Real-time QA/QC

An Instrument Manufacturer's Perspective

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@: **NEMC, 08/11/2016**

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We Provide

Direct measurements

In their natural matrix

High definition data - online

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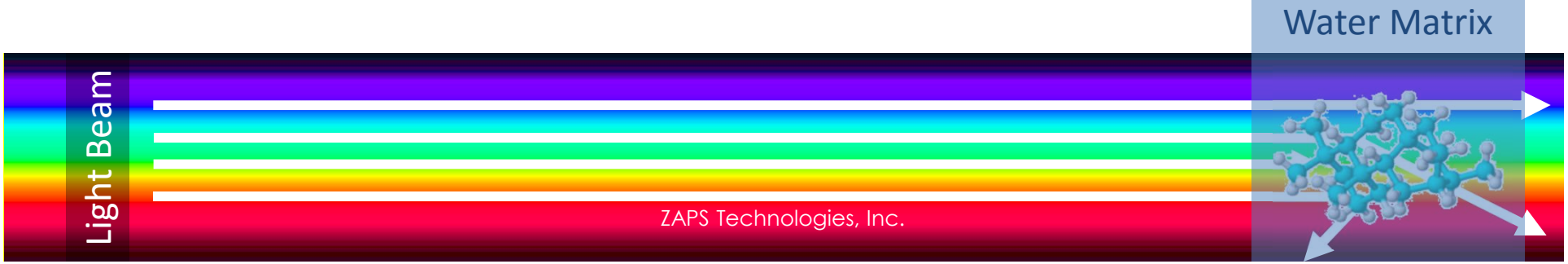
Hybrid Multispectral Analysis (HMA)

Fully optical analytical approach characterizing the chemical bonding and molecular structure of a sample matrix.

A combination of three optical techniques:

- Absorbance
- Scattering
- Fluorescence



Definitions

Quality Assurance	Quality Control
Control of Process	Control of Product
Proactive	Reactive
Prevent errors from entering dataset	Identify potential errors in the dataset

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Data Quality Objectives

Accuracy

Completeness

Consistency

Timeliness

R.Y. Wang, V.C. Storey, and C.P. Firth, "A framework for analysis of data quality research," Knowledge and Data Engineering, IEEE Transactions on, vol. 7, no. 4, 1995, pp. 623-640.

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Instrument Quality Goals

Maximize Data Continuity

Minimize Post Processing

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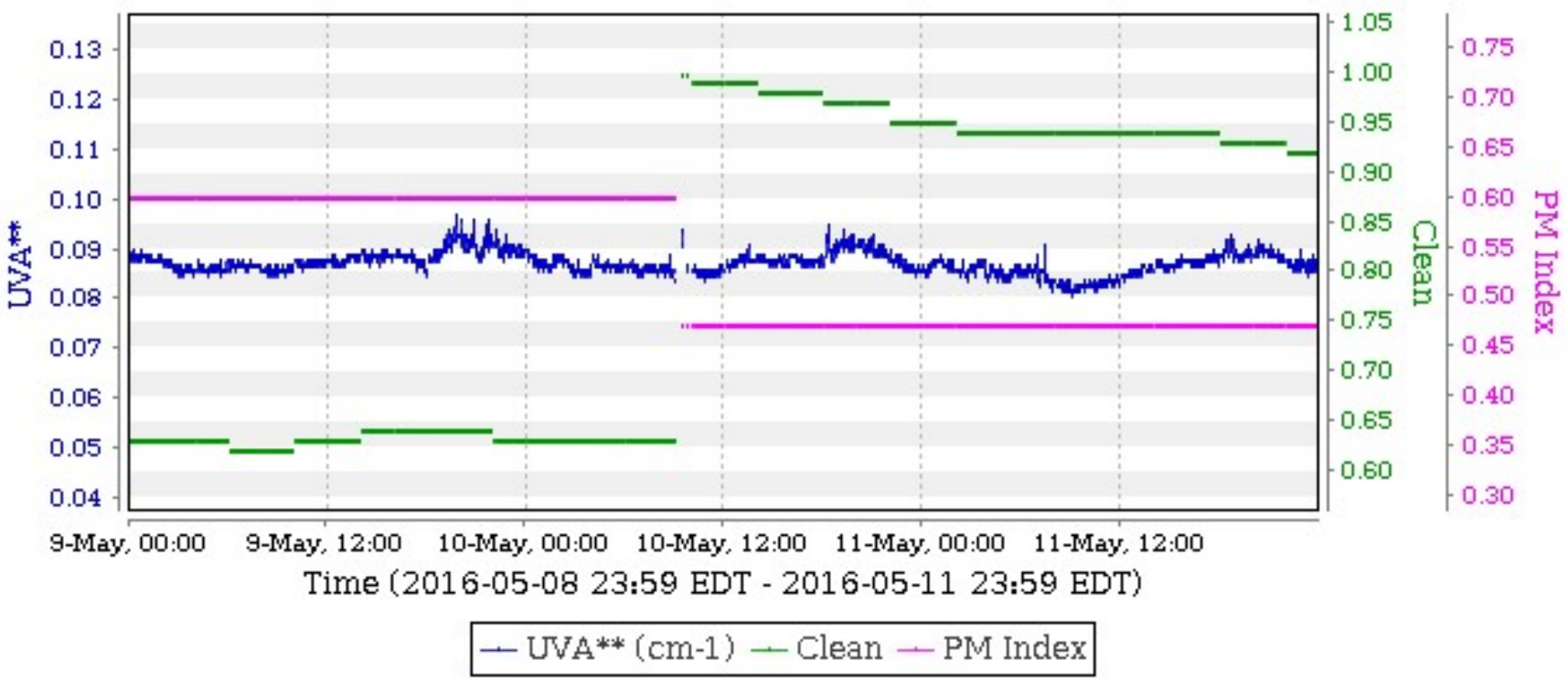
Continuous QA In Action

(UVA : Source Water: 3 days)



Detect. Respond.

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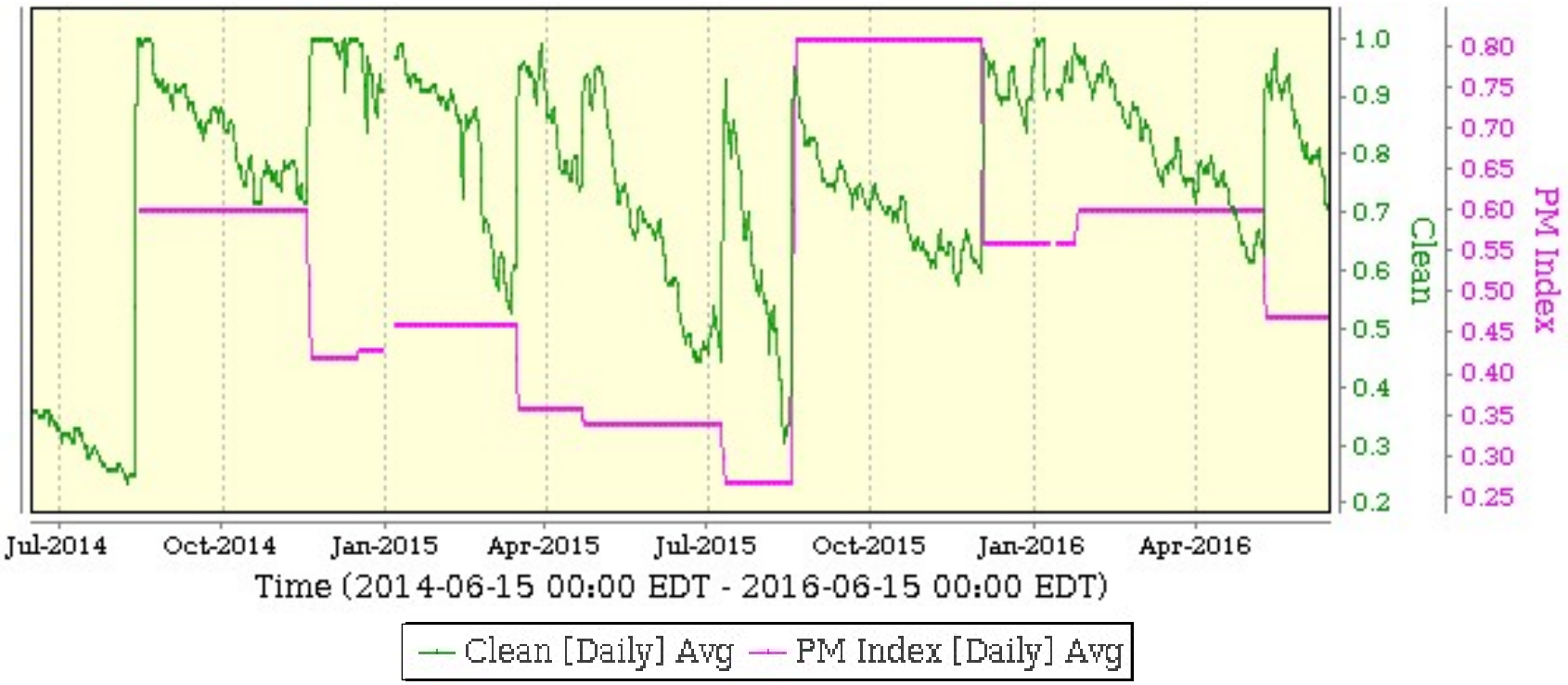
UVA

(Source Water : 2 years)



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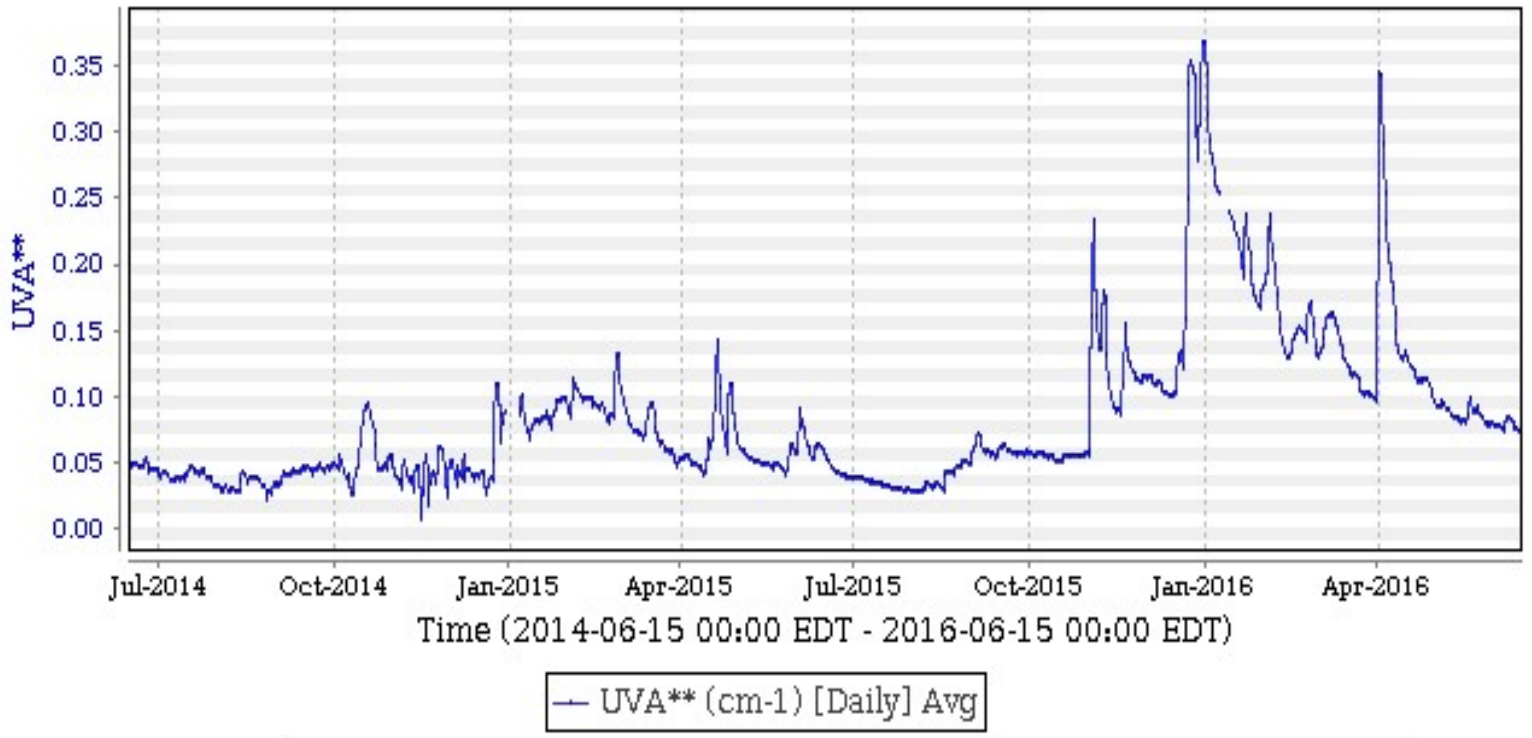
UVA

(Source Water : 2 years)



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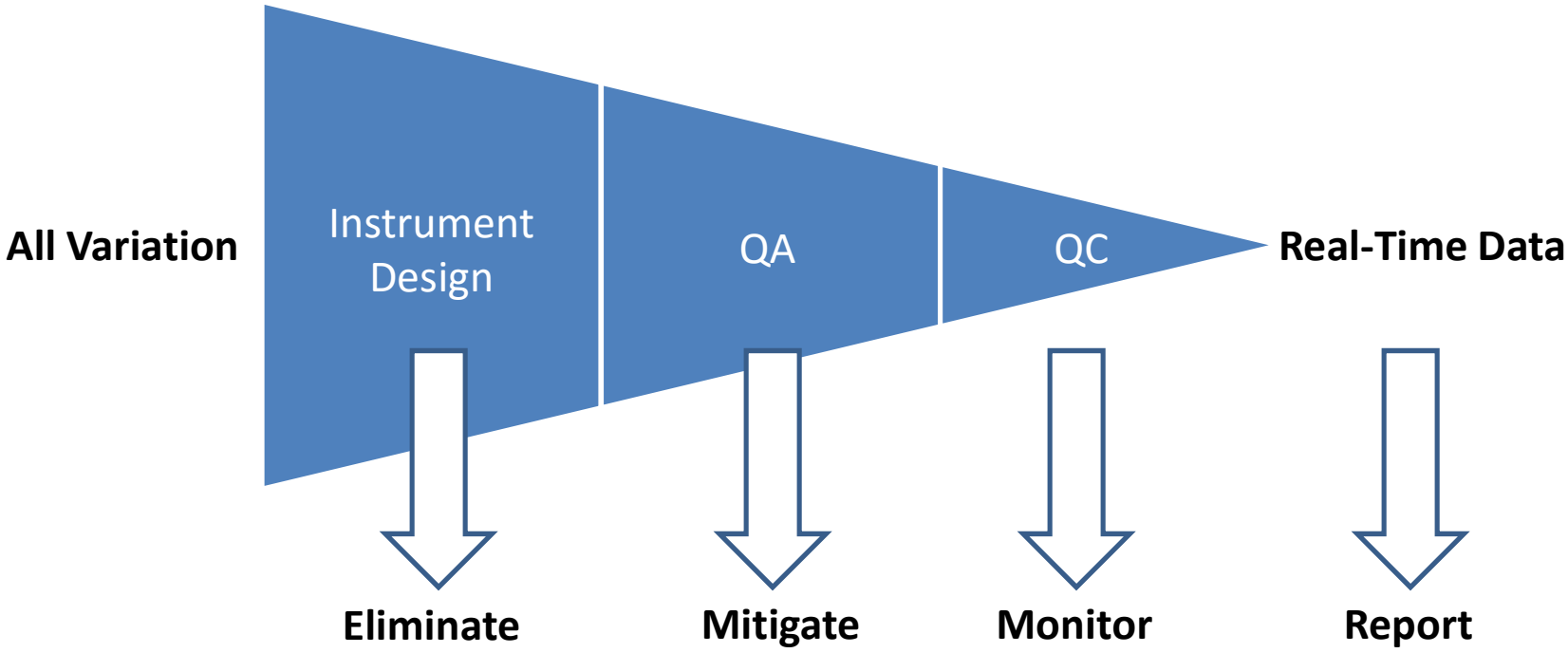
Quality Management Chain



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Quality Assurance

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QA Example
(Wastewater : 3 months)

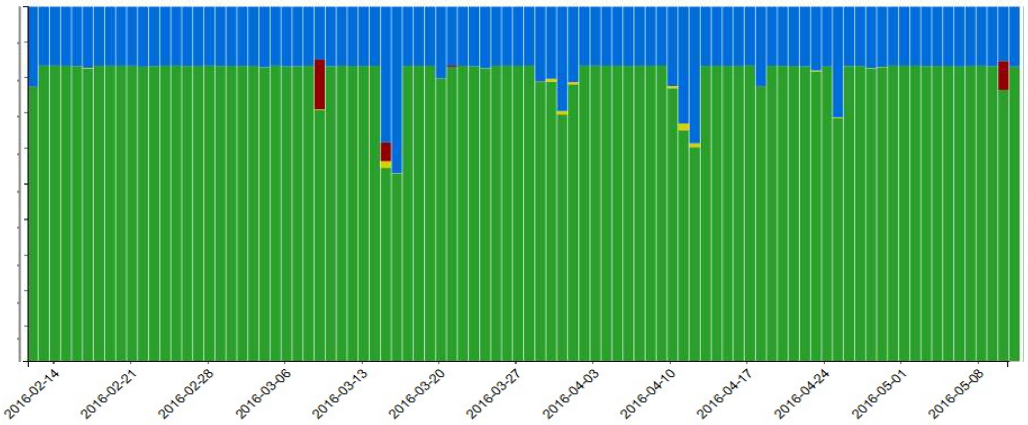
LiquID™ Station

Tracking Companies Users Roles Stations Monitor Logout Print
Welcome, zaps.admin.

Quick Glance | Monitor | Data | Quick Review | Alerts | Control | Grab Sample | QA/QC

Station: WWTP - Influent view

Station Status Analysis



Uptime/Downtime	Status Group	% of Total Time
Functional Uptime (99.6%)	Data Acquisition	81.2%
	QA/QC	18.4%
	External Maintenance	0%
Downtime (0.4%)	Error Handling	0.1%
	Out of Service	0.3%

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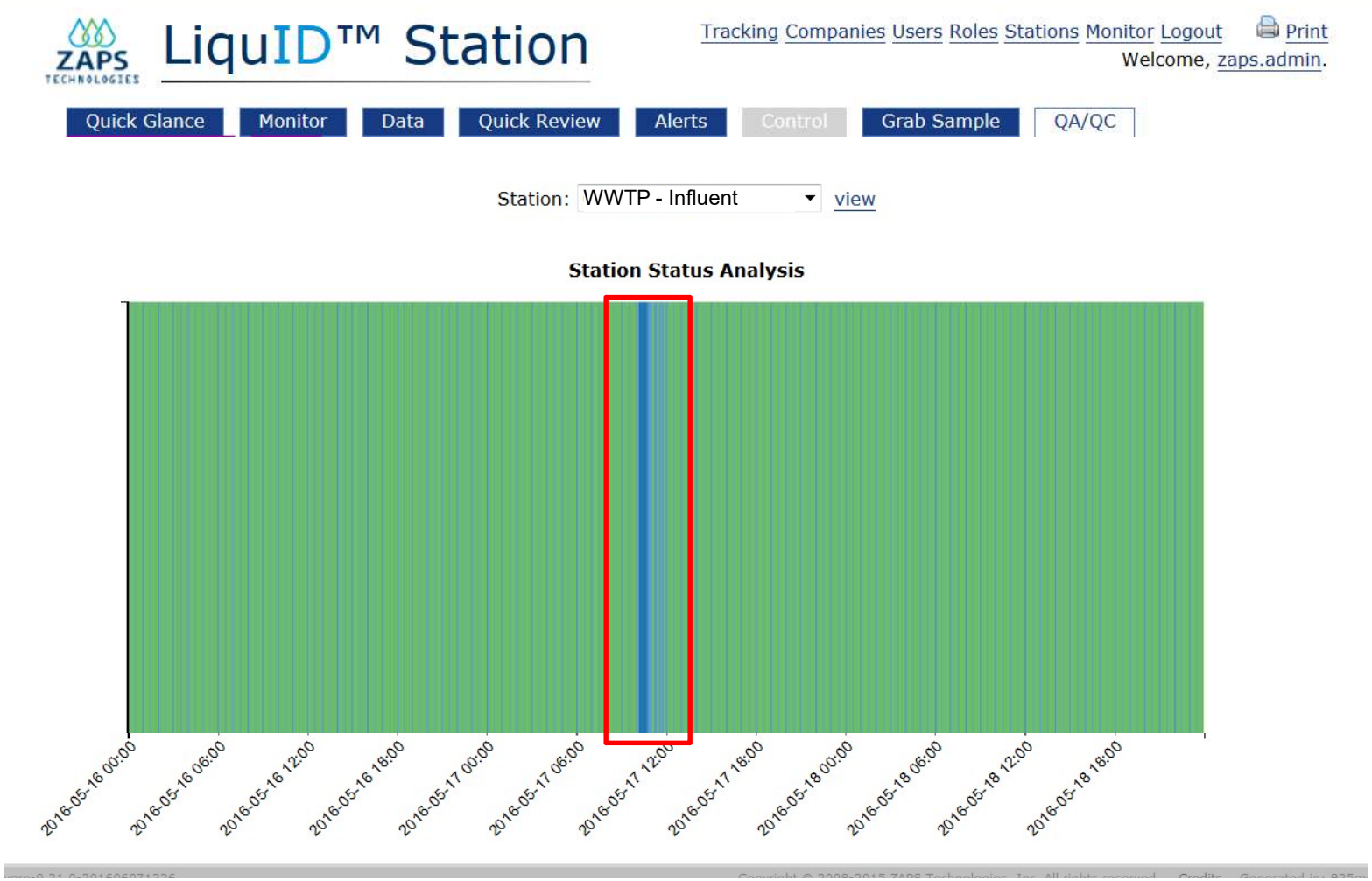
QA Example
(Wastewater : 3 days)



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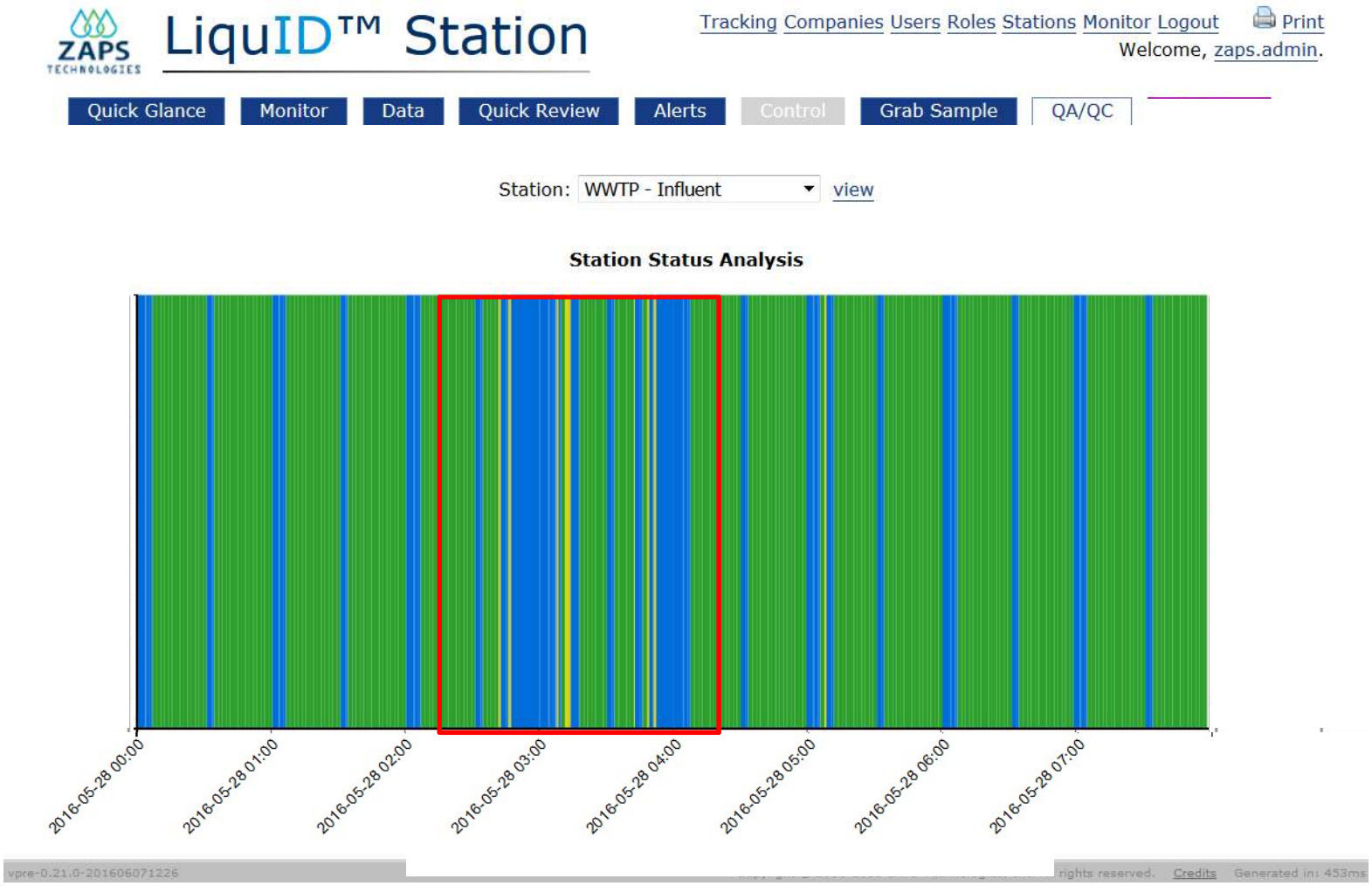
QA Example
(Wastewater : 8 hours)



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QA Example
(Source Water : 3 months)

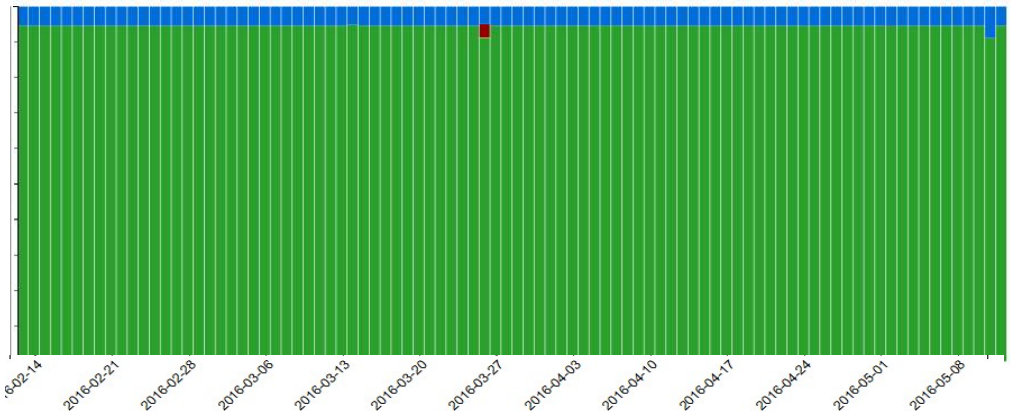
LiquID™ Station

Tracking Companies Users Roles Stations Monitor Logout Print
Welcome, zaps.admin.

Quick Glance | Monitor | Data | Quick Review | Alerts | Control | Grab Sample | QA/QC

Station: N. American Reservoir view

Station Status Analysis



Uptime/Downtime	Status Group	% of Total Time
Functional Uptime (100%)	Data Acquisition	94.5%
	QA/QC	5.4%
	External Maintenance	0%
Downtime (0%)	Error Handling	0%
	Out of Service	0%

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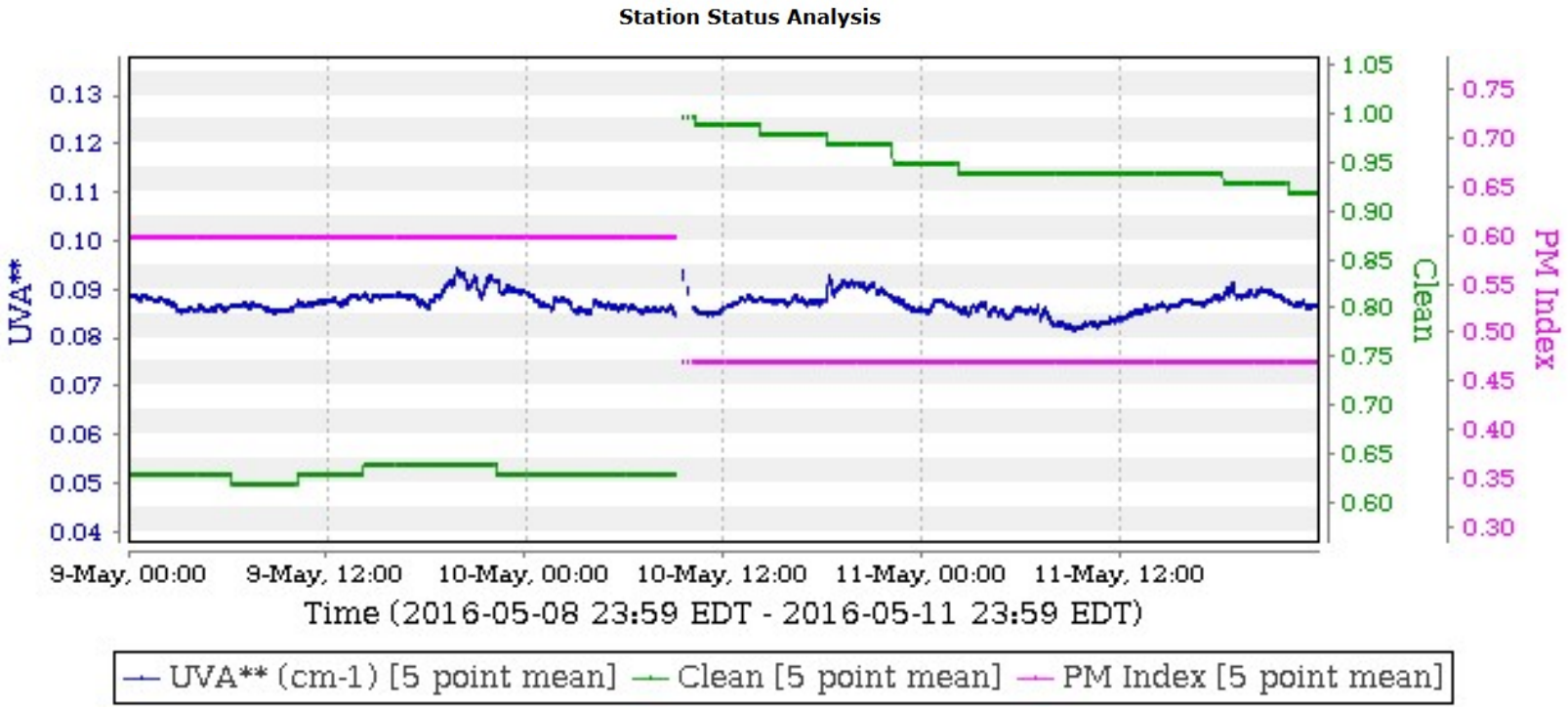
QA Example
(Source Water : 3 days)

LiquID™ Station

Tracking Companies Users Roles Stations Monitor Logout Print
Welcome, zaps.admin.

Quick Glance | Monitor | Data | Quick Review | Alerts | Control | Grab Sample | QA/QC

Station: N. American Reservoir view



Detect. Respond.

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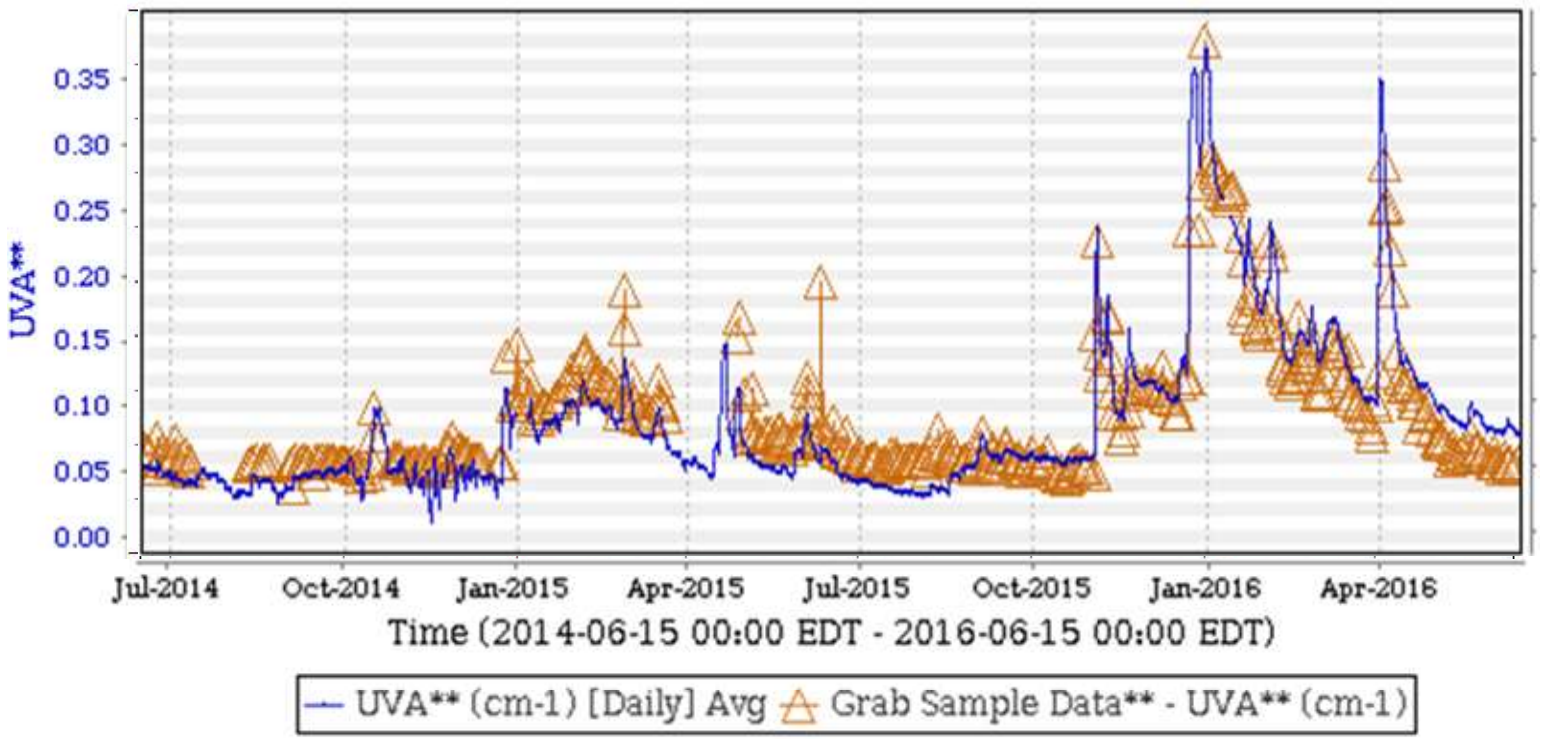
UVA

(Source Water : 2 years)



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Quality Control

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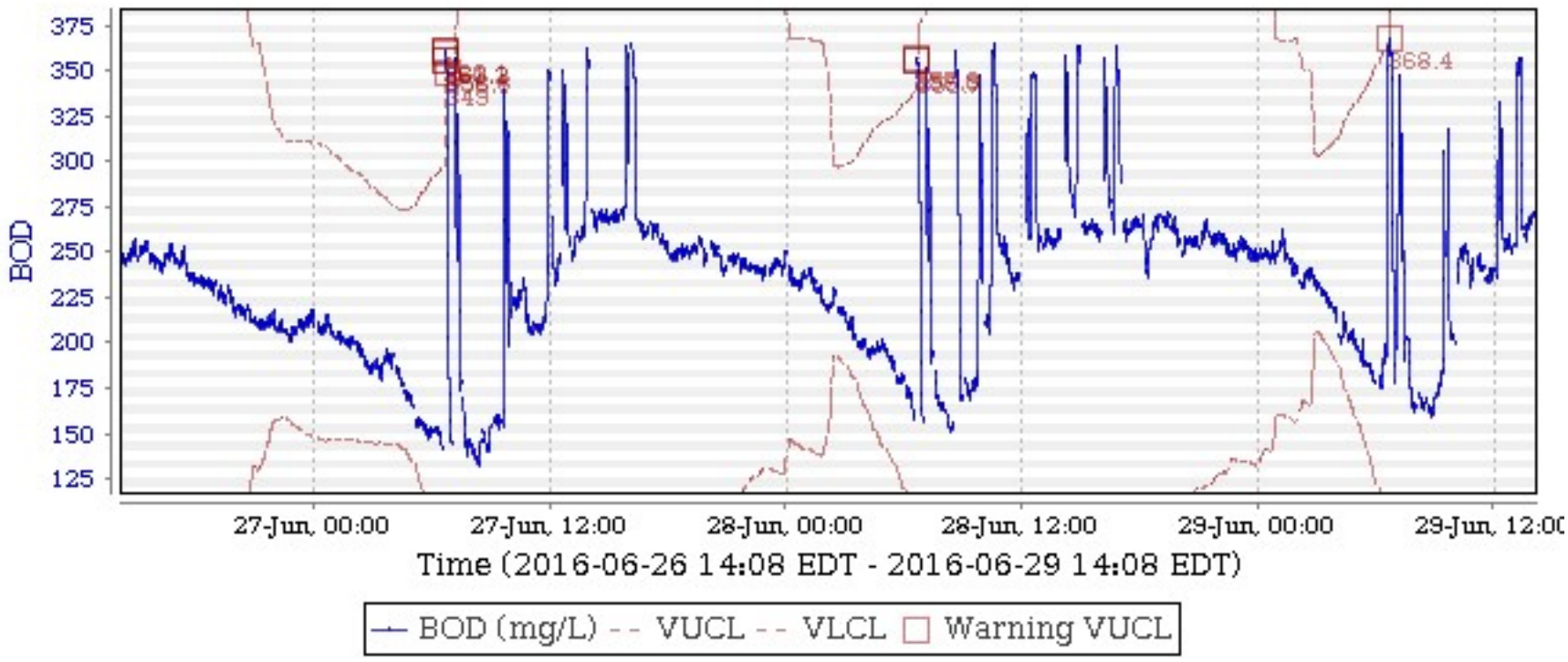
QC Example

(Wastewater : 3 days)



Detect. Respond.

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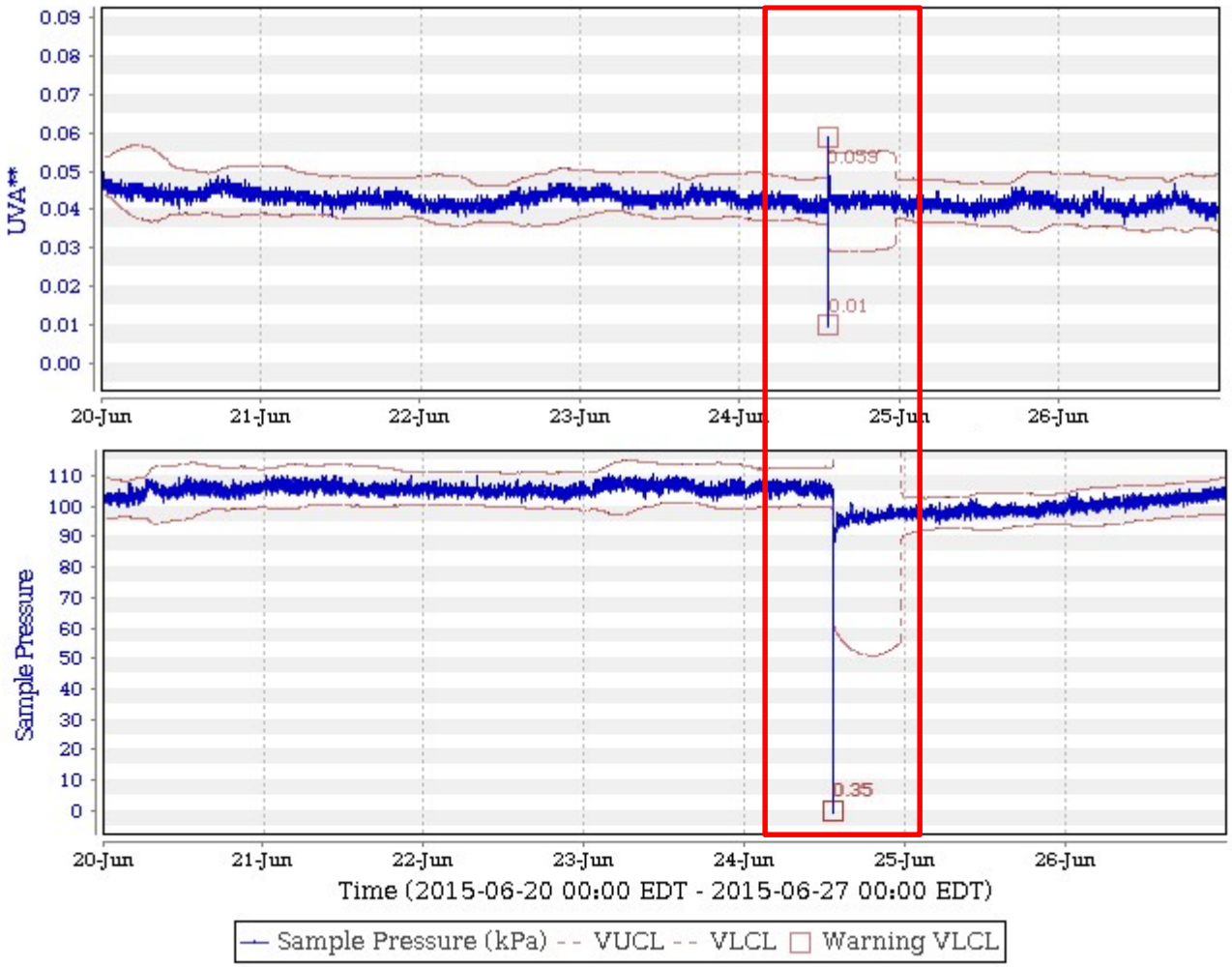
QC Example

(Source Water : 1 week)



Detect. Respond.

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Data Challenges

Quantity is nothing without quality.

Campbell, John L.; Rustad, Lindsey E.; Porter, John H.; Taylor, Jeffrey R.; Dereszynski, Ethan W.; Shanley, James B.; Gries, Corinna; Henshaw, Donald L.; Martin, Mary E.; Sheldon, Wade. M.; Boose, Emery R. 2013. Quantity is nothing without quality: automated QA/QC for streaming sensor networks. BioScience. 63(7): 574-585.

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Future

Real-time QA/QC enables real time data.

Networking

Process Control

Visualization

Data Mining

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References

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- Campbell, John L.; Rustad, Lindsey E.; Porter, John H.; Taylor, Jeffrey R.; Dereszynski, Ethan W.; Shanley, James B.; Gries, Corinna; Henshaw, Donald L.; Martin, Mary E.; Sheldon, Wade. M.; Boose, Emery R. 2013. Quantity is nothing without quality: automated QA/QC for streaming sensor networks. BioScience. 63(7): 574-585.
- Roger Blake and Paul Mangiameli. 2011. The Effects and Interactions of Data Quality and Problem Complexity on Classification. *J. Data and Information Quality* 2, 2, Article 8 (February 2011), 28 pages.
- R.Y. Wang, V.C. Storey, and C.P. Firth, "A framework for analysis of data quality research," Knowledge and Data Engineering, IEEE Transactions on, vol. 7, no. 4, 1995, pp. 623-640.

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