

## **STANDARD OPERATING PROCEDURE (SOP)**

### **Validation of non-EMRS Continuous Water Quality Monitoring Data Collected by Multiparameter Sonde**

**Effective Date: 10/01/2013**

#### ***PURPOSE***

This SOP describes the procedure for validating ambient water quality data collected from non-EMRS continuous water quality monitoring network (CWQMN) stations where the data has been collected by a multiparameter sonde.

#### ***SCOPE AND APPLICABILITY***

This SOP documents the manual validation procedures performed by the Data Management & Analysis (DM&A) Data Validator for multiparameter sonde sites, including daily review of site communication and data availability. This SOP addresses non-EMRS sites only. Procedures for EMRS sites are being developed and WQPD staff will address those procedures in a separate SOP.

#### ***METHOD OR PROCEDURAL SUMMARY***

If a site requires data validation, the CWQMN Network Coordinator initiates validation of CWQMN data by submitting the Data Validation Initiation (DVI) form to the DM&A Team Leader. Some sites may require only daily review and not validation. The DM&A Team Leader maintains the original form and assigns a Data Validator to the site who receives a copy of the DVI form for their records.

Data validators examine the data for record completeness and reasonableness of data and review Operator logs and Post Deployment Worksheets (PDW) or calibration logs for calibration and post-calibration records, post deployment temperature check results, and unusual events. The data validator reviews all data and appropriately flags data values exceeding or falling below established critical limits for each site.

#### ***LIMITATIONS***

1. Data validation is dependent upon the quality of field observations in the Operator Log, and reported calibration information in the PDW or calibration log.
2. The software tool used to validate data is a developing system and may contain defects that have not been identified and that may affect data validation results.
3. System changes initiated by OCE may negatively affect the functionality necessary to perform the tasks encompassed in this SOP.

#### ***SAFETY***

Usual office and computer safety practices apply. For additional information about the Texas Commission on Environmental Quality (TCEQ) safety program, see:

<http://home.tceq.state.tx.us/internal/admin/support/riskmgt/>

## ***EQUIPMENT***

### Computer Hardware:

- Intel Core2 Duo or greater
- Data logger, data communication hardware
- Central office HP Computer K460
- Ethernet Connection

### Computer Software:

- HP UNIX
- Exceed for PC
- LEADS user interface, including Cygwin
- Microsoft Excel
- Internet Explorer
- Microsoft Outlook

## ***PROCEDURES***

### **Daily procedure**

1. Verify the operation of the in-situ multi-parameter data sonde, the ZENO data logger, and completed data transmission daily by using an internet browser to access the Texas Commission on Environmental Quality (TCEQ) internal server at [rhone3](#). Within the Water Data section, view the Daily Report. Select the monitoring site, start date, number of days to report, parameters of interest, and generate a report.
2. Confirm the data retrieval for all expected parameters. If data is unexpectedly missing, troubleshoot the site using the following steps:
  - Access the Comms Report within the Status Pages section at [rhone3](#) to confirm communication between the remote sites and the central computer site. If the 'Comp' column is < 100%, then the site is not communicating reliably. Email the project lead and Cc the operator and Network Coordinator.
  - If the site is communicating reliably, access the Operator Log to check for unscheduled maintenance or unusual events.
  - If the site is communicating and the Operator Log does not indicate any unusual event, contact the LEADS administrator for possible data recovery and/or to resolve other system issues.

### **Weekly Procedure**

1. Check for and/or retrieve a new, completed PDW from your email, OR check for the appropriate calibration log at [rhone3](#).

2. If a PDW or calibration log is found, use an internet browser to access the TCEQ internal server at [rhone3](#). Within the Status Pages Section, review the Water Operator Logs for each site you are validating.
3. Access the Leading Environmental Analysis and Display System (LEADS) Interface via an x-terminal emulation package (Cygwin).

**Note: Contact the LEADS Administrator for access rights, validation rights, and passwords.**

4. Access the Manual Validation Retrieve window via Manual Validation Login.
5. Select the beginning year, month, day, and time of the data validation interval.
6. Select the end year, month, day, and time of the data validation interval.

**Note: manual validation will only allow you to select up to a maximum of 31 days of data.**

7. Select the appropriate time zone (usually CST, which represents Central Standard Time).
8. Select the "Discrete Data" Database. For profiler data, select "Five Minute" Database.
9. Select the Region or Site Group.
10. Select sort by "CAMS."
11. Select "Show Sites."
12. Highlight the CAMS site for validation from the site list.
13. Select "Show Available Parameters."
14. Highlight the validation parameters. Hold down the CTRL key to select up to four validation parameters at one time.
15. Select "Display Data."
16. Compare the automatically generated LEADS data qualifiers (LST, LIM, PMA, VAL) with the Water Operator Logs. Edit any data flagged incorrectly by selecting the data interval in the Manual Validation window and applying the appropriate data flag from the EDIT drop-down menu. Document any changes in the Validator's Log. See Appendix A for data flags.
17. If the PDW or calibration log indicates that a parameter failed Quality Control (QC) checks, flag the data associated with that parameter for the corresponding period as invalid with an Ambient Quality Invalid (AQI) flag. If a site visit has occurred, the data collected during that time period should be flagged PMA. Data for the subsequent hour is flagged as AQI.

**Note: if any temperature data is flagged AQI, the validator must manually flag the corresponding temperature dependent parameters of Dissolved Oxygen (DO), DO%, pH, and specific conductance data with AQI flags for the same period.**

**Note: if any flags are changed for a parameter that has a corresponding calculated parameter, such as DO and DO%, or SPC and TDS, the data validator must flag both parameters in the same manner.**

18. Investigate irregular data patterns by referring to the Operator Log, contacting the site operator for further information, using Best Professional Judgment (BPJ), and/or notifying the Surface Water Quality Monitoring (SWQM) project lead.

**Note: common irregular data patterns include data spikes, data dropouts, unnatural trends in water quality, etc.**

19. Evaluate all data auto-flagged as Limit Exceeded (LIM). These data values have exceeded or fallen below established critical limits. Use BPJ and remove the LIM flags, marking the data as valid or flagging as AQI or other appropriate flag.
20. After all data flagging is complete, choose "Validate Data" from the FILE drop-down menu. Record any changes made to the data during manual validation in the Manual Validation Notes window. Include detailed explanation for the changes, including data ranges affected. Initial all entries. Ensure documentation of all changes in the hard copy and/or the desktop electronic copy of the Validator's Log is complete.
21. Select the "Validate" button on the Manual Validation Notes Page to complete the validation procedure.

**Note: the validator has the option to 'Save without Validating' and this feature can be used but validator notes are required. Another feature in LEADS allows the validator to 'undo' a validation activity much like Microsoft Office products allow the user to 'undo'. The number of allowed 'undo' times is limited back to the last 'Validate' or 'Save without Validation'.**

22. Verify the system correctly auto validated the hourly average data.

### **Monthly Procedure**

1. After the last day of each month has been validated, access the Discrete Data Loss report at [rhone3](#).
2. Run a report for the month that you have just finished validating.
3. Capture a screen shot of the report and save to [WaterData](#) in the folder for the appropriate CAMS. Use the naming convention [MonthYear]Month.doc.
4. Run a report for the fiscal year to date.
5. Capture a screen shot of the report and save to [WaterData](#) in the folder for the appropriate CAMS. Use the naming convention [MonthYear]YTD.doc.
6. Fill out the summary spreadsheet for the site, using the template at [WaterData](#). Save the file in the appropriate CAMS folder using the naming convention C[CAMS#]Summary.xlsx.
7. Send an email to the CWQMN Network Coordinator at the end of each fiscal year to notify them that you have completed the data completeness reports for the year.

### **CALCULATIONS**

Not applicable

## **QUALITY CONTROL**

1. Each data validator reviews, validates, and verifies data from assigned ambient CWQMN stations.
2. Each data validator maintains detailed records in the form of a Validator's Log outside of the LEADS system that includes all activities and follow-up actions relating to the data record. The records should be sufficient to reconstruct the data validation event.

## **ACRONYMS**

<b>AQI</b>	Ambient Quality Invalid
<b>BPJ</b>	Best Professional Judgment
<b>CAMS</b>	Continuous Ambient Monitoring Station
<b>CWQMN</b>	Continuous Water Quality Monitoring Network
<b>DM&amp;A</b>	Data Management & Analysis
<b>DO</b>	Dissolved Oxygen
<b>DVI</b>	Data Validation Initiation
<b>EMRS</b>	Emergency Management and Response System
<b>LEADS</b>	Leading Environmental Analysis and Display System
<b>LIM</b>	Limit Exceeded
<b>LST</b>	Lost
<b>OCE</b>	Office of Compliance and Enforcement
<b>PDW</b>	Post Deployment Worksheet
<b>PMA</b>	Preventive Maintenance Action
<b>QAPP</b>	Quality Assurance Project Plan
<b>QC</b>	Quality Control
<b>SOP</b>	Standard Operating Procedure
<b>SWQM</b>	Surface Water Quality Monitoring
<b>TCEQ</b>	Texas Commission on Environmental Quality
<b>TDS</b>	Total Dissolved Solids
<b>VAL</b>	Valid

## **REFERENCES**

rhone3

*TCEQ Operating Policies and Procedures*, Chapter 6.13

*Analysis of In Situ Dissolved Oxygen, Electrical Conductivity, pH, Water Temperature, Sample Depth, and In Vivo Chlorophyll Fluorescence Detection in Ambient Surface Water Using Yellow Springs Instrument 6-Series Multiprobe, Revision 2, July 2011 (or most recent version)*

*Quality Assurance Project Plan for Continuous Water Quality Monitoring Program, Revision 6, March 2012 (or most recent version)*

## **POLLUTION PREVENTION AND WASTE MANAGEMENT**

Supervisors, sampling personnel, and laboratory analysts should identify and implement innovative and cost-saving waste reduction procedures as part of the method development, and review and revision of standard operating procedures. Wastes that do result from these procedures are managed and disposed in accordance with appropriate state and federal regulations.

Refer to Chapter 6.13 of the *TCEQ Operating Policies and Procedures* for guidelines on general recycling, waste reduction, and water and energy conservation. Review these procedures for specific employee responsibilities and mechanisms for office related waste prevention and management.

## **SHORTHAND PROCEDURES**

### **Daily**

1. Confirm the collection and transmission of data and the reasonableness and completeness of the transmitted data.
2. Contact the appropriate TCEQ staff for recovery of lost data, if necessary.
3. Contact operators and the project lead for site investigations, if necessary.

### **Weekly**

1. Check for and/or retrieve the PDW from your email, OR find the appropriate calibration log on rhone3.
2. Investigate irregular data patterns.
3. Confirm data flags generated by LEADS.
4. Edit incorrect data flags
5. Validate data.
6. Document data changes in the LEADS Validator's Log and the desk copy log.
7. Confirm hourly average auto flags.

### **Monthly**

1. After validating the last day of each month, access the Discrete Data Loss report.
2. Run report for month just validated.
3. Capture screen shot of report and save in appropriate folder.
4. Run same report for fiscal year to date.
5. Capture screen shot of report and save in appropriate folder.
6. Fill out summary spreadsheet for site.

### **Yearly**

1. Notify the CWQMN Network Coordinator via email that the Data Completeness Reports are complete.

**APPROVAL**

Team Leader:	<u>Chouf Zoued</u>	Date:	<u>10/4/13</u>
Team Member:	<u>Cathy</u>	Date:	<u>10/4/13</u>
Team Member:	<u>Pete Bohh</u>	Date:	<u>10/04/13</u>
Team Member:	<u>Alitha Keland</u>	Date:	<u>10/07/2013</u>
Team Member:	<u>Juan</u>	Date:	<u>10/07/2013</u>
Team Member:	<u>Kelly Rood</u>	Date:	<u>10/07/2013</u>

## Appendix A

### Flags used by MeteoStar/LEADS

Flag	Description
VAL	Valid – Valid data measurement.
LST	Lost or missing data - Data for this sample period is not stored in the MeteoStar database because of power outages, equipment malfunction, etc.
NEG	Failed NEG test - Data values are too negative; normally low negative values are set to zero by the MeteoStar software.
FEW	Insufficient Sample - Not enough samples to create an hourly average.
LIM	Limit Exceeded - Data exceeds or falls below pre-set criteria.
PMA	Preventative Maintenance – Instrument in preventative maintenance mode.
AQI	Ambient Quality Invalid - Data invalid.

