Internal Audits for Small Municipal Laboratories

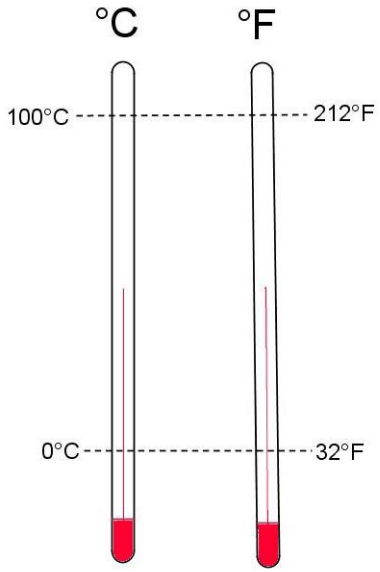
Tiffini Adams
Quality Assurance Officer
Central Valley Water Reclamation Facility
Salt Lake City, UT

Quality Assurance Officer

- 3 Water Reclamation Facility Laboratories
  - 4 analysts for Wet Chem, Micro, Metals, Nutrients
  - 3 analysts for Wet Chem, Organics, Salmonella, and Whole Effluent Toxicity Testing
  - 1 analyst for Wet Chem, including several TestNTube analysis
- One LIMS and Paper Workbooks
- Two still full paper analysis

Annual Verifications

- Thermometers



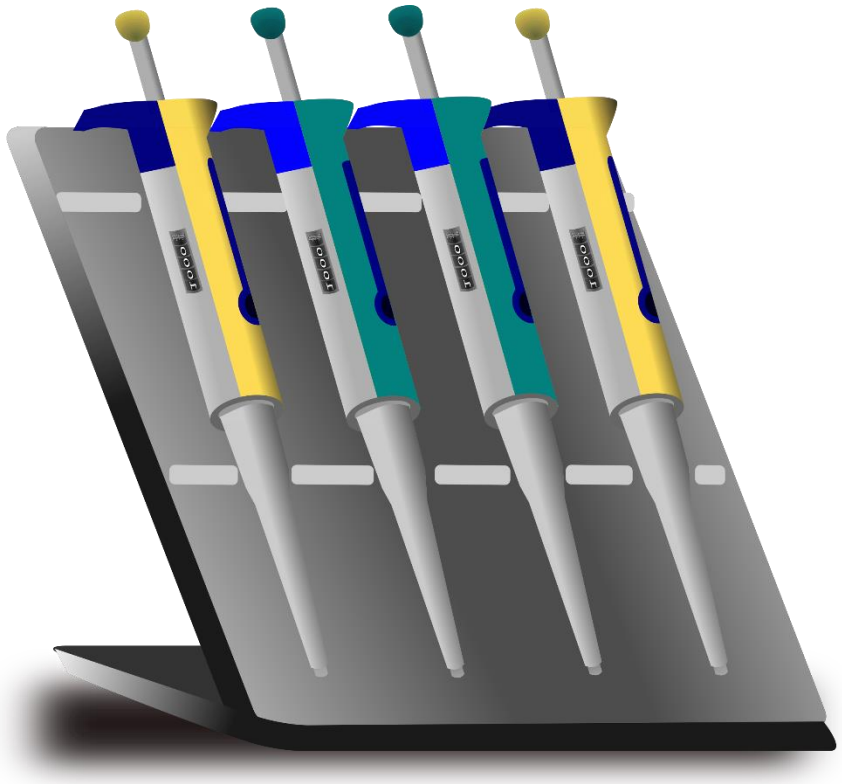
Verify each thermometer against a certified thermometer and note correction factors

2014 Thermometer Calibration								
Certified Thermometer: 1273								
Certified Thermometer: *1542			Record results as					
			Therm. Temp / Certified Therm.Temp					
Thermometer ID	Previous Cal Date / Correction Factor	Use Range	Temp 1	Temp 2	Temp 3	Correction Factor	Calibration Date	Initials
Certified Thermometer Comparison		1273 / 1542	/	/	/			
			/	/	/			
TDS Oven E #50		180°	/	/	/			
			/	/	/			
COD #2824		150°	/	/	/			
COD #2323		150°	/	/	/			
			/	/	/			
Autoclave #9002143		121°	/	/	/			
			/	/	/			
Flash Point L-1		Variable	/	/	/			
			/	/	/			
TDS Oven B #51		105°	/	/	/			
Oven A #18		105°	/	/	/			

Quarterly Verifications

- Pipettes and Dispensers

Measure the accuracy of Pipettes and make adjustments or Take out of service if needed. Start a corrective action and review data if anomalies are found.



Ongoing Checks

- Dates
- Times
- Initials
- Traceability
- QC Checks
- Transcription errors
- Hold time
- Calculations

Drinking Water – Bacteriological Examination

Page # _____

Colilert SM 9223
Reagent #: 1P73

Membrane Filter SM 9222B - Total
Medium #: _____
Buffer #: _____
Filter #: _____

SM 9222D - Fecal
_____
_____
_____

	Date	Time	Analyst
Start:	5/18/15	MW 5/18/15 JP 1515	MW
Finish:	5/19/15	1515	MW

Worksheet #: 31227
Client: _____

	Sample #	Cl_2 Screen Neg.	Cl_2 Screen Pos.	Test Result	Comment/ Dilution
1	3234	X		Neg	
2	3235				
3	3236				
4	3237				
5	3238				
6	3239				
7	3240				
8	3241				
9	3242				
10	3243				
11	3244				
12	3245				
13	3246				
14	3247				
15	3248				
16	3249	X		Neg	
17	3250				
18	3251				
19	3252				
20	3253				
21	3254				
22	3255				
23	3256				
24					
25					
26					
27					
28					
29					
30					

Test Resu
Neg

HACH

Run Information

Prep. Date: 5/28/15
Analyst: MW
Cook Time Start: 1055
Worksheet #: 34306
Instrument: Genesys 10vis

Analysis Date: 5/28/15
Analyst: MW
Analysis Time: 1350
Thermometer ID: 2323
COD Reactor: 2323
COD Temp.: 150°C

Calibration Information

Control	Tracking #	Meter Reading	
Blank		0.615	-6.39
50 ppm Standard	DK02	58.05	54.62
250 ppm Standard	DK02	244.6	252.76
1000 ppm Standard	DK03	947.2	999.01

R^2 = 0.9999

Reagent Tracking #: 1P77

2500 ppm Spike Tracking #: DK04

QCS Tracking #: WP15-1

Lab Number	Sample Identification	Meter Reading	Result (mg/L)	Dilution
Blank		0.314	-6.62	
250ppm Std		248.8	251.22	
QCS		138.9	140.49	
3408	RAW INFLUENT	385	388.16	
3409	TRICKLING FILTER WEST INF	227.6	229.39	
3410	TRICKLING FILTER WEST EFF	137.9	139.43	
3411	TRICKLING FILTER EAST INF	239.8	242.35	

Solutions Preparations Logbook

Solution Tracking Number	Solution Name and/or Concentration	Volume Prepared	Reagents Utilized			Date Prepared	Date Expires	Initials
			Tracking Number	Name	Amount			
DK21	GGA	500ml	1H79	Dextrose	0.0755	2-25-15	3-4-15	DJS
"	"	"	1H80	Glut Acid	0.0747	"	"	"
DK15	CONDUCTIVITY STAND.	2L	E18	KCl	1.4911	2/26/15	2/16	MW
DK16	TSS STANDARD	1L	IN45	Celite	0.2036			
DK17	TSS STANDARD	1L			0.2008			
DK18	TSS STANDARD	1L			0.2008			
DK19	TSS STANDARD	1L			0.2033			
DK20	TSS STANDARD	1L			0.2023			
DK24	UV STANDARD 15ppm KHP	500mL	DJ27	1300 KHP	25mL	3/4/15	3/16	MW
DK22	GGA	500mL	1H79	Dextrose	0.0751	3/5/15	3/12/15	MW
↓	↓	↓	1H80	Glut Acid	0.0749	↓	↓	MW
DK23	Lauryl	1.6L	IP17	Lauryl	57.003	3-10-15	3-24-15	DJS
DK24	Buffer H2O	19L	DJ32	$MgCl_2$ 5ml/L	5ml/L		6-10-15	
"	"	"	DJ91	KH_2PO_4 1.25ml/L	1.25ml/L		"	
						3/4/15	3/16	MW

Time	In Oven/Furnace					Date Setup			Date Read Back
Time	Out Oven/Furnace					Time Setup			Time Read Back
Oven ID						Analyst			Analyst
Lab#	TestGroupID	TestID	QC_Code	SampleID	Dish#	DishWt	SampleWt	DriedWt	NumericResult
Lab.	TestGroupID	TestID	QC	SampleID					
1600442	TS 2540G	TS		Digester #2	20	87.149	147.846	88.249	1.812
1600443	TS 2540G	TS		Digester #3	22	84.846	136.466	85.967	2.172
1600444	TS 2540G	TS		Digester #4	219	101.868	162.206	103.119	2.073
1600445	TS 2540G	TS		Digester #6	228	96.242	155.886	97.727	2.49
1600446	TS 2540G	TS		Digester #7	235	91.579	150.251	93.06	2.524
1600446D	TS 2540G	TS	D	Digester #7	236	104.858	161.722	106.309	2.552
1600447	TS 2540G	TS		Equalization Tank	243	86.213	148.658	89.383	5.076
1600448	TS 2540G	TS		BFP #6 Feed	245	93.593	169.34	95.114	2.008
Blank 36264	TS Blank	TS	B	Blank	246	92.25	149.79	92.25	0
Control DL69	TS KHP1	TS	C	Control	248	107.496	173.629	108.159	1.003

Annual Review

- Ethics and Data Integrity training
- Quality Assurance Plan
- SOP’s
- Comparison of Laboratory method to promulgated method

ETHICS AND DATA INTEGRITY AGREEMENT

I, _____(Name), understand the high standards of honesty and integrity required of me with regard to the duties I perform and the data I report in connection with my employment at the Central Valley Water Reclamation Facility Environmental Laboratory.

I will strive to maintain data integrity and produce data of known quality by following the standards of conduct below to the best of my ability:

a. I shall not intentionally report data values that are not the actual values obtained;
b. I shall not intentionally report the dates and times of data analyses that are not the actual dates and times of analyses;
c. I shall not intentionally represent another individual's work as my own;
d. I shall not intentionally misrepresent any other aspect of the analytical or reporting process;

1. I will record analysis information at the time that it happens;
2. I will record any comments pertinent to the recreation of the analysis and reproduction of the results.

I agree to inform laboratory or facility management of any accidental reporting of non-authentic data by myself in a timely manner.
I agree to inform laboratory or facility management of any accidental or intentional reporting of non-authentic data by other employees.

I understand that loss of employment may result from violation of this agreement.

I agree that I attended that above training and was encouraged to ask questions and participate in open discussion.

Analyst: **_____ Date _____**

Annual Review

- Ethics and Data Integrity training
- Quality Assurance Plan
- SOP’s
- Comparison of Laboratory method to promulgated method

Analysts:

CVWRF Chromatography Analytical Operating Procedures 2016

Title	SDWA & CWA METHODS	RCRA Method	SOP Number	Revison Number	Date SOP Read	22nd Edition Standard Method Reference	Date SM Read
Chromatography Definitions	Various	Various	Chromatography Definitions	2			
Ions by IC	300	SW 9056	AN - 300.0	XI			
Cyanide	335.4	SW 9010A, SW Chapter 7.3.3	AN - 335.4	III			
Ammonia/TKN Distillation	350.1, 4500-NH3B		AN4500 NH3B NH3 Distillation	VI			
Ammonia	350.1	N/A	AN - 350.1	XI		SM 4500 NH3 H	
TKN	EPA 351.2	N/A	AN-351.2	II			
Total Phosphorus	365.1	N/A	AN 365.1 AQ2	VII			

I will discuss any deviations or short cuts from Laboratory procedures with the lab director or QA Officer,

along with open discussions with my peers to improve data quality and reporting

I have read, understood, and agreed to follow the above SOPs. Date:

Customer Feedback Survey

- Distribute to all Departments and Entities that receive data from laboratory.

- Operations
- Pretreatment Department
- Solids Department
- Special Projects

Central Valley Water Reclamation Facility
Laboratory Customer Feedback Survey ~ Year 2014

The Central Valley Water Reclamation Facility Laboratory values your feedback, both positive and negative.
*We can only improve with your help. Thank you for your willingness to participate in this survey regarding the laboratory's **2014** performance.*

Name:_____ **Department:**_____ **Date:**_____

How would you rate the laboratory performance in fulfilling its mission statement?

Circle One			
Data Quality:	Exceptional	Adequate	Poor
Comments:	Exceptional	Adequate	Poor
Report Timeliness:	Exceptional	Adequate	Poor
Comments:	Exceptional	Adequate	Poor
Professional Conduct:	Exceptional	Adequate	Poor
Comments:			

Customer Feedback Cont.

- How would you rate your communication with the laboratory?
  Effective Adequate Poor
- Comments:
- Do you feel that you have reasonable access to the laboratory information pertaining to your samples, including data, calibration, and testing protocols?

- Appropriate Adequate Poor
- Comments:
- Do you receive valuable advice and guidance in technical matters, and opinions and interpretations based on results?

- Appropriate Adequate Poor
- Comments:

- Is there anything the laboratory can improve to better meet your analytical and/or reporting needs?
- Comments:

Corrective Actions

- Corrective Action Reports for Audit Failures

Corrective Action for Audit Failures

Audit ID: Sample ID: WS:

Parameter(s) Failed - Original Results Assigned Values Acceptance Window Laboratory Limits

_____

_____

QC Flags:

_____

_____

Preliminary discussion of why audit may have failed:

_____

_____

_____

Is it necessary to **rerun** the audit or is the failure due to a data error (prep, dilution, transcription errors)?

Is it necessary to **reprep** and **rerun** a new aliquot of the audit or just resubmit and reanalyze the original prepped sample?

Reprep Date: Or Resubmission Date:

Reanalyzed Sample ID: WS:

Parameter(s) **Reanalyzed** Results Assigned Values Acceptance Window Laboratory Limits

_____

_____

Do the Reanalyzed Results fall within the Audit Acceptance Window?

Has the failure been resolved or is there further corrective action needed?

Additional Comments:

_____

_____

_____

Lab Director _____ Date:_____ QA Officer _____ Date:_____

Corrective Actions

- Corrective Action Reports for Audit Failures
- Corrective Actions for :

  Re-Analysis, Re-Evaluation of Data,

  & Amended Reports

Request for Reanalysis

Lab Number:_____

Original WS:_____ Reanalyzed WS:_____

Original Date of Analysis: _____ Date of Re-Analysis: _____

Parameter(s) to be Reanalyzed or Data Re-evaluated:
_____
_____

Reason for Request:
_____
_____
_____

Original Result(s): _____
_____

Reanalyzed Result(s): _____
_____

Has the issue been resolved or is there further corrective action needed? :
_____
_____
_____
_____

Additional Comments:
_____
_____
_____
_____

Analyst _____ Date:_____

Lab Director _____ Date:_____

QA Officer _____ Date:_____

Corrective Action for Amended Reports

Lab Number:_____

Parameter(s) to be amended: _____
_____

Reason for Amended Report: : _____
_____
_____

Original Result(s): _____
_____

Amended Result(s): _____
_____

Original Date of Printed Report: _____

Amended Report Date: _____

Does the Amended Report require corrective action ?
_____
_____

Has the issue been resolved or is there further corrective action needed? :
_____
_____

Additional Comments:
_____
_____

Lab Director _____ Date:_____

QA Officer _____ Date:_____

Corrective Actions

- Corrective Action Reports for Audit Failures
- Corrective Actions for :

  Re-Analysis, Re-Evaluation of Data,

  & Amended Reports
- Corrective Action for

  Misc Findings

CAR – 16 - .

Corrective Actions for 2015 On-Site – Assessment Report Findings

TNI 2009 4.2 Management

Citation

V1M2 4.2.8.4 r)/TNI 2009 4.2 Management

policy addressing the use of unique electronic signatures, where applicable.

ELCP Finding

The laboratory needs a policy addressing the use of electronic signatures in their laboratory.

Possible Root Cause:

The laboratory uses electronic signatures but had not written it into the laboratory's QAP, nor had an effective use of tracking electronic signatures.

Proposed Corrective Action:

We are reviewing how our reports are generated and will implement a macro to ensure that the proper electronic signature is used. This will be incorporated into our QAP.

Follow Up Date:

1/31/16.

Corrective Actions Implemented:

A macro for an electronic signature was created and implemented for the Quality Assurance Officer and for a Laboratory Designee, in addition to the Laboratory Director signature that had already been in use.

The following statement has been added to AD-117 Report Printing of the QAP: An electronic signature is applied to the printed and/or electronically saved report based on who is logged into Apsen when generating the report: Laboratory Director, Quality Assurance Officer, or Laboratory Director Assigned Designee.

Corrective Action has been implemented; no further follow up is needed.

QA Officer_____ Date_____

Corrective Action has not succeeded in solving problem; additional follow up is needed.

QA Officer_____ Date_____

Laboratory Director Approval:

Laboratory Director_____ Date_____

2015
Internal Audit

Table of Contents

Wrap it up and put a bow on it!

- Quality Assurance Officer compilation report
- Laboratory Director Managers Report