

## Appendix E

### VOA/SV Functional Guidelines Action Tables

Note: This appendix is a compilation of the data validation actions that appear in tabular format in Part II - VOLATILE/SEMIVOLATILE Data Validation Functional Guidelines. Other actions that are not presented in tabular format are not contained in this appendix and the validator must refer to Part II to obtain the complete set of actions.

APPENDIX E

Table VOA/SV-I-1:

**QUALIFICATION OF VOLATILE ANALYTES BASED ON PRESERVATION & TECHNICAL HOLDING TIMES**

PRESERVATION			TECHNICAL HOLDING TIMES			
Matrix	Refrig. & Light Protected	Acid Preserved	≤ 7 Days	7 < HT ≤ 14 Days	14 < HT ≤ 28 Days	> 28 Days
AQ	No	Yes or No	J - detects R-non-detects	J - detects R-non-detects	J - detects R-non-detects	J - detects R-non-detects
AQ	Yes	Yes	A	A	J - detects UJ-non-detects	J - detects R-non-detects
AQ	Yes	No	A	<b>Aromatics</b> J - detects R-non-detects <b>Non-aromatics</b> A - detects A-non-detects	<b>Aromatics</b> J - detects R-non-detects <b>Non-aromatics</b> J - detects UJ-non-detects	J - detects R-non-detects
S/S	No	N/A	J - detects R-non-detects	J - detects R-non-detects	J - detects R-non-detects	J - detects R-non-detects
S/S	Yes	N/A	A	A	J - detects UJ-non-detects	J - detects R-non-detects

Table VOA/SV-I-2:

**QUALIFICATION OF SEMIVOLATILE ANALYTES BASED ON PRESERVATION & TECHNICAL HOLDING TIMES**

PRESERVATION		TECHNICAL HOLDING TIMES		
Matrix	Refrig. & Light Protected	Extracted and/or Analyzed Within H.T.	Extracted and/or Analyzed Outside H.T.	If Extraction HT > 28 days and/or Analytical HT > 60 days
AQ and S/S	Yes	A	J - detects UJ - non-detects	J - detects R - non-detects
AQ and S/S	No	J - detects UJ - non-detects	J - detects UJ - non-detects	J - detects R - non-detects

Note: AQ = Aqueous, S/S = Soil/Sediment

**For other matrices, the validator should estimate (J) positive detects and use professional judgment to qualify or reject non-detects when Region I preservation and/or technical holding time criteria are not met.**

For VOA aqueous samples containing excessive headspace (bubbles greater than 2 mm in diameter); J-detects, R-non-detects

Table VOA/SV-III-1:

**QUALIFICATION OF VOA/SV ANALYTES BASED ON THE INITIAL CALIBRATION**

Sample Results	QC Criterion $\overline{RRF} \geq 0.05$ $\%RSD \leq 30.0\%$	Situation 1 $\overline{RRF} < 0.05$ $\%RSD \leq 30.0\%$	Situation 2** $\overline{RRF} \geq 0.05$ $\%RSD > 30.0\%$	Situation 3 $\overline{RRF} < 0.05$ $\%RSD > 30.0\%$
Detects	A	J	J	J
Non-detects	A	R	UJ	R

\*\* See Table VOA/SV-III-2 for additional guidance.

Table VOA/SV-III-2:

**EXPANDED INITIAL CALIBRATION VOA/SV ANALYTE QUALIFICATIONS**

Sample Results	Elimination of High or Low Calibration Points $\%RSD > 30.0\%$	Elimination of High Calibration Points $\%RSD \leq 30.0\%$ $RRF \geq 0.05$	Elimination of Low Calibration Points $\%RSD \leq 30.0\%$ $RRF \geq 0.05$
Detects	J	A: On linear portion of curve J: On high end of curve outside linear portion	A: On linear portion of curve J: On low end of curve outside linear portion
Non-detects	UJ	A	UJ

Table VOA/SV-IV-1:

**QUALIFICATION OF VOA/SV ANALYTES BASED ON THE CONTINUING CALIBRATION**

Sample Results	QC Criteria $RRF \geq 0.05$ $\%D \leq \pm 25.0\%$	Situation 1 $RRF < 0.05$ $\%D \leq \pm 25.0\%$	Situation 2 $RRF \geq 0.05$ $\%D > \pm 25.0\%$	Situation 3 $RRF < 0.05$ $\%D > \pm 25.0\%$
Detects	A	J	J	J

Non-Detects	A	R	UJ	R
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Table VOA/SV-VI-1:

**QUALIFICATION OF VOLATILE/SEMIVOLATILE ANALYTES BASED ON SURROGATE COMPOUND RECOVERIES**

Surrogate Compound Recovery				
Sample Results	one or more surrogates < 10%	one VOA, two B/N or two acid surrogates 10% ≤ %Rec < LL	all VOA, one B/N or one acid surrogate LL ≤ %Rec ≤ UL	one VOA, two B/N or two acid surrogates > UL
Detects	J	J	A	J
Non-detects	R	UJ	A	A

LL - Lower Limit of method QC acceptance criteria  
 UL - Upper Limit of method QC acceptance criteria

Table VOA/SV-VII-1:

**QUALIFICATION OF VOA/SV ANALYTES BASED ON INTERNAL STANDARD AREA COUNTS**

Internal Standard Area Counts				
Sample Results	Area Counts < 20% of associated calibration std. area	20% ≤ Area Counts < LL	LL ≤ Area Counts ≤ UL	Area Counts > UL
Detects	J	J	A	J
Non-detects	R	UJ	A	A

LL - Lower Limit of method QC acceptance criteria based on associated calibration standard area  
 UL - Upper Limit of method QC acceptance criteria based on associated calibration standard area

Table VOA/SV-VIII-1:

**QUALIFICATION OF ORGANIC ANALYTES IN THE UNSPIKED FIELD SAMPLE BASED ON MATRIX SPIKE RECOVERIES AND RPDs\*\***

Sample Results	Recovery < 10%	10% ≤ Recovery < Lower QC Limit	Lower QC Limit ≤ Recovery ≤ Upper QC Limit	Recovery > Upper QC Limit	RPD > QC Limit
Detects	J	J	A	J	J
Non-detects	R	UJ	A	A	UJ

\*\* Note that qualification and rejection generally are limited to the spiking compounds, however, the validator may use professional judgment to qualify or reject all positive detects or non-detects in the unspiked sample if the majority of spike compound recoveries and/or RPDs are outside the method QC acceptance criteria.

Table VOA/SV-VIII-2:

**QUALIFICATION OF ORGANIC ANALYTES IN THE UNSPIKED FIELD SAMPLE  
BASED ON MS, MSD, AND UNSPIKED SAMPLE %RSD**

Sample Results	%RSD ≤ 50%*	%RSD > 50%*	Two out of three sample results reported as non-detects
Detects	A	J	Professional Judgment
Non-detects	A	Professional Judgment	Professional Judgment

\* If a non-detected result is reported for a compound in one of the samples in the MS, MSD or unspiked sample set, then the validator should use the sample quantitation limit value for that compound to calculate the %RSD.

Table VOA/SV-IX-1:

**QUALIFICATION OF ORGANIC ANALYTES IN FIELD DUPLICATES -  
SITUATION 1: POSITIVE DETECTS IN BOTH FIELD DUPLICATES**

Relative Percent Difference	Aqueous > 30% Non-Aqueous > 50%	Aqueous > 30% Non-Aqueous > 50%	Aqueous > 30 Non-Aqueous > 50%
Sample Results	Both duplicate sample concs. ≥ 2 X QL	QL ≤ both duplicate samples concs. < 2 X QL	One sample conc. ≥ 2 X QL QL ≤ Other sample conc. < 2 X QL
Detects	J	Professional Judgment	Professional Judgment
Non-detects	NA	NA	NA

\* QL = Sample Quantitation Limit

Note: Qualification refers to field duplicate sample results only. Professional judgment may be utilized to apply field duplicate actions to all samples of the same matrix.

Table VOA/SV-IX-2:

**QUALIFICATION OF ORGANIC ANALYTES IN FIELD DUPLICATES -  
SITUATION 2: POSITIVE DETECT IN ONLY ONE FIELD DUPLICATE\*\***

Aqueous and Non-Aqueous		
Sample Results	One Sample Conc. = ND (or value reported as less than the QL) QL ≤ Other Sample Conc. < 2 X QL	One sample conc. = ND (or value reported as less than the QL) Other sample conc. ≥ 2 X QL
Detects	Professional Judgment	J
Non-detects	Professional Judgment	UJ

\* QL = Sample Quantitation Limit

\*\* RPD should not be evaluated for these duplicate pairs

Note: Qualification refers to field duplicate sample results only. Professional judgment may be utilized to apply field duplicate actions to all samples of the same matrix.

Table VOA/SV-X-1:

**QUALIFICATION OF ORGANIC ANALYTES BASED ON MDL STUDY RESULTS**

Sample Results	Mean % Recovery			
	%Rec < 10%	10% ≤ %Rec < 80%	80% ≤ %Rec ≤ 120%	%Rec > 120%
Detects	J	Professional Judgment*	A	Professional Judgment*
Non-Detects	R	Professional Judgment*	A	A
Sample Results	% RSD			
	> 25%		≤ 25%	
Detects	Professional Judgment**		A	
Non-detects	Professional Judgment**		A	

\* Taking into consideration LFB results.

\*\* Taking into consideration initial calibration %RSDs.

Table VOA/SV-X-2:

**QUALIFICATION OF ORGANIC ANALYTES BASED ON LFB\* RECOVERIES WHERE:  
≤ ONE-HALF OF LFB COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE LIMITS**

Sample Results	%Recovery			
	%Rec < 10%	10% ≤ %Rec < 60%	60% ≤ %Rec ≤ 140%	%Rec > 140%
Detects	J	J	A	J
Non-detects	R	UJ	A	A

\* LFB = Laboratory fortified blank spiked with several or all of the method target compounds at or below the quantitation limit.

Table VOA/SV-X-3:

**QUALIFICATION OF ORGANIC ANALYTES BASED ON LFB\* RECOVERIES WHERE:  
> ONE-HALF OF LFB COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE LIMITS\*\***

Sample Results	%Recovery			
	%Rec < 10%	10% ≤ %Rec < 60%	60% ≤ %Rec ≤ 140%	%Rec > 140%
All Detects	J	J	A	J

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All Non-detects	R	UJ	A	A
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\* LFB = Laboratory fortified blank spiked with several or all of the method target compounds at or below the quantitation limit.

\*\* Professional judgment should be used when a combination of low recoveries and high recoveries are obtained.

Table VOA/SV-XI-1:

**QUALIFICATION OF INDIVIDUAL ORGANIC ANALYTES BASED ON LCS RECOVERIES WHERE:  
≤ ONE-HALF OF LCS COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE LIMITS**

Sample Results	% Recovery			
	%Rec < 10%	10% ≤ %Rec < LL	LL ≤ %Rec ≤ UL	%Rec > UL
Detects	J	J	A	J
Non-detects	R	UJ	A	A

LL - Lower Limit of method QC acceptance criteria

UL - Upper Limit of method QC acceptance criteria

Table V/SV-XI-2:

**QUALIFICATION OF ORGANIC ANALYTES BASED ON LCS RECOVERIES WHERE:  
> ONE-HALF OF LCS COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE LIMITS\***

Sample Results	% Recovery			
	%Rec < 10%	10% ≤ %Rec < LL	LL ≤ %Rec ≤ UL	%Rec > UL
All Detects	J	J	A	J
All Non-detects	R	UJ	A	A

\* Professional judgment should be used when a combination of low recoveries and high recoveries are obtained.

LL - Lower Limit of method QC acceptance criteria

UL - Upper Limit of method QC acceptance criteria

Table VOA/SV-XI-3:

**QUALIFICATION OF INDIVIDUAL ORGANIC ANALYTES BASED ON PES RESULTS WHERE:  
≤ ONE-HALF OF PES COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE LIMITS**

Sample Results	! Single Blind ! Double Blind PES < Lower Limit "Action Low"	! Single Blind ! Double Blind PES "Within Warning Limits" "Warning High/Warning Low"	! Single Blind ! Double Blind PES > Upper Limit "Action High"
Detects	J	A	J
Non-Detects	R	A	A

Table VOA/SV-XI-4:

**QUALIFICATION OF ORGANIC ANALYTES BASED ON PES RESULTS WHERE:  
> ONE-HALF OF PES COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE LIMITS \***

Sample Results	! Single Blind ! Double Blind PES < Lower Limit "Action Low"	! Single Blind ! Double Blind PES "Within Warning Limits" "Warning High/Warning Low"	! Single Blind ! Double Blind PES > Upper Limit "Action High"
All Detects	J	A	J
All Non-Detects	R	A	A

\* Professional judgment should be used when a combination of low recoveries and high recoveries are obtained.

Table VOA/SV-XIII-1:

**QUALIFICATION OF VOLATILE/SEMIVOLATILE ORGANIC ANALYTES BASED ON  
SAMPLE PERCENT SOLIDS**

Sample Result	% Solids > 30%	10% ≤ % Solids ≤ 30%	% Solids < 10%
Detects	A	J	R
Non-detects	A	R	R

Table SV-XV-1:

**QUALIFICATION OF SEMIVOLATILE ANALYTES BASED ON  
GPC CALIBRATION QUALITY CONTROL**

	Criteria	Action
<b>Peak Resolution</b>	As per method QC acceptance criteria.	Professional Judgment
<b>Peak Shape</b>	Peak shapes must be symmetrical.	Professional Judgment



<b>Retention Time Shift</b>	Retention time shifts between GPC calibration checks must not exceed + 5%.	Professional Judgment
<b>GPC Instrument Blank</b>	Target analytes must be < QL and surrogate compound recoveries and IS area counts and/or RTs (if added) must meet method QC acceptance criteria. (Note: CLP SOW OLM03.2 does not require the addition of surrogate compounds to the GPC instrument blank)	Refer to Section V for Blank Actions

Table VOA/SV-XI-2:

**QUALIFICATION OF SEMIVOLATILE ANALYTES BASED ON GPC CLEANUP QUALITY CONTROL**

**WHERE: ≤ ONE-HALF OF GPC CALIBRATION CHECK COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE LIMITS**

Sample Results	% Recovery			
	%Rec < 10%	10% ≤ %Rec < LL	LL ≤ %Rec ≤ UL	%Rec > UL
Detects	J	J	A	J
Non-detects	R	UJ	A	A

- LL - Lower Limit of method QC acceptance criteria
- UL - Upper Limit of method QC acceptance criteria

Table V/SV-XI-3:

**QUALIFICATION OF SEMIVOLATILE ANALYTES BASED ON GPC CLEANUP QUALITY CONTROL**

**WHERE: > ONE-HALF OF GPC CALIBRATION CHECK COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE LIMITS**

Sample Results	% Recovery			
	%Rec < 10%	10% ≤ %Rec < LL	LL ≤ %Rec ≤ UL	%Rec > UL
<u>All</u> Detects	J	J	A	J
<u>All</u> Non-detects	R	UJ	A	A

Note: Professional judgment should be used when a combination of low recoveries and high recoveries are obtained.

LL - Lower Limit of method QC acceptance criteria  
 UL - Upper Limit of method QC acceptance criteria

Table SV-XV-4:

**QUALIFICATION OF SEMIVOLATILE ANALYTES BASED ON SILICA GEL CLEANUP QUALITY CONTROL WHERE: ≤ ONE HALF OF SILICA GEL CHECK SOLUTION COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE CRITERIA**

Sample Results	% Recovery			
	%Rec < 10%	10% ≤ %Rec ≤ LL	LL ≤ %Rec ≤ UL	%Rec > UL
Detects	J	J	A	J
Non-detects	R	UJ	A	A
Silica Gel Column Blank	Target analytes must be < QL and surrogate compound recoveries and IS area counts and/or RTs (if added) must meet method QC acceptance criteria.			Refer to Section V for Blank Actions

Note: Professional judgment should be used in applying the guidance above to qualify or reject sample data.

LL - Lower Limit of method QC acceptance criteria.  
 UL - Upper Limit of method QC acceptance criteria.

Table V/SV-XI-5:

**QUALIFICATION OF SEMIVOLATILE ANALYTES BASED ON SILICA GEL CLEANUP QUALITY CONTROL WHERE: > ONE-HALF OF SILICA GEL CHECK SOLUTION COMPOUNDS OUTSIDE UPPER OR LOWER ACCEPTANCE LIMITS**

Sample Results	% Recovery			
	%Rec < 10%	10% ≤ %Rec < LL	LL ≤ %Rec ≤ UL	%Rec > UL
All Detects	J	J	A	J

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All Non-detects	R	UJ	A	A
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Note: Professional judgment should be used when a combination of low recoveries and high recoveries are obtained.

- LL - Lower Limit of method QC acceptance criteria
- UL - Upper Limit of method QC acceptance criteria