Chapter 7 – Data Reporting

Surface water quality monitoring data are reported to the Texas Commission on Environmental Quality by two methods: manual data entry and flat-file datasets. This chapter defines the method and formats used when submitting data to TCEQ for upload into the SWQMIS database.

TCEQ Region and Central Office Staff

The TCEQ staff authorized to enter sample data into the database use the data entry screens in the Sampling Module of the SWQMIS database. The creation of Sample Events and Sample Sets along with the entry of field parameter data are required to be reported electronically to the DM&A Data Manager via SWQMIS within 45 days of the sampling event. When data is entered and published by TCEQ staff, SWQMIS assigns the data the status of "pre-production data management" (PREDM).

Laboratory Information Management System (LIMS)

The TCEQ Houston Laboratory and other contracted laboratories perform laboratory analyses requested by TCEQ Regional and Central Office staff. Surface water quality monitoring samples are sent to the laboratories with SWQMIS-generated Request for Analysis (RFA) forms. The laboratory reports this data to DM&A using the LIMS file format provided in Appendix A, and DM&A loads the data into the database. Upon loading, the data are assigned PREDM status in SWQMIS. DM&A staff review the lab report and the electronic data for completeness, appropriateness, and metadata accuracy (including codes, depth, date, time, tag number, and station ID), before publishing the data as Production (PROD) data in the SWQMIS database. Please see the "LIMS File Format" section of this chapter (p. 6) for information on how to structure the data files for LIMS Loader data.

TCEQ Partners and Contractors

Data Deliverables

Two ASCII (DOS) pipe-delimited text files must be provided to the TCEQ Project Manager for inclusion in SWQMIS. These two files must follow the format described below (examples are provided later in this chapter). These files are related to each other through the Tag ID, which is described in Chapter 6. There is a one-to-many relationship between the Event file and the Results file with multiple records in the Results file for each Event (monitoring/sampling event). An Event record is defined as a unique sampling regime conducted at a specific date, place (station ID and depth), and time. For example, an Event record describes the collection of a "metals in sediment" sample at station 12049 on 5 February 2014, 13:00 hours. Water, tissue, sediment, and distinct types of biological (nekton, habitat, benthic) samples are all considered separate Event records in the Event file. Each Event record must have a unique Tag ID. Instantaneous field measurements (grabs) collected immediately before or after 24-hour monitoring are also considered separate Event records and the submitting entity may not report it under the same Tag ID as the 24-hour data. Fields marked as Data Value Required = "Y" must be completed prior to data submission.

Sample/Event File Format

Each record in the Events File consists of the fourteen fields described below; fields may or may not contain data. Fields must be in the order listed in the table below. For a grab sample, if a field is only appropriate for composite sample (noted with a "C" in the Data Value Required column), the field should still be present for that record in the Events file, but left blank. The fields marked with a "Y" in the Data Value Required column must contain either a text or numeric value for every sample collected. Except for the 'Comment' field, these fields must contain only

numeric or alpha characters, as designated in field descriptions. No punctuation (such as quotation marks, commas, periods, etc.) can be accepted.

Sample/Event File Format

Field Name	Data Field Required	Length	Data Value Required	Description
Tag ID	Y	7[1]	Y	Key field that is common to both the Events and Results file. Each Tag ID is unique in the Events file. The first 1- or 2-digits must match the Tag Prefix assigned to the submitting agency.
Station ID	Y	5	Y	A unique 5-digit code that identifies each sampling station. This number is generated by the database in response to the submission of a SLOC Request to DM&A (see SWQM DMRG Chapter 3). Data collected at new stations cannot be loaded into SWQMIS until the station ID has been assigned by TCEQ DM&A.
End date	Y	10	Y	Date the sample was collected. Reported as MM/DD/YYYY. Leading zeros are required for month and day. For composite samples this is the last date a sample or measurement was collected.
End time	Y	5	Y	The time the sample was collected. Reported in military (24-hour, MM:HH) format. For composite samples, this is the time the last sample was collected. Leading zeros are required where applicable (for example, 09:30).
End depth	Y	6	Y	The depth in meters at which the sample was collected. For composite samples, the deepest depth at which the sample was collected.
Start date	Y	10	C	This field requires a value for composite samples only and is the sample collection start date. If this field is not blank, then Start time, Start depth, Category, and Type must also contain a data value. If a sample is not a composite, this field should be blank. Reported as MM/DD/YYYY.
Start time	Y	5	C	This field requires a value for composite samples only and is the sample collection start time. If this field is not blank, then Start date, Start depth, Category, and Type must also contain a data value. If a sample is not a composite, this field should be blank. Leading zeros are required where applicable (for example, 09:30).

Field Name	Data Field Required	Length	Data Value Required	Description
Start depth	Y	6	C	This field requires a value for composite samples only and is the depth nearest the water surface for sample collection (in meters). If this field is not blank, Start time, Category, and Type must also contain a data value. If a sample is not a composite, this field should be blank.
Category	Y	1	C	This field requires a value for composite samples only and should correspond to the following codes: T=time, S=space, B=both, and F=flow weight. If this field is not blank, then Start date, Start time, Start Depth, and Type must also contain a data value. If a sample is not a composite, this field should be blank. Examples: 24-hour DO monitoring is a composite over time only (T). Sediment monitoring is monitoring across space (S). Neckton monitoring occurs across time and space (B). I don't know what flow weight monitoring is.
Type	Y	2	C	This field requires a value for composite samples only and should correspond to the following codes: ## = number of grabs in composite, CN = continuous, GB = number of grabs is unknown. If the data value is a single digit, a leading zero is required (for example, 3 grabs in composite =”03"). If a sample is not a composite, this field should be left blank.
Comment	Y	135	N	This is the text field for any observational data available for the event. If there is no observational data, this field should be left blank.
Submitting Entity	Y	2	Y	The code that indicates the entity responsible for submitting data to the TCEQ, usually the QAPP holder. Valid codes are assigned by the TCEQ, and presented in the SWQM DMRG Chapter 4. (Formerly known as Source Code 1).
Collecting Entity	Y	2	Y	The code that indicates the entity actually collecting samples in the field. Valid codes are assigned by the TCEQ. This document lists these codes in the SWQM DMRG Chapter 4. (Formerly known as Source Code 2).
Monitoring Type	Y	2	Y	The code used to identify the type of sampling that is being reported in the dataset for a unique tag. TCEQ assigns valid codes, and they are listed in the SWQM DMRG Chapter 4. (Formerly known as Program Code).

[1] Tag ID can accept up to nine characters. However, seven characters is the norm.

The generic format of the Sample/Event file:

Tag|Station Id|End Date|End Time|End Depth|Start Date|Start Time|Start Depth|Category|Type|Comment|Submitting Entity|Collecting Entity|Monitoring Type

Example records for a Sample/Event file:

Grab:

0012345|16789|10/11/2013|14:30|0.3|||||Water green|LC|LC|RT

Composite:

0012345|16789|10/11/2013|09:45|0.6|10/11/2013|10:00|0.3|S||Sunny and warm|LC|LC|RT

Profile:

L150001|15301|01/05/2014|14:15|0.3|||||||LC|LC|RT

L150002|15301|01/05/2014|14:16|6|||||||LC|LC|RT

L150003|15301|01/05/2014|14:17|9|||||||LC|LC|RT

24 Hour:

R150001|15301|01/15/2013|14:15|0.3|01/14/2013|14:00|0.3|T|24||LC|LC|CS

Tissue:

0012345|13270|12/12/2003|11:15|2|12/12/2003|14:15|0.3|B|04|Coots feeding|LC|LC|RT

Results File Format

The Results file may have one or multiple records for each Event record. Each record consists of the nine fields described below; fields may or may not contain data. Fields must be in the order listed in the table below. If a value for the field is not appropriate, the blank field must still be present for the record in the Results file. These fields must contain only numeric or alpha characters, as designated in field descriptions. No punctuation (such as quotation marks, commas, periods, etc.) can be accepted.

Results /Event File Format

Field Name	Data Field Required	Length	Data Value Required	Description
Tag ID	Y	7[1]	Y	Unique code connecting the water quality sample results to a Tag ID in the Events file. The same code is assigned to all results that came from the same water quality sample. Therefore, there will be many results with the same Tag ID, which all match a single record in the Events file.
End date	Y	10	Y	The date the sample was collected. Reported as MM/DD/YYYY. This date needs to match the End date in the Events file for the specified Tag ID. Leading zeros are required for month and day.
Parameter Code	Y	5	Y	The 5-digit parameter code that identifies the substance being measured. Leading zeros are required where applicable (for example, 00400).
GT/LT	Y	1	N	If the value determined is a "<" value, report "<" in this field. If the value determined is a ">" value, then report a ">" in this field. Otherwise, leave blank.

Field Name	Data Field Required	Length	Data Value Required	Description
Value	Y	8	Y	This is the level or test result of the substance being measured and is reported in the units defined in the parameter code description found in SWQMIS.
LOD	Y	8	N	This is the Limit of Detection for this parameter.
LOQ	Y	8	N	This is the Limit of Quantitation for this parameter.
Qualifier Code	Y	2	N	Formerly referred to as Remark Code. See the SWQM DMRG Chapter 10 for a list of codes and their definitions.
Verify Flag	Y	1	N	If Value is outside the minimum/maximum range defined in SWQMIS (SWQM DMRG Chapter 2), the data submitter must place a "1" in this field to indicate that s/he has verified the data value. If the value cannot be verified, the submitting entity must add a qualifier code (SWQM DMRG Appendix E) in the Qualifier Code field.

[1] Tag ID can accept up to nine characters. However, seven characters is the norm.

The generic format of the Results file:

Tag|End Date|Parameter|GT/LT|Value|LOD|LOQ|Qualifier Code|Verify Flag

Example records for a Results file:

Grab**:**

0012345|10/11/2013|00061|<|1||||

0012345|10/11/2013|00940||53|||BL|

Composite:

0012345|10/11/2013|00221||24||||

0012345|10/11/2013|00209||18||||

0012345|10/11/2013|00210||22||||

0012345|10/11/2013|00211||14|||PE|1

Profile**:**

L150001|01/14/2014|00010||18.3||||

L150002|01/14/2014|00010||17.6|||J|1

24 Hour**:**

R150001|01/02/2014|00216||7.9||||

R150001|01/02/2014|00220||24||||

R150001|01/02/2014|00218||11.5||||

Tissue**:**

0012345|12/12/2013|74990||016||||

0012345|12/12/2013|74995||59||||

0012345|12/12/2013|81615||1||||

0012345|12/12/2013|00039||92||||1

0012345|12/12/2003|84100||2|||SP|

LIMS File Format

- This file format is specifically for laboratories (the Houston TCEQ Lab as well as other contract labs) that submit data directly to a DM&A Data Manager. *All TCEQ partners and contractors should submit data in the event and results file format previously described in this chapter*.
- Fields are pipe ("|") delimited.
- Alpha fields do *not* contain quotation marks.
- Fields cannot contain the pipe character.
- Fields must be in the order specified.
- Files do not contain a header row.

LIMS File Format Example

LIMS Sample/Event File Format

Field Name	Data Field Required	Length	Data Value Required	Description
Sample Number/Lab ID	Y	Up to 10 characters	Y	This is the ID assigned to the sample by the lab.
Station ID	Y	Consistent with station IDs	Y	Must be a valid existing station ID in SWQMIS.
Tag ID	Y	Up to 30 characters	Y	This is the RFA number.
Sample Date/ Time	Y	Exactly 17 characters	Y	DD-MON-YYYY HH:MM (e.g. 10-DEC-2005 20:05)
Sample Collected By (Name)	Y	Up to 40 characters	Y	This is the SWQMIS user ID for the SWQM FO who collected the sample.
Region ID	Y	Up to 2 characters	Y	This must be a number. Region ID should be provided on RFA by collector. Valid region numbers are: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, or 99 (99=Central Office staff).

Field Name	Data Field Required	Length	Data Value Required	Description
End Collection Depth	Y	Up to 10 characters	Y	The depth in meters at which the sample was collected. For composite samples, the deepest depth at which the sample was collected. Must be a number.
Composite Type	Y	Up to 2 characters	Composite Samples Only	The number of grabs that comprise a composite sample. May be 00-99, or GB (for unknown number of grabs). If leading zero isn't included (e.g., "2"), the system will still accept it.
Composite Category	Y	Exactly 1 character	Composite Samples Only	Use one of the following codes that represent the category of composite sampling (only used for composite samples): "T" (time), "S" (space), "B" (both time and space), or "F" (flow weighted).
Start Date/Time	Y	Exactly 17 characters	Composite Samples Only	DD-MON-YYYY HH:MM (e.g. 10-DEC-2005 20:05) This is the start date/time of composite samples.
Start Sample Collection Depth	Y	Up to 10 characters	Composite Samples Only	This is the start depth (only used for composite samples). It must be a number.

Field Name	Data Field Required	Length	Data Value Required	Description
Submitting Entity	Y	Exactly 2 characters	Y	This is the entity submitting the data. Valid codes are assigned by the TCEQ, and presented in the SWQM DMRG Chapter 4.
Collecting Entity	Y	Exactly 2 characters	Y	This is the entity collecting the data. Valid codes are assigned by the TCEQ, and presented in the SWQM DMRG Chapter 4.
Monitoring Type	Y	Exactly 2 – 4 characters	Y	This indicates the type of sampling being conducted. Valid codes are assigned by the TCEQ, and presented in the SWQM DMRG Chapter 4.
Quality Control Type	Y	Exactly 1 character	N	Code indicating the type of QC sample, if applicable.

The generic format of the LIMS Sample/Event file:
Sample Number/Lab ID |Station Id|Tag ID|End Date End Time|Collector|End Depth|Composite Type|Composite Category|Start Date Start Time| Start Depth|Submitting Entity|Collecting Entity|Monitoring Type|Quality Control Type

LIMS Results File Format

Field Name	Data Field Required	Length	Data Value Required	Description
Sample Number/Lab ID	Y	Up to 10 characters	Y	This is the ID assigned to the sample by the lab. This field must match the associated Sample Number/Lab ID provided in the Event File.
Parameter Code	Y	Exactly 5 characters	Y	Leading zeros are kept by the system. Include the leading zeros in the submitted Results File.
Result	Y	Up to 10 characters	Y	Must be either all numeric, "<" followed by a number, or ">" followed by a number.
Data Qualifier Code	Y	Exactly 2 characters	N	Valid data qualifier code
MDL	Y	Up to 8 digits	N	This is the Method Detection Limit. The values may range from 0 to 99,999,999.
RL	Y	Up to 8 digits	N	This is the Reporting Limit. The values may range from 0 to 99,999,999.
Note/Comment	Y	Up to 4000 characters	N	Notes/comments are required if there was a note/comment necessitated by the laboratory
Person Doing Analysis	Y	Up to 50 characters	Y	This is the first initial and the full last name of the laboratory analyst

The generic format of the LIMS Results file:

Sample Number/Lab ID | Parameter| Result| Qualifier Code|MDL|RL| Comment|Lab Analyst