus, "offsite" includes labs in another part of the facility or outside labs that are contracted to perform specific testing.

The sample feature is used by clicking on a process line or a tank in a process line and then pressing the sample icon. A list of all of the tests used in that process line appears in the working window and the tests desired for the sample are selected by checking the check boxes. TrueChem then assigns a unique tracking number for the sample and assigns the current date and time as the start time. TrueChem tracks the time until the sample results are entered. The default setting for TrueChem is with the Sampling Module deactivated, and then the Sample and test times are the same. The Sampling module is included in the base version of TrueChem. If the sampling module has not been requested and the facility decides it would be useful, simply contact TrueLogic and we will activate the module for the facility.

🖉 TrueChem - Your Company Na	ime					
File Edit View Inventory Tools He	elp					
<u>}</u>		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	2 🖹 🍭 🙈 🔒	۰	
	Process Demo Process					Log samples
Your Company Name	Sample Date 7/31/2012 11:23 AM					
Inventory	Due data 0/0/0012 11/22 11					
🖃 🧄 Processes	Due date 8/3/2012 11:23 AM					
🗄 🍓 Chromic Acid	Notes					~
🗊 🙀 🧟 Cleaners						
🗉 🧟 Cupric Process						
🕀 🎎 Demo Process						
🕀 😹 Desmear Process						
🕀 🍓 Electroless Ni/Au						
🗉 🎎 Electrolytic Copper						~
🗉 🎎 Electrolytic Gold						
🗄 🍓 Layer Clean Process		7			1	
🗄 🎎 Quality Assurance	Process Tanks (Demo Process)	Sample Number	Tank size	Other 1	Other 2	Current level
🕀 🎎 Tool Calibration	01. Conditioner		240 gal	ABC Chemistries, Inc.	Wet Area 1	
🕀 🎎 Waste Treat	06. Demo Tank		560 gal	Acme Chemical Company	Wet Area 1	
🛨 🍘 Yields	12. Cleaner X		315 gal	Acme Chemical Company	WET AREA 1	
	13. Copper		240 gai 240 gai	Acrie Chemical Co.	Wet Area 1	
			240 gai	ABC Chemistnes	wetarea	
Demo Process						
Other 2 - 0						
Type - (None)	<					>
	Print bench worksheet					
	Add Clear					Import
Logged In System Administrator.		Add She	et Past Due	Schedule Past Due Com	ective Action	Samples 13

Figure 52: Sample Module Main Screen

The sample module can also be used to initiate the gathering of a sample for processing. A time window for completing the sample processing provides clear tracking of when the sample was gathered/received and when the analysis results are recorded. The default sample completion time is 3 days.

Some facilities choose not to use this feature especially when samples are gathered and immediately analyzed. If the sampling module is not utilized, TrueChem assigns the sample time to be the time when the results are entered.

# 4.7 Docs Setup

On the **Docs** (Document) tab, multiple documents can be attached to this tank. Attaching a document forms a link. This allows the referenced documents to be maintained and

managed outside of TrueChem. As long as the document filename is maintained and the path is consistent, TrueChem will access the posted document. Documents typically attached include specifications, procedures and MSDS. There is no-limit to the number or types of documents that can be attached. The attached document will be available to anyone performing a test on this tank.

Note: The documents must reside on a computer accessible by the computer that TrueChem is located on - such as the computer itself or a shared drive on the company network.



**Figure 53: Document Screen** 

# 4.8 HMIS Tab

The HMIS tab helps the facility communicate the hazard level of the materials in use for a particular tank and to define the personal protective equipment required to perform work at the tank.

🧭 TrueChem - Your Company N	lame							
File Edit View Inventory Tools H	Help							
🏂 🗴 🐼 🔊 🕢			Ö 🕼 🖉		2 🗈 💐			
M 42.	Process E	lectroless Ni/Au						Tank Setup
Your Company Name	Tank 0	1. Cleaner PC-4	154					
- Inventory				v	v	~	~	~
😑 🧄 Processes 🛛 🚺	General	Notes	Test	Add Sheet	Schedule	Make-up	Docs	HMIS
🕀 🍓 Chromic Acid						- 10	-A.	_
🗉 🎎 Cleaners								
🕀 🍓 Cupric Process								
🗄 🎇 Demo Process								
🕀 🌉 Desmear Process								
Electroless NI/Au				Hazard I	ndex	On actavial: (*) av	othor	
- A Dranaelt 740				4 = Seve	ere	designation corre	esponds	
04. Preposit 748     107. HCL Brodin		Health		3 = Seri	0115	to additional info	mation	
08 SMT Catalyet						on a data sheet o	r	
10 HCl Postdin		Flamn	nability	2 = Mod	erate	separate chronic	enects	
- A 13. SMT Nickel		Reacti	vity	1 = Sliat	ht	nouncation		
- 👗 17. Nickel Activat								
🛁 👗 19. SMT Gold		Personal	Protection	X 0 = Mini	mal			
🗉 🎎 Electrolytic Copper		0.00	to the late &					
🗉 🎎 Electrolytic Gold		Safety equi	pment					
🗄 🎎 Layer Clean Proces		So L	Safety glasses	Spl	ash Goggles	🗺 🗆 Face sh	ield	
+ 3 Guality Assurance					ſ	0		
I Waste Treat			Gloves	E Boc	ots	Apron		
+ M Yields		-1	Full ouit		t maek	Acid E Vanor re	enirator	
		JI, ,	i di sui		SUINGON	Capo i vaporio	sopilator	
< >		1 kiji 🗗	<ul> <li>Dust / vapor respirator</li> </ul>	😨 🗖 Full	face respirator	Airline h	ood or	
01. Cleaner PC-454 Other 1 - ABC Manufacturing Other 2 - Wet Area 2 Size - 93 gal Type - Cleaner				1 <u>1</u> 7		maak		
Logged In System Administrator.			A	dd Sheet Past Du	e Schedule P	ast Due Correct	ive Action	Samples 13

Figure: 54: HMIS Tab page

# 4.9 User Setup

Establishing who will enter, store, review and manipulate data is an important part of the setup of TrueChem. Defining the users and their rights also helps the facility define the roles and responsibilities pertaining to the process areas more clearly. The user setup is where access to the TrueChem functions is established. Creating user accounts is an effective way to build the email directory for personnel receiving notification for various reasons.

## 4.9.1 Defining Users

Initially, TrueChem come with two users; the Default User that opens when TrueChem is started and the Administrator (Admin). To create a user you must have administrative rights. Select the User Setup button from the graphical menu bar.



The initial view is Active Users. There are additional views: Locked Users, Inactive Users and All Users.

					4 🗾 🗐	🍭 🏖 📋	
	-	 					User Se
Inventory	_	View Active u	isers \ Groups 💌	1			
A Processes		User	users	Last Name	Department	Title	Users\Groups
Chromic Acid		Admin Inactive	users -	Administrator	TrueChem	Admin	
🖬 🍓 Cleaners		Defaul All user	s \ All groups	User	TrueChem	Default User	
a 🧌 Cupric Process		Roger	Roger	Smith	TrueLogic	Engineer	Techs
		Sonia	Sonia	Campos	Lab	Lab Tech	Techs
- A Conditioner		matt	Matt	Akin	TrueLogic	Sales	
- Of Dome Tank		dcollins	Dan	Collins	Management	Director	Techs
12 Observation		tobin	Tobin	Alexander	TrueLogic	Sales	Manufacturing
- A 12. Cleaner X	8	Techs	Lab Technicians	12	10 A	20. 	dcollins, Sonia, John, Sally, Rol
- a 13. Copper	8	Eng	Process Enginee	Irs	222	a.	aHickman, jamie, Jessica, Ran
		John	John	Smith	Lab	Tech	Techs
🕀 🌉 Desmear Process		Sally	Sally	Johnson	Lab	Tech	Techs
🗄 🌉 Electroless Ni/Au		Robert	Robert	King	Lab	Tech	Techs
🗄 🌉 Electrolytic Copper	-	Randal	Randal	Babcock	Engineering	Engineer	Eng
🗄 🌉 Electrolytic Gold		Jessica	Jessica	Moore	Engineering	Engineer	Eng
🗄 🍇 Layer Clean Process		George	George	Suarez	Manufacturing	Technician	Manufacturing
🗉 🍓 Quality Assurance	6	QA	Quality Assurance	P 1000002	manataning	Troominioidit	iamie Chris
🗉 🎎 Tool Calibration	22	Manufacturing	adding About and				George tohin
🗄 🍓 Waste Treat	22	iomio	Ismie	Brandenhurg	LOA	OA Engineer	Eng OA
🗿 Yields	-	Michool	Michool	Corr	Maintanansa	Tochnision	Ling, en
		Dill	William	Rhow	Lob	Lob Toob	Taska
	-	Dillo	Vviiridi i	Olidw	Lab	Lab Tech	Tasha
	-	Frank	Frank	VVIIIams	Lap	Lab Tech	Techs
		LISA	Lisa	Heruale	Lap	Lab Tech	Techs
	_	Depole	Debble	Burke	Lap	Lab Tech	Techs
Demo Tank	-	Chris	Chris	Stockton	Lap	Supervisor	QA, Techs
npany							
er 2 - Wet Area 1		(Trank)					
- 560 gal	15						

Figure 55: User Set up

TrueChem comes preloaded with two users, Admin and Default. These users have special functions and cannot be deleted. The Admin user is TrueChem's *Super User* and can do anything within TrueChem. This user's password should be changed and maintained by the highest level TrueChem user. The default password for the administrator is *password*.

The Default User is the user that is logged in when TrueChem first starts and when users log out. The Default User has rights just like any normal user, and those rights should be set up to allow for only the function in TrueChem that you would want any person accessing TrueChem to perform. It is not recommended that the Default User ever be able to perform functions that write data or information to the database. If this were possible, the identity of the individual performing the update would not be known.

Users must be created individually but can be assigned to groups. Groups are also created individually but allow the facility to establish common categories of user rights and then assign users to the groups. The rights of any particular user are the sum of the individual user rights and the rights of group(s) they are assigned to. New users can be added by pressing the *Add User* button. Existing users can be modified by selecting *Modify*.

Add user		
User ID Jeff	Password **** verify ****	<u>O</u> k
User information		Capaci
First Name Jeff	Last Name Lord	
Department	Title MEG Eng	<u>H</u> elp
		Status
vvork location   < Default work		🔽 Active User
Phone () -	Ext Fax () -	Created
Pager () -	E-Mail jlord@roadrunner.com	1/24/2009 10:40 AM
Address		Disabled
		Locked
Idle timeout	nutes (Requires Windows 2000 or higher)	
Piabte Group	٦	
Fuending sights		
	User Cause	User rights
General	users Group	🧁 🔿 On none
Run TrueChem	All	🗧 🕞 On all
Create Processes	All	C On select
Create Tanks	All	
Rename Processes	All	Select
Rename Lanks	All	
		Import rights
Click op a function virtht in th	e liet te receiue more information	
click on a function right in th	e list to receive more imorniation	
		×
1		

Figure 56: User Setup Screen

The User ID field is the name a user will type in each time they log in. It can be anything and can be changed any time <u>but must contain no spaces</u>. The **Password** and **Verify** fields contain the password that the user will enter to authenticate. The **First Name**, **Last Name** and **Work Location** fields allow users to be properly identified and are **required**. The remaining fields in user information are not required. If you want TrueChem to be able to send this user email, use the **Email** field. In the status area, the **Active User** check box indicates this user can logon and use TrueChem. If **Active User** is unchecked, the disabled date will be set and the user becomes disabled. When multiple failed login attempts occur, the Locked check box is set and the date and time saved. To unlock a user, a user with administrative rights must uncheck this box.

#### Note: The number of failed logins to lock the database is six.

There are two tabs to assign rights to users; individually and by group. The **Function Rights** section lists functions that can be performed in TrueChem. By highlighting a function and selecting *On All*, the user has the right to perform this function on all tanks. *On None* says the right is granted on none of the tanks and *On Select* allows for the selection of which tank of which the right is granted.



Figure 57: Pop up for Rights on Select Tanks

When *On Select* is chosen, the select button is enabled. Pressing select causes the Select window to appear. The tree expands as does the tree view. Check boxes allow the selection of entire process lines, individual tanks and, in some instances, individual components to apply rights for a given group or user.

Another way to apply rights is to import them. By clicking on *Import Rights*, the list of available users will appear. And by selecting a user, TrueChem applies those rights to the desired user.

## 4.9.2 User Groups

Groups are created the same way that individual users are. The name of the group and a description are created, and the rights for the groups are assigned. The advantage of creating groups is that the rights are defined based on the job function and then individuals can be assigned or removed without modifying the rights. If groups are not used, as user responsibilities change, the user rights may have to be modified. It is much simpler and more convenient to add or remove groups that a particular user belongs to. The total rights of any particular user are the sum of the different functions of each group to which the user is assigned.

Add user group			
Group ID			<u>o</u> k
- Group information		_	
Description		-	<u>Cancel</u>
			Help
Rights Users			
< ALL FUNCTIONS >	Group N/A		ser rights
General			On none
Run TrueChem	None		On all
Create Processes	None		On select
Create Tanks	None		Off Select
Rename Processes	None		Select
Rename Tanks	None		
Delete Processes	None	~	Import rights
	>		
Click on a function right in the list to receive mo	re information		

Figure 58: Group Set up

The **Groups** tab allows the assignment of the selected user to one or more groups. Groups are either created for assigning rights to a group of individuals or creating an email group. In this example we have on the right hand side

Nodify user	
User ID Jeff Password verify	<u>O</u> k
User information	Cancel
First Name Jeff Last Name Lord	
Department Mfg Title process Mgr	Help
Work location <default location="" work=""></default>	Status
Phone () - Ext Fax () -	Active User
	11/30/2007 9:56 AM
Pager ( ) - E-Mail	Direction
Address	Disabled
	Ladrad
lelle timperit, yua 👘 minister (Requires Méndeure 2000 er bigher).	Looked
nindles (requires windows 2000 or higher)	
Rights Group	
Member of: Not a Member of:	
Inventory Engineering	
Supervisor LabTechs	
- Operator	
>	
<<	
>>	

**Figure 59: User Group Affiliations** 

the names of three groups: Engineering, Manufacturing and QA. This user is not a member of any of these groups. But he is a member of the Inventory group and of the Supervisor group. By selecting any group on the left or the right and using the arrow keys in between to move that group, a user can be assigned to a group or unassigned from a group. The user automatically inherits all rights associated with an assigned group.

## 4.9.3 Assigning members to a Group

By clicking the **Users** tab, the users can be assigned as **Members** or **Non-Members** of the group by selecting the users name and using the arrow key to move them to either the **Members** or **Non-Members** column.

Modify group			
Group ID Manufacturing		<u>O</u> k	
- Group information		Cancel	
Description Manufacturing Managers		Help	
Rights Users			
Members Jeff (Jeff Smith) Jim (Jim Brown)	Non-Members       Andy (Andy McComb)       Brian (Brian Boysel)       Default (Default User)       Peggy (Peggy Cauley)       Vicki (Vicki Ramey)		

Figure 60: Assigning Group Members

#### **4.9.4** Changing a Password

On the *Login* screen there is a *Change Password* button that will allow any particular user to change their password. First the **User ID** must be entered, and then the **Change Password** button can be selected. When it is selected, a dialogue will appear showing the User's ID that was selected and a place to enter the **Old Password** and the **New Password**. If this is successful, the user has changed the password, and may now log in with the new password.

Note: In the User Setup the password is displayed as number of "*". The administrator can reset a password but not identify a user's password.

Change password		st Name
enange password		ministrator
	<u>O</u> k	er
User ID ieff	Cancel	llerani nk
Old password	Help	rd
New password		QK
verify		Cancel
User ID ieff		Help Change password

Figure 61: Change Password Screen

## 5.0 Advanced Setup Variables, Scripts and Rules

Much of the power of TrueChem comes from the ability to write scripts. The syntax for all of the equations and logic is from Visual Basic. The skilled user can develop scripts that perform specific functions.

## 5.1 Variables

All of the variables have the same general form, and are enclosed in brackets:

#### [INP1]

The variables are not case sensitive and after the user gets used to the system, the name describes the variable.

For example [RST.USER1UPPER] returns the values of the User 1 upper spec limit from a result item. The user should become familiar with variables as they are also used when generating emails that are sent by TrueChem. Knowledge of the variables and format is also needed for advanced calculations and scripts.

Equations are written in the format shown

Result = ([INP1]*[INP2]/[INP3])+4

Brackets enclose each variable name and parentheses are used as they would normally in mathematics.

Variables are a great help when rules are written that generate either popup messages or emails. If variables are used, a general message can be written that allows TrueChem to fill process, tank or test information pulled from the database by variables used.

TrueChem has an extensive list of variables. The current list is attached in Appendix A. Each variable and a brief description are listed. TrueLogic makes periodic additions and updates the list on the website. For the most up to date list, go to <a href="http://www.truechem.com/">http://www.truechem.com/</a> and then go to the frequently asked questions (FAQ). The variable list is the first one.

## 5.2 Scripts

Writing scripts is programming. Some scripts are simple IF/THEN statements, others require several steps. Each calculation is actually a script. Many are embedded in the functionality of TrueChem. A good example is the adjustment screen. The script shown reads as follows: "sulfuric acid in the amount of 0.00438 gallons are added to adjust [RST1] by 1 oz/gal for every gallon of tank volume to obtain a value of 33 oz/gal".

Written as a script it would appear as:

tem Type C Test Description C Input Value C Result Calculation C Adjustment	<u>O</u> k
	<u>C</u> ancel
Adjustment	<u>H</u> elp
Add Sulfuric Acid  In the Amount of .00438 gallon	
To Adjust     RST4 - Sulfuric acid (oz/gal)     By 1     Sulfuric acid (oz/gal)       For Every     1     gallons of volume     To obtain a value of     33	
Start making adds at Increments 0.1 Advanced	Test
Apply Rules	
Add	
Modify	

[ADJ] gal = [OBJECT.VOLUME]*([RST.OPT]-[RST.CURRENT])* 0.00438

#### Figure 62: Adjustment Standard Script

Scripts are often used to describe complicated calculations or to incorporate logic into an evaluation. Figure 63 shows a script for determining the highest number of pits present in a group of salt spray coupons. The logic looks at each of the input values for the number

of pits on each coupon and finds the one with the highest number of pits. The number is compared to the limit (5 maximum) to determine pass or fail.

Modify Test Item		
Result Calculation Calculation Calculation Calculation Test Script Dim Hival as Double hiVal = 0 If [inp9]> HiVal then hiVal = [inp9] If [inp10]> HiVal then hiVal = [inp10] If [inp11]> HiVal then hiVal = [inp11]	Result Description high # pits group Short Name High # pits Decimals 0 • Limits Spec. User 1 User 2 Upper 5 Optimum Lower Advanced	<u>O</u> k <u>C</u> ancel <u>H</u> elp
Apply Rules Add Use Rule Set Measurement Deviation Modify Delete		

Figure 63: Salt Spray Evaluation Highest Pits Script

In this script, first the variable "Hival" is defined, and then it is set to zero. Next, the value of Hival is compared to each of the input values for the number of pits on each salt spray coupon ([inp9] through [inp13]). Note than [inp12] and [inp13] are off the screen. If the value of the **INP** is higher than the current value of Hival, the higher value becomes Hival. The last statement (off screen) is Result=Hival, which sets the result to the highest value found. Scripting allows TrueChem basically unlimited capability to perform calculations. The only limitation is the mathematical knowledge of the user.

## 5.3 Rules

The heart of transforming TrueChem from a laboratory database to an expert process control database tool lies in the effective use of rules. Rules "teach" TrueChem to make decisions from the inputs and or calculated results. The decisions made produce actions without human intervention. Rules are logic statements that allow TrueChem to make decisions based on the results calculated and the conditions setup governing the result. Rules can be applied to either results or adjustment items. TrueChem provides input screens that allow the user to quickly create a rule and select actions that fulfill the rule that the conditions initiate. These actions could be a Popup box, automatically rescheduling a test, or sending email notification to name a few. All rule setups start with scripts.

To create a rule, the user will start either in the *Tank Setup*, **Test** tab screen or more often in the *System Setup*, **Rules** tab. Creating rules via both paths will be discussed as well as the benefits of each. Regardless of whether the rule is initiated at the tank level or system level, the *Add Rule* command opens the screen in Figure 64. The logic rule reads "If the current [result] is < [Rst.LSL} (lower spec limit) or > [Rst.USL] (upper spec limit) display a message (the check box selected).

Rule Setup	
If (Result)	<u>O</u> k
Out of the Last Results	<u>H</u> elp
And V Or > (Rst.USL)	
Then Action to Take	
Display Message	
Scheduling options     Log Event     Print message on Add Sheet	
Create bookmark	~

Figure 64: Rule Pop up

The rule shown below was made with the pop up in Figure 64

Ŀ	4			System Setup
	Add Sheet Test Recall	Labels	Inventory	Dashboard
	Schedule Library	E-Mail	Corrective Action	Database
ĺ	Terms Tracking	Graphs	Rules	Colors
	Rule Sets		[	
	Rule set details		1	
	lf [Result] is < [Rst.LSL] Or > [Rst.USL]			



#### 5.3.1 Global Rules

Some of the rules created will affect all process tanks. These are system rules and can be applied globally by creating them in the **System Setup** tab rather than at the tank level.

System Rule Sets allow the facility to create single or multiple rules under the set name that are applied together. This rule set can then be applied to any result or adjustment in the TrueChem facility. However, the same rule cannot be applied to a result and an adjustment simultaneously because different variables are used. The rule set below is accessed by going to *System Setup* and clicking on the **Rules** tab. Then the **Rule Sets** pull down list is used to select the rule.

🖉 TrueChem - Your Company N	ame			
File Edit View Inventory Tools H	elp			
1 2 2 1		N 🔜 🍿 🧃 🗾	🂐 🍰 🔒 📀	
H to e	-			System Setup
Your Company Name	Add Sheet Test	Recall Labels	Inventory	Dashboard
	Terms Tracki	ary E-Mail Oraphs	Rules	Colors
E 🔏 Chromic Acid	Bulo Coto	ing another statements		
🕀 🍓 Cleaners	Out of Spec Rules			
E 😹 Cupric Process	Rule set details			
Otherse	If (Result) is < (Rst   S  1 Or > (Rst US  1			
🛁 🧴 06. Demo Tank	in proceeding (non-cost) of (non-cost)			
- 👗 12. Cleaner X				
3 13. Copper				
🗉 🎎 Desmear Process				
🕀 🌉 Electroless Ni/Au				
Electrolytic Copper				
Figure Clean Process	Add Modify Dele	ste		
🗄 🌉 Quality Assurance	Components using this rule set			
🕀 🎎 Tool Calibration	Results	Adjustments		
🕀 🎆 Waste Treat			rocess	
+ ga neius			Cleaners	
	💮 🗖 🔬 Cleaner 1		Cupric Process	
	🖨 🗖 👗 Stripper	÷ 🗆	Demo Process	
		ipper 😐 🔁	Desmear Process	
	E Gleaner 2		Electrolytic Copper	
06. Demo Tank Other 1 - Acme Chemical	🕀 🔂 🔂 🕀 🔂		Electrolytic Gold	
Company	🗈 🗖 🧟 Demo Process	• <b>•</b>	Layer Clean Process	
Other 2 - Wet Area 1 Size - 560 gal	Desmear Procession - Control - Co	· · · · · · · · · · · · · · · · · · ·	Vvaste Treat	
Type - Plating Tank				] [·
Logged In System Administrator		Add Sheet Schodul	le Corrective Action	Samples 12
Logged in Oystern Aurimistrator.		add officer outledu	Conective Action	Jampies 13

Figure 66: Accessing Rule Sets

Notice that in the bottom of the screen, all the results are checked and the names of the process lines are highlighted gray. This indicates that a rule is applied to the results. At the system level the rule can be applied to all the results, to a few, or to just one. Notice also that the Adjustment side is unchecked. No rules are applied to adjustments here. Creating a Rule Set

To create a new rule, select choose the <Add New Rule Set> from the pull down menu under **Rule Sets**. A pop up will appear to name the rule set. Once named click *OK* and the new rule set will appear in the pull down window where the rule set list was. The rule set details window will be blank. To *Add, Modify* or *Delete* rules in the set, use the button below the **Rule Set Details** window.

Schedule	Library	E-Mail	Corrective Action
(Terms )	Tracking	Graphs	Rules
Rule Sets			
Tank Retest			•
< Add New Rule Set >			
Default Rules			
High - Dump & Remake			
Low - Dump & Remake			
Outside Specs - Dump &	Remake		
Perform a dummy plating	3		
dashboar rules			
Tank Retest			

Figure 67: Creating a Rule Set

Click *Add* to add a rule to the set. The *Rule Setup* window will appear. Fill in the required information. The rule shown in Figure 68 reads as follows:

Rule Setup	
If ● [Result] ● Out of the Last Results Is > ▼ [rst.prewalue]*1.25 ■ And ▼ Or < ▼ [rst.prewalue]*0.75	<u>O</u> k <u>C</u> ancel <u>H</u> elp
Then Action to Take Display Message Protection Scheduling options Log Event Print message on Add Sheet Create bookmark Require New Makeup	
Display Message Send To Pop-Up Message ▼ Sound? No ▼ E Message The current result varies by >25% from the previous Check your data. If the result is saved a retest will b	Black ▼ svalue. se

Figure 68: Rule Set up Window

"If result (of this test) is greater than 1.25 (125%) of the previous result or less than 0.75 (75%) of the previous result then display the message 'The current result varies by >25% from the previous value. Check your data. If the result is saved a retest will be scheduled.' "Displaying a message is one of many possible notifications and these are discussed in detail later. When the rule setup is complete, click *OK*. The complete rule will appear in the rule detail window.

Note: rules are evaluated by TrueChem as soon as the calculation they are attached to is completed which occurs in the <u>Perform Test</u> screen before data is saved.



Figure 69: System Rule Set

Next, apply the rule by clicking on the facility, Process, or tank Results or Adjustments. The rule can be applied to every tank in the facility or to a single result or adjustment item. Clicking the check box at a higher level applies the rule to every item below that level. For example, in Figure 69 the pH Dump rule was applied to only the Stripper tank in the Cleaner line and to the Developer tank in the Cupric Process

4				System Setu
Addslip	Test Recall	Labels	Inventory	Dashboard
Schedule	Library	E-Mail	Corrective Action	Database
Terms	Tracking	Graphs	Rules	Colors
dashboar rules Rule set details			•	
If [Result] is < [rst.lo11:-] If [Result] is < [rst.lsl:-] O	Or > [rst.uo11:+] r > [rst.usl:+]			

**Figure 70: Multiple Rules** 

Multiple rules can be generated for the same rule set. When there is more than one rule, they will appear in sequence. In the case shown in Figure 70, the first rule checks to see if the tank is outside shop limits, and turns the dashboard indicator yellow in each case. The second rule checks to see if the tank is outside of the spec limits, and turns each one red. The second rule here will override the first when true because it is executed second.

Note: Each rule in the set is applied to the tanks selected so if the order the rules are executed in is important, some thought needs to go into the order of creation. Rules can be added or deleted but they cannot be moved in the window like test items can.

#### **5.3.2** Rule Notifications

There are many possible outcomes from fulfilling a rule. The options are shown below.

- Display Message
- Protection
- Scheduling Options
- Log Event
- Print Message on Addsheet
- Create Bookmark
- Require New Makeup
- Require Corrective Action signoff
- Display Result as
- Send an email
- Set Result Status/State
- Execute a script
- Require Bailout

These options can be used individually or in any combination. They are selected by checking the box.

## 5.4 Custom Rules (Tank Level Rule)

Custom rules are created similarly to global rules but are specific to a given tank. Global rules were introduced first because the majority of rules can be written globally if they are applied to more than one process tank. Specific custom rules usually involve controlling unique behaviors for particular tanks and may involve complex scripts. Complex scripts are not covered in this training guide.

#### 5.4.1 Custom Rule Set up

To apply a custom rule, go to the tank of interest and click on the *Tank Setup* icon, then go to **Test** tab and select the result or adjustment item where a rule is needed and click the *Add* button under *Apply Rules*. From this popup, choose *Custom Rule*.

		Table U1 Conditioner	
	Modify Test Item		
	Result Calculation	Result Description	<u>k</u>
3	Calculation	Copper Content	<u>C</u> ancel
	Result= ([INP	Rule Setup	<u>H</u> elp
a ≻	C Script Result=	C System Rule Set C Custom Rule	
؛ د		Select an Option	
с п		Bailout If Above  Advanced Reduce to	
	Apply Rules		
	Add	Use Rule Set Out of Spec Rules Use Rule Set Critical Variable Rules	
	<u>M</u> odify Delete		

Figure 71: Custom Rule Set up

Once *Custom Rule* is selected, the same rule Setup screen appears as in the system rule set discussion (Figure 68) appears.

Note: A system rule set can be applied at the tank level. This is done by selecting <u>System Rule Set</u> and selecting the desired rule from the pull down list.

# 6.0 Inventory Module

The inventory module is an optional feature to TrueChem. The inventory module is accessed by clicking the Inventory icon on the tree view window that appears at the very top of the Tree view below the facility name as shown in the Figure. Clicking the Inventory icon replaces the left four buttons shown when a tank is selected. These buttons access the major features; Enter Transaction, Enter Purchase Orders, Receive Lots and Inventory Reports. The inventory module allows the facility to track material usage by creating an inventory of the chemicals and supplies on hand, receiving new material into inventory and can even generate purchase orders automatically. The usage of materials that are called for in tank make ups and additions are automatically tracked by the inventory module. Materials in stock can also be tracked by expiration dates or by lot number.



Figure 72: Tree View Inventory Icon



Figure 73: Inventory Module Active Buttons

Note: Software key is not required to enter inventory transactions.

## 6.1 Creating the Inventory

The inventory of chemicals and materials used must be created. There are two ways to accomplish this task. Creating tanks (and the additives used to make them up) creates most of the inventory list. Alternately, entering chemicals from building the inventory list makes those additives available for use in tank make up. Practically, most facilities create the processes first and add in inventory control later. Items that are not used in tests must be added. This would include things like laboratory chemicals used for analysis only and other non-test items like filters, anodes or carbon.

If the additive was not initially created as an inventory controlled item, changing it to one that is inventory controlled is a simple task. Go to *Tools, Manage* and *Additive* to access the list of materials available for inventory control.

*Note: If the <u>Manage</u> list shows additive list as inactive (grayed out), click on the Home icon then retry clicking Tools, Manage and Additive to access the list.* 





**Figure 74: Accessing Additives** 

Next, select the additive by highlighting it and clicking *Modify*. A warning will appear that states "changes will affect each occurrence of the chemical use".

TrueChem		
8	Changes made to this additive will affect every occurrence of this additive in TrueChem.	
	Ok	

Click *OK* and the screen in Figure 75 will open. There are three tabs available: General, HMIS and Docs. The General tab contains several items that the facility may want to complete regarding the inventory control of the additive. These include: **Internal Part Number**, clicking the Inventory control check box, setting **Minimum** and **Maximum** Inventory Levels and if inventory lots will have an expiration date. The HMIS tab opens a screen that allows the defining of hazards associated with the chemical and the Docs (document) tab allows the referencing of document s like product literature and MSDS to the specific chemical.

When the information has been added, click *OK*. Now the chemical is ready to be inventoried.

Chemical							
Chemical type	Chemical	• <u>O</u> k					
<u>N</u> ame	3313 Neutralizer	<u>C</u> ancel					
Short name	3313						
Stock units	gallon 💌						
Internal part number							
Other ref	Ma	ire					
General	HMIS	Docs					
This is used to dilute (Water)         Unit class conversion         0       gallon of 3313 Neutralizer equals         0							
This Chemical is: C Non-Inventory Controlled Chemical Properties Minimum quantity 25 gallon Maximum quantity 215 gallon Inventory lots require an expiration date							

#### Figure 75: Additive Setup Screen

## 6.2 Enter a Transaction

To enter a (manual) transaction, click on the icon or go to the Inventory pull down and select *Create a Manual Transaction*.



The screen shown in the Figure 76 will appear. Two actions are possible from the pull down list shown; to add or subtract from the inventory. Fill in the required information which includes the *Lot* number to work against and the quantity (the field to the right of the *Action* field). A comment must be entered. When complete, click on the *Save* button on the bottom left of the working window.

Note: if required sections of a form are omitted, TrueChem will turn them pink and the screen cannot be exited until completed.

**Figure 76: Enter Transaction Inventory Screen** 

# 6.3 Create a Purchase Requisition

Creating a purchase requisition is accomplished by clicking on the "shopping cart" icon.



The screen shown in Figure 77 will appear. The purchase order number is entered and the *Additive* selected from the pull down list. **Vendor** and **Manufacturer** details are entered or selected from their respective pull down lists. **Quantity, Price, Order Date** and projected **Delivery Date** are entered and there is a note field for comments. When complete, click **Save**.

🧖 TrueChem - Your Company Nam	19	
File Edit View Inventory Tools Help		
	i 🖓 🖓 🕼 🕵 👘 🧃 🔛 🗟 🎎 🙆 🖈 🥝	
Your Company Name     Inventory     Processes     Cupric Process     Cupric Proces     Cupric Process     Cupric Process     Cupric Process	Item Information         Requisition         Chemical         Vendor / Product         Manuf / Product         Juit Info         Gity Ordered         Order Date         Price         Per         Delivery Date         Image: State Stat	Requisition
	Save Clear	

Figure 75: Create a Purchase Order

# 6.4 Receive a Lot

To add to the inventory, click *Receive a Lot* either from the pull down menu under *Inventory* or from the icon.



The screen in Figure 76 will appear. Enter the lot information and quantity amount received and expiration date. The sections highlighted in pink are required. The **Note** field is optional and can be used to enter comments about the lot (e.g. was the packaging damaged or the order incomplete?).

🕜 TrueChem - Your Company Name	
File Edit View Inventory Tools Help	
	) 🟹 🖨 🗇 🖉 🔝 📦 🧃 🖉 🖿 🚔 🍇 🍰 🌚
Your Company Name Vour Company Name Vour Company Name Vour Company Name Vour Company Name Charles Cleaners Clea	Item Information Requisition Chemical Vendor / Product Manuf / Product Lot Info Manuf Lot ID Received J Received J Storage Location Manuf Vendor / The storage Location Manuf Lot ID Manuf
	Notes     Documents       The B / U E E E E E E E E E E E E E E E E E E
Logged in Oystern Aurilinistrator.	Audioneer ocheutre Coneutre Audolf Samples 13
start 🦃 Inbox - Outlook Expr	TrueChem - Your Co 😰 Truelogic Training Gui 🔞 10:47 AM

Figure 76: Receive a Lot

# 6.5 Inventory Reports

To access the Inventory reports options, click on the scroll icon.



The screen in Figure 77 will appear. The default view is the *Additive Balance*. The entries are color coded and the legend is in the bottom right corner of the screen.

0
Active
Alert
Retired
On Order
Expired

Yellow alerts indicate that the balance contains material where there is some sort of problem. Other views are available, and you can sort the inventory based on the *Lot Balance*, material *On Order*, by *Transactions*, or by *Expiration* date.

Edit View Inventory Tools	Help								
		▼: 🖨 ờ	31 🕼 💂		[ <b>[</b> ]	A 26		0	
M -	4							Inve	ntory Re
Your Company Name	View	Chemical balance	-	Type V	iew all	-			
📮 Inventory		Chemical balance						BB 1000	
Processes Acid Acid	Drag column he	Lot Balance On order		7				₩ 并	* -
🕂 🍇 Cleaners	Cor	Transactions	number	Unit	Qty in stock	Qty usable	Qty unusable	Qty on order	Qty max
🗄 🤏 Cupric Process	3308 A	Expiration		gallon	77.25	11.75	65.5	0	100
🗄 🍓 Demo Process	3308 B			gallon	109	100	9	0	150
Ŧ 🍓 Desmear Process	3313 Neutralize	r		gallon	211.75	211.75	0	0	215
🗄 🎎 Electroless Ni/Au	ABC			pound	211.25	171.25	40	200	1000
E 🚜 Electrolytic Copper	Accelerator 19			gallon	71	0	71	0	150
A Laver Clean Proces	Acid Cleaner 50	02		liter	38.13	38.13	0	0	200
Quality Assurance	Ammonium Hyd	Iroxide		liter	429.68	378.54	51.14	0	450
Tool Calibration	Antifoam			gallon	9.79	0	9.79	20	50
🛛 🍓 Waste Treat	Aurolectroless SMT Replenisher			liter	206.19	206.19	0	0	210
) Yields	Boric Acid			pound	10	10	0	0	50
	Cataposit 44			liter	158.41	44.84	113.56	0	300
	Cataprep 404 S	alts		pound	1340	0	1340	0	1600
	Chromic Acid, C	r03		kilogram	191.81	2.85	188.95	0	225
	Cleaner PC-454			gallon	43.5	0.5	43	0	100
	Conditioner 117	5		gallon	16	16	0	0	50
	Conditioner 211			gallon	20.5	20.5	0	0	75
	Copper 328 A			gallon	15	15	0	0	20
	Copper 328 L			gallon	15	15	0	0	20
>	Copper Sulfate			gallon	186	0	186	0	300
<u>^</u>	Cuposit Y			gallon	80	5	75	0	150
	Cuposit Z			liter	245.9	0	245.9	10	300
	Deionized Water	r		gallon	936	936	0	0	1000
	4						-	_	
1	59 items disp	layed					Leg	end 📃	

**Figure 77: Inventory Reports** 

# 6.6 Manage Inventory Lots

Several different inventory activities are available by clicking on the Fork truck icon on the graphic tool bar as well.



The option is selected from the pull down list under *View*. The inventory report appears in the main window. The standard reports available track Active Lots, Expired Lots, Retired Lots, All Lots and Purchase Requisitions.

🧭 TrueChem - Your Compan	y Name						
File Edit View Inventory Tool	s Help						
			⇒ 🌮 🞸			🌉 🎎 🔒 津 📀	
M						Invento	ory Management
🛃 Your Company Name	View	Active lots	-				
	-	Active lots					
🗄 🧄 Processes	Drag co	Expired lots	re to group by				
🗄 🌉 Chromic Acid	Lot Lab	Retired lots		Qty balance Unit	Price per unit R	eceived Date Vendor	Manufacture 🔺
🕀 🎎 Cleaners	001-06-	Requisitions	Water	36 gallon	\$0.15	5/14/2012 On Site	On Site
🕀 🍓 Cupric Process	001-06-	06-002 Deionize	d Water	900 gallon	\$0.15	5/27/2012 On Site	On Site
🕀 🍓 Demo Process	006-02-	01-006 3313 Ne	utralizer	206.75 gallon	\$3.20	6/27/2012 Acme Chemical Company	Verifine Che

Figure 78: Inventory View Pull Down Menu

The color coding of the lots is identical to that describe in the Inventory Reports section.

## 7.0 Dashboards

The dashboard is an add-on feature to TrueChem that displays the important elements of the database in a web page format. The Dashboard provides the ability to present the facility data in a "real" time fashion to both TrueChem users and other facility personnel that need current process status information. Personnel such as managers, engineers, process planners and maintenance can access TrueChem information through the Dashboard. Users do not need TrueChem on their computer to view the Dashboard. However, in order to use this feature a network must be available so a short cut to this webpage can be copied to each computer needing access to the dashboard. The dashboard files query TrueChem periodically and update the status of the processes displayed.

Three conditions are displayed: in specification (green) outside shop limits (yellow) and out of specification (red). In order to establish the three levels, the facility must establish shop limits that are inside of the specification limits for each process. Clicking any of the left buttons displayed allows the viewer to "drill down" - first into the line view and then into the tank view. For example clicking on the red Test line shown in Figure 79 opens the screen in Figure 80. The deepest level is the tank level shown in Figure 81.

Other information about the processes and tanks is also available, including whether the tank is active or inactive (asterisk or grayed), when the next analysis is due if samples are out for the process, any pending adds, or if corrective actions (Exceptions) need action.



Figure 79: Dashboard Facility View

C TrueLogic Dashboard			👌 • 🗟 · 🖃	🖶 🔹 Page 👻 Safety	🔹 Tools 🔹 🔞 🔹
Truet C:\TC	.ogic Dashboard IDDB\Dashboard Files\Web Page	s Output\Dashboard File	s\G4.HTM		^
_	8				
	TRUEL	OGIC			
	TrueLogic D	ashboard			
<<<	Electrolytic	Copper			
Tank	Sample	Test	Add	Exception	
1. Acid Copper AC-90					
2. Acid Copper AC-90					
(. <del>.</del>					

Figure 80: Process Level Dashboard View

Figure 80 shows the Process Level where the condition of the individual tanks making up the line is displayed. The gray tank shown is inactive and resulted in the asterisk shown in Figure 79. Figure 81 shows additional information accessed by drilling down to the Tank Level. Here the status of each tested parameter is shown.

TRUELOGIC TrueLogic DashboardDemo ProcessOf. Demo TarbeValueNew NameDate-TimeVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSLVSL013/13/13/13/13/13/103/13/1	• @•	age + Safety + Tools +	🖶 🔹 Pa		<u>∱</u> •							iboard	TrueLogic Dasi	
TrueLogic DashboardDemo Processobe Processobe Demo TarbeValueResult NameDate - TimeLSLOpt.LSLUCL2.4g/L ABC Concentration12/15/2010 6:05 am2.12.42.72.262.531.1g/l XYZ Concentration12/15/2010 6:05 am0.1.350.080.127pH12/15/2010 6:05 am6786.8927.131							5	GI	TRUELO					
Value       Result Name       Date - Time       USL       USL         Value       Result Name       Date - Time       LSL       Opt.       USL       LCL       UCL         2.4       g/LABC Concentration       12/15/2010 6:05 am       2.1       2.4       2.7       2.26       2.53         1.1       g/LX7Z Concentration       12/15/2010 6:05 am       0       1.1       .35       0.08       0.12         7       pH       12/15/2010 6:05 am       6       7       8       6.892       7.131							ard	hbo	rueLogic Das	TI				
Value         Result Name         Date - Time         LSL         Opt.         USIL         UCL           2.4         g/L ABC Concentration         12/15/2010 6:05 am         2.1         2.4         2.7         2.26         2.53           1.1         g/l XYZ Concentration         12/15/2010 6:05 am         0         .1         .35         0.08         0.12           7         pH         12/15/2010 6:05 am         6         7         8         6.892         7.131								SS	Demo Proce		<< )	<		
Value         Result Name         Date - Time         LSL         Opt.         USL         LCL         UCL           2.4         g/L ABC Concentration         12/15/2010 6:05 am         2.1         2.4         2.7         2.2.6         2.53           1.1         g/LX72 Concentration         12/15/2010 6:05 am         0         .1         .35         0.08         0.12           7         pH         12/15/2010 6:05 am         6         7         8         6.892         7.131								n le	06 Demo Te					
Value         Result name         Date - time         CSL         Opt.         USL         LCL         OCL           2.4         g/L ABC Concentration         12/15/2010 6:05 am         2.1         2.4         2.7         2.26         2.53           1.1         g/LX72 Concentration         12/15/2010 6:05 am         0         1.1         .35         0.08         0.12           7         pH         12/15/2010 6:05 am         6         7         8         6.892         7.131		1101	C		1101	0-1		nĸ	Ub. Demo Ta	n - la tra-	Volue			
1         g/l xyz Concentration         12/15/2010 6:05 am         0         1.1         2.7         2.26         2.33           •         1.1         g/l Xyz Concentration         12/15/2010 6:05 am         0         1.1         .35         0.08         0.12           •         7         pH         12/15/2010 6:05 am         6         7         8         6.892         7.131		2.02	26		USL	орг.	-	LSI	Date - Time	Result Name	value			
7         pH         12/15/2010 6:05 am         6         7         8         6.892         7.131		0.17	20	2.2	2.7	1		2.1	12/15/2010 6:05 am	g/L ABC Concentration	2/4			
		7.131	892	6.8	8	7		6	12/15/2010 6:05 am	pH	7			
														L
	×													

Figure 81: Tank Level Dashboard View

## 7.1 Dashboard Setup

Setting up the dashboard involves several steps. First, the facility must establish shop limits for the processes. These limits will be inside of the specification limits established for each process. The shop limits allow the cautionary yellow dashboard color to function. Next, dashboard rules must be created. These rules tell TrueChem how to interpret the results relative to the shop and specification limits.

# Note: The dashboard rules are advanced rules and should be set up by qualified personnel.

## 7.1.1 Shop Limits

Shop limits are established by using the *User1* Limits available on the Result items (shown in Figure 82). <u>*Each*</u> result tracked by the dashboard must have *User 1* limits in order for the yellow caution alert on the dashboard to function

Modify Test Item		
Result Calculation Calculation Result= [INP1] * [INP2] *4 Script Result=	Result Description g/L ABC Concentration Short Name g/L ABC More Decimals 2 Limits Spec. User 1 User 2 Upper 2.7 2.65 Optimum 2.4 Custom Lower 2.1 2.15 Bailout If Above 3.0 Advanced Reduce to 2.6	<u>O</u> k <u>C</u> ancel <u>H</u> elp
Apply Rules		
Add Custom Rule If [Result] is < [RST.L	CL] Or > [RST.UCL]	
Modify Oustom Rule Jf 5 out of the last 5 re	eulte are « fret nrevi	



## 7.1.2 Dashboard Rules

The dashboard rules have a specific format. To create the rules, click the *System Setup* icon and then the *Rules* tab. Create a rule set called "Dashboard Rules (see Figure 83). The details of rule setup are discussed in section of this chapter. The rule syntax must match that shown in the figure exactly!!

-	]				System Setup
	Add Sheet	Test Recall	Labels	Inventory	Dashboard
	Schedule	Library	E-Mail	Corrective Action	Database
	Terms	Tracking	Graphs	Rules	Colors
	Rule Sets Dashboard Rules			•	
	Rule set details If [Result] is < [rst.user11ow If [Result] is < [rst.Isl:-] Or >	er:-] Or > [rst.user1upper:+] [rst.usl:+]			

Figure 83: Dashboard Rules

The first rule shown in Figure 83 is the cautionary rule (yellow for outside shop limits), the rule setup screen is shown in Figure 84. The variable name [rst.user1lower] is the name of user 1 lower limit. Similarly, the upper other limit is named [rst.userlupper] As shown in Figure 84, the *Set Result Status/State* check box is selected and for the cautionary rule Out of Control is selected. In addition, the *Apply Additively* pull down is selected.

Rule Setup							
If ● [Result] ● Out of the Last Results Is ■ And ♥ Or > ♥ [rst.user1upper:+]	<u>O</u> k <u>C</u> ancel <u>H</u> elp						
Then  Action to Take  Require New Makeup  Require Corrective Action signoff  Display result as  Send E-Mail  Set Result's status/state  Execute Script  Require Bailout							
Set Result's status/state Out of Spec Out of Control Apply Additively							

Figure 84: Dashboard Rule Setup

The second rule is the out Specification portion. This rule is similar to cautionary except the variables [rst.lsl] and [rst.usl], in the *Set Result Status/State* check box the *Out of Spec* check box is selected and the rule is again *Applied Additively*. Once the rules are

completed, apply the rules to each result in the facility by click on the highest level check box on the result tree shown in the *Rule Setup* screen.

## 7.1.3 Building the Dashboard

To build the dashboard, go to the *Dashboard* tab in the *System Setup*. In this screen, the Source and Destination file paths have to be established. *Browse* to the *TrueChem* folder and find the *Dashboard* folder. For the source path, select the source folder. Then repeat to set the destination path. Here, however, you go to the *Web Pages Output* folder and then to the *Dashboard files* folder. Once the paths are set up, click on *Rebuild Dashboard* and then on *Update Results Table*. Then click on *View Dashboard*. Figure 85 shows the dashboard tab. The update time can be set to any desired interval.



Figure 85: Building the Dashboard

The final step is to create a short cut to the dashboard. This is accomplished by using Windows File Explorer to navigate to the TrueChem folder and finding the *Dashboard* folder and then the *Output* folder, and selecting *Main.htm* file. Right click on the file and select *Create Shortcut*. Drag the short cut to the desktop and rename it to Dashboard.

# **Chapter 3 Using TrueChem**

#### 1.0 User Log In/ Logout

When TrueChem opens, it automatically logs in as the Default User. Most facilities limit the rights of the Default User so that important actions are performed only by authorized employees. Each user should log in and out of TrueChem. This is especially important if multiple analysts perform the tests on the process tanks. Logging in and out allows tracking of the analyses each analyst performs. Login also helps regulate access to particular areas of the program.

#### 1.1 User Login

By selecting the log in key, a login screen will be displayed.



This allows the entry of the **User ID** and the **Password**. If the authentication is successful then the users name will appear in the lower left hand corner of the main TrueChem screen indicating logged in user.

rueChem User Login	
Please Enter A User Name and Password	<u>O</u> k
	<u>C</u> ancel
User ID	Help
Password	Change password

#### Figure 1: User Login

If the user has no rights, the following screen will be displayed.

TrueChem User Login	
The Current User Does Not Have	<u>O</u> k
Perform tests	<u>C</u> ancel
User ID	<u>H</u> elp
Password	Change password

**Figure 2 Failed Login** 

If the **User ID** or **password** is entered incorrectly six times the login for that user will lock. The administrator will have to go into the User Setup to unlock a locked out user.

# 1.2 User Log Out

Pressing the *Logout* button immediately logs out the current user.



This function allows the operator to preserve the identity of the data they have entered into TrueChem. Other users may now log in and begin entering data without shutting down TrueChem by simply logging in with their own User ID and passwords.

Note: Requiring Users to Login and out maintains the integrity of audit traceability.

# 2.0 Using the Schedule to Organize Work

Although most facilities have a schedule for their laboratory work, TrueChem's schedule feature can provide a number of advantages in that it can be used to optimize laboratory work flow, assist with balancing work assignments, and provide a low-cost solution to preventive maintenance scheduling.

# 2.1 Laboratory Tests

The schedule page is accessed by clicking on the schedule icon in the tool bar.



The schedule organizes the tasks scheduled for a particular day. The tasks are organized by the time due and shows late items first (red), then those currently due but not late (black). The active button on the top right of the schedule window can be used to perform tests or customize the view. Customization of the view allows the columns and sorting to be changed to an arrangement that meets the facility's particular needs, and the resultant view can be saved and accessed over and over again. The items shown in the schedule can be printed as a work sheet by pressing the printer icon.
Type 7	All Schedul	e Types 💽	☐ Show tim	neline <u>a</u> ra	ph	ļ	
					ê Wə	* -	
Status	Type	Due By 🛛 🗸	Remaining	Priority	Item Description	Tank	F
Past Due	Test	7/31/2012 11:12 AM	(1-02:23)	2	Copper Content	01. Conditioner	Demo
Past Due	Test	7/31/2012 1:12 PM	(1-00:23)	2	Normality	01. Conditioner	Demo
Due	Test	8/1/2012 2:02 PM	0-00:27	5	%/volume Developer Concentration	Cleaner 2	Cleane
Due	Test	8/1/2012 2:02 PM	0-00:27	6	pH Value	Cleaner 2	Cleane
Due	Test	8/1/2012 2:02 PM	0-00:27	6	Differential between pH readings	Cleaner 2	Cleane
Due	Other	8/1/2012 2:08 PM	0-00:33	4	Anode Check	07. Nickel Sulfamate	Electro
Due	Other	8/1/2012 2:08 PM	0-00:33	4	Anode Check	13. SMT Nickel	Electro
Due	Test	8/1/2012 2:08 PM	0-00:33	8	ppm Nickel Content	19. SMT Gold	Electro
Due	Test	8/1/2012 2:08 PM	0-00:33	8	pH Reading	19. SMT Gold	Electro
Due	Test	8/1/2012 2:08 PM	0-00:33	8	Specific Gravity	19. SMT Gold	Electro
Due	Test	8/1/2012 2:08 PM	0-00:33	10	oz/gal Gold Metal Concentration	19. SMT Gold	Electro
Due	Test	8/1/2012 2:12 PM	0-00:37	3	g/L ABC Concentration	06. Demo Tank	Demo
Due	Test	8/1/2012 2:12 PM	0-00:37	3	g/I XYZ Concentration	06. Demo Tank	Demo
Due	Test	8/1/2012 2:12 PM	0-00:37	3	рH	06. Demo Tank	Demo
Due	Test	8/1/2012 2:38 PM	0-01:03	10	oz/gal Nickel Sulfamate Concentration	07. Nickel Sulfamate	Electro
Due	Test	8/1/2012 2:38 PM	0-01:03	10	oz/gal Nickel Chloride Concentration	07. Nickel Sulfamate	Electro
Due	Test	8/1/2012 2:38 PM	0-01:03	10	pH Value	07. Nickel Sulfamate	Electro
Due	Test	8/1/2012 4:08 PM	0-02:33	4	g/I AOC Concentration	04. Preposit 748	Electro
Due	Test	8/1/2012 5:08 PM	0-03:33	5	Concentration 3313	9. Neutralizer 3313	Desme
Due	Test	8/1/2012 6:08 PM	0-04:33	5	Normality	17. Nickel Activate	Electro
Dilo	Toot	0/1/2012 7-12 DM	0,06.27	0	Catalyst Concentration	12 Connor	Domo

**Figure 3: Schedule Log** 

The schedule page is sortable. Clicking on any of the column headings will reorganize the schedule. Shown in the figure is the view reorganized by process. Other sorting can be useful such as sorting by priority or process line. The schedule is also printable from any of the views. However if the view is not saved before exiting, then the schedule log will have the default view upon return.

•

⊻iew  Cur	rently Sch	eduled Items 👻 Work location 🗚	Il work locations 👤			
Type All S	Schedule 1	Types 🔄 🗖 Show timelin	e <u>a</u> raph			
				😒 🔮 🔚		198
Remaining	Priority	Item Description	Tank	Process 📈	Other 1	
0-02:53	5	%/volume Developer Concentration	Cleaner 2	Cleaners	XYZ Manufacturing	W
0-02:53	6	pH Value	Cleaner 2	Cleaners	XYZ Manufacturing	W
0-02:53	6	Differential between pH readings	Cleaner 2	Cleaners	XYZ Manufacturing	W
(0-23:57)	2	Copper Content	01. Conditioner	Demo Process	ABC Chemistries, Inc.	W
(0-21:57)	2	Normality	01. Conditioner	Demo Process	ABC Chemistries, Inc.	W
0-03:03	3	рН	06. Demo Tank	Demo Process	Acme Chemical Company	W
0-03:03	3	g/L ABC Concentration	06. Demo Tank	Demo Process	Acme Chemical Company	W
0-03:03	3	g/I XYZ Concentration	06. Demo Tank	Demo Process	Acme Chemical Company	W
0-05:59	5	Concentration 3313	9. Neutralizer 3313	Desmear Process	Chems-R-Us	W
0-20:59	4	g/l Permanganate	5. Permanganate 3308	Desmear Process	Chems-R-Us	W
0-20:59	5	g/I Manganate	5. Permanganate 3308	Desmear Process	Chems-R-Us	W
0-20:59	5	Total Manganese	5. Permanganate 3308	Desmear Process	Chems-R-Us	W
0-20:59	6	Normality	5. Permanganate 3308	Desmear Process	Chems-R-Us	W
0-02:59	4	Anode Check	13. SMT Nickel	Electroless Ni/Au	Chems-R-Us	W
	-					

Figure 4: Schedule Organized by Process

🧭 TrueChem - Your Company	y Name						
File Edit View Inventory Tools	Help						
🧏 🛓 🏁 🔊 🛛	(		<u>ک</u>	<b>)</b>	🍿 🧃 🛃 🗟 💐	🅵 🔒 🔹 🥝	
							Schedule
🛃 Your Company Name	View	Currently Scheduled	Items 👻	Work locat	tion *All work locations		
-41 Inventory	– Туре	Currently Scheduled Past due items	Items	☐ Show	timeline graph		
E 🧏 Chromic Acid	Drag col	Deactivated items All scheduled items				2 2 😫	₩ <b>₩ ♣ = </b> }}
🗈 🎎 Cleaners	Туре	Due by	Remaining	Priority	Item Description	Tank	Process / 📥
🕀 🌉 Cupric Process	Test	8/1/2012 2:02 PM	(0-00:35)	5	%/volume Developer Concentration	Cleaner 2	Cleaners
E 🗸 Demo Process	Test	8/1/2012 2:02 PM	(0-00:35)	6	pH Value	Cleaner 2	Cleaners
a u1. Conditioner	Toot	0/1/2012 2:02 DM	(0.00.25)	e	Differential between all readings	Cleaner 2	Cleanara

The View pull down menu allows for other views and for performing a schedule forecast.

Figure 5: Pull Down of Schedule Views

Selecting the schedule forecast from the pull down brings up the screen in Figure 6. To select the date range of the forecast, simply select the start and stop dates.



Figure 6: Forecast Date Range Screen

The view of the schedule can also be changed to show a calendar view by clicking "show timeline graph". This view can be useful in visualizing the loading of lab days. The forecast (1 week) is shown in calendar format. Items in the future are shown in blue.

🖉 TrueChem - Your Company	v Name							
File Edit View Inventory Tools	Help							
1 2 2 2 1						🚺 🕑 🚳 🦀 🔒	٠	
M	-							Schedule
Your Company Name	⊻iew <b> </b> Type	Schedule f All Schedul	e Types	Work location	n (*All wor neline gra	k locations 🔄		
🛓 👗 Chromic Acid	Drag colur					100		💠 💳 💦
🕀 🍓 Cleaners	Status	Туре	Due By	Remaining	Priority	Item Description	Tank	Pro 🔺
🕀 🍕 Cupric Process	Not Due	Test	8/7/2012 3:38 PM	6-00:44	5	ozigal Cr03	Chromic Acid	Chromic
E 🔏 Demo Process	Not Due	Test	8/8/2012 5:30 PM	7-02:36	5	oz/gal Cr03	Chromic Acid	Chromic
a 06 Demo Tank	Past Due	Test	8/1/2012 2:02 PM	(0-00:52)	5	%/volume Developer Concentration	Cleaner 2	Cleaner
12. Cleaner X	Past Due	Test	8/1/2012 2:02 PM	(0-00:52)	6	pH Value	Cleaner 2	Cleaner
- 👗 13. Copper	Past Due	Test	8/1/2012 2:02 PM	(0-00:52)	6	Differential between pH readings	Cleaner 2	Cleaner
	Not Due	Test	8/2/2012 3:08 PM	1-00:14	6	%/volume Developer Concentration	Cleaner 1	Cleaners
🕀 🎎 Desmear Process	Not Due	Test	8/4/2012 8:00 AM	2-17:06	5	%/volume Developer Concentration	Cleaner 2	Cleaner
Electroless Ni/Au	Not Due	Test	8/3/2012 5:00 PM	2-02:06	6	pH Value	Cleaner 2	Cleaner: -
Electrolytic Copper     A Electrolytic Copper	•							<u>→</u>
Electrolytic Cold	155 item	s displaye	d Custom view					
🗄 🧕 🧕 Quality Assurance								
🗄 🍓 Tool Calibration							View All listed item	s 🗾
🗄 🎎 Waste Treat		indev	Monday	Tuesday	1	Wednesday Thursday	Friday	aturday
🕀 🎯 Yields	Jul, 12	2	3 30	-	31 Aug	12 1 2	3	4
	edited and the	20	5					2
06. Demo Tank			5 6		7	8  9	10	11
Company								
Other 2 - Wet Area 1					-			
Type - Plating Tank			54 55		100			
			1	1				
Logged In System Administrator.				Add S	heet Pa	st Due Schedule Past Due Corr	ective Action S	amples 13

Figure 7: Schedule Showing a Calendar view

# 2.2 Other Schedules

One very useful feature of TrueChem is the Other schedule. These items are not tested, and the schedule is a notification that the activity is required. Activities like Carbon treatment, Filter changes, or pump maintenance are easily controlled using "other" schedules. The schedule forecast provides a work list of these activities that need completion. Scheduling other items is unlimited and can be used to schedule all of the facility preventive maintenance.

🧭 TrueChem - Your Company	y Name							
File Edit View Inventory Tools	Help							
1 2 2 2 1				1		1 🗾 🗟 🔏		
	-							Schedule
<ul> <li>Your Company Name</li> <li>↓</li> <li>↓</li></ul>	⊻iew Type	Schedule fi Other	orecast 💌	Work location	n (*All wor neline <u>a</u> ra	k locations 🗾	Û	
E 🎇 Chromic Acid	Drag colur	nn header	s here to group by					♣ ━ 💔
🕀 🍓 Cleaners	Status	Туре	Due By	Remaining	Priority	Item Description	Print Worksheet nk	Proces
🕀 🎎 Cupric Process	Past Due	Other	8/1/2012 2:08 PM	(0-01:03)	4	Anode Check	13. SMT Nickel	Electroless
E 🚜 Demo Process	Past Due	Other	8/1/2012 2:08 PM	(0-01:03)	4	Anode Check	07. Nickel Sulfamate	Electrolytic
- 3 01. Conditioner	Not Due	Other	8/5/2012 3:08 PM	3-23:57	7	Calibration	Temp Controller	Tool Calibra

Figure 8: Printing a Schedule Worksheet

### 3.0 Collecting Data

Getting the most out of TrueChem involves not only setting up the facility to collect and evaluate the data and determine additions needed, it also involves using the data collected to move the facility into statistical control. Excellent process control begins with the data collection.

### 3.1 Logging Samples

The sampling module is part of the standard TrueChem package. The sampling icon appears next to the perform test icon and is shown below



The sampling module allows the facility to separately record and track samples used for monitoring processes. The sample feature is used by clicking on a process line or a tank in a process line and then pressing the sample icon. A list of all of the tests used in that process line appears in the working window. The tests desired for a particular sample are selected by checking the check boxes. TrueChem then assigns a unique tracking number for the sample and assigns the current date and time as the start time. There is a default due date but this can be changed to suit the specific testing requirement. TrueChem then tracks the time until the sample results are entered.

🧭 TrueChem - Your Company	/ Name					
File Edit View Inventory Tools	Help					
<u>}</u>		8	1		1 🔹 📀	
Your Company Name Vour Company Name Processes Chromic Acid Sciences Cleaners Cupric Process Cupric Process Cupric Process 06. Demo Tank Cianer X	Process Demo Process Sample Date 8/1/2012 3:17 PM Due date 8/6/2012 3:17 PM Notes	u u				Log samples
- 5 13. Copper - 5 16. Etch ⊕ 3 Desmear Process ⊕ 3 Electroless Ni/Au	Process Tanks (Demo Process) 01. Conditioner 06. Demo Tank	Sample Number	Tank size 240 gal 560 gal	Other 1 ABC Chemistries, Inc. Acme Chemical Company	Other 2 Wet Area 1 Wet Area 1	Current level
	☐ 12: Cleaner X ☑ 13. Copper ☐ 16. Etch	2012-00001 2012-00002	315 gal 240 gal 240 gal	Acme Chemical Company Acme Chemical Co. ABC Chemistries	WET AREA 1 Wet Area Wet Area 1	
🛨 🎆 Quanty Assurance						

Figure 9: Sample Module Main Screen

This feature is particularly useful if the lab analyzing the process samples is in another location or if the facility takes in outside samples for analysis. This feature provides clear tracking of when the sample was gathered/received and when the analysis results are recorded. Many facilities choose not to use this feature especially when samples are gathered and immediately analyzed. If the sampling module is not utilized, TrueChem assigns the sample time to be the same time as when results are entered.

#### **3.2** Conducting Tests

Performing tests, entering and evaluating the data are some of TrueChem's basic functions. Accessing the Perform Test function can be done from the scheduled items



icon

or by selecting the tank in the tree view and pressing the perform test icon.



From the *Schedule* icon, a list of the items requiring tests will appear. Right clicking and selecting *Do Now* will start the test. You can also click the perform test icon pointed to by the arrow in Figure 10.

Your Company Name Unventory Processes	⊻iew ( Type /	Currently S All Schedu	Scheduled Items 💌	Work locatio	n <b>*</b> All wor neline <u>g</u> ra	k locations		Schedule
😑 🍓 Chromic Acid	Drag colur	nn header	rs here to group by			3 3	8 9 =	* - 199
🖅 🍓 Cleaners	Status	Туре	Due By	Remaining	Priority	Item Description	Tank	Pr 🔺
🗄 🍓 Cupric Process	Past Due	Test	7/31/2012 11:12 AM	(1-04:10)	2	Copper Content	01. Conditioner	Demo Pi
E 🚴 Demo Process	Past Due	Test	7/31/2012 1:12 PM	(1-02:10)	2	Normality	01. Conditioner	Demo Pi
01. Contailloner     106. Domo Tank	Past Due	Test	8/1/2012 2:02 PM	(0-01:20)	5	%/volume Developer Concentration	Cleaner 2	Cleaners
12. Cleaner X	Past Due	Test	8/1/2012 2: Do No	w :20)	6	pH Value	Cleaner 2	Cleaners
👗 13. Copper	Past Due	Test	8/1/2012 2:02 - W	(0-0) (20)	6	Differential between pH readings	Cleaner 2	Cleaners
I 10 THE	0.10				10 1410	and the second sec		

Figure 10: Performing a Test from the Schedule Screen

Alternately a test can be performed on an existing tank by selecting the tank on the tree and clicking on the *Perform Test* button.



Figure 11: Beginning Test from the Tree View

Initiating a test from either the schedule or from the Perform Test button causes the *Perform Test* screen to appear.

🖉 TrueChem - Your Company	Name									
File Edit View Inventory Tools	Help									
🧏 🛓 📨 🖉 🜌			D 00 00		1		A. 26		0	
H 4 2	Proce	ss Demo Proc	ess 🔽 Show I	Debug						Perform Test
🛃 Your Company Name	Та	nk 06. Demo T	ank							
	Sample Da	ate 8/1/2012 7:	42 AM						Test Status	
E S Processes		Y			Y				Y	
E 🍕 Chromic Acid	Notes	Test	Log	Docs	Output		General	Schedule	Маке-ир	HMIS
⊡ 👌 Chromic Acid ⊕ 🎉 Cleaners		Test Dai	te 8/1/2012 3:30	D PM						Recall last test
😑 🎎 Cupric Process	17	1		ABC	CONCENTR	ATION		ABC Test Proce	edure	
Developer				In	out ml of Thio	sulfate	e-			
Etcher (Cupric)					Enter No	rmality	0.1			
Stripper	Late	Range: 2.1 - 2.7	Optimum: 2.4					g/L ABC Conce	ntration	
E M Demo Process	1	0	22	Add to: 2.40	Start at: 2.30	Add		Ib ABC		
- 3 01. Conditioner				XYZ	CONCENTR	ATION		XYZ Test Proce	dure	
12 Oleaner V				Input ml	of Hydrochlor	ic Acid				
- A 12. Cleaner X				Ente	r Sample Size	e (mls)	50			
13. Copper	Late	Range: 035 (	Optimum: .1		242			g/I XYZ Concen	tration	
		ii			Add to: .1	Add	15	gal XYZ Concer	ntrate	
Electrologo Ni/Au						pН		pH Test Proced	<u>lure</u>	
Electroless NiAd					Enter pH R	eading				
Electrolytic Copper	Late	Range: 6 - 8 Op	otimum: 7					pН		
		-		Add to: 7	Start at: 7.1	Add		gal Sulfamic		
A Cuplity Accurates				Add to: 7	Start at: 6.9	Add		lb Nickel Carbo	nate	
Tool Calibration	6									
A Wacto Troat										
T M Violde										
	Message									

Figure 12: Perform Test Screen

When the sample module is used to track tests, performing the test must be initiated from the sample log to close out the sample.



Clicking on the sample log icon (right of the schedule icon) brings up the sample log shown in the figure below. To perform a test on the sample shown, double click on the sample row or single click the *Perform Test* icon marked with the arrow.

🧭 TrueChem - Your Company	Nar	ne						- FX			
The Edit View Inventory Tools Help											
<u>▶</u> ◆ ≫ √ <u>→</u> → ⊘ <del>↓</del> → ⊘ <u>↓</u> • <u>0</u>											
	-							Sample log			
<ul> <li>Your Company Name</li> <li>Inventory</li> <li>Processes</li> </ul>	Your Company Name     View Outstanding samples ▼ Work location *All work locations ▼     Inventory     For Dates 6/2/2012 3:40 PM - 8/6/2012 8:40 AM										
🖻 🎎 Chromic Acid	Dr					🛓 🛃 🗡	( 💫 🔬 🚍	🛧 🕳 👬			
🕀 🎎 Cleaners		Sample Number	Due By	Process	Tank	Sample Date	Received Date	Work loca			
🗄 🔏 Cupric Process		200900007	8/6/2012 8:37 AM	Electrolytic Gold	07. Nickel Sulfamate	7/29/2012 8:37 AM	8/1/2012 8:37 AM	*All work local			
- 🔬 Developer	•	200900008	8/6/2012 8:37 AM	Electrolytic Gold	11. Sulfuric Acid	7/29/2012 8:37 AM	8/1/2012 8:37 AM	*All work locat			
Etcher (Cupric)		200900009	8/6/2012 8:38 AM	Electroless Ni/Au	17 Nickel Activate	7/30/2012 8:38 AM	8/1/2012 8:38 AM	*All work locat			

**Figure 13: Performing a Test from the Sample Log** 

Note: Tests must be performed on the computer with the software key in order to save the date into the database.

When the *Perform Test* screen opens in the working window, it will initially be on the **Test** tab unless the check box on the **Notes** tab was selected. The check indicates the facility wanted to show the **Notes** tab first on opening screens in the *Tank Setup*. At the top of the perform test screen is the process line and tank being tested. Also shown are the sample date and the test date. The default for both of these dates is the time that the perform test was initiated. At the bottom left of the screen (noted by an arrow) is the user that is logged in, which is who the test will be associated with.

	Proce	ess Demo Process	Show	Debug						Perform Tes
vour Company Name	Ta	ank   06. Demo Tan								
	Sample D	ate 8/1/2012 7:42	AM						Test Status	
E 🍓 Chromic Acid	Notes	Test	Log	Docs	Output	T	General	Schedule	Make-up	HMIS
Chromic Acid	Test Date 8/1/2012 3:30 PM Recall last test									
😑 🎎 Cupric Process		1		ABC	CONCENTR	ATION		ABC Test Proce	dure	
Developer	1	2		In	put ml of Thio	sulfate				
Etcher (Cupric)		1			Enter No	rmality	0.1			
Stripper	Late	Range: 2.1 - 2.7 0	ptimum: 2.4					g/L ABC Conce	ntration	
E 3 Demo Process				Add to: 2.40	Start at: 2.30	Add		Ib ABC		
- Of Conditioner	1	8		XY.	Z CONCENTR	ATION	5	XYZ Test Proce	<u>dure</u>	
12 Oleanory		2		Input m	l of Hydrochlor	ic Acid	•			
12. Cleaner A				Ente	er Sample Size	e (mis)	50			
A 16 Etch	Late	Range: 035 Opt	imum: .1					g/I XYZ Concen	tration	
Decrease Process					Add to: .1	Add		gal XYZ Concer	ntrate	
Electrologe Ni(Au		1				pН		pH Test Proced	lure	
Electrolytic Conner					Enter pH Re	eading			11	
Electrolytic Copper	Late	Range: 6 - 8 Optin	num: 7					pН		
🕂 🍓 Laver Clean Proces		ĵ.		Add to: 7	Start at: 7.1	Add		gal Sulfamic		
A Cuplity Accurates				Add to: 7	Start at: 6.9	Add		Ib Nickel Carbo	nate	
🛓 🍘 Yields	Message									
< >										
06. Demo Tank Other 1 - Acme Chemical Company Other 2 - Wet Area 1 Size - 560 gal Type - Plating Tank										

Figure 14: Perform Test Screen

The **Test** tab shows all calculation created, and shows them in the same order they were created during setup. Fields where input values can be entered are highlighted in blue. By using the mouse, *Tab* key or *Arrow* keys, position the cursor inside the desired input item. Type the value and press *Enter*. The *Enter* key advances the cursor to the next field where another input can be entered. Any calculations in between the first entered value and the next possible field are completed. In addition, any rules applied to the calculation will be evaluated and acted upon. Although, some rule actions (like scheduling a retest or sending email alerts) do not take effect until the data is saved.

At this point, the data is ready to be saved to the database. But the data has not been saved yet, so exiting the **Test** screen to navigate to some other part of the program will erase the data entered. If the data is saved, only values in fields that have been entered will be recorded (blank fields are left blank and are not recorded as zeros in the data log). The window also indicates if a test is late (marked in red on the left), and shows the ranges for each result item calculated.

Note: The Enter key must be used to tell TrueChem that the value should be used in the results calculations. If you enter a value and attempt to leave the cell, a warning will appear "Ignored! Use enter key".

Not all of the tests listed need to be completed. When finished entering data, press the *Output* button. Only those entries followed by the *Enter* key will be saved to the database. If raw data is being reviewed then exiting without saving erases the data. This could be done on a computer without a software key to save the data.

### 3.3 Saving Data

Data can be re-entered at any time to replace the previous value. Once the test inputs have been calculated, select the *Output* tab. Clicking on the *Output* tab initiates the action of saving the data and brings up the screen shown in Figure 15.

# Note: Data can only be saved by working at the computer with the software key attached to it.

On this screen, you will see the results of the tests performed and it will display any Adjustments that have been calculated. You may enter comments regarding the test. The Addslip can also be previewed by clicking on the *Preview* button. With the appropriate rights, the user can override the calculated add amounts by clicking *Override*. In addition, the analyst can override next schedules of items and define the test as a Startup or Dump and Remake. To save the test or an Add Sheet, click the *Print\Save* button. If the *Print\Save* button is grayed out, this indicates that the button is not active and means that the software key is not currently installed on the computer. To correct the condition, check that the key is pushed into the connector completely, exit to another part of the program, and return to the *Test* screen (the data entered will need to be re-entered as it was not saved).

With the key properly installed, the *Print\Save* button will now be active. Clicking the *Print\Save* button saves the data to the database, and it will print the Addslips to the printer if that option had been previously selected.

# Note: For facilities that have checked not to print the Addslip on Print\Save, the Addslip can be printed as an option from the Preview button.

File       Edit       View Inventory Tools Help         Image: Second seco	
Image: Second	
Process Demo Process Characteristic Show Debug	
The New Company Name	ertorm les
👻 Your Company Name Tank Ub. Demo Tank	
Inventory Sample Date 8/1/2012 7:42 AM Test Status	
Chromic Acid     Notes     Test     Log     Docs     Output     General     Schedule     Make-up	HMIS
Cleaners Start up Test New Makeup Signoff required Will print	Print\Save
Comments	
	Store
Contract (Coping)	
- 🧟 Demo Process	<u>C</u> ancel
- a 01. Conditioner	
🚽 🗛 06. Demo Tank	Preview
- 👗 12. Cleaner X	
- a 13. Copper Due Br: 24/2012 2:42 BM	ſ
La 16 Etch Due by 6/1/2012 3-42 FM	
Add 47 00 point Amount Ones Addive	
Add gallon XYZ Concentrate	
A generative copper Add gallon Sulfamic	
Add pound Nickel Carbonate	Override
Quality Assurance Add International Protection Add Add Add Add Add Add Add Add Add Ad	
Tool Calibration	
Waste Treat     Intern Description     Missee     Next Test     Intern Description     Missee     Next Test     Trequency     Frequency	
W Yields	
	Set next
Camples	
06. Demo Tank Comple Number Due By Comple Date Received Date Level Nates	
Other 1 - Acme Chemical Date V - Sample Founder Date V - Sample Founder Hotes	
Company Control Contro	
Type - Plating Tank	

**Figure 15: Output Screen** 

# 3.4 Process Level Addslips

Sometimes it is desirable to issue addslips on a process line basis. Process level Addsheets combine the adds generated for the process line together, resulting in fewer sheets of paper. This feature is activated by a right click on a process line and then selecting *Process Setup* and then going to the **Addslip** tab. There is a checkbox for process level addslips. Selection is done for each process line where process level addslips are desired.

🙋 TrueChem - Your Compan	y Name				
File Edit View Inventory Tools	Help				
<u></u>		▼:日	2 😺 🔜 🍿 🧃 🛛	2 🖹 🍭 🎎 🔒 🚮	2
M ->>	Process	Chromic Acid			Process Setup
🛃 Your Company Name	G	eneral	Notes	Distribution	Add Sheet
- Inventory					
Processes					
Process 9	ietup				
E Rupric Pre	ess Add Sheet				
🕀 🍓 Demo Pro 🛛 New					
🕀 🍓 Desmear 🔤 Copy					
Electroles Paste					
Electrolytic Delete		Printing	Templates		

Figure 16: Activating Process Level Addslips

Once the feature is activated, performing a test on a given line will not result in an addslip being printed after Print/Save is clicked. Instead, each successive test will cause the flask icon (indicated by the yellow arrows) for the tank tested to become highlighted in blue as shown in the Figure. The process name also becomes highlighted. When the testing for that line is complete (note all the tanks do not have to be tested at once), the Addslip for the tanks tested is printed by right clicking on the process line and selecting "print process addslip". The additions called for by the various tanks tested appear the same as they would on individual Addslips but are combined on fewer sheets of paper.



**Figure 17: Printing Process Addslips** 

The sign off of process level addsheets (via the Addsheet Log) is the same as for normal addsheets, except that all of the items from all the adds appear on the same signoff. In the Figure, the tank Column shows "Process Add Sheet".



Figure 18: Process Level Addsheet Sign off

## 3.5 Performing Other Schedules

Performing other scheduled items is somewhat unique because no test is performed. Selecting an *Other* item from the schedule takes the user to the *Output* Tab to print and save. The default schedule shows all currently due items.

Fried hem - Your Company Name		×
TrueChem Message		
ID: N/A       CarbonTreatment       8/2/2012       11:32 AM         [1) Obtain granualted activated carbon in the amount of per 10 gallons of solution.       2)Assemble Carbolux unit w/ 20 lbs of carbon       3) Transfer process solution to treament tank.         4) Add peroxide inthe amount of 100 ml/gal       4) Run unit for 12 hrs then change carbon       5) Replace cartridge filter in Carbolux unit and filter on return to process tank.         Notes         Print library (Carbon Treatment)	<u>Ω</u> κ	
	ID: N/A CarbonTreatment 8/2/2012 11:32 AM  I) Obtain granualted activated carbon in the amount of per 10 gallons of solution. 2)Assemble Carbolux unit w/ 20 lbs of carbon 3) Transfer process solution to treament tank. 4) Add peroxide inthe amount of 100 ml/gal 4) Run unit for 12 hrs then change carbon 5) Replace cartridge filter in Carbolux unit and filter on return to process tank. Notes Print library (Carbon Treatment)	ID: N/A CarbonTreatment 8/2/2012 11:32 AM           1) Obtain granualted activated carbon in the amount of per 10 gallons of solution.         2/Assemble Carbolux unit w/ 20 lbs of carbon           3) Transfer process solution to treament tank.         4) Add peroxide inthe amount of 100 ml/gal           4) Run unit for 12 hrs then change carbon         5) Replace cartridge filter in Carbolux unit and filter on return to process tank.           Notes         Print library (Carbon Treatment)

Figure 19: Typical Other Item Addsheet

Other schedule items will be mixed in. Since there are no calculations associated with these items, selecting an Other Schedule item and clicking "Do Now" opens the output screen for printing and saving. Performing an *Other* schedule item really says that the task needs to be completed. In this respect, using a view in the Schedule of only the *Other* items can be used to create a work list. The addsheet in Figure 19 will show only the activity instructions. After the activity is complete, the *Other* schedule item is signed off by going to the Addslip log and selecting the item. Notice that the addsheet has a number in the upper left corner that can be found in the Addslip log to help locate it in and sign it off.

Note: Other schedule item addslips can be viewed in the Addslip Log, but they may have no additions on them.

### 4.0 Graphs and Statistical Tools

The ability to use the data in TrueChem to optimize the operation of a process is one of the main reasons for using TrueChem. TrueChem has several different graphing tools available, and it has built-in statistical functions to evaluate the data. TrueChem also has the ability to overlay graphs of the different components tested in any given process tank onto the same graph for that process tank.

The statistical functions in TrueChem provide the user with the ability to evaluate the operation of the process relative to established statistical techniques commonly used in statistical process control (SPC). TrueChem automatically plots the data and calculates several parameters. It is possible to customize the settings of some of the statistical functions to further optimize the data analysis to the needs of the facility.

### 4.1 Controlling a Process

The goal of all process control is to manage sources of variation so that only random fluctuations occur and so that all systematic sources of variation have been eliminated. Random fluctuations exhibit the bell shaped distribution that most are familiar with. Maintaining a process within + or -3 standard deviations of the mean value establishes a process that will practically almost never fail. "Almost never" is used because random variations can still cause a failure, but these will occur rarely.

There are several stages of establishing process control. First, process variables must be identified, then measurements are devised, data is collected, and the data is used to identify and remove systematic sources of variation. Removing these variations establishes a process with lower variation. Then the process starts all over again (continuous improvement) until any improvement suggested by the data is not cost effective to implement.

In metal finishing, the goal is to produce a part with little or no variation from a series of process steps. These process steps are controlled to minimize variation and establish

process limits that result in a high quality product. Some of the variables are easy to identify like the solution temperature, concentration, or current density. However, a common mistake made by metal finishers is to apply variation analysis to the process solution concentration. The solution concentration is maintained to eliminate variation in the effect produced by the process. For example, the concentration of an etch solution is not as important as the amount of material it dissolves from the surface in the allotted time. The etch rate is a function of the processing time, solution temperature and the concentration. Each of these parameters is managed so that the etch result is produced consistently. TrueChem allows the user to easily compare etch rate or other physical parameters to the control variables such as concentration and temperature if the physical parameter is part of the analyses used for the tank.

The first step required to establish process control is to identify the variables that must be controlled, and then implement methods that will assess these variables. Sources of this information include:

- Vendor literature
- Process review by chemical experts
- End item Specification
- Practical experience from extended use of a process

Generally, metal finishers trust that vendors provide suitable tests for the process chemicals they supply. However the tests provided should be validated, particularly for the desired accuracy and precision needed to affect SPC. The methods should be checked by applying SPC techniques to insure they perform acceptably. Once the methods have been validated, then the process is evaluated to determine if it is operating in control.

The run chart plots the process parameter data versus a time index. For a process truly in control, the run chart will exhibit only random fluctuations above and below the mean. This would be the kind of data expected if the plated thickness was measured from a controlled plating process. If the process does not exhibit this behavior then it contains sources of variation other than random. These must be identified and controlled. Basic statistical calculations and tools can aid in this effort. From this simple definition it is easy to see that solution concentration is not random because it exhibits a slow trend (usually decreasing) over time.

### 4.2 Basic Statistical Calculations

TrueChem makes use of standard statistical calculations, and these calculations are described in the following sections.

<u>Sample Mean:</u> One of the most basic calculations used in TrueChem is to determine the sample mean. The sample mean is the average of all the data in the sample and is given by equation 1, where x is the parameter measured for n samples.

$$\frac{1}{X} \text{ (Sample Mean)} = 1/n \sum_{i=1}^{n} x_i$$
 (Eq 1)

Several other statistical parameters can calculated from the data collected. These calculations include

Range: Measures the high and low values of x

<u>Sample variance:</u> sample variance measures the spread of the data from the calculated mean. This is accomplished by summing the square of the differences between the mean and each data point, and then dividing that sum by the sample size (Eq 2)

$$S^{2} = \frac{1}{(n-1)} \sum_{i=1}^{n} (x_{i} - \overline{X})^{2}$$
 (Eq 2

The units of variance are in the square of the units measured. Inspecting equation 2 shows that the smaller the sample size, the larger the contribution seen from the difference to the mean for each individual data point. Although the variation can be calculated for very small samples, the utility of information on the data spread becomes meaningless.

<u>Standard Deviation</u>: standard deviation is the square root of variance and presents the dispersion in the same units as the parameter measured. The sigma ( $\sigma$ ) is the symbol used for standard deviation. Data dispersion is commonly expressed by the standard deviation. For any sample exhibiting only random variation, the data will be spread as shown in Figure 20. 68.2% of the data is +/- 1 standard deviation from the mean, 95.4 % of the data is +/- 2 standard deviations, and 99.8% of the data is +/- 3 standard deviations from the mean. The general equation for the normal distribution is:

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$
(Eq 3)

Where f(x) is the y value calculated, x is the parameter of interest,  $\mu$  is the mean of all x and  $\sigma$  is the standard deviation. The variables  $\mu$  and  $\sigma$  refer to the population mean and standard deviation. If the process limits contain +/-  $3\sigma$  ( $6\sigma$  total) and only random variation exists, then only 0.2% of the data measured would be outside the acceptable limits.

It is impractical to assess the entire population, and thus data samples are gathered. The sample standard deviation is S and is simply the square root of the variance (S²). And these variables replace  $\sigma$  in equation 3.





#### 4.3 Drift in Chemical Processes

Most chemical processes do not remain completely constant. Some parameters such as concentration, pH or contaminant levels change over the course of time. Contaminants change from the action of the process, drag in and drag out, or chemical actions introducing contaminants that grow over the course of operation. This behavior makes the operation of a process solution less random. Thus, the x-bar chart is less valuable. Typically, plots of the run data with the calculated mean are referred to as "individuals" charts.

#### **Moving Range Chart**

A simpler way to deal with drift that many practitioners use is the moving range chart. The moving range chart plots the change (range) between data points. A process where the change between successive points was always the same would have flat moving range chart. The moving range chart is always coupled with an "Individuals" chart as the average range ( $\overline{R}$ ) is used to calculate control limits on the "Individuals" chart.

$$\overline{R} = 1/n \sum_{i=1}^{n} Xi - (X_{i-1} + \ldots + X_{i-m})/m$$
 (Eq 4)

In the moving range calculation the subgroup size is important. Normally a subgroup of 1 is used. In this case, adjacent data points are evaluated to determine the range. A subgroup size of 2 indicates that the previous two data are averaged to determine the range. In equation 4,  $X_{i-m}$  is used to determine the points averaged in the subset of m data points.

#### **Control Limits**

Control limits are calculated from the average range derived from Equation 4 and placed on the "Individuals" chart.

$$UCL = \overline{X} + (\overline{R} \times d_2)$$
 (Eq 5)

$$LCL = \overline{X} - (\overline{R} \times d_2)$$
 (Eq 6)

Where  $d_2$  is the factor for the subgroup size used (typically 2.66).

	$\mathbf{D}_2$
# Samples	Subgroup
	Factor
1	2.66
2	1.88
3	1.02
4	0.73
5	0.58
6	0.48
7	0.42
8	0.37
9	0.34

# Table 1D2 Subgroup Factors

#### 4.4 Histogram

Histograms provide a pictorial representation of the data that allows the user to easily identify central tendencies and skewing of the data. Ideally, the histogram will depict the normal distribution in Figure 20. Occasionally, outliers will occur well away from the center, and this data can indicate special causes of variation that should be investigated. In practice for metal finishers, a normally distributed histogram would only be seen from well controlled processes that exhibit no drift. For example, one would expect the histogram of anodizing coating weight to be normally distributed but not the concentration of sulfuric acid in the same anodizing process tank as the acid concentration would be expected to change over time.

Histograms are constructed by grouping the data into cells. Cells have the effect of rounding the data because each cell has a range (the cell width W). The number of cells is adjusted to optimize the data representation. Rigorously, the number of cells is the square root of the sample size. Typically for samples less than 100 data points, 7 to 10 cells are used.

$$W = (Xmax - Xmin) / #cells$$
 (Eq 7)

The data is sorted into the cells based on the cell width (range) and each cell is plotted. The height of the cell is the number of data points in the cell. Figure 21 shows a histogram of data. The figure also shows the upper and lower specification limits and the calculated upper and lower control limits. Control limits were calculated from equations 5 and 6. The data in this histogram is well grouped with only a couple outlying values and these are within the control limits. This process appears to be well controlled.



Figure 21: Histogram

## 4.5 Capability Index

Process capability compares the output of an "<u>in-control</u>" process to the specification limits by using *capability indices*. An "in control" process means nearly all of the measurements of the parameter of interest are within limits. The comparison is made by forming the ratio of the spread between the process operating limits (usually the specifications limits) to the spread of the process values, as measured by 6 process standard deviation units (the process "width"). To make a valid capability assessment, the sample size used must contain enough sample points. Generally, about 50 independent data values are thought to be enough.

Common capability indices include: Pp, Ppk, Cp and Cpk. The Pp and Cp indices are calculated against  $6\sigma$  using the entire specification range where the Ppk and Cpk are against  $3\sigma$  but use the smallest of the upper or lower specification range from the calculated mean value of the data. The P indices are also calculated using the actual standard deviation of the sample where the C indices use an estimated standard deviation from the average range and a factor for the sub-group size. Ppk is thought to measure actual performance better (and more conservatively) than Cpk. This is because Cpk is thought to be more sensitive to variation outside the sub-group because of using an estimated standard deviation. In addition, Pp and Cp are not valid for process parameters that have both upper and lower specification limits. Each will be discussed separately.

Pp is the natural tolerance. It is calculated by dividing the difference between the upper and lower specification limits and the population standard deviation. First, the standard deviation is calculated as in Eq 8.

$$Sx = \sqrt{\frac{1}{(n-1)} \sum_{i=1}^{n} (x_i - \overline{X})^2}$$
(Eq 8)

$$Pp = \frac{USL - LSL}{6Sx}$$
(Eq 9)

Ppk is the capability index to the nearest specification limit. First  $Z_U$  and  $Z_L$  are calculated and then the smallest is used to estimate Ppk.

$$Z_{\rm U} = \underline{\rm USL} - \overline{\rm X} \tag{Eq 10}$$

$$Z_{L} = \frac{\overline{X} - LSL}{Sx}$$
(Eq 11)

The smaller of  $Z_U$  and  $Z_L$  become  $Z_{min}$ 

$$Ppk = Z_{min}/3$$
 (Eq 12)

Cp is also the "natural tolerance" of the process sample calculated over 6 standard deviations. However Cp uses a standard deviation estimated from the average range and the subgroup size  $d_2$  used in the range calculation (Table 1)

$$\mathbf{S}_{est} = \mathbf{R} / \mathbf{d}_2 \tag{Eq 13}$$

$$Cp = \frac{USL - LSL}{6S_{est}}$$
(Eq 14)

Cpk is the capability index to the nearest specification limit. First  $Z_U$  and  $Z_L$  are calculated and then the smallest is used to estimate Cpk.

$$Z_{\rm U} = \underline{\rm USL} - \overline{\rm X} \tag{Eq 15}$$

$$Z_{L} = \frac{X - LSL}{S_{est}}$$
(Eq 16)

The smaller of  $Z_U$  and  $Z_L$  become  $Z_{min}$ 

 $Cpk = Z_{min}/3$  (Eq 17)

### 4.6 Statistical Functions Graphs in TrueChem

Several different graphs (charts) are available from TrueChem. They include; the X-bar, run moving range and histogram charts. Any of the process control parameters that result items are defined for can be displayed. There is also an option to overlay all of the parameters on the X-bar and run charts. TrueChem automatically performs statistical calculations to evaluate data mean, standard deviation, and capability indices.

Graphs are displayed, along with the statistical results, by clicking on a particular tank in the tree view and then on the icon from the menu bar.



At the top of the window the process, tank, and component displayed is identified. The date range of the data displayed can be changed by pressing the *calendar* icon to the right of the range currently displayed. In addition, check boxes allow the data to displayed *Time relative* or with **dates** displayed. Also, by clicking on a data point on the run chart comments relating to the test can be added. To the left of calendar icon are several tabs. These tabs allow the user to change the view of the screen. The default view when opening the screen is *Overview*. The individual graphs can also be displayed and are enlarged by clicking on the tab desired.



Figure 22: Graph Display Screen

### 5.0 Using the Statistical Features

TrueChem calculates the statistical parameters assuming that all the conditions have been met for the quantities to be valid. This means TrueChem assumes that

- Samples size is large enough for X and R to be valid
- Systematic sources of variation have been removed and only random variation persists
- Processes are in control and the capability indices are valid

If this is not the case, the validity of the calculations must be understood. Some of these tools can also be used to bring processes into control. The primary tools are the X-Bar, run charts and the histogram. These tools can be used to help identify sources of variation and remove them. Once this is completed and the processes are "largely in control" then the statistical calculations results can be used to assess the health of the process.

### 5.1 X-Bar Chart

Although listed as an X-bar chart in the heading, this graph may display data that is more accurately an "Individual's" run chart depending on the nature of the process. The X-Bar chart displays any, or all (by overlaying) of the <u>results</u> calculated for the tank against



Figure 23: X-Bar and Range Chart

time. In addition, TrueChem displays the calculated upper control limit (UCL), middle control limit (MCL) and the lower control limit LCL from the data sampled. These parameters are calculated from the moving range chart using Equations 5 and 6. Notice in Figure 23 that the data goes below the lower control limit. This may be caused by a new source of variation and should be investigated.

In addition, this screen displays the range chart which plots the absolute value of the difference between adjacent data points (Eq 19).

$$\mathbf{X} = \left| \mathbf{X}\mathbf{i} - \overline{\mathbf{X}} \right| \tag{Eq 19}$$

It is also possible to overlay all of the components in process solutions containing multiple components. An overlaid X-Bar chart is shown in Figure 12. When *Component Overlay* is selected, the components displayed can be pared down by clicking the button that appears to the right of field and checking the components desired from the list.



Figure 24: Component Data Overlay

#### 5.2 Run Chart

The run chart shows data plotted against time compared to the location of several limits. Shown are upper specification limit (USL), Upper shop limit (UO1) upper control limit (UCL) Process optimum (OPT), Lower control (LCL), lower shop limit (LO1) and the lower specification limit (LSL). Multiple components can also be displayed on this chart. This window also displays the moving range chart. As in the range chart above, the moving range displays the absolute value of the change between subgroups. Subgroup may be one or some number of data points, and is specified in the set up window. The run chart is very useful in determining adjustments to operating limits to center the process.



**Figure 25: Run Chart** 

### 5.3 Histogram

The histogram displays the data locating both the specification limits and control limits for the component displayed. This graph displays the data and provides a comparison to a normal distribution of the process data. Clearly in this figure the data is not normally distributed. This figure points out one of the great benefits of the histogram. It is a very effective tool for identifying that additional sources of variation still remain in the process. Work is needed on this process to identify the source(s) of the data spread and to remove the spread resulting in more normally distributed data.



Figure 26: Histogram

## 5.4 Graph Settings

Pressing the *Settings* tab displays a number of features that can be used to customize the graphs. Figure 27 shows the settings that can be modified for the Run Chart.

Component a/LABC Co	oncentration	•		
For Dates 2/2/2012 1	7:52 AM - 8/5/2012 7:22 AM			Littere mente Cettin ne 1
101 Dates 2/2/2012 1.	2.52711 0/5/2012 1.22711		Overview   X-Bar   Ru	n   <u>H</u> istogram <u>S</u> ettings
	Settings	Mode	Status	
	Data range	Default	Show last 60 Data po	ints
	Fixed SPC Limits	Calculated		
	X-Bar / Individuals	Default	Display chart, SG=1,	Control: Lower,Upper,C
	Run Chart	Default	Display run chart, Dis	play moving range, Sp
	Histogram	Default	Display histogram ch	artShow Bell Shaped C
	Display SPC data	Default	Display SPC data, Inc	lude: Mean,High && L(
				>
	Run Chart			
	📉 Display run chart			Default
	Display maying ra			
		inge		
	Include			
	Spec. Y	Lower	Vpper	Y Optimum
	Control V	Lower	Vpper	N Optimum
	Liser 1 🔽	Lower	V Linner	
	User 2 In	Lower		
	Oser 2 IN	Lower	M opper	

Figure 27: Graph Settings Screen

The subgroup size for the X-bar can be modified by selecting the X-bar/individuals row on the setting tab.

Dates 2/2/2012 12:52 AM - 8/5/2012 7:22 AM		Overview X-Bar Run His	togram Setting
,			
		1	
Settings	Mode	Status	
Data range	Default	Show last 60 Data points	
Fixed SPC Limits	Calculated		
X-Bar / Individuals	Default	Display chart, SG=1, Control:	Lower,Upper,C
Run Chart	Default	Display run chart, Display mo	oving range, Sp
Histogram	Default	Display histogram chartShov	v Bell Shaped (
Display SPC data	Default	Display SPC data, Include: M	ean,High && L(
			>
X-Bar / Individuals			1
🕎 Display X-Bar/Individu	uals chart		Default
Sub group s	size 1 💌		
Include			
Spec. N	Lower	N Upper N O	ptimum
Control 🕎	Lower	Y Upper Y O	ptimum
User 1 🕟	Lower	N Upper	
User 2 N	Lower	N Upper	
L			

Figure 28: X-bar/Individuals Settings

Component of ABC Co	ncontrotion				
Component   g/E ABC CC	Incentration	<u> </u>			
For Dates 2/2/2012 12	2:52 AM - 8/5/2012 7:22 AM		Overview X-Bar Run	<u>H</u> istogram <u>S</u> ettings	
	Settings	Mode	Status		
	Data range	Default	Show last 60 Data points		
	Fixed SPC Limits	Calculated			
	X-Bar / Individuals	Default	Display chart, SG=1, Con	trol: Lower,Upper,C	
	Run Chart	Default	Display run chart, Display	/ moving range, Sp	
	Histogram	Default	Display histogram chartS	how Bell Shaped C	
	Display SPC data	Default	Display SPC data, Includ	e: Mean,High && L(	
				>	
	Fixed SPC Data and Cont	rol Limits ——		1	
	🔲 Use fixed limits			ReCalc	
	Number o	f Points used 🗟	52		
	SPC	Data	Control	Range	
	Cpk 2.153	7	Upper 2.53	0.17	
	Cp 2.187	4	Optimum 2.40		
	Ppk 2.402	0	Lower 2.26	0.00	
	Pp 2.439	6			

Figure 29: SPC Settings

By selecting the Fixed SPC Limits row, the settings used for the capability indices is displayed and can be adjusted if desired.

Note: The settings page only changes the properties for the current tank. To make global changes go to the "System Setup", Graphs tab.

### 6.0 Data Log

Pressing the scroll icon accesses the data log (Figure 30).



The data log presents all of the stored data in a tabular format. The columns match up to the test screen rows rotated 90 degrees. Items at the top of the test window appear at the left on the Data Log.

Data displayed is color coded depending on whether it is in specification or not, and by actions required that have or have not been completed. The default settings are

- white In spec or no specification associated (i.e. input item)
- gray Addslip not signed off
- blue Corrective action signed off with assignable cause
- yellow Corrective action not signed off
- red Corrective action signed off without assignable cause

🖉 TrueChem - Your Company	Nam	e													BX
File Edit View Inventory Tools	Help														
1 2 2 1 1			5 🕹 🚱 🚺					3	26						
M		Process Demo I	Process											Da	ta Log
🛃 Your Company Name		Tank 06. Der	no Tank												
- 🚚 Inventory	For Dates 1/19/2012 1:05 PM - 8/6/2012 1:05 PM														
Processes	-	1			_	_	_	_	_	_			-		langel
E 🦓 Cleaners	Drag column headers here to group by														
The second secon		Sample Date 🦙	Test Date	Elapsed	User	S	н	g/L ABC	ABC		g/I XYZ	XYZ		pН	Sul 🔺
Demo Process     Demo Process     Di. Conditioner     Di. Demo Tank     Di. Cleaner X     Di. Cle	F	8/5/2012 7:22 AM	8/5/2012 7:57 AM	1-01:24	24			2.40			0.10			7.000	
		8/4/2012 5:58 AM	8/4/2012 6:33 AM	3-23:14	13			2.42			0.11			7.050	
		7/31/2012 6:44 AM	7/31/2012 7:19 AM	1-01:01	13			2.40			0.10			7.000	
		7/30/2012 5:43 AM	7/30/2012 6:18 AM	0-23:08	22			2.34	14	lb	0.09	0.5	gal	6.900	
		7/29/2012 6:35 AM	7/29/2012 7:10 AM	1-00:04	16			2.36	9.5	lb	0.10			7.000	
		7/28/2012 6:31 AM	7/28/2012 7:06 AM	1-00:58	23			2.38	4.75	lb	0.11			7.100	
🗄 🧟 Electroless Ni/Au		7/27/2012 5:33 AM	7/27/2012 6:08 AM	3-23:23	23			2.40			0.10			7.000	
🗄 🍓 Electrolytic Copper		7/23/2012 6:10 AM	7/23/2012 6:45 AM	1-23:36	16			2.42			0.10			7.000	
🗄 🍓 Electrolytic Gold		7/21/2012 6:34 AM	7/21/2012 7:09 AM	4-00:25	16			2.38	4.75	lb	0.10			7.000	
🕀 🍇 Layer Clean Proces		7/17/2012 6:09 AM	7/17/2012 6:44 AM	1-23:26	16			2.44			0.08	1	gal	7.000	
H M Quality Assurance     Tool Calibration		7/15/2012 6:43 AM	7/15/2012 7:18 AM	9-00:38	16			2.38	4.75	lb	0.09	0.5	gal	6.950	
+ 3 Waste Treat		7/6/2012 6:05 AM	7/6/2012 6:40 AM	2-23:19	23			2.38	4.75	lb	0.09	0.5	gal	6.950	
🕀 🍘 Yields		7/3/2012 6:46 AM	7/3/2012 7:21 AM	3-00:35	13			2.34	14	lb	0.08	1	gal	6.830	
-		6/30/2012 6:11 AM	6/30/2012 6:46 AM	4-23:46	13			2.38	4.75	lb	0.10			7.050	
		6/25/2012 6:25 AM	6/25/2012 7:00 AM	29-23:52	23			2.38	4.75	lb	0.11			7.100	
	*	5/26/2012 6:33 AM	5/26/2012 7:08 AM	4-00:39	16			2.42			0.11			7.030	
		5/22/2012 5:54 AM	5/22/2012 6:29 AM	3-23:48	4			2.38	4.75	lb	0.09	0.5	gal	6.950	
< >		5/18/2012 6:06 AM	5/18/2012 6:41 AM	2-23:11	14			2.42			0.11			7.100	
06. Demo Tank		5/15/2012 6:55 AM	5/15/2012 7:30 AM	2-01:02	22			2.36	9.5	lb	0.08	1	gal	6.900	
Jther 1 - Acme Chemical Company		5/13/2012 5:53 AM	5/13/2012 6:28 AM	1-23:13	22			2.40			0.10			7.000	
Other 2 - Wet Area 1 Bize - 560 gal	•	5/11/2012 6:40 AM	5/11/2012 7:15 AM	2-20:09	13			2.42			0.11			7.050	+
Type - Plating Tank	73	3 items displayed								Le	gend	1.0 1	.0		?
ogged In Default User.				Add Shee	et Past	Due	So	hedule Pa	st Due	Cor	rective Actio	on	S	amples	13

Figure 30: Data Log

#### 6.1 Data Point Features

By right clicking on a data point, a number of options appear in the menu shown. Some reproduce the page active buttons. The others show test details, test summary, the change history, create bookmark or allow data editing. You can also view the corrective actions (if any), notes on the data, and the addslip resulting from the analysis.

Note: most of these functions require administrator rights. Editing data creates an entry in the event log.

2.42			0.11			7.0
2.40			0.10			7.00
2.34	14	lh .	<u>n ng</u>	0.5	gal	6.90
2.36	9	Test	details			7.00
2.38	4.7 -	Test	summary			7.10
2.40		Corr	ective Action	٦		7.00
2.42		Note	Add Sheet			7.00
2.38	4.7		- 			7.0(
2.44	_	Shov	v change his	gal	7.0(	
2.38	4.7	Book	marks		gal	6.9(
2.38	4.7	Redo	o test		gal	6.9(
2.34	1	Edit	Cell		gal	6.80
2.38	4.7	Dele	te cell			7.0(
2.38	4.7	Dele	te Row			7.10
2.42			0.11			7.00
2.38	4.75	lb	0.09	0.5	gal	6.9(
2.42			0.11			7.10

Figure 31: Data Log Right-click Menu

#### 6.1.1 Test Detail Screen

The test detail screen is shown in Figure 32. This screen shows the input values and results for the row of data selected. The arrow buttons on the right side of the screen allow the user to move up and down the data row in the data log and display that information in the detail screen.

Test details								
Sample Date 12/11/2008 3:38 PM User System Administrator Entry date 12/11/2008 3:38 PM Partial Remake								
Test	Sulfuric Acid							
Input	MIs of 1.0N Sodium Hydroxide	37.1						
Result	Range: 165 - 200 Optimum: 182.5	185.5	g/L Sulfuric Acid					
Adjustment			Sulfuric Acid					
Test	Alumina							
Input	MIs of 1.0N Sodium Hydroxide	37.1						
Result	Range: - 20 Optimum:	0	g/L Alumina					
Make-up			Deionized Water					

Figure 32: Test Details Screen

#### 6.1.2 Test Summary Screen

The test summary screen is shown below. This screen shows a great deal of information about the test performed and includes sign off information. This screen also has a *Print* function that will send the report to the printer. This screen contains all of the information relating to the process tank and the row of data selected. The screen shows details about the process tank chemistry, physical parameters, recaps additions made, signoffs and corrective actions relating to the row of data.

Test Number 7225		Test summers	Durinte d. 9/6/2012 2:41:44 DM	1000	1				
Test Number: 7325		Test summary	<b>Frinted:</b> 8/6/2012 2:41:44 PM		<u>k</u>				
Process			Tank						
Name: Demo Process	Na	Name: 06. Demo Tank Volume: 560 (gallon)							
Other 1:	Oth	er 1 Acme Chemical Compa	any Diminsions: 110 x 24 x 55 (inch)						
Other 2: 0	Othe	r 2: Wet Area 1	From Top: 6 (inch)						
Type:	T	pe: Plating Tank							
Responsible:	Responsible: Responsible: Matt Akin								
		Schedule		1					
	Sche	duled							
Scheduled Start:		End:							
		Sample		1					
Date/Time:	Num	Jampie	Sampled By:	-					
Notes:			Complete Bjr						
		Test							
Test Date/Time: 7/28/2012 6:31 AM	Tested	By: Frank Williams	Entered: 7/28/2012 7:06 AM	-					
Comments:				1					
Test Results	Optimum	Limits	Info	1					
2.38 g/L ABC Concentration	2.4	2.1 - 2.7							
0.11 g/I XYZ Concentration	.1	035							
7.1 pH	7	6 - 8		]					
Adjustmen	ts		Info	1					
dd 4.75 pound ABC		8							
d 28 gallon Sulfamic				]					
Condition									

Figure 33: Test Summary Screen

# 6.1.3 Adding a Bookmark

Bookmarks are used to flag events that occur to process tanks (overflow or remake for example) and allow the insertion of a break in the data if desired. Breaks in the data can

Bookmarks 7/28/2012 6:31 AM	
Bookmarks	Ok
Bookmark type Created On By	
	<u>H</u> elp
<u>A</u> dd <u>M</u> odify <u>D</u> elete	
Bookmark note	
🗖 Cause break in SPC	
	ļ

Figure 34: Bookmark Screen

be used to restart the statistical calculations. The bookmark screen appears by selecting the data row in the *Data Log* and right clicking. Then select *Bookmarks*. From this screen the user can *Add*, *Modify* or *Delete* bookmarks. A check box at the bottom allows the user to create a break in SPC calculations and restart the statistical sample.

## 7.0 Data Points and SPC

A very powerful feature of TrueChem is the built in statistical functions that are part of the graphing features. TrueChem calculates a number of standard statistical parameters such as mean, standard deviation, control limits and capability indices. However these parameters are only as good as the data used to calculate them. Rules to help reduce data entry errors improve data quality, however even these rules do not cover a few instances. TrueChem has some ability to remove erroneous data points (Data Editing), hide specific data points in lieu of editing, and mark particular data points as start up tests. Each of these activities removes the data point form the SPC calculations

## 7.1 Data Editing

If the user has the proper rights, data in TrueChem can be edited. But the activity is time consuming, so the TrueChem rights should normally be set to prevent this.

### 7.1.1 Changing a Data value

To change the value of a cell you must be in the Data Log. Right click on the cell and select Edit Cell and the screen shown below will appear the current value is shown and

		81 🔝					23		1
ces		- 1	1.5.51.5			1. 751		-	4
Tan Ch	ange result valı	це							
)ate:	Value	2.38				<u>0</u> k			
n he	Display As	<none></none>	_		•	<u>C</u> ancel			
ple (	comments				-		ABC		
012						~			
012									
012									
012							14	lb	
012							9.5	lb	
>012							4.75	lb	
012						<u>×</u>			
012 6:10	JAM 7/23/201	2 6:45 AM	1-23:30	16		2.42			
012 6-24	LAM 7(21(20)	2.7.09 AM	4-00:25	16		2.38	4 7 5	lh	

Figure 35: Editing a Cell in the Data Log

can be altered. However, a reason must be entered to exit the screen. The sample date and Test date cannot be edited. If these are incorrect, the entire row must be deleted and the date re-entered.

#### 7.1.2 Deleting a Row of Data

This occasionally needs to done, particularly if the sample date and/or time are entered incorrectly. The row is selected, and a right click brings up the menu that includes *Delete Row*. A warning is displayed that deleting the row deletes everything related to the row of data including any additions. Then a reason must be given to complete the deletion.

#### 7.2 Hiding a Data Point from the SPC

To hide a data point from the SPC calculations and from graphing, right click column H for a particular row and select *Modify Hidden Status*. A reason must be given and an "X" appears in column H as shown. Everything in the row is hidden including adjustments.

🖉 TrueChem - Your Company	Nam	9													
File Edit View Inventory Tools	Help														
1 2 2 2 1			4 🤣 🐼 🐌						26			9			
e se m	-	Process Demo I	Process											Da	ta Log
Your Company Name	_	Tank 06. Der	no Tank												
		For Dates 1(19/20	12 4:45 PM - 8(6(201	2.4:45 PM											
🗄 🧄 Processes	_	Pui Dates   1110/20	12 4.45 T M 0/0/201	12 4.40 F M											
🕀 🌉 Chromic Acid	Dra		to group by									7	Į 🚆	+	L ( ) 9
E Cleaners		Samnle Date	Test Date	Flansed	Liser	9	H-	of ABC	ABC		all XV7	XY7	- 1	nH	Sul 📤
- A Demo Process		1/25/2012 7:38 AM	1/25/2012 8:13 AM	0-22.00	26		1.6.3	2.55	37.82	lb	0.10	7.12		6.620	- Our
1. Conditioner	-	1/26/2012 8:38 AM	1/26/2012 9:13 AM	1-01:00	25			2.55			0.29	0.33	nal	6 550	
🛛 🚡 06. Demo Tank		1/27/2012 6:38 AM	1/27/2012 7:13 AM	0-22:00	24			2.00			0.08	0.00	gui	7 450	
👗 12. Cleaner X		8(5(2012 7:22 AM	8/5/2012 7:57 AM	1-01:24	24			2.41			0.00			7 000	
🍝 13. Copper	-	3(9/2012 6:14 AM	3/9/2012 F:49 AM	1-11:54	23			2.40			0.10			7 100	
16. Etch	-	3/26/2012 6:34 AM	2/26/2012 7:00 AM	1-09:54	20			2.44			0.11			7.050	<u></u>
🕀 🌉 Desmear Process		3/20/2012 0.34 AM	5/20/2012 7.09 AW	1-00.04	23			2.42	0.05	100	0.11			7.000	
🗄 🦉 Electroless Ni/Au		4/12/2012 9:56 AM	4/12/2012 10:31 AM	3-00:02	23			2.39	2.25	aı	0.11			7.100	
🗄 🍇 Electrolytic Copper		4/18/2012 10:12 AM	4/18/2012 10:47 AM	3-00:00	23			2.44			0.11			7.200	
🕀 🌉 Electrolytic Gold	•	4/23/2012 10:15 AM	4/23/2012 10:50 AM	2-00:01		>	Х	2.48			0.13			7.210	
A Guality Assurance		4/24/2012 10:16 AM	4/24/2012 10:51 AM	1-00:01	23			2.24	37.75	lb	0.10			7.000	

#### Figure 36: Hiding a Data Point

Should the data point be unhidden later, that change in hidden status will be recorded in the notes with the original hiding.

### 7.3 Marking a Test as a Start up Test

When a new tank is made, often tests are done prior to placing the tank in service to insure that the tank was made properly. In addition, with some additives several additions can be necessary to bring the tank into specification. It makes sense not to include these results in the SPC as the tank is not yet in production. Instead of hiding the test, marking the test as a makeup test records the material used but does not use the results in SPC calculations. To mark a test as a *Start up Test*, select the check box on the *Output* screen after entering the data as shown

🌠 TrueChem - Your Company	/ Name						
File Edit View Inventory Tools	Help						
1 2 2 2 1		2 2 6 1		🗈 🍕 🤽			
M	Process D	emo Process 🗖 Show	Debug			P	erform Test
Your Company Name	Tank 08	j. Demo Tank					
	Sample Date 8	/6/2012 5:14 PM			Test Status	Corrective	Action
🗄 🍓 Chromic Acid	Notes	Test Log	Docs Output	General	Schedule	Make-up	HMIS
I	Start up Test	🗖 New Make	oup 🔽 Signoff re	quired	F Will print		PrintiSave
🖻 🎎 Demo Process	T D B I						Store
06. Demo Tank o 12. Cleaner X						2	<u>C</u> ancel

Figure 37: Marking a Test as Start up

The data associated with the test will show an X in the S column of the Data Log as shown

🖉 TrueChem - Your Company	y Name												
File Edit View Inventory Tools	Help												
1 2 2 1 1 1	[		2 3		1				26	) 🔹 🥝			
		Process Demo P	rocess									Dat	a Log
🛃 Your Company Name		Tank 06. Dem	io Tank										
		For Dates 1(19/201	2.5:11 PM - 8(6(20	12.5-11 PM									
🗄 🧄 Processes		For Dates   Wisizon	12 3.111 M 6/0/20	12 0.111 1								 	
🕀 🎎 Chromic Acid	Drag									E	) W	* -	88
🕂 🧟 Cupric Process		Sample Date 🦙	Test Date	Elapsed	User	S	н	g/L ABC	ABC	g/I XYZ	XYZ	pН	St_
🔄 🧕 🧟 Demo Process	•	8/6/2012 8:00 AM	8/6/2012 5:11 PM	1-09:14		×		0.96	338.75	b			
01. Conditioner		8/5/2012 7:22 AM	8/5/2012 7:57 AM	1-01:24	24			2.40		0.10		7.000	

Figure 38 Data Log Showing a Start up Test

## 8.0 Sign Off Requirements

The various sign off requirements that exist in TrueChem create more traceability and assist the facility to complete actions that have been determined to be important to the operation of the facility. In addition to Add Slip sign offs, the facility can decide to create Corrective Actions and Events that may also require a sign-off. Sign-off conditions can be made to require an explanation, which helps document the activities and in the case of troubleshooting, can help prevent retracing steps.

# 8.1 Addslip sign off

When an Addslip is created by the *Print/Save* option, TrueChem adds that adjustment to the Addslip Log. The facility can either print out the addslip immediately on *Print/Save* or can go "paperless" and only print the Addslip when needed. In any case, the sign off process begins after the addition has been completed. The user signing off the addition goes to *Addslip Log* by clicking on the icon.



The Addslip log is shown in Figure 39. The list shown can be sorted in a number of ways to make finding the entry easier. The Addslip Log, by default, displays the current list of outstanding add sheets. Addslips listed here have been issued from a test but not yet signed off. Items appearing in red are overdue. Once the test generates the add sheet, and the allotted time expires for sign off, the status indicator at the bottom of the screen flashes "Past Due".

Once the desired entry is selected, either right click on the entry and select the *Sign Off* button or select the sign off icon from the button in the Add Sheet screen (yellow arrow).





Figure 39: Addslip Log

ļ	١dd	Sheet sign	off				
			Add Sh	eet ID 9	64		<u>S</u> ign Off
Date Issued			ssued 8	/5/20	12 1:23 PM	Cancel	
			Userl	Name <mark>S</mark>	Sonia	Campos	
				Tank 1	3. SN	IT Nickel	Helb
			Pro	ocess <mark>E</mark>	lectro	oless Ni/Au	
			Sign o	ff date 8	/6/20	12 5:23 PM	
1		Action	Amount	Unit		Chemical	
	$\mathbf{\nabla}$	Add	2	liter		SMT Rep I (Lot- 021-05-01-001)	
	$\square$	Add	1	liter		SMT Rep II (Lot- 022-05-01-001)	
	$\mathbf{\nabla}$	Add	2	liter		Everon Reducer Concentrate	
	⊻	Add	37.5	millilite	r	Everon Accelerator	
	☑	Add	705	millilite	r	Ammonium Hydroxide (Lot- 025-01-04-002)	)
	<					ш )	>
	Con	nments					
	Se	elect All	Unselect All	Mod	lify		<u>P</u> rint

Figure 40: Addslip Sign Off

The *Addslip Signoff* screen will appear. The list of add amounts that were called for in the test are displayed with a check box to the left. If all of these boxes are checked and the *Sign Off* button is pressed, then the add is signed off as issued.

If one of the adds needs to be modified, double click, or select, the item and press the *Modify* button. The *Modify* adjustment dialogue will appear. The amount or units can be modified and a comment must be given explaining why the modification occurred.

Add Sheet signoff	Hedify Adjustment	
	Amount Amount Qk Units liter	<u>S</u> ign Off <u>C</u> ancel <u>H</u> elp
Action Al Add 2 Add 1 Add 2 Add 3 Add 3 Add 3		4.002)
Comments		
Select All Un	select All <u>M</u> odify	Print

Note: The comment action is not optional and is required whenever the add amount has been changed.

Figure 41: Modify Adjustment

### **8.2 Corrective Actions**

What is a Corrective Action? Corrective Actions are defined by rules and are results that the facility decides needs further investigation or documentation. An example might be when a result is outside of its spec limits. By checking the *Require corrective Action Sign Off* check box (Figure 42) in a *Rule Setup*, you are saying that this condition should be flagged for sign off and tracked for sign off completion. In the *Sign off* section, the exception type can be selected. These types are user defined. The exception can be viewed and tracked by this type. A priority can be defined to assist in identifying the importance of the exception. The description will help identify the details of the exception. Allotted time is used to determine how much time should be allowed for the signoff to occur. At the expiration of this time, an email could be sent to further raise the awareness of the situation.

C System Rule Set © Custom Rule	<u>O</u> k
_ If	<u>C</u> ancel
(Result)	Help
O Out of the Last Results	
☐ And ☐ Or	
Then	
Action to Take	<u>^</u>
Scheduling options	
Log Event	
Print message on Add Sheet	
Create bookmark	
Require New Makeup	
	_
	~
Require Corrective Action signoff	
Corrective Retion type Lout of Owner	Priority 1
Description	
Description	

Figure 42: Defining a Corrective Action in a Rule

Once defined, conditions that create a corrective action will result in the Status bar blinking "Exist" in the Corrective Action Field



Figure 43: Corrective Action in the Status Bar

If the Facility uses a Dashboard, the *Exception* column will show "signoff needed'

TRUELOGIC TrueLogic Dashboard									
Process Chromic Acid	Sample	Test	Add	Exception					
Cleaners	Samples Late	Tests Due	Adds Needed						
Cupric Process Demo Process	Samples Late	Tests Late		Signoff Needed					

Figure 43: Corrective Action Indicated on the Dashboard

#### **8.2.1** Completing a Corrective Action

To view the list of corrective actions, select the Corrective Action log button on the graphical menu bar.



The Corrective Action Log screen will be displayed. The log is similar in format to the Schedule Log or the Addslip Log. Items due are in black, those late are at the top of the list in red. The initial view is always All Exceptions Not Signed Off. Like the Addslip

Corrective Action signoff	
Corrective Action type Out of Spec	<u>0</u> k
Date Issued 8/7/2012 9:58 AM	<u>C</u> ancel
Description 1100 PPM Copper Concentration Limits: 0 - 1000	<u>H</u> elp
Tank 12. Cleaner X	
Process Demo Process	
Result Status	
Value 1100 PPM Copper Concentration	omplete
Lower  0 Optimum Upper  1000	
Control limits	e Cause
Lower - 170 Mean   338 Opper   831	
Defined Corrective Action cause	
Dropped Part	•
Comments	
E E B I U Arial V Black V 8 V	
Part Dropped in tank slowly dissolved	

Figure 43: Corrective Action Sign Off

Log, the sign off process begins by selecting the item from the list and clicking *Sign Off.* As shown in Figure 44, details about the result that led to the corrective action are listed. The sign off is completed by checking the boxes and filling in a cause description and comments. The user also has the option of checking that there was an assignable cause. For example, overflowing a tank could be and assignable cause to an out of spec concentration resulting in a corrective action. When complete click *OK*.

# Note: When complete, Corrective Actions disappear from TrueChem. If a permanent record of the condition is needed, define the condition as an Event

Corrective actions are noted in the Data Log by color coding of the result. Orange indicates a Corrective Action exists, blue a corrective action signed off with cause and red a corrective action signed off without an assignable cause. When signing off, a reason must be supplied and the user must have rights to sign off the corrective action.



Figure 45: Corrective Actions in the Data Log

Figure 45 indicates two corrective actions. One needs action (orange) and the other has been signed off with a cause (blue).

### 8.3 Events

What is an Event? An Event is created when some action has occurred that TrueChem was told to track. This includes changes to the data or the database set up. The tracking of these actions is permanent and cannot be erased by anyone. Events, like Corrective Actions, can also be created when a user defined rule condition creates a result that the facility wishes to track permanently.

#### **8.3.1** Events that TrueChem logs

There are several event types that TrueChem will automatically track. This tracking is turned on in TrueChem's *System Setup* under the *Tracking* tab.

- <u>Track Add Sheet Status</u>: This will cause TrueChem to require add sheets be signed off.
- <u>Track User Activity</u>: This will cause TrueChem to log events related to user rights such as invalid password attempts, changes to user rights or changes to user status.
- <u>Track Setup Changes</u>: This option will cause TrueChem to log changes to the setup of Processes (Groups), Tank (Objects) and Rules.
- <u>Track Add Sheet Override</u>: This causes a required reason be given for any changes to add amounts.
- <u>Track Schedule Override</u>: This will log events describing changes when a schedule has been overridden.
- <u>Track Data Editing</u>: This will cause TrueChem to log any editing or deleting of test data from any Tank (Object).



Figure 46: Tracking Screen System Setup

### **8.3.2** Rule Driven Events

Events can be created and added to the event log by a rule. Figure 47 shows the set up and it is very similar to setting up a corrective action. In this example, the log message contains variables. This allows TrueChem to communicate about any tank because the message draws the information to construct the message. The difference between the Corrective Action and the Event is that events remain in the system even after being resolved while Corrective Actions go away when resolved.

ule Setup	
(Result)	Qk
C Out of the Last Results	Cancel
ls < ▼ [Rst.LSL] And ▼ Or > ▼ [Rst.USL]	Help
Then	
Action to Take	^
Display Message	
Hide Data Point	
Schedule Re-Test	
🗹 Log Event	
Print Message on Add Sheet	
Create Bookmark	~
	1
Log Event	
Event Type Out of Spec.	•
Log Message	
[RST.NAME] was out of spec. Value=[RESULT] Lower spec=[RST.LSL] Upper spec=[RST.USL]	

**Figure 47: Rule Driven Events** 

### 8.3.3 Event Log

TrueChem's Event Log is much like an audit log entry. However, it cannot be edited or deleted. The event log can be viewed by selecting the Event Log button from the graphical menu bar.



Since the event log is permanent, it will get large over time. As with the other logs, a date range can be defined and then the columns sorted to facilitate navigation. The event log is shown in Figure 48.

e Edit View Inventory Tools	Help					لعارف
🎍 🗴 🔊 🖉		⇒  🌮 🐼 🐌	S 📦 🚺 🖻 🗎	🂐 🍰 🔒 💰		
H	<b>-</b>					Event L
Your Company Name	For Dates 7/8/2012 1	1:00 AM - 8/7/2012 11:0	00 AM			
	Drag column headers he	re to group by				
	Date	Process	Tank	licer	Workstation	Event Type
🗄 🍓 Cleaners	8(7/2012 9:34 AM	1100000	- MATTA	Roger Smith	LIFEBOOK	Data Editing
E Cupric Process	8(7(2012 9:34 AM			Roger Smith	LIFEBOOK	Data Editing
E M Conditioner	8/7/2012 9:34 AM			Roger Smith	LIFEBOOK	Data Editing
A 06 Demo Tank	8/7/2012 0:34 AM	Waste Treat		Roger Smith	LIFEBOOK	Setun Change
🛛 👗 12. Cleaner X	8/7/2012 8:42 AM	Tradic from		Roger Smith	LIFEBOOK	Data Editing
- 👗 13. Copper	8/7/2012 8:40 AM	Demo Process	06 Demo Tank	Roger Smith	LIFEBOOK	Data Editing
🖵 👗 16. Etch	8(7(2012 8:37 AM	Demo Process	06 Demo Tank	System Administrator	LIFEBOOK	Data Editing
E Schertrologo Niklau	8/7/2012 8:36 AM	Demo Process	06 Demo Tank	System Administrator	LIFEBOOK	Data Editing
A Electrolytic Conner	8/7/2012 8:36 AM	Demo Process	06 Demo Tank	System Administrator	LIFEBOOK	Data Editing
+ A Electrolytic Gold	8/7/2012 8:26 AM	Cessna Demo Tanks	2227 - Hekel Alodine 1600 / 1660	System Administrator	LIFEBOOK	Setun Change
🗄 🧸 Layer Clean Proces	8/7/2012 8:25 AM	Cessna Demo Tanks	2220 - A45 Etchant	System Administrator	LIFEBOOK	Setup Change
🗄 🍓 Quality Assurance	8/7/2012 8:25 AM	Cessna Demo Tanks	2220 - A45 Etchant	System Administrator	LIFEBOOK	Setup Change
🗄 🎎 Tool Calibration	8/7/2012 8:25 AM	Cessna Demo Tanks	2225 - Deoxidizer 6/16	System Administrator	LIFEBOOK	Setup Change
⊕ 3% Waste Freat Maste Freat	8/7/2012 8:25 AM	Electrolytic Gold	14. Orosene Gold	Roger Smith	LIFEBOOK	Setup Change
i neius	8/7/2012 8:23 AM	Cessna Demo Tanks		System Administrator	LIFEBOOK	Setup Chang
	8/7/2012 8:22 AM			Default User	LIFEBOOK	TrueChem Lo
	8/7/2012 8:15 AM				LIFEBOOK	TrueChem Lo
	8/7/2012 8:14 AM			Default User	ROGERVAIO	TrueChem Lo
	8/7/2012 8:13 AM	Cessna Demo Tanks	2220 - A45 Etchant	System Administrator	LIFEBOOK	Setup Change
Demo Tank	8/7/2012 8:13 AM	Cessna Demo Tanks	2225 - Deoxidizer 6/16	System Administrator	LIFEBOOK	Setup Change
er 1 - Acme Chemical	8/7/2012 8:13 AM	Cessna Demo Tanks	2227 - Hekel Alodine 1600 / 1660	System Administrator	LIFEBOOK	Setup Change
npany er 2 - Wet Area 1	8/7/2012 8:13 AM	Cessna Demo Tanks		System Administrator	LIFEBOOK	Setup Change
e - 560 gal	•	I	-1	1.48		
/e - Plating Tank	539 items displayed					

### **Figure 48: Event Log**

The Event Log serves as an audit log in TrueChem for events such as deleting of data, editing of set ups and possible user defined events. The Event Log cannot be edited or

Event Log Details			
General			
Event Type	Data Editing	Date 8/7/2012 8:40 AM	<u>0</u> k
User ID	Roger Smith	Workstation LIFEBOOK	Help
Process	Demo Process		
Tank	06. Demo Tank		+
Event description			
An entire test was d	deleted		•
Event details			
Sample Date: 9/ User: Roger Sm S: No	/8/2005 10:37 AM iith		
H: No	entration 2.24		
ABC Solution: 3	37.75 lb		_
Test Comment:	7 <b>A</b>		~

Figure 49: Event Log Detail

erased in any way. It only serves as an audit trail of what occurred. By double clicking any item in the Event Log, the details of the event can be displayed.

The Event Log Details screen displays the following data: the event type, date, time, user ID of the person who was logged into TrueChem, the work station (meaning the name of the computer on the network that was used to perform this event), type, description, the process that was involved, the tank that was involved and the subsequent message which includes specific details of the event.

## 9.0 Reports

The Reports screen allows for running predefined reports. To access the report Screen, click the icon in the graphic tool bar.



Several predefined reports are available in the pull down list. After selecting the report type, select the scope. If the scope will be something you want regularly, add a scope description. Selecting *All* will create a report run against all items on the TrueChem tree. Using the *Custom Scope* allows the use of specific items. Adding and defining individual scopes are then saved and become a part of the scope description list. The *For Dates* box requires a date range the report will scan. The lower section of the report window displays specific options for the selected report.



Figure 50: Available Reports Screen

### 10.0 The Placard System

The Placard System provides a way to print tank placards. Figure 51 is an example of an 8.5" x 5.5" placard. TrueLogic can customize your placards to suit your specific needs.



Figure 51: Example Of A Placard

To print one or more placards, click the Document Manager button at the top of the screen (see arrow 1 in Figure 52). Then select Tank Placards from the View dropdown list (arrow 2). Select one or more rows with the mouse, and click the print button or the preview button located above the list (arrow 3).

			1					
leip			K					
		🤣 🚱 🚱	3 🌾 🧃 📘	1 🖹 🂐 🤽 🕻	🔒 🤹 📀			
4		2						3 Document Mar
View Teals D	Ľ	- Work k						Ă.
Tank Pl	acaros	- WOIKI	Cation ["All work location	Jins 🔟			100	$\Lambda$
Filter All		×					V	
Dran column hea	ders here to	aroun by					1	
Needs Printing	Required	Status	Process	Tank	Last Printed By	Last Printed	Expiration	Placard Description
No	No	Printed	Desmear Process	5. Permanganate 3308	Default User	11/26/2012 10:46 AM	Never	Standard placard
No	No	Printed	Desmear Process	9. Neutralizer 3313	Default User	11/26/2012 10:55 AM	Never	Standard placard
No	No							
140	140	Printed	Demo Process	01. Conditioner	Default User	11/26/2012 10:21 AM	Never	Standard placard
No	No	Printed Printed	Demo Process Demo Process	01. Conditioner 06. Demo Tank	Default User Default User	11/26/2012 10:21 AM 12/21/2012 9:36 AM	Never Never	Standard placard Standard placard
No No	No No	Printed Printed Printed	Demo Process Demo Process Demo Process	01. Conditioner 06. Demo Tank 12. Cleaner X	Default User Default User Default User	11/26/2012 10:21 AM 12/21/2012 9:36 AM 11/16/2012 6:46 PM	Never Never Never	Standard placard Standard placard Standard placard
No No No	No No No	Printed Printed Printed Never Been Printed	Demo Process Demo Process Demo Process Demo Process	01. Conditioner 06. Demo Tank 12. Cleaner X 13. Copper	Default User Default User Default User N/A	11/26/2012 10:21 AM 12/21/2012 9:36 AM 11/16/2012 6:46 PM N/A	Never Never Never Never	Standard placard Standard placard Standard placard Standard placard
No No No	No No No	Printed Printed Printed Never Been Printed Printed	Demo Process Demo Process Demo Process Demo Process Demo Process	01. Conditioner 06. Demo Tank 12. Cleaner X 13. Copper 16. Etch	Default User Default User Default User N/A Default User	11/26/2012 10:21 AM 12/21/2012 9:36 AM 11/16/2012 6:46 PM N/A 11/15/2012 8:23 PM	Never Never Never Never Never	Standard placard Standard placard Standard placard Standard placard Standard placard
No No No No	No No No No No	Printed Printed Printed Never Been Printed Printed Never Been Printed	Demo Process Demo Process Demo Process Demo Process Demo Process Electroless Ni/Au	01. Conditioner 06. Demo Tank 12. Cleaner X 13. Copper 16. Etch 01. Cleaner PC-454	Default User Default User Default User N/A Default User N/A	11/26/2012 10:21 AM 12/21/2012 9:36 AM 11/16/2012 6:46 PM N/A 11/15/2012 8:23 PM N/A	Never Never Never Never Never Never	Standard placard Standard placard Standard placard Standard placard Standard placard Standard placard

Figure 52: The Document Manager

#### Required versus Not Required

If a placard is "required", two things can happen:

- 1. An expiration time for printing the placard can be set. Once that time has passed, the "Needs Printing" column in Figure 2 will be set to "Yes" and an email can optionally be sent to a user indicating that the placard needs to be printed.
- 2. A warning will be given at the close of Tank Setup if a parameter on the placard was changed (e.g. tank volume or length). In such cases, the "Needs Printing" column in Figure 2 will be set to "Yes".

As of this writing, all placards use the same placard layout. And they will either be all required or all not required. The default is <u>not</u> required, but contact TrueLogic technical support if you'd like them to be required. Even if a placard is not required, it can still be printed from the Document Manger. Non-required placards do not have an expiration print date, and a warning will not be displayed when items on the placards are changed in Tank Setup.

## 11.0 Lookup Tables

Users sometimes have two external lists of values. And there is often a need to approximate a value from one list, given a value from the other list. The library of type *"Lookup Table"* addresses this need.

### Create A Lookup Table Library

To create a "*Lookup Table*", click the System Setup button at the top of the screen, then click the Library tab. Use the Add button to create a new library item of type "*Lookup Table*". As you add new XY pairs of values, a corresponding data point is added to the graph. See Figure 53. The graph allows you to visualize your data – and spot trends and outliers. The values for X and Y must all be either increasing or decreasing. But the lists can go in opposite directions.

Мо	dify Library Note	e		
	Ту	pe Lookup Table	<b>•</b>	<u>O</u> k
	Descriptio	Absorbance		Cancel
	Out of rar	nge points Return lin	mit error codes 🔹	Help
		Lower limit error	code -99999	
		Upper limit error	code 99999	
	Х	Y		
	0.00	0.00	-	
	0.26	0.07	X=0.7968 Y=0.325	न 🗟 🖉
	0.48	0.16		
	0.01	0.22		•
	0.92	0.34		
*				

Figure 53: A "Lookup Table" Library

#### lib.TableLookupX and lib.TableLookupY

Two variables return approximations from a "*Lookup Table*" library. The format for them is: lib.TableLookupY (library name, givenX) and lib.TableLookupX(library name, givenY). These variables require that the Lookup Table contains at least two data points. In the above example, if you want to approximate X when Y is 0.29, you'd use: lib.TableLookupX(Absorbance, 0.29)

#### **Limit Error Codes**

The Lookup variables make use of *limit error codes* as defined on the library creation screen. See Figure 53. If your given value is either smaller or larger than all the values in its list, we deem it "out of range". There are two ways for the Lookup variables to generate the return value when the given value is "out of range":

- 1. the return value can be approximated, or
- 2. the return value can be a pre-defined *limit error code*. See Figure 53.

### 12.0 Selection Tables

The Input items on the Perform Test screen normally allow the user to type in values. But if a library of type "*Selection Table*" has been created, then its values can be selected for use on an Input item. In the below example, instead of typing "4" in the Input box, the user simply selected it from the dropdown list box. The text to the right of the values will be displayed in the Data Log.

						Perform Test
					Test Stat	tus
Docs Out	out	Ge	eneral	Schedule	Make-up	HMIS
		1				Recall last test
ABC CONCENTRATIO	1	V.	ABC Test F	rocedure		
Inpu	t 4'	1~RIGID EPO	XY			
Enter Normali	y 0.1	1 2~FLEXIBLE	EPOXY			
	-	3~GEL COAT	ATEROXY			
Add to: 2.40 Start at: 2.30 Ad		5~ALLIMINUM				
XYZ CONCENTRATIO	1	6~POLYMER	CONCRETE			
Input ml of Hydrochloric Aci	d	7~POLYESTE	RRESIN			
Enter Sample Size (mls	) 50					
			g/I XYZ Con	centration		
Add to:1 Ad	d		gal XYZ Co	ncentrate		

Figure 54: A Dropdown List For An Input Item

#### Create A Selection Table Library

The first step in using a "*Selection Table*" as a dropdown list for a test Input is to create a library item of type Selection Table. To do this, click the System Setup button at the top of the screen, then click the Library tab. Use the Add button to create a new library item of type "*Selection Table*". As you add new Descriptions to the new library, the indices are added automatically for you. You cannot change an index. Note that caution must be taken before modifying an existing library because those changes will appear everywhere that library was previously used.

Мо	dify Lib	rary Note						
		<u>O</u> k						
	[	Description Adhesives	<u>C</u> ancel					
	Index	Description	Help					
	⁹ 1	RIGID EPOXY						
	2	FLEXIBLE EPOXY						
	3	GEL COAT						
	4	CLEAR COAT EPOXY						
	5	ALUMINUM FILLED						
	6	POLYMER CONCRETE						
	7	OLYESTER RESIN						
×	÷							

Figure 55: Create A Selection Table Library

### **Configure An Input Item To Use A Selection Table**

Once a "Selection Table" library item has been created, you can instruct an Input item to use it on the Perform Test screen. To do this, go to Tank Setup, select the Test tab, and double click the Input item of interest. Place a checkmark next to "Select from Table," and use the dropdown box to select the desired library item. See Figure 56. If you were to go to the Perform Test screen, clicking on this Input item will display the contents of the "Selection Table".

Modify Test Item		
Input Value     O     Non-Inventory Controlled     O     Inventory	ry Controlled	Qk
Prompt text Input	Short prompt Input	<u>Cancel</u>
Default input Value Save changes	Input value restrictions Lowest Highest	<u>H</u> elp
<ul> <li>Save input data as text</li> <li>Select from table</li> <li>Adhesives</li> </ul>	Y	

Figure 56: Configure An Input Item To Use A Selection Table

### lib.TableSelect

A variable called lib.TableSelect returns the text Description from a "*Selection Table*" library. Its format is lib.TableSelect (library name, index). In the example shown in Figure 57, if the library name is "Pass Fail Library" then lib.TableSelect(Pass Fail Library, 2) would return "Fail".

							Perform Test
						Test Stat	us 📃 📃
Docs	Outp	ut	Gen	ieral	Schedule	Make-up	HMIS
							Recall last test
ABC CON	CENTRATION	1		ABC Test	Procedure		
	Inpu	t 1 🚹	Pass				
Er	nter Normalit	y 2~l	Fail				
				oz/Gal AB	C Concentration		
2.40 Start at	t: 2.30 Ad	t		Ib ABC			

Figure 57: Selection Table For Pass/Fail On An Input Item

## **13.0** Miscellaneous TrueChem Features

## 13.1 Printing, E-Mailing, and Exporting

Data from TrueChem is easily sent from the program. A few of those functions not covered elsewhere are discussed.

### Printing

The printer set up dialogue displays the specific details of the selected printer. The lower section Printout Headings allows for customization of each heading that TrueChem will use in various parts of the software, enabling report or printout customization by the user. Note that TrueChem variables are being used in the Printout Heading section.

Printer To		Qk
Name OKI C9500(B&W)		
Location NeO2:		
Select style		
TrueChem default printer :	settings	-
Paper		Copies
Size 8 5" × 11.0"	Portrait	Num <u>b</u> er of Copies
	A	· · · · · · · · · · · · · · · · · · ·
Auto Select	<ul> <li>Lanoscape</li> </ul>	1
Margins	Mode	
<u>I</u> op 1	Quality Standard Qualit	y 💌
Left 1 <u>R</u> ight 1	Duplex Single-Sided	_
Bottom 1	Color Color	•
Printout headings		
Process printout heading		
E E B I U Aria	I Black	▼ 10 ▼
	EPORTTITLE]	المنبع المسع
	[GRP.NAME]	
	[DATE][TIME]	

**Figure 58: Printer Setup** 

Clicking on the print button sends what is viewed in the working window to the printer.



### Emailing

Clicking on the email button emails the information displayed in the working window to a particular email address.



A pop up will appear asking for the recipient's email address and the subject of the email. An open area allows a message to be entered to go with the screen image.

To	<u></u> <u></u>	}
Dubicat	Canc	el
oubject		
lessage		
		4

**Figure:59 Email Popup** 

### **Exporting Data**

Running a report automatically exports the data to an Excel compatible format. Selecting *Export* from the file pull down menu causes a popup to appear asking whether all rows of data shown are to be exported or if only selected rows are desired.

🖄 T	<b>rue</b> C	hem	- Your	Cor	npany	Nam
File	Edit	View	Invent	ory	Tools	Help
N	ew			F		
Pr	rint		Ctrl+P			
Pr	rint Sel	tup		_		
E	-Mail			_		Ē,
E	xport.					-
U	ser Lo	g-out	Ctrl+0			
U	ser Lo	g-in	Ctrl+I			
D	elete					
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				8	ISS	

Due By 🛛 🔬	Remaining	Priority	ltem De	scription
3/7/2012 11:01 AM	(1-02:13)	2	Copper Content	
P/T/2042 4-04 DM	(4.00.4 m	~	K ( 2000 - 206 -	
Export Options				oncentrati
Export all row	s		<u>O</u> k	readings
C Export selecte	ed rows		<u>C</u> ancel	
UNUTATION DM	140023	4	Anode Check	

After selection, the destination and file type must be defined. The file type choices are shown in Figure 60.

xport As				?
Save in: My Recent Documents Desktop My Documents	Desktop     My Document     My Computer     My Network F     Revised proce     TrueChem De     xp_exe_fix     Demo dashbo	is Places edures emo pard	• • • • • • • •	
	File name:	Export		Save
1.11			1	0220.00000

**Figure 60: Export File Type Choices** 

## 14.0 Getting Help

There are a variety of ways to get help with specific features of TrueChem. To access TrueChem's built-in help function, press the button at the right end of the graphic tool bar.



The screen shown below will appear and the user can navigate to various topics.



### Figure 61: Online help

TrueChem's Help functions were designed to be consistent with other widely used and familiar software Help options.

## **TrueLogic's Website**

When TrueChem is initially opened or when the Home button is press in the graphic tool bar, the screen below is shown





Figure 62: TrueChem Home Screen

If the computer has access to the internet, clicking on either the web address or the logo will take you to the TrueLogic Webpage.



Figure 63: TrueLogic's Home Page



Additional assistance can be found at the TrueChem pull down on TrueLogic website.

Figure 64: FAQ's

The FAQ contains the most up to date list of variables as well as answers to commonly asked questions.

Finally, feel free to contact TrueLogic directly for additional assistance.

## **Appendix A: TrueChem Variable List**

## **Categories:**

<u>Adjustment</u> Variables	Input Variables	Result Variables	<u>Units</u>
General Variables	Library Variables	Run Variables	User Variables
<u>GET Variables</u>	Name Variables	<u>Schedule</u> <u>Variables</u>	<u>User-Defined</u> <u>Variables</u>
{Group} Variables	{Object} Variables	Test Variables	

**Adjustment Item Variables** – A test may contain multiple adjustment items. To specify a specific adjustment item, you must include the item number associated with the adjustment. If no item number is specified, TrueChem will use the current adjustment item. Example: [ADJ4.VALUE] will return the value of adjustment item number 4.

Name	Description
ADJ	The displayed adjustment amount (in the unit defined on the setup of the adjustment item)
ADJ.ACCUM	The accumulated amount added since the last remake not including the current adjustment amount
ADJ.ACCUM( <u>unit</u> )	The accumulated amount added since the last remake (in the unit specified) not including the current adjustment amount
ADJ.ADDAMOUNT	The amount of additive to add to adjust [ADJ.BASEDON] by [ADJ.TOVARY]
ADJ.BASEDON	The name of the test item the adjustment effects
ADJ.CONSISINVENTORIED	Returns 1 if consumable is inventory controlled, 0 otherwise
ADJ.CONSLOTBALANCE	Returns balance of consumable's current active inventory lot in consumable's defined stock unit, 0 if no active lots are found or consumable is not inventoried
ADJ.CONSTOTALBALANCE	Returns total balance of all consumable's current active inventory lots in consumable's defined stock unit, 0 if no active lots are found or consumable is not inventoried
ADJ.DILUTEPOINT	Point beyond which dilutions are calculated

ADJ.DILUTETO	Target value of dilution	
ADJ.DISPLAYAS	Displayed name of the additive for the adjustment item based on advanced settings	
ADJ.DISPLAYVALUE	Displayed text or number for the adjustment amount	
ADJ.FRACTIONOFMAKEUP	Percentage of current adjustment based on the additives makeup amount (as a decimal ie: 0.25=25%, 1.00=100%)	
ADJ.ID	Unique ID number	
ADJ.LOTLABELS	List of lot labels associated with this adjustment	
ADJ.LOTLABELS(#)	Lot label associated with this adjustment. Replace # with the number of lots you want to show	
ADJ.MAKEUPAMOUNT	Makeup amount of additive in defined makeup unit	
ADJ.MAKEUPSHORTUNIT	Short name for the additive's makeup unit	
ADJ.MAKEUPUNIT	Name for the additive's makeup unit	
ADJ.MAXADD	The maximum add amount. Adds will not be greater than [ADJ.MAXADD]	
ADJ.MINADD	The minimum add amount. No adds will be given if [ADJ.RAWVALUE] is less than [ADJ.MINADD]	
ADJ.MSDS	MSDS associated with this adjustment	
ADJ.NAME	Name of the additive	
ADJ.NOTES	Notes assigned by a rule that are directly associated with the adjustment item	
ADJ.NUM	Adjustment item number. ie ADJ1 number is 1	
ADJ.PARTNUMBER	Part number for this adjustment	
ADJ.PERCENTOFMAKEUP	The percentage added, since the last remake, based on the additives makeup amount (as a decimal)	
ADJ.PREVVALUE	Previous adjustment amount (in the unit defined on the setup of the adjustment item)	
ADJ.PREVVALUE( <u>unit</u> )	Previous adjustment amount (in the unit specified)	
ADJ.PRICEPERSTOCKUNIT	Price of additive	
ADJ.RAWVALUE	The calculated adjustment amount (in the unit defined on the setup of the adjustment item) before rounding, applying the minimum and maximum add amounts, and other adjustments	
ADJ.RAWVALUE( <u>unit</u> )	The calculated adjustment amount (in the unit specified) before rounding, applying the minimum and maximum add amounts, and other	

	adjustments
ADJ.REFERENCE	The calculated adjustment amount (in the unit specified) before rounding, applying the minimum and maximum add amounts, and other adjustments
ADJ.SHORTNAME	Short chemical name
ADJ.SHORTSTOCKUNIT	Short stock unit name
ADJ.SHORTUNIT	Short unit name
ADJ.STOCKUNIT	Stock unit name for additive
ADJ.TOOBTAIN	The target value of [ADJ.BASEDON] item
ADJ.TOVARY	Amount of change to [ADJ.BASEDON] item when [ADJ.ADDAMOUNT] is added
ADJ.UNIT	Name of the additive unit
ADJ.VALUE	The displayed adjustment amount (in the unit defined on the setup of the adjustment item)
ADJ.VALUE( <u>unit</u> )	The displayed adjustment (in the unit specified)
ADJ.VENDOR	Vendor of the additive
ADJ.VERB	Verb that describes addition or removal action

## **General Variables**

Name	Description
COMPUTERNAME	The current computer's name
DATE	The current date
DAY	The current day
MONTH	The current month
RESULT	The current value of the result or adjustment item. You can use this variable in a rule to reference the current item's value.
TIME	The current time
YEAR	The current year

**GET Variables –** GET variables are used to collect data from the end user.

Name	Description	
GET.PROMPT	Replace PROMPT with the text the user will see when entering the variable's value	

**{Group} Variables -** {Group} is a user defined term in TrueChem. {Group}s contain a collection of {Object}s.

Name	Description
GRP.DATECREATED	Date the {Group} was created
GRP.DESCP	Name of the {Group}
GRP.DISTINFO	Distribution information
GRP.DISTLIST	Distribution list
GRP.DSPMESSAGE	The display message for the {Group} (on the {Group} setup form)
GRP.FIELD1	User defined field in {Group} setup
GRP.FIELD2	User defined field in {Group} setup
GRP.ID	Unique ID number
GRP.NAME	Name of the {Group}
GRP.PRTMESSAGE	The print message for the {Group} (on the {Group} setup form)
GRP.SELECT1	User defined list in {Group} setup
GRP.SELECT1SHORT	User defined list in {Group} setup

**Input Variables** – A test may contain multiple input items. To specify a specific input item, you must include the item number associated with the input. If no item number is specified, TrueChem will use the current input item. Example: [INP4] will return the value of input item number 4.

Name	e Descrip	tion
INP	The value of the input item	

**Inventory Variables** – Inventory variables are used to obtain data related to a particular lot when sending emails or other notifications. NOTE: These variables are invalid in other areas of TrueChem.

Name	Description
INV.CONSMAXQTY	Maximum quantity defined for consumable
INV.CONSMINQTY	Minimum quantity defined for consumable
INV.CONSQTYONORDER	Current amount of consumable on order
INV.CONSQTYUNUSABLE	Current unusable amount of consumable
INV.CONSQTYUSABLE	Current usable amount of consumable
INV.CONSREORDERPOINT	Reorder point defined for consumable
INV.CONSSHORTNAME	Short name of consumable
INV.CONSSTOCKBALANCE	Current balance of consumable

INV.CONSSTOCKUNITNAME	Stock unit name of consumable
INV.CONSTYPEDESCRIPTION	Type description of consumable
INV.CONSUMABLENAME	Name of additive
INV.LOTBALANCE	Current balance of lot
INV.LOTDATEORDERED	Date lot was ordered
INV.LOTDATERECEIVED	Date lot was received
INV.LOTDATERETIRED	Date lot was retired
INV.LOTEXPIRATION	Expiration date of lot
INV.LOTLABEL	Lot label
INV.LOTLOCATIONDESCRIPTION	Storage location description of lot
INV.LOTMANUFDATE	Manufacture date of lot
INV.LOTPRICEPERUNIT	Price per stock unit of lot
INV.LOTQTYRECEIVED	Quantity received for lot
INV.MANUFLOTID	Manufacturer lot identifier
INV.MANUFNAME	Manufacturer name
INV.MANUFPRODDESCRIPTION	Manufacturer product description
INV.MANUFPRODMSDS	Manufacturer product MSDS
INV.POAMOUNT	Quantity received for lot
INV.PODELIVERYDATE	Requisition delivery date
INV.PONUMBER	Requisition number
INV.TRANSAMOUNT	Amount of transaction
INV.TRANSDATETIME	Date/Time of transaction
INV.TRANSGROUPNAME	Name of {Group} associated with transaction
INV.TRANSOBJECTNAME	Name of {Object} associated with transaction
INV.TRANSTYPE	Type of transaction
INV.TRANSUNITNAME	Unit name of transaction amount
INV.TRANSUSERNAME	TrueChem user associated with transaction
INV.VENADDRESS	Vendor address
INV.VENCONTACT	Vendor contact name
INV.VENDESCRIPTION	Vendor description
INV.VENEMAIL	Vendor e-mail address
INV.VENFAX	Vendor fax number
INV.VENNAME	Vendor name

INV.VENPHONE	Vendor phone number
INV.VENPRODDESCRIPTION	Vendor product description
INV.VENPRODPARTNUM	Vendor part number
INV.VENWEBSITE	Vendor website address

**Library Variables** – You can reference a user defined library using variables. Library items can be custom documents or scripts.

Name	Description
LIB.DESCRIPTION	Replace Description with the description of the library you want to use. Example: [LIB.Safety Instructions] will return the library item with a description of Safety Instructions
LIB.ID	Replace ID with the ID number of the library you want to use. Example: [LIB.12] will return library number 12
LIB.TABLELOOKUPX (lib name, Y-value)	Returns a numeric value from a Lookup Table type library item.
LIB.TABLELOOKUPY (lib name, X-value)	Returns a numeric value from a Lookup Table type library item.
LIB.TABLESELECT (lib name, index)	Returns a text value from a Selection Table type library.

**Name Variables** – Name variables are used to return the user defined terms in TrueChem.

Name	Description
NAM.ACTION	The word used to describe the action being performed on the current adjustment
NAM.ADD	The word used to describe an addition (On the Terms Tab in SystemSetup)
NAM.CATEGORY	The word used to describe a category (On the terms tab in System Setup)
NAM.COMPANY	Your company's name
NAM.CONSUMABLE	The word used to describe item that are used within the company
NAM.EXCEPT	The word used to describe exceptions (On the Terms Tab in SystemSetup)

NAM.GROUP	The word used to describe {Group}s (On the Terms tab in System Setup)
NAM.GROUPFIELD1	The description of the first user definable field in {Group} setup
NAM.GROUPFIELD2	The description of the second user definable field in {Group} setup
NAM.GROUPSELECT1	The description of the first user definable selection in {Group} setup
NAM.ITEM	The word used to describe items (On the Terms Tab in SystemSetup)
NAM.OBJECT	The word used to describe {Object}s (On the Terms Tab in SystemSetup)
NAM.OBJECTFIELD1	The description of the first user definable field in {Object} setup
NAM.OBJECTFIELD2	The description of the second user definable field in {Object} setup
NAM.OBJECTSELECT1	The description of the first user definable selection in {Object} setup
NAM.PARTIAL	The word used to describe a partial remake (On the Terms Tab in SystemSetup)
NAM.REMAKE	The word used to describe a total remake (On the Terms Tab in SystemSetup)
NAM.REMOVE	The word used to describe a remove (On the Terms Tab in SystemSetup)
NAM.REPORT	The word used to describe a test report (On the Terms Tab in SystemSetup)
NAM.SEQUENCE1	The word used to describe sequence 1 (On the General Tab in [NAM.TREATMENT] System Setup)
NAM.SEQUENCE2	The word used to describe sequence 2 (On the General Tab in [NAM.TREATMENT] System Setup)
NAM.SHIFT1NAME	Name of the 1st shift
NAM.SHIFT2NAME	Name of the 2nd shift
NAM.SHIFT3NAME	Name of the 3rd shift
NAM.SHIFT4NAME	Name of the 4th shift
NAM.SHIFT5NAME	Name of the 5th shift
NAM.SHIFT6NAME	Name of the 6th shift
NAM.TESTDATETIME1	Name of the primary date and time when performing a test
NAM.TESTDATETIME2	Name of the secondary date and time when performing

	a test
NAM.TREATMENT	The word used to describe products

**{Object} Variables –** {Object} is a user defined term in TrueChem. {Object}s represent a single tank\bath\solution.

Name	Description
OBJ.CURRVOLUME	Volume of {Object} including the current level input
OBJ.DATECREATED	Date {Object} was created
OBJ.DESCP	Name of the {Object}
OBJ.DIMFT	From top
OBJ.DIMUNIT	Unit name for the dimensions of the {Object}
OBJ.DIMX	Width
OBJ.DIMY	Length
OBJ.DIMZ	Height
OBJ.FIELD1	User defined field in {Object}
OBJ.FIELD2	User defined field in {Object}
OBJ.GROUPID	The unique {Group} ID for this {Object}
OBJ.HMISHTMLIMAGE	HTML to display the HMIS image for an {Object}
OBJ.ID	Unique ID number
OBJ.LASTCHANGED	Date {Object} was last changed
OBJ.LASTREMAKE	Date of last {Remake}
OBJ.LEVELINPUT	The current operating level entered when performing a test
OBJ.LOCATION	Location of the {Object}
OBJ.MAKEUPHTML	HTML for displaying the makeup information for an {Object}
OBJ.MANUFACTURER	Manufacturer of {Object}
OBJ.NAME	Name of the {Object}
OBJ.PERCENTVOLUME	Percentage of volume, as a decimal, of {Object} based on the current level
OBJ.PPEHTMLIMAGES	HTML for displaying the PPE requirements for an {Object}
OBJ.REMAKENOTES	{Remake} notes for {Object}
OBJ.SELECT1	User defined list in {Object} setup
OBJ.SELECT1SHORT	User defined list in {Object} setup

OBJ.VOLSHORTUNIT	Short name of the volume unit
OBJ.VOLUME	Volume of {Object}
OBJ.VOLUNIT	Name of the volume unit

**Result Variables** – A test may contain multiple result items. To specify a specific result item, you must include the item number associated with the result. If no item number is specified, TrueChem will use the current result item. Example: [RST4.VALUE] will return the value of result item number 4.

Name	Description
RST.CALC	Calculation or script text
RST.CP	Calculated Cp of results
RST.CPK	Calculated Cpk of results
RST.CURRENTVALUE	The current or previous result value
RST.DESCP	Description of the result
RST.DISPLAYVALUE	Displayed value of result item (set by a rule action)
RST.ESTSTDDEV	Estimated standard deviation of results
RST.ID	Unique ID number
RST.LCL	Lower control limit of result
RST.LSL	Lower spec limit
RST.MCL	Middle control limit
RST.MEAN	Calculated Mean of results
RST.NAME	Description of the result
RST.NOTES	Notes assigned by a rule that are directly associated with the result item
RST.NUM	Result number
RST.OPT	Optimum spec limit
RST.PP	Calculated Pp of results
RST.PPK	Calculated Ppk of results
RST.PREVVALUE	Previous result value
RST.RLL	Range lower limit
RST.RML	Range middle limit
RST.RUL	Range upper limit
RST.SHORT	Short description of the result
RST.SPCPOINTS	Number of points used for SPC calculations
RST.STDDEV	Standard deviation of results

RST.TRENDDOWN(#)	Returns 1 if downward trend is detected, 0 otherwise. Replace # with the number of points to include in the trend analysis
RST.TRENDSAWTOOTH(#)	Returns 1 if sawtooth trend (>, <, >, <, etc) is detected, 0 otherwise. Replace # with the number of points to include in the trend analysis
RST.TRENDUP(#)	Returns 1 if upward trend is detected, 0 otherwise. Replace # with the number of points to include in the trend analysis
RST.UCL	Upper control limit of result
RST.USER1LOWER	Lower other 1 limit
RST.USER1UPPER	Upper other 1 limit
RST.USER2LOWER	Lower other 2 limit
RST.USER2UPPER	Upper other 2 limit
RST.USL	Upper spec limit
RST.VALUE	Calculated value of the result

**Run Variables** – Run variables are used to perform tasks within a script or calculation.

Name	Description
RUN.CALC(C)	Returns the result of a simple one line calculation. Replace C with the calculation to be evaluated
RUN.LIB(L)	Returns the result of a library script. Replace L with the ID or Description of the library script to be evaluated
RUN.SCRIPT(S)	Executes a simple script and can return a value if script contains "result=". Replace S with the script to be executed

**Schedule Variables** – Schedule variables are used to obtain data related to a scheduled item when sending emails or other notifications. NOTE: These variables are invalid in other areas of TrueChem.

Name	Description
SCH.ALLOTTEDTIME	The allotted time of the schedule
SCH.DESCP	The name of the scheduled item
SCH.ENDDATETIME	The end date and time of the schedule
SCH.FREQDESCP	The schedule frequency
SCH.LASTDONE	The date and time the schedule was last done
SCH.MISSED	The number of times the schedule has been missed

SCH.NAME	The name of the scheduled item
SCH.PRIORITY	the priority of the schedule
SCH.STARTDATETIME	The start date and time of the schedule

NOTE: The following variables are also valid schedule variables: [DATE], [TIME], [OBJ.NAME], [OBJ.DESCP], [OBJ.LOCATION], [GRP.NAME], [GRP.DESCP] and all Name variables.

## **System Variables**

Name	Description	
SYS.APPPATH	Path to TrueChem.exe	
SYS.DATAPATH	Path to TrueChem database or database connection file	
SYS.TEMPPATH	Path to TrueChem temporary directory	

## **Test Variables –** Test variables are used when performing a test.

Name	Description
TST.DATE	Primary test date
TST.DATE1	Primary test date
TST.DATE2	Secondary test date
TST.ELAPSEDDATE1	Number of minutes between the current value of Date1 and the last saved value of Date1
TST.ELAPSEDDATE2	Number of minutes between the current value of Date2 and the last saved value of Date2
TST.ELAPSEDDATE3	Number of minutes between the current time and the last saved test
TST.ID	Unique ID number
TST.NOTES	Current test notes
TST.PARTIAL	Current test partial percentage (as a decimal)
TST.REMAKE	Current test remake (returns "True" or "False")
TST.REPORTID	Current test report ID
TST.SAMPLEDATE	Sample date and time
TST.SAMPLENOTES	Sample notes
TST.SAMPLENUMBER	Sample number
TST.SAMPLERECVDATE	Date and time sample was received
TST.TIME	Current test time
TST.TIME1	Current test time 1

TST.TIME2	Current test time 2
TST.DATETIME1	Current test data time 1
TST.DATETIME2	Current test data time 2

**User Variables** – User variables are used to access information of the user who is currently logged on to TrueChem.

Name	Description	
USR.ADDR	The current users address	
USR.DEPT	The current users department	
USR.EMAIL	The current users Email address	
USR.EXT	The current users extension	
USR.FAX	The current users Fax number	
USR.FNAME	The current users first name	
USR.ID	The current users user ID	
USR.LNAME	The current users last name	
USR.NAME	The current users first and last name	
USR.PHONE	The current uses phone	
USR.TITLE	The current users Title	

**User-Defined Variables** – User defined variables are used to store and retrieve information.

Name	Description
VAR.GET(NAME)	Replace NAME with the name of the variable. Returns the current value for the user defined variables
VAR.PUT(NAME=VALUE)	Replace NAME with the name of the variable and VALUE with the value to store. Sets the value of the user defined variable

**Units** – When using variables with a unit parameter, use the units short name to specify which unit to return the value in.

For example, the following variables will work correctly:

[ADJ.VALUE(gal)] [ADJ.VALUE(lt)] [ADJ.VALUE(ml)] [ADJ.ACCUM(gal)] [ADJ.ACCUM(lt)] [ADJ.ACCUM(ml)]

The following examples will NOT work:

[ADJ.VALUE(gallons)] :: uses unit long name instead of short name [ADJ.VALUE (It)] :: space prior to first "(" [ADJ.VALUE ml] :: missing parentheses around unit short name

Use the tables below to help identify a unit's short name. NOTE: You cannot convert units between tables.

#### Volume

barrel Fluid	bbl
cubic centimeter	сс
cubic foot	f3
cubic inch	in3
cubic kilometer	km3
cubic millimeter	mm3
cup	С
drop	gtt
gallon	gal
imperial gallon	imp gal
liter	lt
fluid ounce	floz
pint	pt
quart	qt
tablespoon	tbsp
teaspoon	tsp
milliliter	ml
cubic meters	m3
cubic yard	yd3

#### Mass

grain	gr
gram	g
kilogram	kg
milligram	mg

ounce	OZ
troy ounce	troz
pound	lb

# Length

centimeter	cm
foot	ft
inch	in
kilometer	km
meter	m
millimeter	mm
yard	yd
Micron	u

### Time

day	d
hour	hr
minute	min
month	mon
second	sec
year	yr

## Current

ampere hour	Ah
•	

# Speed

miles per hour	mph
feet per second	fps
kilometer per hour	km/h
meters per second	mps

# Temperature

British thermal unit Btu

# Proportion

Molarity	Mol
molality	mo
normality	N
part per million	ppm
percent	%

## Area

square centimeter	cm2
square foot	f2
square inch	in2
square kilometer	km2
square mile	mi2
square millimeter	mm2
square yard	y2
square Meter	m2