Attachment B-1 SWQB Validation Codes

Field and analytical data are verified and validated for completeness, correctness and conformance of the dataset against specified method, procedural or contractual requirements.

When deficiencies are identified through the data verification and validation process, the SWQB documents or "flags" the deficiencies by assigning validation codes. All data collected from the last compliant QC sample and up to the next compliant QC sample are assigned validation codes. The validation code alerts the data user that the results are outside QA control limits and may require re-sampling or a separate, qualitative analysis based on professional judgment.

Validation Code	Definition	WQX Equivalent
A1	Sample not collected according to SOP	
A2	Method QC check not completed according to SOP	
B1	Chemical was detected in the field blank at a concentration less than 5% of the sample concentration.	
BN	Blanks NOT collected during sampling run	
BU	Detection in blank. Analyte was not detected in this sample above the method's sample detection limit.	BU
C1	Instrument verification between in-calibration range and maximum interpolation range.	EST
C2	Data corrected for instrument drift within acceptable interpolation range	CLC
E	The listed result is greater than the upper quantitation limit for either the analytical method or the meter used for the measurement.	GT
RB1	Chemical was detected in the field blank at a concentration greater than or equal to 5% of the sample concentration. Results for this sample are rejected because they may be the result of contamination; the results may not be reported or used for regulatory compliance purposes.	B
R1	Rejected due to incorrect sample preservation	R
R2	Rejected due to equipment failure in the field	R
R3	Rejected based on best professional judgment	R
R4	Instrument failed quality control check	FQC
D1	Spike recovery not within method acceptance limits	
F1	Sample filter time exceeded	
J1	Estimated: the analyte was positively identified and the associated value is an approximate concentration of the analyte in the sample	J
K1	Holding time violation	H
Ea	Estimated-Incubation temperature between 35.5 and 38.0° Celsius	
Er	Rejected-Incubation temperature < 34.5 or >38.0° Celsius	R
PD1	Percent difference between duplicate samples excessive	

S1	Per SLD, uncertainties (sigmas) are expressed as one standard deviation, i.e. one standard error. Small negative or positive values that are less than two standard deviations should be interpreted as "less than the detection limit."	
S2	Data are suspect but deemed usable based on best professional judgment; documentation of justification is required and should be included in the Data Verification and Validation Packet and reported with results	SUS
Z1	Macroinvertebrate data did follow methods in SOP 11.1	
H1	Habitat data did not meet QC criteria specified in SOP 5.0. Pebble count replicate not completed by observer.	

Attachment B-2 SLD Data Qualifiers

The following description of data qualifiers is from SLD (2011):

In some cases, it may be necessary to report data using associated data qualifiers. Circumstances warranting the use of data qualifiers are varied, but generally reflect an anomaly with QC criteria, which may or may not disqualify the use of the data for its intended purpose. Qualifiers are meant to inform the user of inconsistencies that occurred during the course of analysis due to matrix effects, sampler or analyst error, lab accident, or any other uncontrollable situation. Qualifiers aid the user in making judgments regarding data quality and use.

This Appendix provides a list of New Mexico Scientific Laboratory Division Chemistry Bureau data qualifiers (SLD 2011). Data qualifiers used by other laboratories in previous years are found in previous QAPPs.

Data Qualifier	Description	WQX Equivalent
A	See note/comments.	
B	Analyte was detected in the laboratory blank.	B
C	Spike recovery in laboratory fortified blank is within method acceptance limits.	
D	Spike recovery in laboratory fortified blank is not within method acceptance limits.	
E	Analyte value exceeded calibration range.	
F	Sample matrix interference suspected.	
H	Sample was analyzed in duplicate.	
I	Sample was analyzed in triplicate.	
J	Analyte was detected at a level below the method's sample detection limit.	
K	Holding time was exceeded at laboratory.	H
L	Regulated parameter value equals or exceeds the EPA SDWA Maximum Contamination Level.	
M	Regulated parameter value equals or exceeds the EPA SDWA Action Level.	

N	Insufficient sample to verify results.	
O	Method internal standard(s) not within method acceptance limits when analyzed undiluted.	
P	Sample rejected/voided at laboratory.	R
Q	Sample submitted to laboratory past holding time.	H
R	Results based on four or more replicates.	
S	Relative percent difference between duplicates greater than 10% (waters).	
T	Relative percent difference between duplicates greater than 30% (soils).	
U	Analyte was not detected in this sample above the method's sample detection limit.	U

Attachment B-3 Field Quality Control Summary

Data Type	QC Check	QC Criteria	Action for Data Not Meeting QC Requirements	Information Provided	QC Frequency
Chemical Data	Field Blank for nutrients, TDS/TSS, anions, cyanide and *E. coli*	Parameter detected at concentration $\geq$ SDL	Flag data appropriately; determine source of contamination and implement corrective action	Sample collection, transportation and/or handling bias	10% of samples per sampling run with a minimum of one
	Equipment Blank for dissolved metals	Parameter detected at concentration $\geq$ SDL	Flag data appropriately; determine source of contamination and implement corrective action	Sample collection, transportation and/or handling bias	10% of samples per sampling run with a minimum of one
	Trip Blank for VOCs	Parameter detected at concentration $\geq$ SDL	Flag data appropriately; determine source of contamination and implement corrective action	Sample collection, transportation and/or handling bias	10% of samples per sampling run with a minimum of one
	Replicates/Duplicates	RPD between samples greater than analytical uncertainty	Determine possible cause (variability in environmental conditions, improper sampling technique, lack of training, etc.); flag data if appropriate and implement corrective action	Performance characteristics for sampling protocols; environmental variability	Determined on project specific basis
Macro-invertebrate Data	Sample Sorting Efficiency (done by contractor)	$\geq$ 95% sorting efficiency* defined as: $SE = \frac{n_1}{n_2} \times 100$	Re-sort entire sample and adjust data, with proper notations, to incorporate missed specimens; determine cause and implement corrective actions (retrain sorter, use larger magnification, etc.)	Sample sorter bias	100% of total samples

	Taxonomic Verification (done by contractor)	≥ 95% similarity between original and QC identifications	Adjust data, with proper notations, according to mutual agreement of the original and QC taxonomists; determine source of differences (specimen damage, regional familiarity, etc.) and implement corrective action	Taxonomic Identification bias	10% of total samples
Fish	Taxonomic Verification (performed by Museum of Southwestern Biology)	N/A	Adjust data, with proper notations, according to mutual agreement of the original and QC taxonomists	Taxonomic Identification bias	100% of total samples
Habitat Data	Field Replicates (Site sampled by different field crew)	For D84 and other metrics and attributes as appropriate: RPD ≤ 10%	Determine possible cause (variability in environmental conditions, improper sampling technique, lack of training, etc.); implement corrective action	Data collector bias; performance characteristics for sampling protocols (primarily field sampling precision)	1 per observer per index period
Hydrology Protocol	Field Replicates (Site sampled by different field crew)	For all attribute measures: +/- one scoring category For aggregate score: difference ≤ 3	Determine possible cause (variability in environmental conditions, improper sampling technique, lack of training, etc.); flag data appropriately and implement corrective action	Data collector bias; performance characteristics for sampling protocols (primarily field sampling precision)	1 per sample field season

NOTES:
RPD = Relative Percent Difference
* Independent observers microscopically re-examine 20% of sorted substrate from each sample. All organisms that were missed are counted. n_1 is the total number of specimens in the first sort, and n_2 is the total number of specimens in the first and second sorts combined.

Attachment B-4 SLD Detection Flags

LABORATORY DETECTION QUALIFIERS AND REPORTING CONVENTIONS

		Logical Response[1]	Flag	Reporting Convention
not detected a C ≥ SDL	C < SDL	TRUE	U	Report SDL
detected at C ≥ SDL but < MRL	SDL ≤ C <MRL	FALSE	J	Report estimated value
detected at C ≥ MRL	C ≥ MRL	FALSE	No Flag	Report value

[1] Logical Question: Was the substance not detected at a concentration greater than or equal to the SDL?

Attachment B-5 LTD Parameter Qualifier Codes

Parameter	Corrected Qualifier (LTD only)	Rejected Qualifier
Temperature, °C	**CT**	**RT**
Conductivity, µS/cm	**CSC**	**RSC**
Dissolved Oxygen, %	**C%**	**R%**
Dissolved Oxygen, mg/L	**CDO**	**RDO**
pH	**CPH**	**RPH**
Turbidity, NTU	**CY**	**RY**