



MANAGING CRITICAL DATA IN THE SMALL WWTP LABORATORY

New England WEA
Laboratory Practices Committee
2016 Specialty Conference & Workshop Series –
Laboratory Information Management Systems & Other Emerging Technologies

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LabCal (OPS SQL v6.6.6) - SUPER @ "Rocky WWTP Tutorial" on LT006.OPSROCKY

Find Setup Utilities Help

Oil Calendar: 17

	Sunday 5/11/2006	Monday 5/12/2006	Tuesday 5/13/2006	Wednesday 5/14/2006	Thursday 5/15/2006
1	060611-0007 // Aeration 8AM	060612-0007 // Aeration 8AM	060613-0007 // Aeration 8AM	060614-0007 // Aeration 8AM	060615-0007 // Aeration 8AM
2	060611-0008 // Aeration Noon	060612-0008 // Aeration Noon	060613-0008 // Aeration Noon	060614-0008 // Aeration Noon	060615-0008 // Aeration Noon
3	W-060611-0009 // Effluent	060612-0012 // Influent Comp	060613-0013 // Primary Effluent	060614-0013 // RAS	060615-0012 // Influent
4		W-060612-0011 // Effluent	W-060613-0011 // Effluent	060614-0014 // Effluent	060615-0014 // Primary
5				060614-0015 // Primary Effluent	W-060615-0011 // Effluent
6				060614-0016 // Influent Comp	
7				W-060614-0011 // Effluent	
8					

Sample Detail - Pending

Sample # 060614-0007 Scheduled For Collection On 6/14/2006 08:00 AM

Sample Name Aeration 8AM Date Closed

Sampled By Sample Type Regular

Sampled On Sample Status pending

Sample Notes

Tests	Result	Closed
TSS		Closed
BOD		Late 1 Day
		Due
		Stopped
		Received
		Analyzed

2187



AGENDA

Data Management challenges in a WWTP

What is LIMS?

Keeping Lab and Operations Connected

Possible Solutions

[illegible]

OVERVIEW

A typical LIMS solution is designed to address the demanding environments experienced across a variety of laboratory environments, including such functionalities as Inventory Control, Analysis, Reporting with various deliverables packages, QA/QC, Labor Costs, and other features not necessarily needed by the smaller WWTP labs.

Today, we will discuss some key requirements of the smaller WWTP lab and how they can be addressed via a SQL based Data Management Solution designed specifically for small to medium WWTPs.

IMPORTANT FUNCTIONS FOR US IN OUR WWTPS

- Create & schedule samples by entering key data & choosing tests from the modifiable Methods Library.
- Data entry sheets that can be designed to match current bench sheets.
- Schedule samples using a wide variety of scheduling options, from standard recurrence patterns to customized schedules.
- Identify unique sample IDs, tests & methods to be run, along with chain of custody & other sample details.
- Use familiar bench sheets to assign samples by method.
- Print bar-coded sample labels from the calendar.
- Use to track NELAC compliance.
- Certificate of Analysis, Chain of Custody, QA/QC reports, Missing Samples, Execution reports.
- Create DMRs and other reports

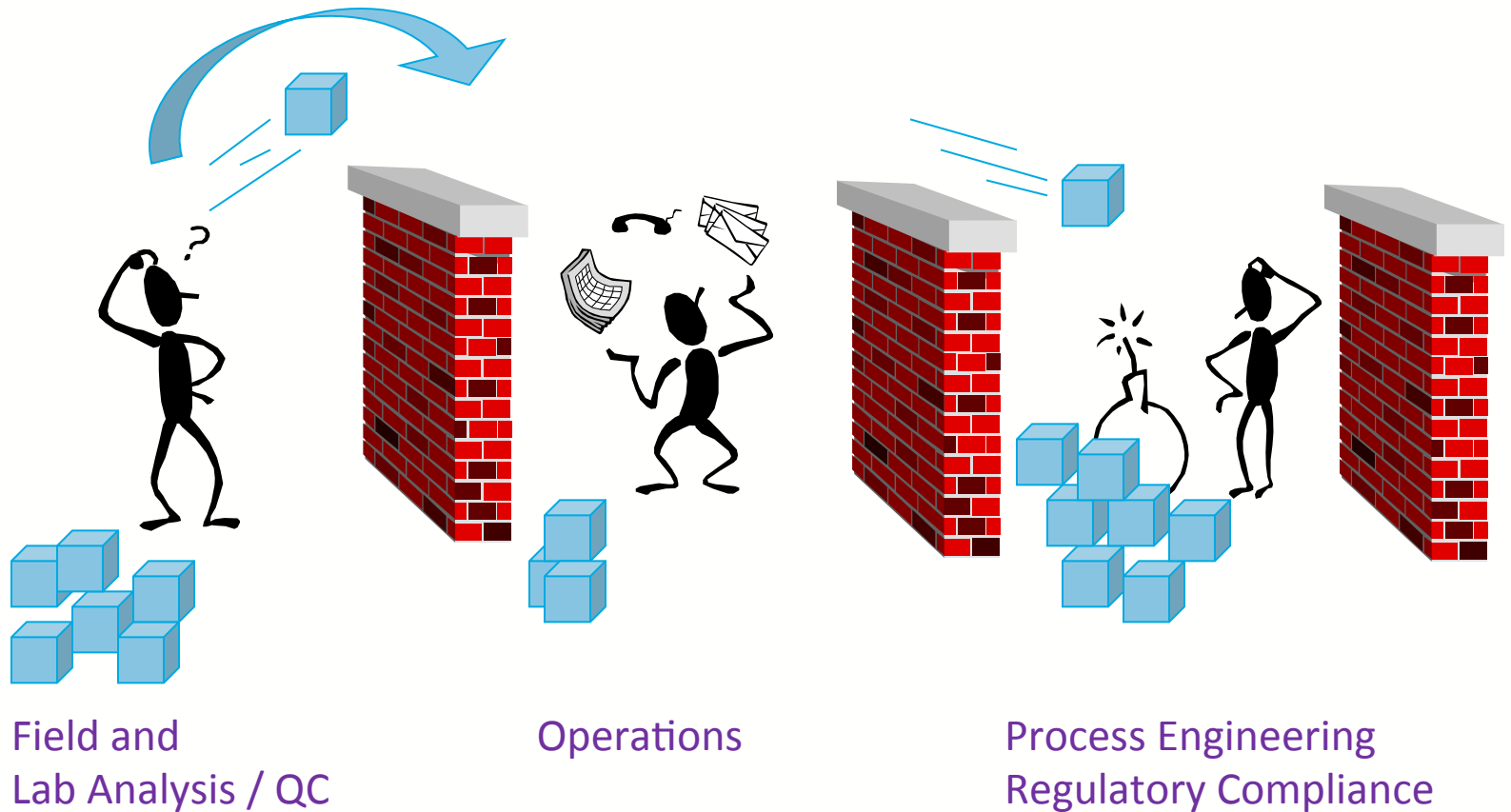
UTILITY MARKET'S GROWING CHALLENGES

- Budgets are tight
 - Treatment costs are increasing
 - Infrastructure investments going unfunded
 - Raising rates is difficult
- New regulations are coming at a fast pace
- Retiring workforce = knowledge loss



Everyone is being asked to do more with less but how?

TRADITIONAL “OVER THE WALL” BATCH PROCESSING

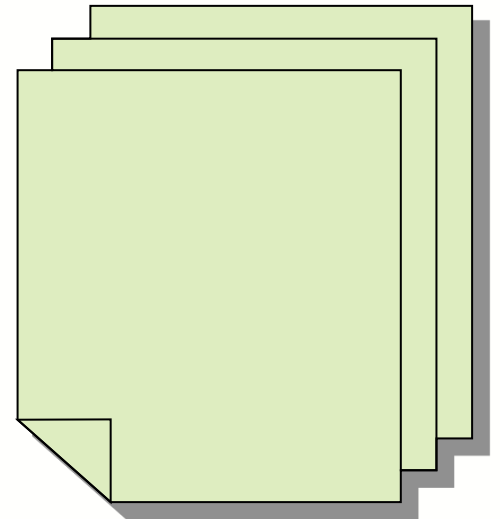


LET SOFTWARE DO THE DETECTIVE WORK

- Spend less time gathering and more time analyzing
- Prioritize solving problems over gathering data:
 - System upsets
 - Cost overruns
 - Compliance issues
 - Customer complaints
- Use predictive modeling tools to prevent future issues from occurring
 - Develop "what if" scenarios
- Perform simple or complex search queries
 - Find the exact information you need

HOW HAVE WE DONE IT IN PAST?

- Paper, Paper, Paper, & more Paper
- File Card boxes
- Log Books / Binders / Notebooks
- Boards - T-Card, Dry Erase, Chalk
- Lotus
- Excel



WHY NOT EXCEL ANYMORE?

- It's easy to overwrite cells in Excel
- Excel has limitations on the amount of data it can hold
- Excel can import data but requires advanced programming to format it
- Manipulating & reorganizing data once it is loaded into Excel can be difficult
- Excel does not automatically back up data or provide version control



SOURCES OF DATA

- Central Lab Data
- Operations Lab Data
- Commercial Lab Data
- SCADA Data
- Other sources

Everyone needs to understand where the data comes from and how it is produced. Understand sample locations, sample techniques, sample lines for process, analytical methods, etc.

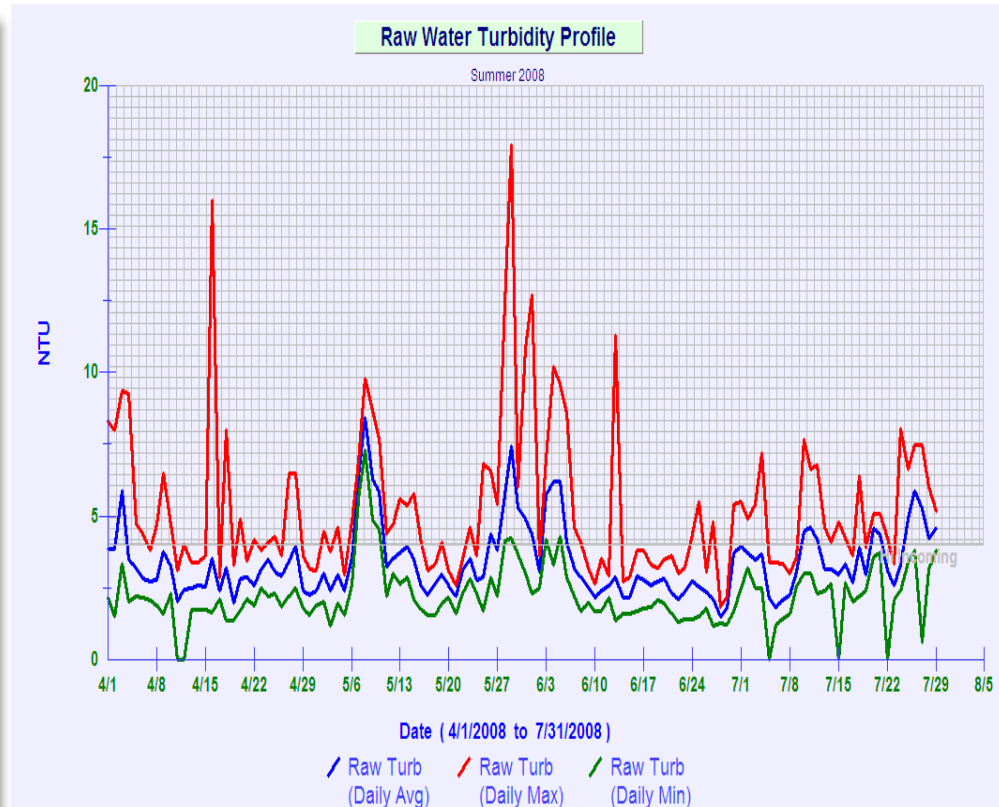
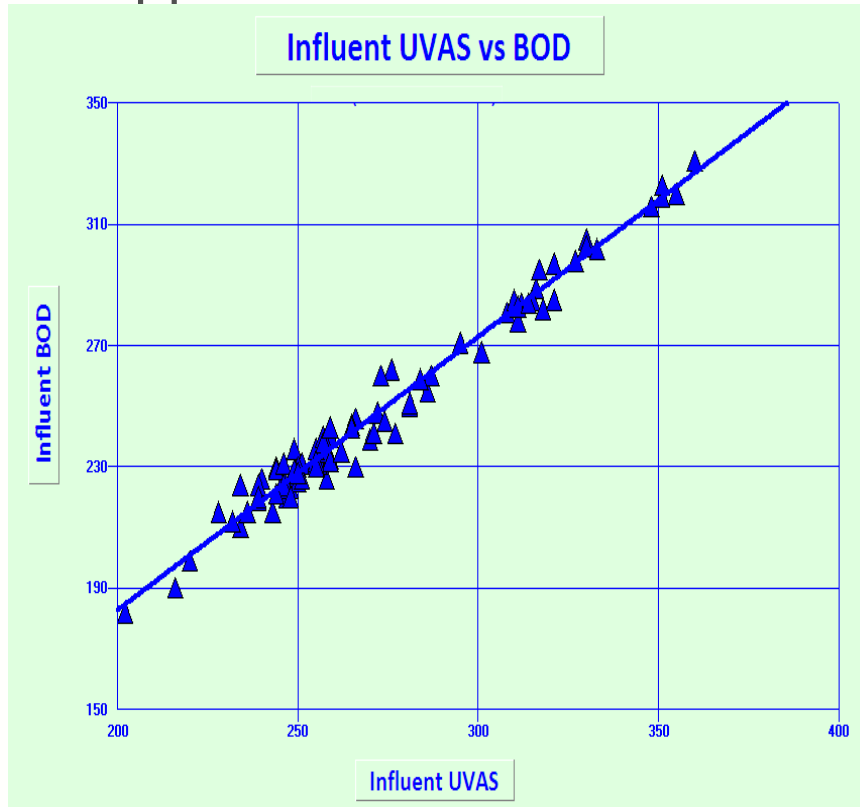
Turn Data into Information & Knowledge!!!

WHAT DO WE WANT TO BE ABLE TO DO?

- 1) Combine Data from Field, Lab and Operations
- 2) Automate Manual Processes
- 3) Gather & Organize Data for Immediate Access & Analysis
- 4) Leverage Tools for Auto-Report Generation
- 5) Monitor On-Going Performance

1) COMBINE DATA FROM FIELD, LAB AND OPERATIONS

- Enable easy access to cross-functional data
- Configure graphs for trend analysis, correlations, and control charting
- Compare various sets of data to identify cost reduction opportunities



2) AUTOMATE MANUAL PROCESSES

- Replace manual with software-based data gathering and info reporting
 - Allows increased focus on “holistic” view
 - Improves productivity
 - Reduces errors
 - Maximizes new workforce skills
- EPA moving to on-line reporting in all states
- Frees up time for value-added work
- Efficiently drives collaborative analysis and decisions across business, enterprise, or ecosystem

3) GATHER & ORGANIZE DATA FOR IMMEDIATE ACCESS AND ANALYSIS

Manual Data Entry:

- If manual data entry is necessary, enter it directly into software thereby eliminating multiple-transcriptions

TSS Benchsheet - Method SM 2540D

Analyst: Oven Temperature In:

Sample Date: Oven Temperature Out:

Analysis Date/Time:

	Inf TSS	PETSS	PAS Conc	MLSS
Sample & Tare	<input type="text"/> g	<input type="text"/> g	<input type="text"/> g	<input type="text"/> g
Tare	<input type="text"/> g	<input type="text"/> g	<input type="text"/> g	<input type="text"/> g
Solids	<input type="text"/> g	<input type="text"/> g	<input type="text"/> g	<input type="text"/> g
Sample Volume	<input type="text"/> ml	<input type="text"/> ml	<input type="text"/> ml	<input type="text"/> ml
Suspended Solids	205 mg/L	62 mg/L	10,000 mg/L	3,780 mg/L

Edit/View Variables

Var # 1

Name: Influent Flow Units: MGD

Track every: Day Type: Parameter ☐ Read-Only

Options: User Defined MDL Rules List Additional Info

Description Limits Optional Print Quality Control Equation Interface

☐ OFF ☒ Interface To: iFix_Historian Data Approval Level To Write With: ENTERED

Help ☐ External Source

TAG: HDW_FIT_INF Statistic: TOTAL Scale Factor: 1

Start Time: 00:00 (hh:mm)

Filter Data: Collect data when: Node: Tag.Field F1_ON

SUPER (2/9/2009 1:28:50)

Automated Data Entry:

- Download data directly from instruments
- SCADA / HMI / Historians
- Dataloggers
- LIMS
- Commercial Lab Reports
- Other Third Party Software

4) LEVERAGE TOOLS FOR AUTO-REPORT GENERATION

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if different) Name Rocky Creek W/TP Address Rocky Creek, Village of 4020 Peggy Rd SE Rio Rancho NM 87124 Facility Rocky Creek Wastewater Treatment Plant Location 1234 Lois Lane Attn: Clark Kent		NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) DISCHARGE MONITORING REPORT (DMR) (2-16) (17-19) NM00057493 PERMIT NUMBER 001 A DISCHARGE NUMBER		COMBINED TREATED PROCESS (SUBR M) F: FINAL MAJOR MUNICIPAL, NO PRE-TREATMENT *** NO DISCHARGE *** NOTE: Read instructions before completing this form.	
MONITORING PERIOD FROM YEAR MO DAY TO YEAR MO DAY (20-21) (22-23) (24-25) (26-27) (28-29) (30-31) 02 06 01 02 06 30					
PARAMETER (22-27)	Q (GROSS) (28-29)	QUANTITY OR LOADING (30-31)	Q (GROSS) (32-33)	QUALITY OR CONCENTRATION (34-35)	NO. OF ANALYSES (36-37)
	AVERAGE	MAXIMUM	UNITS	MINIMUM AVERAGE MAXIMUM	SAMPLE TYPE
BOD, 5-DAY (20 DEG. C)	SAMPLE	MEASUREMENT	000000	000000	0000
00310 1 0 0	PERMIT	000000	0000	205	000000
RAW SEW/INFLUENT	REQUIREMENT	000000	0000	REPORT DAILY MN	REPORT DAILY MN
BOD, 5-DAY (20 DEG. C)	SAMPLE	MEASUREMENT	637	2,209	(26)
00310 1 0 0	PERMIT	REPORT	REPORT	LBS/DAY	000000
EFFLUENT GROSS VALUE	REQUIREMENT	300A AVG	DAILY MX	300A AVG	45.00 DAILY
PH	SAMPLE	MEASUREMENT	000000	000000	0000
00400 1 0 0	PERMIT	000000	0000	6.3	000000
EFFLUENT GROSS VALUE	REQUIREMENT	000000	000000	6.0	8.0 DAILY MN
SOLIDS, TOTAL	SAMPLE	MEASUREMENT	000000	000000	0000
SUSPENDED	PERMIT	000000	0000	206	264
00530 1 0 0	PERMIT	000000	0000	REPORT	REPORT
RAW SEW/INFLUENT	REQUIREMENT	000000	0000	300A AVG	DAILY MN
SOLIDS, TOTAL	SAMPLE	MEASUREMENT	612	1,910	(26)
SUSPENDED	PERMIT	REPORT	REPORT	LBS/DAY	000000
00530 1 0 0	REQUIREMENT	300A AVG	DAILY MX	300A AVG	45 DAILY
EFFLUENT GROSS VALUE	SAMPLE	MEASUREMENT	2.96	4.49	(03)
FLOW, IN CONDUIT OR	PERMIT	000000	0000	000000	000000
THRU TREATMENT PLANT	REQUIREMENT	000000	0000	000000	000000
50050 1	PERMIT	REPORT	REPORT	MGD	000000
EFFLUENT GROSS VALUE	REQUIREMENT	300A AVG	DAILY MX	000000	000000
BOD, 5-DAY PERCENT	SAMPLE	MEASUREMENT	000000	000000	0000
REMOVAL	PERMIT	000000	0000	74.57	000000
01010 K 0 0	PERMIT	000000	0000	85.00	000000
PERCENT REMOVAL	REQUIREMENT	000000	0000	DAILY MN	000000
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN, AND BASED ON MY INSPECTION OF THESE DATA I HAVE SUGGESTED RECOMMENDATIONS FOR IMPROVING THE INFORMATION. I RELY ON THE SUBMITTED INFORMATION TO BE TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 C.F.R. 101.141 AND 18 U.S.C. 1011. (INFORMATION UNDER THESE STATUTES MAY INCLUDE FINES UP TO \$14,144 AND OR IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS.)			
SCOTT MOEHLING CHIEF DATA MANAGER		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT			
TYPED OR PRINTED		AREA 0000			
COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)					
EPA Form 3320-1 (Rev. 8/89) Previous editions may be used. (REPLACES EPA FORM 3320-1 WHICH MAY NOT BE USED.)					

← Example Discharge Monitoring Report

3800-FM-WSFR0006 9/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER STANDARDS AND FACILITY REGULATION

SURFACE WATER SUPPLY MONTHLY TURBIDITY REPORT

PWS Name: Sample Water System

Address: 100 Water Street

Plant Name: Sandy Beach WTP

Phone

PWS

Month

DATE	*RAW	*SETTLED	*CFE	COMMENT
1	8.35	0.74	0.10	
2	8.02	0.87	0.10	
3	9.38	1.10	0.12	
4	9.28	0.82	0.11	
5	4.77	0.43	0.10	
6	4.38	0.42	0.11	
7	3.80	0.44	0.09	
8	4.70	0.37	0.12	
9	6.50	0.35	0.11	

Example Turbidity Report →

REPORTS - REGULATORY & PROCESS

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if different)
Name Rocky Creek WWTP
Address Rocky Creek, Village of
4020 Peggy Rd SE
Rio Rancho NM 87124
Facility Rocky Creek Wastewater Treatment Plant
Location 1234 Lois Lane
Attn: Clark Kent

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
DISCHARGE MONITORING REPORT
(2-16)
NM0057493
PERMIT NUMBER
(17)
001 A
DISCHARGE

MONITORING PERIOD
YEAR MO DAY YEAR MO DAY
FROM 09 01 01 TO 09 01 31
(20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53)			(4 Card Only) (38-39)	
		AVERAGE	MAXIMUM	UNITS	MIN	MAX
BOD, 5-DAY (20 DEG. C) 00310 1 0 0 RAW SEW/INFLUENT	SAMPLE MEASUREMENT	XXXXXX	XXXXXX	XXXX	2	

Monthly Process Review Report January 2008


	Influent Flow	RAS Flow	Influent BOD	Primary Eff BOD	Effluent BOD	Influent TSS	Primary Eff TSS	Ras Concent
Date	MGD	MGD	mg/L	mg/L	mg/L	mg/L	mg/L	mg
1/1/2008	2.500	1.7400	279	216	13	208	62	
1/2/2008	2.620	1.7500	205	199	15	223	67	
1/3/2008	2.980	1.7500	295	207	10	215	65	
1/4/2008	2.800	1.7500	317	222	17	216	65	
1/5/2008	2.730	2.0000	302	211	13	238	71	
1/6/2008	3.470	2.0000	273	191	25	257	77	
1/7/2008	4.230	2.0000	242	169	42	264	79	
1/8/2008	4.550	2.0000	232	162	47	306	154	
1/9/2008	3.880	2.0000	255	179	33	229	69	
1/10/2008	3.210	2.0000	287	201	27	225	68	
1/11/2008	3.110	1.7500	308	216	43	204	61	
1/12/2008	3.200	1.7500	331	232	37	182	55	
1/13/2008	3.000	1.7500	224	224	22	211	61	

Create paper or electronic reports for both Waste Water and Drinking water for each state.



Quality Analysis/Control
Missing Sample
Exception Reports
And more

CHAIN OF CUSTODY & CERTIFICATE OF ANALYSIS REPORTS

 <div style="border: 1px solid black; width: 150px; height: 50px; display: inline-block; vertical-align: middle;"></div> <h2 style="margin: 0; display: inline;">Certificate of Analysis</h2>																															
Sample Number: 090209-0002	Sample Type: Composite																														
Sample Name: Effluent	Scheduled for collection on: 2/9/2009 8:00:00 AM																														
Location: Effluent	Area: Rocky WWTP																														
Sample Date/Time: 2/9/2009 8:00:00 AM																															
Sampled By: Scott Patrick Dörner																															
Notes: Sample looked green when recvd in the lab...																															
Tests:																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #d9ead3;"> <th style="text-align: left;">Variable</th> <th style="text-align: left;">Units</th> <th style="text-align: left;">Analysis Method</th> <th style="text-align: left;">Result</th> <th style="text-align: left;">Date Complete</th> <th style="text-align: left;">Analyzed By</th> </tr> </thead> <tbody> <tr> <td>Effluent BOD</td> <td>mg/L</td> <td>SM 5210B</td> <td><2.0</td> <td>2/9/2009 7:45:00 AM</td> <td>Mark G Mack</td> </tr> <tr> <td>Effluent TSS</td> <td>mg/L</td> <td>SM 2540D</td> <td>5</td> <td>2/9/2009 7:45:00 AM</td> <td>Mark G Mack</td> </tr> <tr> <td>Effluent pH</td> <td>SU</td> <td>SM 4500-pH B</td> <td>7.2</td> <td>2/9/2009 7:45:00 AM</td> <td>Mark G Mack</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Variable	Units	Analysis Method	Result	Date Complete	Analyzed By	Effluent BOD	mg/L	SM 5210B	<2.0	2/9/2009 7:45:00 AM	Mark G Mack	Effluent TSS	mg/L	SM 2540D	5	2/9/2009 7:45:00 AM	Mark G Mack	Effluent pH	SU	SM 4500-pH B	7.2	2/9/2009 7:45:00 AM	Mark G Mack							
Variable	Units	Analysis Method	Result	Date Complete	Analyzed By																										
Effluent BOD	mg/L	SM 5210B	<2.0	2/9/2009 7:45:00 AM	Mark G Mack																										
Effluent TSS	mg/L	SM 2540D	5	2/9/2009 7:45:00 AM	Mark G Mack																										
Effluent pH	SU	SM 4500-pH B	7.2	2/9/2009 7:45:00 AM	Mark G Mack																										

5) MONITOR ON-GOING PERFORMANCE

Visual management provides easy sustained monitoring =

- * Customize dashboards for different levels of the organization.
- * Enable quick retrieval of reports, graphs, and entry forms.
- * KPIs = Key Performance Indicators.
- * Make review of data & information part of every day culture.

ROCKY CREEK WWTP



Report Manager



Lab Dashboard



Report Design



Compliance Graphs



BOD Manager

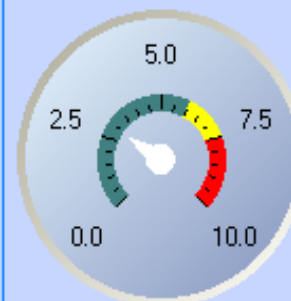
BOD, 5-DAY (20 DEG.C)	SAM MEASUR	NPDES
00310 1 0 0	PCR	
EFFLUENT GROSS VALUE	REQUR	

Review Report

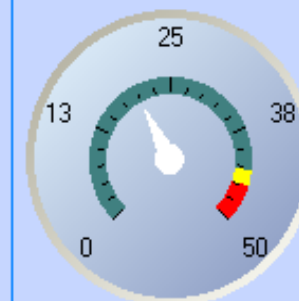
MLSS



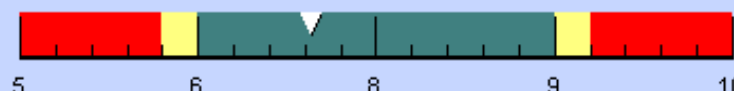
Flow



Eff TSS



pH



Key Performance Indicator
Last 30 day Avgs(01/10/09-02/09/09)

Flow:	2.927	MGD
MLSS:	3,671	mg/L
F/M:	0.077	ratio
Effluent TSS:	20.06	mg/L
Effluent pH:	7.04	SU

KEEP LAB AND OPERATIONS CONNECTED!!!!!!

Let's look at some specific items we want to do in our labs to keep our lab and our operations connected!!!!



SAMPLE SCHEDULING & TRACKING

LabCal - OPSROCKY

Find Setup Utilities Help

	Saturday 3/4/2006	Sunday 3/5/2006	Monday 3/6/2006	Tuesday 3/7/2006	Wednesday 3/8/2006
1		060303-0005 // Influent	060306-0005 // Effluent	060307-0005 // Effluent	060308-0005 // Effluent
2		060304-0005 // Effluent	060306-0006 // Influent	060307-0006 // Influent	060308-0006 // Influent
3		060304-0006 // Influent	060306-0007 // Aeration 8AM	060307-0007 // Aeration 8AM	060308-0007 // Aeration
4		060305-0005 // Effluent	060306-0008 // Aeration Noon	060307-0008 // Aeration Noon	060308-0008 // Aeration
5		060305-0006 // Influent			
6		060305-0007 // Aeration 8AM			
7		060305-0008 // Aeration Noon			
8					
9					
10					
11					
12					
13					
14					
15					
16					

Sample Detail - Analyzed

Sample # **060304-0006** Scheduled For Collection On **3/4/2006 08:00 AM**
 Sample Name **Influent** Date Closed
 Sampled By **Dr Bob** Schedule Type **Regular**
 Sampled On **3/4/2006 12:00 AM** Sample Status **analyzed**

Tests	Result
TSS	231
BOD	198
Oil & Grease - Total	1.70

Sample Notes
 Sample Type **Grab**
 Client
 Edit Sample Details

Closed
 Late > 1 Day
 Late 1 Day
 Due
 Skipped
 Received
 Analyzed

1747

CHOOSE TESTS & METHODS FROM A MODIFIABLE LIBRARY

Add Tests From Library

Save & Close Exit

Find Tests In Library

Name	Description	CAS #
1,1,1,2-Tetrachloroethane	1,1,1,2-Tetrachloroethane	
1,1,1-Trichloroethane	1,1,1-Trichloroethane	71556
1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	79345
1,1,2-Trichloro-1,2,2-Trifluoroethane	1,1,2-Trichloro-1,2,2-Trifluoroethane	
1,1,2-Trichloroethane	1,1,2-Trichloroethane	79005
1,1-Dichloroethane	1,1-Dichloroethane	75343
1,1-Dichloroethylene	1,1-Dichloroethylene	75354
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,2,3,4,6,7,8-Heptachlorodibenzofuran	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,2,3,4,6,7,8-Heptachlorodibenzofuran	
1,2,3,4,7,8-Hexachlorodibenzofuran	1,2,3,4,7,8-Hexachlorodibenzofuran	
1,2,3,4,7,8-Hexachlorodibenzofuran	1,2,3,4,7,8-Hexachlorodibenzofuran	
1,2,3,6,7,8-Hexachlorodibenzofuran	1,2,3,6,7,8-Hexachlorodibenzofuran	
1,2,3,6,7,8-Hexachlorodibenzofuran	1,2,3,6,7,8-Hexachlorodibenzofuran	
1,2,3,7,8,9-Hexachlorodibenzofuran	1,2,3,7,8,9-Hexachlorodibenzofuran	
1,2,3,7,8,9-Hexachlorodibenzofuran	1,2,3,7,8,9-Hexachlorodibenzofuran	
1,2,3,7,8-Pentachlorodibenzofuran	1,2,3,7,8-Pentachlorodibenzofuran	
1,2,3,7,8-Pentachlorodibenzofuran	1,2,3,7,8-Pentachlorodibenzofuran	
1,2,3-Trichloropropane	1,2,3-Trichloropropane	
1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzene	120821
1,2,4-trimethylbenzene	1,2,4-trimethylbenzene	95636
1,2-Dibromo-3-Chloropropane	1,2-Dibromo-3-Chloropropane	

Find Tests In Database

Name	Description	Acronym
BOD 5-day @ 20 Deg. C	Biochemical Oxygen Demand (BOD) 5-day @ 20 Deg. C	BOD5
BOD5	BOD5 @ 20 Deg. C, Percent Removable BOD5	
Mercury	Mercury Testing : Quarterly	
Nitrogen, Total Inorganic (as Nitrogen, Total Inorganic (as N))	Nitrogen, Total Inorganic (as Nitrogen, Total Inorganic (as N))	IN
Non-polar Material (sgt-hem)	Non-polar Material (sgt-hem)	
pH	pH	PH
Temperature	Temperature	TEMP
TSS	Total Suspended Solids (TSS)	TSS

Add Methods from Library

Save & Close Exit

Find Methods In Library

Name	Description
8260+OX	Volatile Organic Compounds by
8260BOS	Volatile Organic Compounds by
8260FA	Volatile Organic Compounds by
8260FAB	VOCs by GC/MS Fuel Additives
8260SIM	Volatile Organic Compounds by
8260TPB	Total Petroleum Hydrocarbons (TPH)
8260TPH	Total Petroleum Hydrocarbons (TPH)
8270COS	Semivolatile Organic Compound
8270SIM	Semivolatile Organic Compound
AK101E	State of Alaska Method 101 Extended Range
AK102_3	State of Alaska Method 102 Extended Range
AK102E	State of Alaska Method 102 Extended Range
AK103	State of Alaska Residual Range
BTSNTOT	Total Butyltins [BTSNTOT]
CL272.2	Silver (AA, Furnace) - modified for CL272.2
CL273.1	Sodium (AA, Direct Aspiration) - modified for CL273.1
CL279.2	Thallium (AA, Furnace) - modified for CL279.2
CL335.2	Total Cyanide - modified for CL335.2
E120.1	Specific Conductance [E120.1]
E160.5	Settleable Matter [E160.5]
E1600	Enterococci bacteria - Membrane Filtration
E1613A	Tetra thru Octa-Chlorinated Dioxins and Furans
E1613B	Tetra-through Octa-Chlorinated Dioxins and Furans
E1624	Volatile Organic Compounds by
E1625C	Semivolatile Organic Compound
E1639	Trace Elements in Ambient Water
E170.1	Temperature [E170.1]

Find Methods In Database

Name	Description
E170.1	Temperature [E170.1]
SM 2540D	Standard Method (19th) 2540 D: Total Dissolved Solids
SM 4110B	Chloride (IC)
SM 4500-CL	Standard Method (19th) 4500-CL: Chloride
SM 4500CN	Standard Method (19th) 4500-CN: Cyanide
SM 4500-NO3E	Nitrogen (Nitrate) - Cadmium Reduction
SM 4500-O G	Standard Method (19th) 4500-O: Oxygen
SM 4500-P E	Phosphorus - Ascorbic Acid Method
SM 4500-pH B	pH - Electrometric Method
SM 5210B	Biochemical Oxygen Demand - 5-day
SM 5220D	Standard Method (19th) 5220 D: Dissolved Oxygen
SM 5310B	Standard Method (19th) 5310 B: BOD

BUILD YOUR SAMPLE / TESTING SCHEDULE

Add Test(s) and Schedule(s) for Sample 'Effluent'

Tests

pH

Add Test(s)

Delete Test

☐ Auto Sense variables

Save & Close

Cancel

SCHEDULES (all schedules apply to all of the test(s) above)

Next Due Date
Enter the date the first sample is due.

4 / 1 / 2016

Save Schedule

Cancel Saving Schedule

Recurrence pattern

☒ Daily

☒ Every 1 day(s)

☐ Every weekday

☐ Weekly

Recur every 1 week(s) on:

☐ Sunday ☐ Monday ☐ Tuesday

☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday

☐ Monthly

☐ Day of every 1 month(s)

☐ The of every 1 month(s)

☐ Yearly

☐ Every of

☐ The of

☐ Custom

March 2016

April 2016

Sun Mon Tue Wed Thu Fri Sat

28 29 1 2 3 4 5

6 7 8 9 10 11 12

3 4 5 6 7 8 9

Dates

PRINT / EMAIL SAMPLE ORDERS FOR COLLECTION OR USE AS A CERTIFICATE OF ANALYSIS

LabCal (Hach WIMS v7.5.0) - SUPER @ "Wastewater Tutorial" on LOCALHOST\OPSSQL.OPSWWTUTOR

Find Setup Utilities Help

Receive Close Skip Delete

Create Sample 1 Test Results Print Page Print All Zoom In Zoom Out 75%

Wastewater Tutorial

SAMPLE ORDER

Sample Number: 140702-0001 Sample Type: Composite

Sample Name: Effluent Scheduled for collection on: 7/2/2014 8:00:00 AM

Location: Effluent Area: WWTP

Sample Date/Time: 7/2/2014 3:24:32 PM Sampled By: Scott Patrick Dornier

Notes:

Tests:

Variable	Units	Analysis Method	Result	Date Complete	Analyzed By
Effluent BOD	mg/L	SM 5210B	2	7/14/2014 2:42:00 PM	
Effluent TSS	mg/L	SM 2540D	6	7/14/2014 2:42:00 PM	
Effluent pH	SU	SM 4500-pH B	7.5	7/14/2014 2:42:00 PM	

Chain of Custody

Transfer Date	Relinquished By	Received By	Notes
7/3/2014 12:08:00 PM	Scott Patrick Dornier	Jim S Carroll	Sample properly preserved

Sheet: Sheet1 Export As

Page 1 Microsoft XPS Document Writer 2:56 PM

BENCH SHEETS TO CAPTURE DATA WITH CUSTOM DATA ENTRY FORMS

TSS Benchsheet (Custom Data Entry Form)

File Edit Format Help KeyPad

Start Date: 1 / 4 / 2016 Current Date: Comment

H26 Save Approve Calc Show Calcs

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1																
2	<u>TSS Benchsheet - Method SM 2540D</u>															
3																
4	Analyst:					Oven Temperature In:										
5																
6	Sample Date:	01/04/16 - Mon				Oven Temperature Out:										
7																
8	Analysis Date/Time:															
9																
10																
11		<u>Inf TSS</u>				<u>PE TSS</u>		<u>RAS Conc</u>			<u>MLSS</u>			<u>Ef TSS</u>		
12																
13	Sample & Tare			g			g			g			g			g
14	Tare			g			g			g			g			g
15																
16	Solids			g			g			g			g			g
17																
18	Sample Volume			ml			ml			ml			ml			ml
19																
20	Suspended Solids	245		mg/L		77	mg/L		10300	mg/L		3622	mg/L		28	mg/L
21																

ENTER RESULTS DIRECTLY INTO COMPUTER


Tests	Chain Of Custody	Sample Notes	Sample Definition Notes	Test Notes	User Defined Fields	Associated Samples
Variable	Test	Method	Result	Units	Analysis Start Date	Ar T
4011 - Effluent BOD	BOD5	SM 5210B	<2	mg/L		
4041 - Effluent TSS	TSS	SM 2540D	6	mg/L		
4081 - Effluent pH	pH	SM 4500-pH B	7.5	SU		

Add Test

Delete Test

View Test History

Approve ☒



INTERFACE TO LAB INSTRUMENTS AND / OR CONTRACT LABS

DR3900 Client-Side Interface on Daily Plant Rounds - Monthly Data Entry

Select Data Delete Font Find Export Excel Help Exit

Parse Date	Parameter	Date	Result	Unit	Name	Device	Device Serial	Device Version	Sample ID	Sample Number	Sampling Date	Sampling Opera

RESULT Auto Refresh Auto Parse Last 30 Days Found a total of 0 enabled profiles to monitor.

Q14162 Hach WIMS Direct Server-Side Interface to doForms Web Service v1.0.3 - Interactive Mode

File Configuration Automated Import Test Utilities Support Help

Import All Import For Vars Activity Log View Help About ... Exit

Configuration loaded from C:\Program Files (x86)\Hach Company\doForms Web Service Direct Interface\Q14162.xml
Connecting to Hach WIMS server '(local)\OPSSQL' ...
Connection to Hach WIMS was established.
Verifying license...
License Summary : Available = 6, In Use = 4, Total = 10
License was successfully verified.
Connecting to Hach WIMS server '(local)\OPSSQL' ...
Connection to Hach WIMS was established.
Scanning all facilities for variables that are linked to
Found 8 variable(s) in 1 facility(s) that are linked to
Found Variable Detail : OPSWWTUTOR~1
Found Variable Detail : OPSWWTUTOR~6
Found Variable Detail : OPSWWTUTOR~9
Found Variable Detail : OPSWWTUTOR~32
Found Variable Detail : OPSWWTUTOR~40
Found Variable Detail : OPSWWTUTOR~45
Found Variable Detail : OPSWWTUTOR~92
Found Variable Detail : OPSWWTUTOR~94
waiting for user to select import date range ...

Select Date Range to Import

Import Help Cancel

Start Date and Time
03/31/2016 00:00:00

End Date and Time
04/01/2016 15:16:00

Set Using Start and End Date Shortcuts
YESTERDAY AND TODAY

MANAGE THE PROCESS – CLOSE OUT SAMPLES, RESCHEDULE SAMPLES, SKIP SAMPLES, BUILD ASSOCIATED SAMPLES, ONE TIME/AD HOC SAMPLES

LabCal (Hach WIMS v7.5.0) - SUPER

Find Setup Utilities Help

Receive Close Skip

Create Sample Test Results

	Wednesday 7/16/2014
1	140716-0002 // Effluent
2	140716-0003 // Influent
3	140716-0004 // Aeration Basin
4	140716-0006 // One-Time
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	

Double click to Edit Sample

Close/Edit Sample 140716-0006

Sample # 140716-0006 Schedule Type One-Time Sample Status pending

Sample Name One-Time

Sampled By Sample Date/Time 07/16/2014 12:00 AM

Sample Type Grab

Scheduled For Collection On 07/16/2014 09:39 AM

Date Closed 07/16/2014 12:00 AM Assigned To

Location Aeration Basin

Save Changes Exit

Close Sample

Exit

Delete

Skip

Tests Chain Of Custody Sample Notes Sample Definition Notes Test Notes User Defined Fields **Associated Samples**

Parent Sample# 140716-0004 Clear Create Child Sample Link Child Sample Unlink Child Sample

Child Samples

Sample #	Scheduled For Collection On	Sampled Date	Sample Type
----------	-----------------------------	--------------	-------------

Parent Sample # is set to original Aeration Basin

MANAGE THE PROCESS – REPORTING

Spread Report Output

Report Groups

- Reports for SUPER
- ** Default Group
- > Dashboards
- > Hach LabCal Reports**
- > Process Reports
- > Regulatory Reports
- > To be Deleted

Reports

Quick Filter

Report	User	Description
Hach LabCal Overdue Samples Report	Hach	Hach LabCal O
Hach LabCal Results List For Selected Variables Report	Hach	Hach LabCal F
Hach LabCal Sample List Report	Hach	Hach LabCal S
Hach LabCal Test Methods Report	Hach	Hach Test Met
Hach LabCal Tests Ready For Analysis by Lab Section Rep	Hach	Hach LabCal T
Hach LabCal Tests Ready For Analysis by Test Report	Hach	Hach LabCal T

LabCal Built-In Reports

MANAGE THE PROCESS – REPORTING

EXAMPLES:

Hach Lab Cal Overdue Samples Report

Displays all the overdue samples:

Rocky Creek Waste Water TUTORIAL Overdue Samples Report				13-May-14 10:23
Samples due before: 13-May-14				
Sample Number	Description	Scheduled for Collection	Tests	
140512-0001	Effluent	12-May-14 08:00:00	BOD5, TSS	
140512-0002	Influent Test	12-May-14 08:00:00	BOD5	
140512-0003	Influent	12-May-14	TSS	
140509-0002	Influent Test	09-May-14 08:00:00	BOD5	
140509-0001	Effluent	09-May-14 08:00:00	BOD5, TSS	

Hach Lab Cal Results List For Selected Variables Report

Displays list of results for selected variables:

Rocky Creek Waste Water TUTORIAL Results for Variables					13-May-14 10:28
01-Jul-13 - 31-Jul-13					
Variable	Date	Result	Audit User	Audit Timestamp	
Influent BOD {mg/L}	01-Jul-13	220	BGIORD	07-Jul-13 10:22:15	
Influent Flow Hourly {MGD}	01-Jul-13	2.381	VIA_HISTORIAN	02-Jul-13 02:24:03	
Influent Flow Hourly {MGD}	01-Jul-13 01:00:00	2.562	VIA_HISTORIAN	02-Jul-13 02:24:03	
Influent Flow Hourly {MGD}	01-Jul-13 02:00:00	2.401	VIA_HISTORIAN	02-Jul-13 02:24:03	

MANAGE THE PROCESS – REPORTING

Hach Lab Cal Sample List Report

Displays all the samples:

Rocky Creek Waste Water TUTORIAL Sample List Report				13-May-14 10:30
Sample Name	Location	Test	Schedule	
Effluent	Effluent	BOD5	Weekly,Start-18-Dec-13,Every 1 week(s) on M,W,F	
		TSS	Weekly,Start-18-Dec-13,Every 1 week(s) on M,W,F	
Influent	Influent	TSS	Weekly,Start-06-Jan-14,Every 1 week(s) on M,W,F	
Influent Test		BOD5	Weekly,Start-06-Jan-14,Every 1 week(s) on M,W,F	

Hach Lab Cal Test Methods Report

Displays all the tests and associated methods:

Rocky Creek Waste Water TUTORIAL Test - Methods Report				13-May-14 10:35
Test	Description	Method	Max Hold Time (Hours)	
BOD5	BOD5 @ 20 Deg. C, Percent Removal	SM 5210B	24	
TSS	Total Suspended Solids (TSS)	SM 2540D	24	

Hach Lab Cal Tests Ready For Analysis by Lab Section Report

Displays tests ready for analysis grouped by Lab Section entry

Rocky Creek Waste Water TUTORIAL Tests Ready for Analysis				13-May-14 10:56
By Lab Section				
LabSection	Test	Sample	DateCollected	
Contractor	TSS	140512-0001 Effluent	13-May-14 08:00:00	
	TSS	140512-0003 Influent	13-May-14	
Kitchen	BOD5	140512-0001 Effluent	13-May-14 08:00:00	

MANAGE THE PROCESS – REPORTING

Hach Lab Cal Tests Ready For Analysis by Test Report

Displays tests ready for analysis grouped by Test entry

Rocky Creek Waste Water TUTORIAL Tests Ready for Analysis			13-May-14 10:48
By Test			
Test	SampleNum	Sample Name	Date Collected
BOD5	140512-0001	Effluent	13-May-14 08:00:00
TSS	140512-0001	Effluent	13-May-14 08:00:00

Sample Login and Chain of Custody

[illegible]

DATA ENTRY AND REVIEW



NPDES Review Form - Monthly Data Entry

File Edit Format

Jan 2009 Monday, January 19, 2009 Comments Calc Approve

Entry Min Max Daily Limit Min Max Var Info 12 Influent BOD Load (lbs/day) Equation V1*V11*8.34

Daily Com	Influent		Effluent		Influent		Effluent		4081 - Effluent pH SU
	11 - Influent BOD mg/L	12 - Influent BOD Load lbs/day	4011 - Effluent BOD mg/L	4012 - Effluent BOD Load lbs/day	41 - Influent TSS mg/L	42 - Influent TSS Load lbs/day	4041 - Effluent TSS mg/L	4042 - Effluent TSS Load lbs/day	

15 Thu		319	7423	19
16 Fri		268	6705	16
17 Sat		285	6275	24
18 Sun		297	7183	16
19 Mon		305	7199	11
20 Tue		285	6608	18
21 Wed		260	6635	17
22 Thu		323	7489	14
23 Fri		282	6844	17
24 Sat		285	6822	19
25 Sun		316	8275	25

TSS Benchsheet (Custom Data Entry Form)

File Edit Format Help

Start Date: 1/8/2009 Current Date: Thursday, January 08, 2009

C20 \$C\$16/\$C\$18*1000000 Save Approve Calc

TSS Benchsheet - Method SM 2540D

Analyst: MGM Oven Temperature In: 103.8

Sample Date: 01/08/09 - Thu Oven Temperature Out: 104.2

Date/Time: 1/9/09 9:33AM

	Inf TSS	PE TSS	RAS Conc
Wet & Tare	0.9755 g	0.9748 g	0.9748 g
Tare	0.9602 g	0.9671 g	0.9198 g
Solids	0.0153 g	0.0077 g	0.0550 g
Volume	50.00 ml	50.00 ml	5.00 ml
Solids	306 mg/L	154 mg/L	11.000 mg/L

Audit Trail

4011 Effluent BOD (mg/L)

Current State of Datapoint
Datapoint Date: 1/8/2009 Value: 47 (47)

History of Actions

Date & Time	User	Action	Value	Approval Level
1/13/2009 3:50:24 PM	JAS	Data MODIFIED to	47 (47)	FINAL APPROVAL
1/13/2009 9:36:00 AM	MGM	Data INSERTED	47 (47)	ENTERED

Restore Selected Value

Note: Only Super Users and Managers have privileges to restore values from Audit Trail.

QA/QC =

HAVING A DATABASE PROVIDES EASY ACCESS TO TRENDING & ANALYSIS AND PROVIDES MEANING TO THE DATA

QC Report

Preview Graph Histogram Load Save Exit

Report Settings Options QC Limits

Run Report for

☒ Date Range

Start Date 3 / 1 /2016

End Date 3 /31/2016

< Mar 2016 >

☐ Number of Samples

Find last 20 ending on 4 / 1 /2016

Analyze Variables

... Add Remove Remove All

Var #	Var Name	Units	VarType
1021	MLSS	mg/L	P

↑

↓

QA/QC =

CHOOSE WHAT REPRESENTS A MEANINGFUL DEPARTURE FROM THE NORM.

QC Report

Preview Graph Histogram Load Save Exit

Report Settings **Options** QC Limits

Report/Graph Options

Report/Graph Heading

MLSS (mg/L) QC

Report Options

☒ All points above or below Upper and Lower Control Limit

☒ 2 Consecutive points are above or below the Warning Limits

☒ 7 Consecutive points are on one side of the mean

☐ 5 Consecutive points are sloping in one direction

Outlier Detection

☒ Off

☐ T Test (Critical Value 5%)

☐ T Test (Critical Value 1%)

☐ Grubbs Test

☐ Manually mark the outliers

Outlier Type

For the Test Selected, Check For High Outliers

QA/QC –

EITHER SET CONTROL LIMITS OR HAVE THE SYSTEM CALCULATE THEM BASED ON YOUR DATA

The screenshot shows the 'QC Report' application window. The top menu bar includes 'Preview', 'Graph', 'Histogram', 'Load', 'Save', and 'Exit'. Below the menu bar are three tabs: 'Report Settings', 'Options', and 'QC Limits' (which is currently selected). The main area of the window is titled 'What QC Limits to use' and contains two radio button options: 'From Variable's QC Settings' (which is selected) and 'User Defined'. Under 'From Variable's QC Settings', there is a 'Choose Variable' section with a text box containing '1021 - MLSS' and a dropdown arrow. Below this is a table with the following data:

Start Date	UCL	UWL	QC Mean	LWL	LCL
1/1/2009	4000	3800	3500	3000	2800

Under the 'User Defined' option, there is a 'User Defined Limits' section with five input fields for 'Upper Control Limit', 'Upper Warning Limit', 'QC Mean', 'Lower Warning Limit', and 'Lower Control Limit'.

QA/QC

Variable Analysis

Variable to Analyze
1021 - MLSS

Date Settings
Start Date 3 / 1 /2016
End Date 3 /31/2016
Mar 2016

Graph

Options

Stats

Graphs to display

☒ Show Trend Graph
☒ Show Year Over Year Graph
☒ Show Individuals-Moving Range Graph
☒ Show Histogram Graph
☐ Show Compare to Graph

Suggest

QC Flag Detection Rules

☒ All points above or below Upper and Lower Control Limit
☒ 2 Consecutive points are above or below the Warning Limits
☒ 7 Consecutive points are on one side of the mean
☒ 5 Consecutive points are sloping in one direction

Control Limits

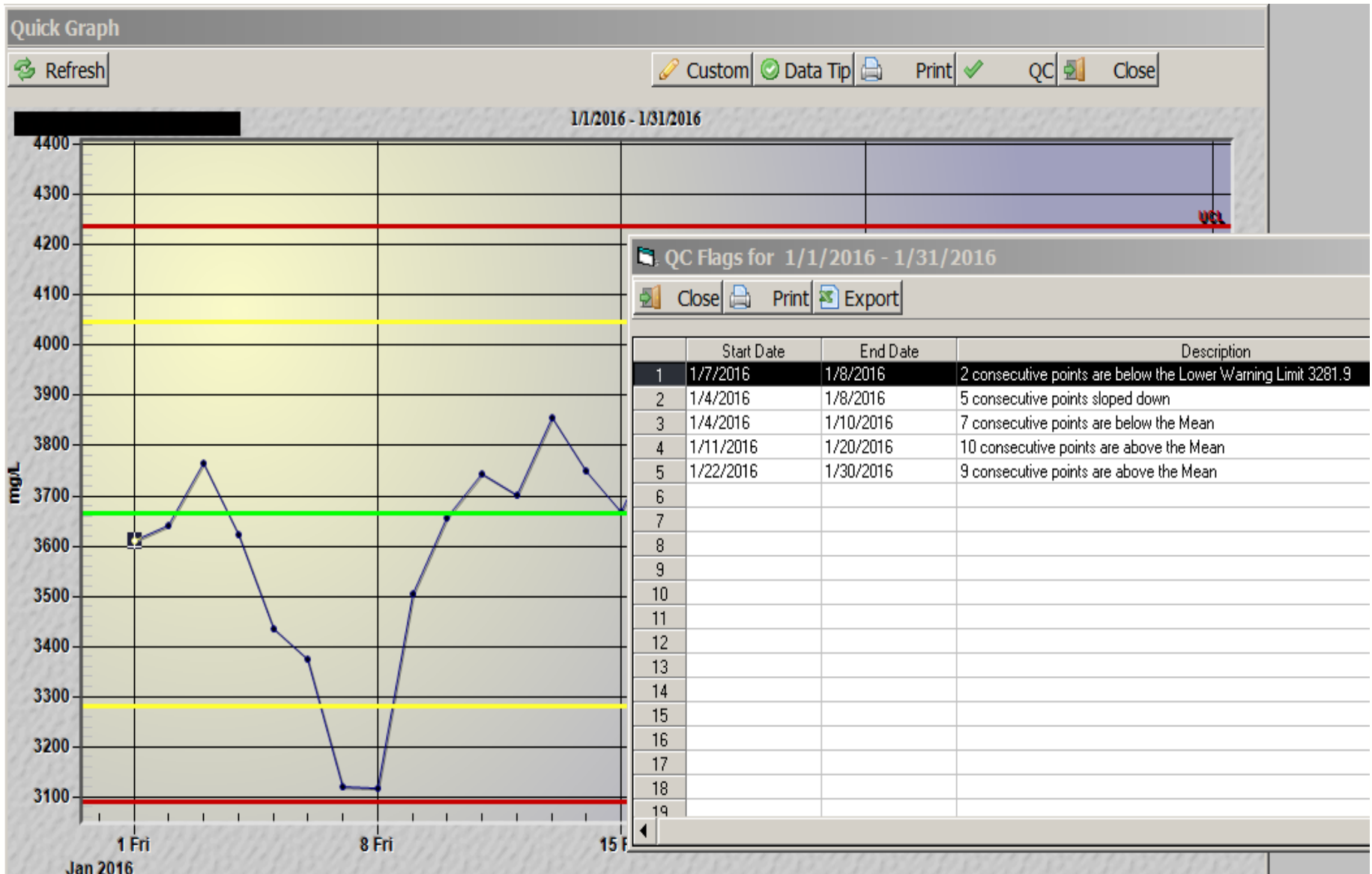
☐ From Variable's QC Settings
☐ User Defined
☒ Calculated

Calculated Limits

Upper Control Limit	4,409.4
Upper Warning Limit	4,119.1
QC Mean	3,538.6
Lower Warning Limit	2,958.0
Lower Control Limit	2,667.7

☐ Calculated with outliers removed

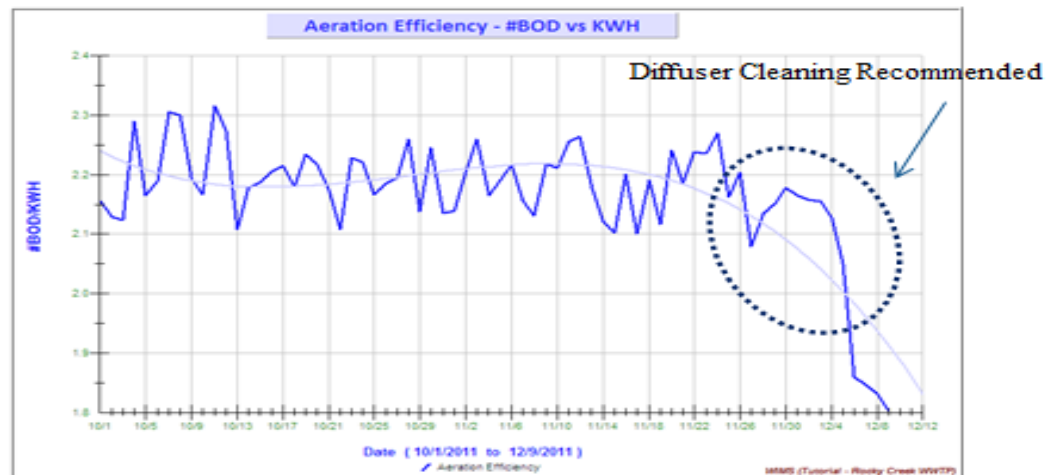
RESULT IS EASY TO FIND, MEANINGFUL DATA!!



LAB & SCADA DATA COMBINE TO PROVIDE OPERATIONS WITH INSIGHT INTO THE CLEANING CYCLE FOR DIFFUSERS DUE TO REDUCED BUBBLE SIZE FROM CLOGGING

Do: Identify the Problem

WIMS™ shows the cleaning cycle by benchmarking pounds of BOD removed (lab data) per KW of electricity used (SCADA data). Benchmark shows that the diffuser should be cleaned at 2.0lb BOD/kwh



LAB DATA, FIELD DATA, & SCADA DATA ARE ALL REQUIRED FOR CT CALCULATIONS.

Automates your CT calculations making them fast, accurate, and reliable.

For each disinfectant segment given a baffling factor, volume, etc... the CT Achieved is calculated. Flows, pH, temperatures, and Disinfectant Residuals can be hand entered or pulled from your SCADA system to calculate your CT Required.

Weekly CT Report			
	Clearwell CT Achieved	Clearwell 3 Log Giardia CT Required	Clearwell Giardia Log Inactivation
Date	mg/L-mins	mg/L-mins	
1/1/2009	42.7	79.3	1.6
1/2/2009	47.7	96.6	1.5
1/3/2009	41.9	92.1	1.4
1/4/2009	40.7	93.0	1.3
1/5/2009	29.8	96.6	0.9
1/6/2009	63.3	85.9	2.2
1/7/2009	50.9	98.9	1.5
Minimum	29.8	79.3	0.9
Maximum	63.3	98.9	2.2
Average	45.3	91.8	1.5

USE KEY PERFORMANCE INDICATORS (KPI) SUCH AS CALCIUM CARBONATE PRECIPITATION POTENTIAL (CCPP)



Hach WIMS

< Input Data >

MOR Entry Form

< Graphs >

Output Graphs

Raw VS Settled Turb

< Reports >

Output Reports

MOR Report

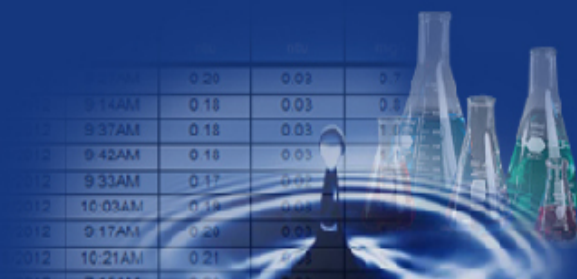
Variable Analysis

Design Reports

Help

Key Performance Indicators

03/02/16 - 04/01/16	Min	Max	Avg
Water Production	41.89	45.62	44.15
Chlorine Residual	0.620	2.900	2.402
CCPP - Corrosion Potential	-2.090	-1.380	-1.659



SOLUTION

Integrated Software for Decision Support =

- Combines Lab Data with Process and Field Data
- Powerful Trending and Analysis for QA/QC and Optimization

QUESTIONS?



THANK YOU!!!!!!!!!!!!!!!!!!!!

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