MODIFICATIONS UPDATING SOM01.1 TO SOM01.2
October 5, 2006
(Updated 02-12-2007) Amended 04-11-2007

This document contains an updated version of proposed contract modifications made to the Contract Laboratory Program Analytical Methods for Organics Analysis, SOM01.1. This document is intended to provide a high-level summary of changes made to *Exhibits B, C, D-Trace Volatiles, D-Low-Medium Volatiles, D-Semivolatiles, D-Pesticides, D-Aroclor and Exhibit-H*. It is recommended that the document, be reviewed in its entirety.

EXHIBIT B	
EXHIBIT/SECTION(S)	**MODIFICATION (S)**
B-Item 1 Exhibit B: Section 3.6, Table 3	The Volatile Deuterated Monitoring Compounds in Table 3 is updated to include VDMC7 Benzene-d_6 and CAS Number 1076-43-3.
B-Item 2 Exhibit B: Section 3.10.1	The following sentence is added: "**Note**: Although injection of an Instrument Performance Check (IPC) solution is optional for analysis using Selected Ion Monitoring (SIM) technique, report all associated instrumental raw data if one is performed."
B-Item 3 Exhibit B: Section 2.5.4.2.2	The following sentence: "Form I SV-TIC is the tabulated list of the highest probable match for up to 30 organic compounds that are not DMCs, internal standard compounds, or alkanes and are not target compounds listed in Exhibit C – Volatiles and Semivolatiles." is updated to: "Form I SV-TIC is the tabulated list of the highest probable match for up to 30 organic compounds that are not DMCs , internal standard compounds, or alkanes and are not target compounds listed in Exhibit C – Volatiles **(except 1,4-Dioxane)** and Semivolatiles."
B-Item 4a Exhibit B: Section 3.4.2.18	The following: 'E: This flag identifies compounds whose ***response*** exceed *the* ***response of the highest standard in*** the initial calibration range of the instrument for that specific analysis. If one or more compounds have a *response* greater than the *response of the highest standard in the initial calibration*, the sample or extract shall be diluted and reanalyzed according to the specifications in Exhibit D. Exceptions are also noted in Exhibit D. All such compounds with ***responses greater than the response of the highest standard in the initial calibration*** shall have the result flagged with an "E" on Form I **for** the original analysis. The results of both analyses shall be reported on separate copies of Form I. The Form I **for** the diluted sample shall have "DL" suffix appended to the Sample Number.' *Is updated to:* 'E: This flag identifies compounds whose *concentration* exceed**s** the ***upper limit of*** the initial calibration range of the instrument for that specific analysis. If one or more compounds have a ***concentration*** greater than the ***upper limit of the initial calibration range***, the sample or extract shall be diluted and reanalyzed according to the specifications in Exhibit D. Exceptions are also noted in Exhibit D. All such compounds with ***concentrations*** greater than the ***upper limit of the initial calibration range*** shall have the result flagged with an "E" on Form I **of** the original analysis. The results of both analyses shall be reported on separate copies of Form I. The Form I ***of*** the diluted sample shall have "DL" suffix appended to the Sample Number.

	Note: A dilution for the co-eluting isomers m,p-Xylene, is required only if the concentration exceeds the upper limit of the calibration range.'
B-Item 4b Exhibit B: Section 3.4.2.18	The following: 'D: If a sample or extract is reanalyzed at a DF greater than 1 (e.g., when the ***response*** of an analyte exceeds the **response *of the highest standard in the initial calibration***), the DL suffix is appended to the ***Sample Number*** on Form I **for** the more diluted sample, and all reported concentrations on that Form I are flagged with the "D" flag. This flag alerts data users that any discrepancies between the reported concentrations may be due to dilution of the sample or extract. NOTE 1: The "D" flag is not applied to compounds which are not detected in the sample analysis (i.e., compounds reported with the adjusted CRQL and the "U" flag). NOTE 2: Separate Form Is are required for reporting the original analysis (EPA Sample No. XXXXX) and the more diluted sample analysis (EPA Sample No. XXXXXDL). The results from both analyses cannot be combined on a single Form I.' ***Is updated to:*** 'D: If a sample or extract is reanalyzed at a DF greater than 1 (e.g., when the **concentration** of an analyte exceeds the ***upper limit of the initial calibration range***), the DL suffix is appended to the ***EPA Sample Number*** on Form I **of** the more diluted sample, and all reported concentrations on that Form I are flagged with the "D" flag. This flag alerts data users that any discrepancies between the reported concentrations may be due to dilution of the sample or extract. NOTE 1: The "D" flag is not applied to compounds which are not detected in the sample analysis (i.e., compounds reported with the adjusted CRQL and the "U" flag). NOTE 2: Separate Form Is are required for reporting the original analysis (EPA Sample No. XXXXX) and the more diluted sample analysis (EPA Sample No. XXXXXDL). The results from both analyses cannot be combined on a single Form I.'
B-Item 5 Exhibit B: Section 3.18.2.7	The following: "Calculate the Percent Difference between the concentrations ***entered on this form***. See Exhibits D - Analytical Methods for Pesticides and Analytical Methods for Aroclors for equations, and report to a tenth of a percent in the "%D" column. If the Percent Difference is greater than 999.9, report it as 999.9." is updated to: "Calculate the Percent Difference between the concentrations ***from both column analyses*.** See Exhibits D - Analytical Methods for Pesticides and Analytical Methods for Aroclors for equations, and report to a tenth of a percent in the "%D" column. If the Percent Difference is greater than 999.9, report it as 999.9."
B-Item 6 Exhibit B: Section 4.0	The target analyte, 1,4-Dioxane is removed from the Trace Volatile SIM reporting Form 1C.

EXHIBIT/SECTION(S)	**MODIFICATION (S)**

B-Item 7 Exhibit B: Section 4.0	The DMC analyte, 1,4-Dioxane-d8 is removed from the Trace Volatile SIM reporting Form 2F, that is VDMC12.
B-Item 8 Exhibit B: Section 4.0	On all Volatile analytical forms used for reporting, both Trace VOA and Low-Medium VOA data: 1) On Forms 1A, 6A, 7A. the following Footnote is added "Report 1,4-Dioxane for Low-Medium VOA analysis only" 2) On Forms 2B, 6C, 7C. the following Footnote is added "Report 1,4-Dioxane-d8 for Low-Medium VOA analysis only"
B-Item 9 Exhibit B: Section *.*	Add notes to exclude target analyte, 1,4- Dioxane and DMC 1,4-Dioxane-d8 from Trace VOA reporting forms, to the appropriate SOW SOM01.1, Exhibit B form reporting Sections.

EXHIBIT C	
EXHIBIT/SECTION(S)	**MODIFICATION (S)**
C-Item 1 Section 1.0	Analyses of the target compound 1,4-Dioxane, CAS Number 123-91-1 by Trace Water by SIM and Trace Water will be taken out from the target analyte list, therefore the CRQL 2.0ug/L and 20ug/ values, respectively, are removed.

EXHIBIT D – TRACE VOLATILES	
EXHIBIT/SECTION(S)	**MODIFICATION (S)**
TVOA-Item 1 Exhibit D – Trace Volatile: Section 7.2.2.4	**1)** The following is updated: "For samples and blanks, add sufficient amount of DMC solution to each 25 mL of sample to result in a concentration of 5.0 ug/L of each non-ketone DMC, 50 ug/L for each ketone DMC**, ~~and 250 ug/L for 1,4_dioxane-d_8 DMC.~~** If SIM analysis is required, add sufficient amount of DMC solution to each sample and blank to result in a concentration of 0.50 ug/L for each non-ketone DMC**, ~~and 25 ug/L for 1,4-dioxane-d_8 DMC~~**." **2) ~~1,4-Dioxane-d8~~** is deleted from the Compound list of DMCs.
TVOA-Item 2 Exhibit D – Trace Volatile: Section 7.2.2.6.2	The following is updated: **1)** "Prepare five aqueous initial calibration standard solutions containing all of the purgeable target compounds, and the DMCs at the suggested following levels: all non-ketone target compounds and associated DMCs (see Table 7), **~~except 1,4-dioxane, at 0.50, 1.0, 5.0, 10, and 20 ug/L;~~** all ketones and their associated DMCs (see Table 7) at 5.0, 10, 50, 100, and 200 ug/L**; ~~and 1,4-dioxane and its associated DMC (see Table 7), 1,4-dioxane-d_8 at 20, 40, 250, 400, and 800 ug/L.~~**" **2) ~~"If analysis by the SIM technique is requested for 1,4-dioxane, prepare calibration standards containing 1,4-dioxane and its associated DMC (see Table 8) at concentrations of 2.0, 4.0, 25, 40, and 80 ug/L~~**. If analysis by the SIM technique is requested for all other compounds of interest, prepare calibration standards containing the compounds of interest and their associated DMCs (see Table 8) at concentrations of 0.050, 0.10, 0.50, 1.0, and 2.0 ug/L."

EXHIBIT/SECTION(S)	**MODIFICATION (S)**
TVOA-Item 3	The following is updated:

Exhibit D – Trace Volatile: Section 7.2.2.6.4	"For CCV (beginning and ending CCV), the aqueous CCV standard shall be at a concentration equivalent to the mid-level calibration standard listed in Section 7.2.2.6.2 (i.e., 5.0 ug/L for non-ketones, 50 ug/L for ketones, ~~**250 ug/L for 1,4-dioxane, 25 ug/L for 1,4-dioxane by the SIM technique,**~~ and 0.50 ug/L for other compounds analyzed by the SIM technique)."
TVOA-Item 4 (formerly TVOA-Item 1) Exhibit D – Trace Volatile: Section 9.2.1.2	The following sentence: "This requirement does not apply when samples are analyzed by the Selected Ion Monitoring (SIM) technique." is updated to: "This requirement does not apply when samples are analyzed by the Selected Ion Monitoring (SIM) technique; **however, the Laboratory is given the option to perform an IPC.**"
TVOA-Item 5 Exhibit D – Trace Volatile: Section 9.3.5.5	The following is updated: "Up to two target compounds and DMCs (excluding those with minimum RRF requirements of 0.010) may fail to meet the criteria listed in Section 9.3.5.3 but these compounds must still meet the minimum RRF requirements of 0.010. Up to two target compounds and DMCs (excluding those with maximum %RSD requirements of 40.0%) may fail to meet the criteria listed in Section 9.3.5.4 but these compounds must still meet the maximum %RSD requirements of 40.0%. ~~**The exceptions are 1,4-dioxane and 1,4_dioxane_d_8, which must have a minimum RRF greater than or equal to 0.0050 and the %RSD must be less than or equal to 50.0%**~~."
TVOA-Item 6 Exhibit D – Trace Volatile: Section 9.3.5.6	The following is updated: "For analysis using the SIM technique, all target compounds and DMCs must meet a minimum RRF criterion of 0.010 and have a %RSD less than or equal to 50%. ~~**The exceptions are 1,4-dioxane and 1,4-dioxane-d_8, which must meet a minimum RRF of 0.0050.**~~"
TVOA-Item 7 Exhibit D – Trace Volatile: Section 9.4.1	The following is updated: "NOTE: For analysis using the SIM technique, prior to the analysis of samples and required blanks, and after initial calibration technical acceptance criteria have been met, each GC/MS system must be routinely checked by analyzing a CCV standard ~~**(25 ug/L for 1,4-dioxane and its associated DMC, and 0.50 ug/L for all other target compounds and associated DMCs)**~~."
TVOA-Item 8 Exhibit D – Trace Volatile: Section 9.4.5.1	The following is updated: "The concentration of the trace volatile organic target compounds and DMCs in the opening and closing CCV must be at or near the mid-point concentration level of the calibration standards, (5.0 ug/L for non-ketones, 50 ug/L for ketones~~**, and 250 ug/L for 1,4-dioxane**~~)." NOTE: For analysis using the SIM technique**,** the concentration of ~~**1,4_dioxane and the DMC 1,4_dioxane_d_8 in the opening and closing CCV standard must be at or near the mid-point concentration level of the calibration standards (25 ug/L). The concentration for the remaining**~~ target compounds and DMCs must be 0.50 ug/L. The opening and closing CCV standard must be analyzed at the frequency described in Section 9.4.2 on a GC/MS system meeting the initial calibration technical acceptance criteria.

EXHIBIT/SECTION(S)	**MODIFICATION (S)**
TVOA-Item 9 Exhibit D – Trace Volatile: Section	The following is updated:

9.4.5.2	For an opening CCV, ***the*** RRF for each purgeable target and DMC must be greater than, or equal to, the compound's minimum acceptable RRF listed in ***Table 2***. For a closing CCV, The RRF for each purgeable target and DMC must be at least 0.010 **~~(except for 1,4_dioxane and its associated DMC, 1,4_dioxane_d_8, which must be at least 0.0050)~~**.
TVOA-Item 10 Exhibit D – Trace Volatile: Section 9.4.5.4	The following is updated: "For an opening CCV, up to two target compounds and DMCs (excluding those compounds with minimum RRF requirements of 0.010) may fail to meet the criteria listed in Section 9.4.5.2 but these compounds must still meet the minimum RRF requirements of 0.010. Up to two target compounds and DMCs (excluding those compounds with maximum Percent Difference requirements of ±40.0%) may fail to meet the requirements listed in Section 9.4.5.3 but these compounds must still meet the maximum Percent Difference requirements of ±40.0%. **~~The exceptions are 1,4-dioxane and 1,4-dioxane-d_8, which must have a minimum RRF greater than or equal to 0.0050 and the Percent Difference must be within the inclusive range of ±50.0%.~~** For a closing CCV, all target compounds and DMCs must meet the requirements listed in Sections 9.4.5.2 and 9.4.5.3."
TVOA-Item 11 Exhibit D – Trace Volatile: Section 9.4.5.5	The following is updated: "For analysis using the SIM technique, all target compounds and DMCs must meet a minimum RRF criterion of 0.010 and have a maximum Percent Different of ±50%. **~~The exceptions are 1,4-dioxane and 1,4-dioxane-d_8 which must meet a minimum RRF of 0.0050."~~**
TVOA-Item 12 (formerly TVOA-Item 2) Exhibit D – Trace Volatile: Section 10.2.10.1	The following: 'An original undiluted analysis must be made and results reported for all samples. If the ***peak response*** for any target compound in any sample exceeds the ***peak response in the highest standard in*** the initial calibration, a new aliquot of that sample must be diluted and purged. Guidance for performing dilutions and exceptions to this requirement are given in Sections 10.2.10.2 - 10.2.10.8.' Is updated to: 'An original undiluted analysis must be made and results reported for all samples. If the ***concentration*** for any target compound in any sample exceeds the ***upper limit of*** the initial calibration, a new aliquot of that sample must be diluted and purged. Guidance for performing dilutions and exceptions to this requirement are given in Sections 10.2.10.2 - 10.2.10.8.'

EXHIBIT/SECTION(S)	MODIFICATION (S)
TVOA-Item 13 (formerly TVOA-Item 3) Exhibit D – Trace Volatile: Section 11.3.4.1	The following Section: "Calculate the concentration of each DMC using the same equation as used for target compounds (Equation 6)." is updated to: "Calculate the concentration of each DMC using the same equation as used for target compounds (Equation 6). Note: If a sample is diluted, the Dilution Factor (DF) in the equation will not apply to the calculation of a DMC concentration."
TVOA-Item 14 (formerly TVOA-Item 4) Exhibit D – Trace Volatile: Section 11.2.2	The following sentence: "All organic compounds that have not been positively identified as volatile target analytes using the procedures detailed in Section 11.1, or that are not Deuterated Monitoring Compounds (DMCs) or internal standards shall be tentatively identified via a forward search of NIST, Wiley, or equivalent mass spectral library." is updated to: "All organic compounds that have not been positively identified as volatile target analytes using the procedures detailed in Section 11.1, or that are not Deuterated Monitoring Compounds (DMCs), internal standards **or semivolatile target compounds listed in Exhibit C**, shall be tentatively identified via a forward search of NIST, Wiley, or equivalent mass spectral library."
TVOA-Item 15 (formerly TVOA-Item 5) Exhibit D – Trace Volatile: Section 11.2.4.2	The following sentence: "Do not report DMCs, internal standards, or analytes that are on the volatile target analyte list, unless the library search produces only one compound having a match of greater than 85%, and that compound is identified as a DMC, internal standard, or volatile target analyte." is updated to: "**Do not report DMCs, internal standards, or analytes that are on the volatile or semivolatile target analyte list.**"
TVOA-Item 16 Exhibit D – Trace Volatile: Section 11.3.5	The following is updated: "Internal standard responses and RTs in all samples and blanks must be evaluated during or immediately after data acquisition. Compare the sample/blank internal standard responses and RTs to the opening CCV internal standard responses and RTs. For samples and blanks analyzed during the same 12-hour time period as the initial calibration standards, compare the internal standard responses and RTs against the initial calibration standard with non-ketone concentrations of 5.0 ug/L, ketone concentrations of 50 ug/L, ~~**and a 1,4-dioxane concentration of 250 ug/L (25 ug/L concentration of 1,4-dioxane**~~ and 0.5 ug/L concentration for ~~**other**~~ compounds analyzed by SIM ~~**)**~~. The EICP of the internal standards must be monitored and evaluated for each sample and blank."

EXHIBIT/SECTION(S)	MODIFICATION (S)
TVOA-Item 17 Exhibit D – Trace Volatile: Section 11.4.4	The following is updated: The Percent Recovery (%R) of each of the DMCs in the sample must be within the acceptance windows in Table 5. ~~**The recovery limits for 1,4-dioxane-d_8 are advisory.**~~ Up to three DMCs, ~~**excluding 1,4_dioxane-d_8,**~~ per sample may fail to meet the recovery limits listed in Table 5. For SIM analysis, all DMCs must meet the recovery limits listed in Table 5.
TVOA-Item 18 Exhibit D – Trace Volatile: Section 12.1.5.3	The following is updated: The Percent Recovery (%R) of each of the DMCs in the blank must be within the acceptance windows in Table 5. ~~**The recovery limits for 1,4-dioxane-d_8 are advisory.**~~
TVOA-Item 19 Exhibit D – Trace Volatile: Section 17.0 Table 2	The target analyte 1,4-Dioxane and DMC 1,4-Dioxane-d8 are deleted from Table 2.
TVOA-Item 20 Exhibit D – Trace Volatile: Section 17.0 Table 3	The target analyte 1,4-Dioxane and DMC 1,4-Dioxane-d8 are deleted from Table 3.
TVOA-Item 21 Exhibit D – Trace Volatile: Section 17.0 Table 5	The analyte 1,4-Dioxane-d8 is deleted from the Table 5.
TVOA-Item 22 Exhibit D – Trace Volatile: Section 17.0 Table 7	In Table 7: 1) The "Volatile Deuterated Monitoring Compounds and the Associated Target Compounds" list. is updated to: Delete 1,1-Dichloroethene as an associated target compound to the "Volatile Deuterated Monitoring Compound" 1,2-dichloroethane-d4. 2) In addition, the VDMC 1,1-Dichloroethene-d2 in Table 7 is updated to include 1,1-Dichloroethene as an associated target compound. 3) Table 7 is revised to exclude 1,4-Dioxane-d8 (DMC) and 1,4-Dioxane.
TVOA-Item 23 Exhibit D – Trace Volatile: Section 17.0 Table 8	Table 8 is revised to exclude 1,4-Dioxane-d8 (DMC) and 1,4-Dioxane.

EXHIBIT D – LOW/MEDIUM VOLATILES	
EXHIBIT/SECTION(S)	**MODIFICATION (S)**
L-MVOA-Item 1 Exhibit D – Low-Med Volatiles: Section 7.2.2.6.2	The following sentence: "Prepare five aqueous initial calibration standard solutions containing all of the purgable target compounds and the DMCs at the following levels: all ketone target compounds and their associated DMCs (see Table 7) at 10, 20,100, 200 and 400ug/L; 1,4-dioxane and 1,4- dioxane$_{d8}$ DMC at 100, 200, **1250**, 2000, and 4000ug/L." is updated to: "Prepare five aqueous initial calibration standard solutions containing all of the purgable target compounds and the DMCs at the following levels: all ketone target compounds and their associated DMCs (see Table 7) at 10, 20,100, 200 and 400ug/L; 1,4-dioxane and 1,4- dioxane$_{d8}$ DMC at 100, 200, **1000**, 2000, and 4000ug/L."
L-MVOA-Item 2 Exhibit D – Low-Med Volatiles: Section 10.1.6.1	The following: 'The Contractor shall analyze samples undiluted, or at minimal dilution. Samples may be diluted because of target compound ***responses*** exceeding the ***response*** of the same target compound in the high standard, or because of excessive matrix interference that hinders accurate quantitation. It is highly recommended that screening analysis be performed prior to sample analysis to determine estimated compound concentration and matrix problems.' Is updated to: 'The Contractor shall analyze samples undiluted, or at minimal dilution. Samples may be diluted because of target compound ***concentration*** exceeding the ***concentration*** of the same target compound in the high standard, or because of excessive matrix interference that hinders accurate quantitation. It is highly recommended that screening analysis be performed prior to sample analysis to determine estimated compound concentration and matrix problems.'
L-MVOA-Item 3 Exhibit D – Low-Med Volatile: Section 10.1.6.3	The following sentence: 'For soil samples analyzed by the low-level method, if the ***response*** of any target compound in the sample exceeds the ***response*** of the same target compound in the high standard, then a new sample must be prepared and analyzed by the medium-level method (Section 10.1.5).' is updated to: 'For soil samples analyzed by the low-level method, if the ***concentration*** of any target compound in the sample exceeds the ***concentration*** of the same target compound in the high standard, then a new sample must be prepared and analyzed by the medium-level method (Section 10.1.5).'

EXHIBIT/SECTION(S)	MODIFICATION (S)
L-MVOA-Item 4 Exhibit D – Low-Med Volatile: Section 10.1.6.4	The following sentence: 'The Dilution Factor (DF) chosen must keep the ***responses*** of the volatile target compounds that required dilutions in the upper half of the calibration range.' Is updated to: 'The Dilution Factor (DF) chosen must keep the ***concentrations*** of the volatile target compounds that required dilutions in the upper half of the calibration range.'
L-MVOA-Item 5 Exhibit D – Low-Med Volatile: Section 11.1.2.2	The following sentence: "All organic compounds that have not been positively identified as volatile target analytes using the procedures detailed in Section 11.1, or that are not Deuterated Monitoring Compounds (DMCs) or internal standards shall be tentatively identified via a forward search of NIST, Wiley, or equivalent mass spectral library." is updated to: "All organic compounds that have not been positively identified as volatile target analytes using the procedures detailed in Section 11.1, or that are not Deuterated Monitoring Compounds (DMCs), internal standards **or semivolatile target compounds listed in Exhibit C,** shall be tentatively identified via a forward search of NIST, Wiley, or equivalent mass spectral library."
L-MVOA-Item 6 Exhibit D – Low-Med Volatile: Section 11.1.2.4.2	The following sentence: "Do not report DMCs, internal standards, or analytes that are on the volatile target analyte list, unless the library search produces only one compound having a match of greater than 85%, and that compound is identified as a DMC, internal standard, or volatile target analyte." is updated to: "Do not report DMCs, internal standards, or analytes that are on the volatile **or semivolatile** target analyte list."

L-MVOA-Item 7

Exhibit D – Low-Med Volatile: Section 11.2.3.3, Equation 12

The equation is modified to replace the term V_t (Total Volume) with AV_t (Adjusted Total Volume) to be consistent with EQ. 9 as follows:

$$\text{Adjusted CRQL} = \text{Contract CRQL} \times \frac{(W_x)(AV_t)(V_y)(1000)(DF)}{(W_s)(V_c)(V_a)(D)}$$

where,

AV_t, DF, W_s, V_a and D are given in Equation 9.

W_x = Contract Sample Weight (5.0 g).

V_y = Contract Soil Aliquot Volume from soil methanol extract (100 µL).

V_c = Contract Soil Methanol Extract Volume (5,000 µL).

EXHIBIT/SECTION(S)	MODIFICATION (S)
L-MVOA-Item 8 Exhibit D – Low-Med Volatile: Section 11.2.4.1	The following sentence: "Calculate the concentration of each DMC using the same equation as used for target compounds." is updated to: "Calculate the concentration of each DMC using the same equation as used for target compounds. Note: If a sample is diluted, the Dilution Factor (DF) in the equation will not apply to the calculation of a DMC concentration."
L-MVOA-Item 9 Exhibit D - Low-Med Volatile: Section 17.0 Table 7	In Table 7: The "Volatile Deuterated Monitoring Compounds and the Associated Target Compounds" list is updated to: Delete 1,1-Dichloroethene as an associated target compound to the "Volatile Deuterated Monitoring Compound" 1,2-dichloroethane-d4. In addition, the VDMC 1,1-Dichloroethene-d2 in Table 7 is updated to include 1,1-Dichloroethene as an associated target compound.

EXHIBIT D – SEMIVOLATILES	
EXHIBIT/SECTION(S)	**MODIFICATION (S)**
SV-Item 1 Exhibit D – Semivolatile: Section 11.1.2.5.2	The following sentence: "Do not report DMCs, internal standards, or analytes that are on the volatile target analyte list, unless the library search produces only one compound having a match of greater than 85%, and that compound is identified as a DMC, internal standard, or semivolatile target analyte." is updated to: "Do not report DMCs, internal standards, or analytes that are on the volatile **or semivolatile** target analyte list."
SV-Item 2 Exhibit D – Semivolatile: Section 11.1.2.2	The following sentence: "All organic compounds that have not been positively identified as semivolatile target analytes using the procedures detailed in Section 11.1.1, or that are not Deuterated Monitoring Compounds (DMCs) or internal standards shall be tentatively identified via a forward search of NIST, Wiley, or equivalent mass spectral library." is updated to: "All organic compounds that have not been positively identified as semivolatile target analytes using the procedures detailed in Section 11.1.1, or that are not Deuterated Monitoring Compounds (DMCs), internal standards **or volatile target compounds listed in Exhibit C (except 1,4-Dioxane)**, shall be tentatively identified via a forward search of NIST, Wiley, or equivalent mass spectral library." This sentence is added immediately after the preceding sentence: "Although 1,4-Dioxane is a target volatile compound in Exhibit C, this analyte may be included as a TIC."

EXHIBIT/SECTION(S)	MODIFICATION (S)
SV-Item 3 Exhibit D - Semivolatile: Section 9.2.1	The following sentence: "NOTE: The requirement to analyze the instrument performance check solution does not apply when the optional analysis of Polyaromatic Hydrocarbons (PAHs)/pentachlorophenol is to be performed." is updated to: "The requirement to analyze the instrument performance check solution is optional when analysis of Polynuclear Hydrocarbons (PAHs)/pentachlorophenol is to be performed **by the Selected Ion Monitoring (SIM) technique**."
SV-Item 4 Exhibit D - Semivolatile: Section 10.6.6.1	The following: 'If the ***response*** of any target compound in any sample exceeds the ***response*** of the same target compound in the high standard of the initial calibration, that sample extract must be diluted. Add the internal standard solution to the diluted extract for a concentration of 20 ng/uL (0.40 ng/uL for optional analysis of PAHs/pentachlorophenol by SIM) of each internal standard, and analyze the diluted extract. Guidance in performing dilution and exceptions to this requirement are given below.' Is updated to: 'If the ***concentration*** of any target compound in any sample exceeds the **concentration** of the same target compound in the high standard of the initial calibration, that sample extract must be diluted. Add the internal standard solution to the diluted extract for a concentration of 20 ng/uL (0.40 ng/uL for optional analysis of PAHs/pentachlorophenol by SIM) of each internal standard, and analyze the diluted extract. Guidance in performing dilution and exceptions to this requirement are given below.'
SV-Item 5 Exhibit D - Semivolatile: Section 10.6.6.3	The following sentence: 'The DF chosen must keep the ***response*** of the largest peak for a target compound in the upper half of the calibration range of the instrument.' Is updated to: 'The DF chosen must keep the ***concentration*** of the largest peak for a target compound in the upper half of the calibration range of the instrument.'

SV-Item 6

Exhibit D - Semivolatile: Section 11.2.1.6.1, Equation 5

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

$$\text{Concentration } \mu\text{g/L} = \left(\frac{A_x \times I_s}{A_{is} \times \overline{RRF}}\right)\left(\frac{DF}{V_i}\right)\left(\frac{V_t}{V_o}\right)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

A_x	=	**Area of the characteristic ion for the compound to be measured.**
A_{is}	=	**Area of the characteristic ion for the internal standard.**
I_s	=	**Amount of internal standard injected in ng.**
$\overline{RRF}$	=	**Mean Relative Response Factor determined from the initial calibration for the compound to be measured.**
DF	=	**Dilution Factor.**
V_i	=	**Volume of extract injected in µL.**
V_t	=	**Volume of extract produced by the preparation process (extraction and concentration), and before cleanup, in µL.**
V_o	=	**Volume of the original water sample extracted in mL.**
CV_{out}	=	**Volume of extract produced by a cleanup process (cleanup and concentration), in µL.**
CV_{in}	=	**Volume of extract subjected to a cleanup process, in µL.**
E	=	**The efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step (e.g. 50% efficiency must be expressed as 0.50)**.

SV-Item 7

Exhibit D - Semivolatile: Section 11.2.1.6.2, Equation 6

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

$$\text{Concentration } \mu\text{g/kg} = \left(\frac{A_x \times I_s}{A_{is} \times \overline{RRF}}\right)\left(\frac{DF}{V_i}\right)\left(\frac{V_t}{W_t \times D}\right)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

A_x, A_{is}, I_s, $\overline{RRF}$, DF, V_i, V_t, CV_{out}, CV_{in}, and E are the same as Equation 5 above.

W_t	=	**Weight of the original soil sample extracted in g.**
D	=	$\frac{100 - \%Moisture}{100}$

SV-Item 8

Exhibit D - Semivolatile: Section 11.2.3.1, Equation 7

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

EQ. 7 Aqueous Adjusted CRQL

$$\text{Adjusted CRQL} = (\text{Contract CRQL})\left(\frac{V_x}{V_o}\right)\left(\frac{V_t}{V_y}\right)(DF)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

Contract CRQL	=	**The CRQL value reported in Exhibit C – Semivolatiles (µg/L).**
V_x	=	**Contract Sample volume (1000 mL).**
V_o	=	**Volume of water extracted in mL.**
V_t	=	**Volume of the concentrated extract in µL.**
V_y	=	**Contract concentrated extract volume (1,000 µL).**
DF	=	**DilutionFactor.**
CV_{out}	=	**Volume of extract produced by a cleanup process (cleanup and concentration), in µL.**
CV_{in}	=	**Volume of extract subjected to a cleanup process, in µL.**
E	=	**The efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step (e.g. 50% efficiency must be expressed as 0.50)**

SV-Item 9

Exhibit D - Semivolatile: Section 11.2.3.2, Equation 8

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

EQ. 8 Soil/Sediment Adjusted CRQL

$$\text{Adjusted CRQL} = (\text{Contract CRQL})\left(\frac{W_x}{W_s \times D}\right)\left(\frac{V_t}{V_y}\right)(DF)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

Contract CRQL = The CRQL value reported in Exhibit C – Semivolatile (µg/kg).

W_x = Contract sample weight (30 g for low level soil/sediment and 1.0g for medium level soil/sediment samples).

W_s = Weight of sample extracted in grams (g).

D = $\frac{100 - \%\text{Moisture}}{100}$

V_t = Volume of the concentrated extract in µL.

V_y = Contract concentrated extract volume (1,000 µL).

DF = Dilution Factor.

CV_{out} = Volume of extract produced by a cleanup process (cleanup and concentration), in µL.

CV_{in} = Volume of extract subjected to a cleanup process, in µL.

E = The efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step (e.g. 50% efficiency must be expressed as 0.50)

EXHIBIT D – PESTICIDES	
EXHIBIT/SECTION(S)	**MODIFICATION (S)**
Pest-Item 1 Exhibit D-Section 10.4.3.2	The following: 'If the ***response*** of any single component pesticide is greater than the ***response*** of the high standard (CS5) of the initial calibration range on both GC columns, then the extract must be diluted. The ***response*** of the pesticide compound(s) in the diluted extract must be between the initial calibration low-point (CS1) and high-point (CS5) standards for the lower column ***response*** of the two analyses.' Is updated: 'If the ***concentration*** of any single component pesticide is greater than the ***concentration*** of the high standard (CS5) of the initial calibration range on both GC columns, then the extract must be diluted. The ***concentration*** of the pesticide compound(s) in the diluted extract must be between the initial calibration low-point (CS1) and high-point (CS5) standards for the lower column ***concentration*** of the two analyses.'
Pest-Item 2 Exhibit D-Section 10.4.3.3	The following: 'If the ***response*** of any Toxaphene peak used for quantitation is greater than the ***response*** of the corresponding Toxaphene peak in the high standard (CS5) on both columns, then the sample must be diluted to have the ***response*** of the same peak be between the mid-point (CS3) and high-point (CS5) standards of Toxaphene.' Is updated to: 'If the ***concentration*** of any Toxaphene peak used for quantitation is greater than the ***concentration*** of the corresponding Toxaphene peak in the high standard (CS5) on both columns, then the sample must be diluted to have the ***concentration*** of the same peak be between the mid-point (CS3) and high-point (CS5) standards of Toxaphene.'
Pest-Item 3 Exhibit D-Section 10.4.3.9	The following: 'Samples with analytes detected at a level greater than the high calibration point must be diluted until the ***response*** is within the linear range established during calibration, or to a maximum of 1:100,000.' Is updated to: 'Samples with analytes detected at a level greater than the high calibration point must be diluted until the ***concentration*** is within the linear range established during calibration, or to a maximum of 1:100,000.'

EXHIBIT/SECTION(S)	MODIFICATION (S)
Pest-Item 4 Exhibit D-Section 10.4.3.10	The following is updated: "If the ***response*** is still above the high calibration point after the dilution of 1:100,000, the Contractor shall contact SMO immediately." Is updated to: "If the ***concentration*** is still above the high calibration point after the dilution of 1:100,000, the Contractor shall contact SMO immediately."
Pest-Item 5 Exhibit D-Section 10.4.3.11	The following: 'Use the results of the original analysis to determine the approximate DF required to get the largest analyte peak (for the lower of the two column ***responses***) within the initial calibration range.' Is updated to: 'Use the results of the original analysis to determine the approximate DF required to get the largest analyte peak (for the lower of the two column ***concentrations***) within the initial calibration range.'

Pest-Item 6

Exhibit D - Pesticide: Section 11.2.1.6.1.1, Equation 14

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

$$\text{Concentration } \mu\text{g/L} = \left(\frac{A_x}{\overline{CF}}\right)\left(\frac{DF}{V_i}\right)\left(\frac{V_t}{V_o}\right)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1 \cdot \left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

$\mathbf{A_x}$	=	**Peak area or peak height of the compound to be measured.**
$\overline{\text{CF}}$	=	**Mean Calibration Factor determined from the initial calibration for the compound to be measured, in area/ng.**
DF	=	**Dilution Factor.**
$\mathbf{V_i}$	=	**Volume of extract injected in µL.**
$\mathbf{V_t}$	=	**Volume of extract produced by the preparation process (extraction and concentration), and before cleanup, in µL.**
$\mathbf{V_o}$	=	**Volume of the original water sample extracted in mL. Note: for instrument and sulfur blanks assume a volume of 1000mL.**
$\mathbf{CV_{out}}$	=	**Volume of extract produced by a cleanup process (cleanup and concentration), in µL.**
$\mathbf{CV_{in}}$	=	**Volume of extract subjected to a cleanup process, in µL.**
E	=	**The efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step (e.g. 50% efficiency must be expressed as 0.50).**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Pest-Item 7 Exhibit D - Pesticide: Section 11.2.1.6.2.1, Equation 16	The variable "D = % dry weight or $\frac{100 - \%\text{Moisture}}{100}$" is updated to "**D =** $\frac{100 - \%\text{Moisture}}{100}$".

Pest-Item 8

Exhibit D - Pesticide: Section 11.2.1.6.2.1, Equation 16

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

$$\text{Concentration } \mu g/kg = \left(\frac{A_x}{\overline{CF}}\right)\left(\frac{DF}{V_i}\right)\left(\frac{V_t}{W_t \times D}\right)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

A_x, $\overline{CF}$, DF, V_i, V_t, CV_{out}, CV_{in}, and E are the same as Equation 14 above.

W_t = Weight of the original soil sample extracted in g.

D = $\frac{100 - \%\text{Moisture}}{100}$

Pest-Item 9

Exhibit D - Pesticide: Section 11.2.2.1, Equation 19

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

EQ. 19 CRQL for Water Samples

$$\text{Adjusted CRQL} = (\text{Contract CRQL})\left(\frac{V_x}{V_o}\right)\left(\frac{V_t}{V_y}\right)(DF)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

Contract CRQL = The CRQL value reported in Exhibit C – Pesticide (µg/L).

V_x = Contract sample volume (1000 mL).

V_o = Volume of water extracted (mL). Note: for instrument and sulfur blanks assume a volume of 1000mL.

V_t = Volume of concentrated extract in µL.

V_y = Contract concentrated extract volume (10,000 µL).

DF = Dilution Factor.

CV_{out} = Volume of extract produced by a cleanup process (cleanup and concentration), in µL.

CV_{in} = Volume of extract subjected to a cleanup process, in µL.

E = The efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step (e.g. 50% efficiency must be expressed as 0.50).

EXHIBIT/SECTION(S)	MODIFICATION (S)
Pest-Item 10 Exhibit D - Pesticide: Section 11.2.2.2 Equation 20 **The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:** **EQ. 20 CRQL for Soil/Sediment Samples** $$\text{Adjusted CRQL} = (\text{Contract CRQL})\left(\frac{W_x}{W_s \times D}\right)\left(\frac{V_t}{V_y}\right)(DF)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \ldots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$ **where,** **Contract CRQL = The CRQL value reported in Exhibit C – Pesticides (µg/Kg).** **W_x = Contract sample weight (30 g).** **W_s = Weight of sample extracted in grams (g).** **D** = $\frac{100 - \%\text{Moisture}}{100}$ **V_t = Volume of concentrated extract (uL).** **V_y = Contract concentrated extract volume (10,000 µL).** **DF = Dilution Factor.** **CV_{out} = Volume of extract produced by a cleanup process (cleanup and concentration), in µL.** **CV_{in} = Volume of extract subjected to a cleanup process, in µL.** **E = The efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step (e.g. 50% efficiency must be expressed as 0.50).**
Pest-Item 11 Exhibit D-Section 12.2.4.2	The following sentence: "Calculate individual compound recoveries of the LCS using Equation 13" is updated to: "Calculate individual compound recoveries of the LCS using **Equation 21**".

EXHIBIT D – AROCLORS	
EXHIBIT/SECTION(S)	**MODIFICATION (S)**
Aro-Item 1 Exhibit D - Aroclor: Section 7.2.3.4.1	The following Section: "Prepare five-point initial calibration standard solutions containing a mixture of Aroclors 1016 and 1260 at the following suggested levels: 100; 200; 400; 800; and 1600 ng/mL and surrogates at 5.0, 10, 20, 40 and 80 ng/mL for tetrachloro-m-xylene and 10, 20, 40, 80 and 160 ng/mL for decachlorobiphenyl. Also, prepare a single-point initial calibration standard solution containing Aroclors 1221, 1232, 1242, 1248, 1254, 1262, and 1268 at 400 ng/mL and surrogates at 20 ng/mL for tetrachloro-m-xylene and 40 ng/mL for decachlorobiphenyl. The solutions must be prepared every 6 months, or sooner if the solutions have degraded or concentrated." Is updated to: "Prepare five-point initial calibration standard solutions containing a mixture of Aroclors 1016 and 1260 at the following suggested levels: 100; 200; 400; 800; and 1600 ng/mL and surrogates at 5.0, 10, 20, 40 and 80 ng/mL for tetrachloro-m-xylene and 10, 20, 40, 80 and 160 ng/mL for decachlorobiphenyl. ***In addition, prepare a single-point initial calibration standard solution containing Aroclors 1221 at 400 ng/mL including surrogates, tetrachloro-m-xylene at 20 ng/mL and decachlorobiphenyl at 40 ng/mL. A1so, prepare a single point calibration initial calibration standard of Aroclor 1232, 1242, 1248, 1254, 1262, and 1268 as instructed for Aroclor 1221.*** **Refer to Section 7.2.3.4.3 for five-point calibration standards of the other Aroclors.** The solutions must be prepared every 6 months, or sooner if the solutions have degraded or concentrated."
Aro-Item 2 Exhibit D - Aroclor: Section 7.2.3.4.2	The following Section: "Prepare a single-point calibration verification standard solution containing Aroclor 1260 and Aroclor 1016 at 400 ng/mL and surrogates at 20 ng/mL for tetrachloro-m-xylene and 40 ng/mL for decachlorobiphenyl. The solution must be prepared every 6 months, or sooner if the solution has degraded or concentrated." Is updated to: "Prepare a single-point calibration verification standard solution containing Aroclor 1260 and Aroclor 1016 at 400 ng/mL and surrogates, ***tetrachloro-m-xylene at 20 ng/mL and decachlorobiphenyl 40 ng/mL.*** **Additional *individual* calibration verification standard *solution(s)* containing any other Aroclor may be prepared when necessary at 400 ng/mL*, including surrogates, tetrachloro-m-xylene at 20 ng/mL and decachlorobiphenyl at 40 ng/mL*.** The solution must be prepared every 6 months, or sooner if the solution has degraded or concentrated."

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 3 Exhibit D - Aroclor: Section 9.2.1	The following Section: "Summary of Initial Calibration Prior to sample analysis (including LCSs and MS/MSDs) and required blanks (method/sulfur cleanup/instrument), each GC/ECD system must be initially calibrated to determine instrument sensitivity and the linearity of Aroclor response. An initial five-point calibration is performed using Aroclors 1016 and 1260 to demonstrate the linearity of the detector response. The other seven Aroclors are calibrated at a single mid-point for pattern recognition. The standards for these seven Aroclors should be analyzed before the analysis of any samples, and may be analyzed before or after the analysis of the five levels of the Aroclor 1016/1260 standards. is updated to: Summary of Initial Calibration Prior to sample analysis (including LCSs and MS/MSDs) and required blanks (method/sulfur cleanup/instrument), each GC/ECD system must be initially calibrated to determine instrument sensitivity and the linearity of Aroclor response. An initial five-point calibration is performed using Aroclors 1016 and 1260 to demonstrate the linearity of the detector response. The other seven Aroclors can be calibrated at a single mid-point **at a minimum**, for pattern recognition. The standards for these seven Aroclors should be analyzed before the analysis of any samples, and may be analyzed before or after the analysis of the five levels of the Aroclor 1016/1260 standards. **Note: All Aroclor target compounds may have five-point calibrations performed initially, prior to sample analyses. Alternately, as long as a valid five-point calibration of Aroclor 1016/1260 is present, five-point calibrations for any of the remaining Aroclor target compounds may be performed, prior to sample analyses.**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 4 Exhibit D - Aroclor: Section 9.2.2	The following Section: Each GC/ECD system must be initially calibrated upon award of the contract, whenever major instrument maintenance or modification is performed (e.g., column replacement or repair, cleaning or replacement of the ECD, etc.), or if the calibration verification technical acceptance criteria have not been met. Also, for any sample in which an Aroclor, other than Aroclor 1016 or Aroclor 1260 is detected, results for the specific Aroclor(s) may only be reported if the Aroclor(s) have been calibrated using multipoint standards (five-point). If time remains in the 12-hour period after a valid five-point initial calibration for a detected Aroclor(s) has been performed, then samples containing the Aroclor(s) may be analyzed. If the previously-analyzed five-point initial calibration containing the Aroclor(s) detected in the sample(s) is not in the same 12-hour sequence, then the sample(s) must be analyzed after a Continuing Calibration Verification (CCV) analysis containing the Aroclor(s) detected in the sample(s) that meets the criteria for CCVs in Section 9.3. is updated to: Each GC/ECD system must be initially calibrated upon award of the contract, whenever major instrument maintenance or modification is performed (e.g., column replacement or repair, cleaning or replacement of the ECD, etc.), or if the calibration verification technical acceptance criteria have not been met. Also, for any sample, in which an Aroclor (other than Aroclor 1016 or Aroclor 1260) is detected, **for which a valid five point calibration curve is not available, results for these specific Aroclors must be reported as an estimated concentration with the appropriate compound qualifier. Subsequently, the sample must be re-analyzed following a valid five point calibration of the specific Aroclor. All sample analysis, must be preceded by an opening CCV with an Aroclor 1016/1260 CS3 standard, at a minimum. Additional Aroclor opening CCV standards may be analyzed at the laboratory's discretion. The closing CCV must include Aroclor 1016/1260 CS3 and all detected Aroclors in the sample. When an Aroclor, other than Aroclor 1016/1260, is detected in a sample, the closing CCV CS3 standard of this detected Aroclor standard must meet opening CCV technical acceptance criteria in Section 9.3.5, if the sample was not preceded by the Aroclor included as a CS3 standard in the opening CCV."**
Aro-Item 5 Exhibit D – Aroclor: Section 9.2.3.3	The following Section: "If Aroclors other than Aroclor 1016/1260 are detected in an analysis, a separate five point calibration must be prepared (Section 7.2.3.4.3) and run for that particular Aroclor." is updated to: "If Aroclors other than Aroclor 1016/1260 are detected in **a sample** analysis, **following a single-point calibration for that particular Aroclor,** a separate five-point calibration must be prepared (Section 7.2.3.4.3) and run for that particular Aroclor, **followed by a re-analysis of the sample."**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 6 Exhibit D – Aroclor: Section 9.2.3.5	Analyze the initial calibration sequence as given below. Initial Calibration Sequence 1. Aroclor 1221 CS3 (400 ng/mL) 2. Aroclor 1232 CS3 (400 ng/mL) 3. Aroclor 1242 CS3 (400 ng/mL) 4. Aroclor 1248 CS3 (400 ng/mL) 5. Aroclor 1254 CS3 (400 ng/mL) 6. Aroclor 1262 CS3 (400 ng/mL) 7. Aroclor 1268 CS3 (400 ng/mL) 8. Aroclor 1016/1260 CS1 (100 ng/mL) 9. Aroclor 1016/1260 CS2 (200 ng/mL) 10. Aroclor 1016/1260 CS3 (400 ng/mL) 11. Aroclor 1016/1260 CS4 (800 ng/mL) 12. Aroclor 1016/1260 CS5 (1600 ng/mL) 13. Instrument blank **Note**: The single-point Aroclor standards may be analyzed after the analysis of the five levels of the Aroclor 1016/1260 standards. The steps pertaining to the instrument blank are used as part of the calibration verification as well. is updated to: **"Initial Calibration may be performed by any of the following sequence Options given below:** Initial Calibration Sequence – **Option 1** 1. Aroclor 1221 CS3 (400 ng/mL) 2. Aroclor 1232 CS3 (400 ng/mL) 3. Aroclor 1242 CS3 (400 ng/mL) 4. Aroclor 1248 CS3 (400 ng/mL) 5. Aroclor 1254 CS3 (400 ng/mL) 6. Aroclor 1262 CS3 (400 ng/mL) 7. Aroclor 1268 CS3 (400 ng/mL) 8. Aroclor 1016/1260 CS1 (100 ng/mL) 9. Aroclor 1016/1260 CS2 (200 ng/mL) 10. Aroclor 1016/1260 CS3 (400 ng/mL) 11. Aroclor 1016/1260 CS4 (800 ng/mL) 12. Aroclor 1016/1260 CS5 (1600 ng/mL) **Note: The single-point Aroclor standards may be analyzed after the analysis of the five levels of the Aroclor 1016/1260 standards in Option 1 above.** **OR**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 6 Exhibit D – Aroclor: Section 9.2.3.5 *(Cont.)*	**Initial Calibration Sequence - Option 2** **5-points of Aroclor 1016/1260(100ng/mL to 1600ng/mL)** **5-points of Aroclor 1221 (100ng/mL to 1600ng/mL)** **5-points of Aroclor 1232(100ng/mL to 1600ng/mL)** **5-points of Aroclor 1242(100ng/mL to 1600ng/mL)** **5-points of Aroclor 1248(100ng/mL to 1600ng/mL)** **5-points of Aroclor 1254(100ng/mL to 1600ng/mL)** **5-points of Aroclor 1262(100ng/mL to 1600ng/mL)** **5-points of Aroclor 1268(100ng/mL to 1600ng/mL)** **OR** **Initial Calibration Sequence - Option 3** **5-points of Aroclor 1016/1260(100ng/mL to 1600ng/mL)** **5-points or single point Aroclor 1221 (100ng/mL - 1600ng/mL or 400ng/mL)** **5-points or single point Aroclor 1232 (100ng/mL - 1600ng/mL or 400ng/mL)** **5-points or single point Aroclor 1242 (100ng/mL - 1600ng/mL or 400ng/mL)** **5-points or single point Aroclor 1248 (100ng/mL - 1600ng/mL or 400ng/mL)** **5-points or single point Aroclor 1254 (100ng/mL - 1600ng/mL or 400ng/mL)** **5-points or single point Aroclor 1262 (100ng/mL- 1600ng/mL or 400ng/mL)** **5-points or single point Aroclor 1268 (100ng/mL - 1600ng/mL or 400ng/mL)** **Note: Option 2 and 3 Initial Calibration above may be performed in any Aroclor sequence as long as a valid five-point calibration of Aroclor 1016/1260 is present. Refer to Section 7.2.3.4 for initial calibration standard concentrations.**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 7 Exhibit D – Aroclor: Section 9.2.4.2	The following Section: "For Aroclors 1016 and 1260, an RT is measured for a minimum of 3 peaks in each of the five calibration standards and the mean RT ($\overline{RT}$) is calculated for each of the peaks as the average of the five values obtained from the five calibration standards. For Aroclors 1221, 1232, 1242, 1248, 1254, 1262, and 1268 an RT is measured for each of the peaks for a single-point calibration standard. If a valid five-point calibration is present for a specific Aroclor then an RT is measured for each of the peaks in each of the five calibration standards and the $\overline{RT}$ is calculated as the average of the five values for each of the peaks obtained from the five calibration standards. An RT is measured for the surrogates in each of the five calibration standards and the $\overline{RT}$ is calculated as the average of the five values. Calculate the $\overline{RT}$ using Equation 1: is updated to: "For Aroclors 1016 and 1260, an RT is measured for a minimum of 3 peaks in each of the five calibration standards and the mean RT ($\overline{RT}$) is calculated for each of the peaks as the average of the five values obtained from the five calibration standards. For Aroclors 1221, 1232, 1242, 1248, 1254, 1262, and 1268 an RT is measured for **a minimum of three** peaks for a single-point calibration standard. If a valid five-point calibration is present for a specific Aroclor then an RT is measured for **a minimum of three** peaks in each of the five calibration standards and the $\overline{RT}$ is calculated as the average of the five values for each of the peaks obtained from the five calibration standards. An RT is measured for the surrogates in each of the five calibration standards of **Aroclor 1016/1260, or from Aroclor 1016 if analyzed as a separate mixture. The surrogate** $\overline{RT}$ **is** calculated as the average of the five values. Calculate the $\overline{RT}$ using Equation 1:"

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 8 Exhibit D – Aroclor: Section 9.2.4.4	The following Section: "The linearity of the instrument is determined by calculating a Percent Relative Standard Deviation (%RSD) of the Calibration Factors (CFs). Either peak area or peak height may be used to calculate CFs used in the %RSD equation. Five sets of CFs will be generated for the Aroclor 1016/1260 mixture, each set consisting of the CFs for each of the five peaks chosen for this mixture. The single standard for each of the other Aroclors will generate at least three CFs, one for each selected peak, unless a valid five-point calibration is present for a specific Aroclor, in which case five sets of CFs will be generated for the specific Aroclor. Calculate CFs, the Mean CF ($\overline{CF}$), and the %RSD of the CFs for each peak in a selected set of a minimum of 3 major peaks for each Aroclor using Equations 2, 3, and 4." Is updated to: "The linearity of the instrument is determined by calculating a Percent Relative Standard Deviation (%RSD) of the Calibration Factors (CFs). Either peak area or peak height may be used to calculate CFs used in the %RSD equation. Five sets of CFs will be generated for the Aroclor 1016/1260 mixture, each set consisting of the CFs for each of the peaks **(minimum of three)** chosen for this mixture. The single standard for each of the other Aroclors will generate at least three CFs, one for each selected peak, unless a valid five-point calibration is present for a specific Aroclor, in which case five sets of CFs will be generated for the specific Aroclor. **Calibration Factors (CF) for the surrogates must be generated for each of the five calibration standards of Aroclor 1016/1260, or from Aroclor 1016 if analyzed as a separate mixture. The $\overline{CF}$ of each surrogate compound is calculated as the average of the five values.** Calculate CFs, the Mean CF ($\overline{CF}$), and the %RSD of the CFs for each peak in a selected set of a minimum of 3 major peaks for each Aroclor using Equations 2, 3, and 4."

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 9 Exhibit D – Aroclor: Section 9.3.1	The following Section: "Summary of Continuing Calibration Verification (CCV) The analyses of instrument blanks and the required Aroclor CS3 Standard Mixtures (see Section 9.3.2) constitute the calibration verification. Sample (including LCS and MS/MSD) and required blank (method/sulfur cleanup) data are not acceptable unless bracketed by acceptable analyses of instrument blanks and the Aroclor CS3 Standard Mixtures. In cases where a valid five-point initial calibration for the detected Aroclors is required, that initial calibration may be substituted for the opening CCV." Is updated to: "Summary of Continuing Calibration Verification (CCV) **The analyses of instrument blanks and the required Aroclor CS3 Standard Mixtures (see Section 9.3.2) constitute the calibration verification. Sample (including LCS and MS/MSD) and required blank (method/sulfur cleanup) data are not acceptable unless bracketed by acceptable analyses of instrument blanks and the Aroclor CS3 Standard Mixtures."** Note the last sentence in the section is deleted: **"In cases where a valid five-point initial calibration for the detected Aroclors is required, that initial calibration may be substituted for the opening CCV."**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 10 Exhibit D – Aroclor: Section 9.3.2.1	The following section: An instrument blank and Aroclor 1016/1260 CS3 Standard Mixture must bracket one end of a 12-hour period (opening CCV) during which sample and required blank data are collected, and a second instrument blank and the Aroclor 1016/1260 CS3 Standard Mixture must bracket the other end of the 12-hour period (closing CCV). If during any 12-hour period, an Aroclor other than 1016 or 1260 is detected and the 12-hour time period for the five-point initial calibration of the detected Aroclor(s) has elapsed, then an instrument blank and a CS3 standard of the detected Aroclor(s) must bracket both ends of the 12-hour period. If the opening CCV does not meet all technical acceptance criteria, then a new valid five-point initial calibration for the detected Aroclors must be performed before samples containing the detected Aroclors may be analyzed. is updated to: "An instrument blank and Aroclor 1016/1260 CS3 Standard Mixture must bracket one end of a 12-hour period (opening CCV) during which sample and required blank data are collected, **a second instrument blank, Aroclor 1016/1260 CS3 and CS3 Standard Mixture (s) of any other detected Aroclor (s) must bracket the other end of a 12-hour period (closing CCV). Each opening CCV must include an instrument blank and Aroclor 1016/1260 CS3 standard, additional Aroclor CS3 standards may be performed at the laboratory's discretion. If a valid five-point calibration is available for Aroclor (s) other than 1016/1260, an opening CCV with an instrument blank and Aroclor 1016/1260 CS3 is sufficient, however, the closing CCV must *include* all Aroclors detected and meet opening CCV technical acceptance criteria in Section 9.3.5.3.**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 11 Exhibit D – Aroclor: Section 9.3.2.2	For the 12-hour period immediately following the initial calibration sequence, the instrument blank is the last step in the initial calibration sequence and brackets the front end of that 12-hour period. The injection of the instrument blank starts the beginning of the 12-hour period (Section 10.3.2.1.1), followed by the injection of the Aroclor 1016/1260 CS3 Standard. Samples (including LCSs and MS/MSDs) and required blanks (method/sulfur cleanup) may be injected for 12 hours from the injection of the instrument blank. The first injections immediately after that 12-hour period must be an instrument blank and the Aroclor 1016/1260 CS3 Standard Mixture. The instrument blank must be analyzed first, before the standard. Is updated to: "The injection of **an** instrument blank starts the beginning of the 12-hour period (Section 10.3.2.1.1), followed by the injection of Aroclor 1016/1260 CS3 Standard **and any additional CS3 Standard Mixture(s) as determined by the laboratory**. Samples (including LCSs and MS/MSDs) and required blanks (method/sulfur cleanup) may be injected for 12 hours from the injection of the instrument blank. The first injections immediately after **the previous** 12-hour period must be an instrument blank, Aroclor 1016/1260 CS3 Standard **and CS3 Standard Mixture(s) of any other detected Aroclor. A closing CCV must bracket the end of a 12-hour sequence.**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 12 Exhibit D – Aroclor: Section 9.3.2.3	The following Section: "The analyses of the instrument blank and CS3 Standard Mixture (closing CCV) immediately following one 12-hour period may be used to begin the subsequent 12-hour period as an opening CCV, provided that they meet the technical acceptance criteria in Section 9.3.5. In that instance, the subsequent 12-hour period must be bracketed by the acceptable analyses of an instrument blank and a CS3 Standard Mixture (closing CCV), in that order. Those two analyses may in turn be used to bracket the front end of yet another 12-hour period (opening CCV). This progression may continue every 12 hours until such time as any of the instrument blanks or the CS3 Standard Mixture fails to meet the technical acceptance criteria in Section 9.3.4, or an Aroclor has been detected in a sample for which the corresponding CS3 standard was not performed for the opening CCV. The 12-hour time period begins with the injection of the instrument blank." is updated to: "The analyses of the instrument blank and CS3 Standard Mixture***(s)*** (closing CCV) immediately following one 12-hour period may be used to begin the subsequent 12-hour period as an opening CCV, provided that they meet the technical acceptance criteria in Section 9.3.5. In that instance, the subsequent 12-hour period must be bracketed by the acceptable analyses of an instrument blank and a CS3 Standard Mixture***(s)*** (closing CCV), in that order. Those two analyses may in turn be used to bracket the front end of yet another 12-hour period (opening CCV). This progression may continue every 12 hours until such time as any of the instrument blanks or the **required** CS3 Standard Mixture (s) fails to meet the technical acceptance criteria in **Section 9.3.5**.
Aro-Item 13 Exhibit D – Aroclor: Section 9.3.2.4	The following section is deleted: **"If more than 12 hours have elapsed since the injection of the instrument blank that bracketed a previous 12-hour period, an acceptable instrument blank and an Aroclor 1016/1260 CS3 standard must be analyzed in order to start a new sequence. This requirement applies even if no analyses were performed since that standard was injected."**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 14 Exhibit D – Aroclor: Section 9.3.2.5	The following Section: "The requirements for running the instrument blanks and CS3 Aroclor 1016/1260 Standard Mixture are waived when no samples (including LCSs and MS/MSDs), dilutions, reanalyses, or required blanks (method/sulfur cleanup) are analyzed during that 12-hour period. To resume analysis, using the existing initial calibration, the Contractor must first analyze an instrument blank and CS3 Aroclor 1016/1260 Standard that meet the technical acceptance criteria." Is updated to: "The requirements for running the instrument blanks and CS3 Aroclor 1016/1260 Standard Mixture are waived when no samples (including LCSs and MS/MSDs), dilutions, reanalyses, or required blanks (method/sulfur cleanup) are analyzed during that 12-hour period. To resume analysis, using the existing initial calibration, the Contractor must first analyze an **opening CCV that consist of** an instrument blank, Aroclor 1016/1260 CS3 Standard, **and any additional CS3 Aroclor Standard (s)** that meet the technical acceptance criteria. **Note: Additional opening CCV CS3 Aroclor Standard (s) determined to be necessary are at the laboratory's discretion.**"
Aro-Item 15 Exhibit D – Aroclor: Section 9.3.2.5	The current "Section 9.3.2.5" is updated to "**Section 9.3.2.4**".
Aro-Item 16 Exhibit D – Aroclor: Section 9.3.2.6	The following Section: "If the entire 12-hour period is not required for the analyses of all samples and blanks to be reported and all data collection is to be stopped, the sequence must be ended with the instrument blank/CS3 Aroclor Standard Mixture (s) (1016/1260 and all detected Aroclors) combination." is updated to: "If the entire 12-hour period is not required for the analyses of all samples and blanks to be reported and all data collection is to be stopped, the sequence must **end with an appropriate closing CCV combination, that is, an instrument blank/CS3 Aroclor 1016/1260 and all detected Aroclor CS3 Standard Mixture(s)**."
Aro-Item 17 Exhibit D – Aroclor: Section 9.3.2.6	The current "Section 9.3.2.6" is updated to "**Section 9.3.2.5**".
Aro-Item 18 Exhibit D – Aroclor: Section 9.3.2.7	The following Section: "No more than 14 hours may elapse from the injection beginning the opening CCV (instrument blank) and the injection ending the closing CCV (Aroclor Standard)." Is updated to: "No more than 14 hours may elapse from the injection beginning the opening CCV (instrument blank) and the injection ending the closing CCV (Aroclor Standard). **If more than 12 hours elapse between the injections of the two instrument blanks (opening and closing CCV) that bracket a 12-hour period in which samples or required blanks are analyzed, then the time between the injection of the instrument blank (closing CCV) and the preceding sample may not exceed the length of one chromatographic run."**

Aro-Item 19 Exhibit D – Aroclor: Section 9.3.2.7	**The current "Section 9.3.2.7" is updated to "Section 9.3.2.6".**
Aro-Item 20 Exhibit D – Aroclor: Section 9.3.4	The following Section: "Calculations for Calibration Verification For each analysis of the CS3 Individual Standard Mixture(s) used to demonstrate calibration verification, calculate the Percent Difference between the CF of each Aroclor peak (including the surrogates) in the standard mixture and the $\overline{CF}$ from the initial calibration, using Equation 5." is updated to: "Calculations for Calibration Verification For each analysis of the CS3 Individual Standard Mixture(s) used to demonstrate calibration verification, calculate the Percent Difference between the CF of each Aroclor peak **in the standard mixture and the $\overline{CF}$ from the initial calibration, using Equation 5. Calculate the Percent Difference between CF of surrogates in each standard mixture and the $\overline{CF}$ from the initial calibration of Aroclor 1016/1260 or 1016 if analyzed as a separate mixture, using Equation 5."**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 21 Exhibit D – Aroclor: Section 9.3.5.3	The following Section: "For the opening CCV, Percent Difference for each Aroclor peak and surrogates calculated from the CCV standard must not exceed ±15%. For the closing CCV, Percent Difference for each Aroclor peak and surrogates calculated from the CCV must not exceed ±50%. If the Percent Difference for the closing CCV is ±15% or less, then it can be used for the opening CCV of the next 12-hour period." is updated to: "For the opening CCV, Percent Difference for each Aroclor peak and surrogates calculated from the CCV standard must not exceed ±15%. For the closing CCV, Percent Difference for each Aroclor peak and surrogates calculated from the CCV must not exceed ±50%. If the Percent Difference for the closing CCV is ±15% or less, then it can be used for the opening CCV of the next 12-hour period. **Note: When a required closing CCV of an Aroclor other than Aroclor 1016/1260 is preceded by an opening CCV of Aroclor 1016/1260 CS3 only, the percent difference of each Aroclor peak and surrogate compound must not exceed ± 15%."**
Aro-Item 22 Exhibit D – Aroclor: Section 9.3.6.7	The following Section: "If a successful instrument blank and Aroclor 1016/1260 standard cannot be run after an interruption in analysis (Section 9.3.2.6), an acceptable initial calibration must be run before sample data may be collected. All acceptable sample (including LCS and MS/MSDs) and required blank (method/sulfur cleanup) analyses must be preceded and followed by acceptable standards and instrument blanks, as described in Section 9.3.2." is updated to: "If a successful instrument blank and Aroclor 1016/1260 standard cannot be run after an interruption in analysis (Section 9.3.2.6), an acceptable initial calibration must be run before sample data may be collected. All acceptable sample (including LCS and MS/MSDs) and required blank (method/sulfur cleanup) analyses must be preceded and followed by acceptable instrument blanks and standards **(opening and closing CCV)** as described in Section 9.3.2."
Aro-Item 23 Exhibit D - Aroclor: Section 10.2.2.3.1	The following Section: "Using a syringe or a volumetric pipet, transfer all of the hexane extract to a 10mL vial and, in a fume hood, carefully add 5mL of the 1:1 (v/v) sulfuric acid/water solution." is updated to: "Using a syringe or a volumetric pipet, transfer **an aliquot (1 or 2 mL)** of the hexane extract to a 10mL vial and, in a fume hood, carefully add 5mL of the 1:1 (v/v) sulfuric acid/water solution."
Aro-Item 24 Exhibit D – Aroclor: Section 10.2.2.3.1 and 10.2.2.3.2	The following Sections will be switched: The language for the updated sentence of Section 10.2.2.3.1 will become Section 10.2.2.3.2 and vice versa.

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 25 Exhibit D – Aroclor: Section 10.3.2.1	The following Section: "Analytical Sequence All acceptable samples must be analyzed within a valid analysis sequence as given below: Time / Injection # / Material Injected 1-12 / First 12 steps of the initial calibration 0 hr. / 13 / Instrument blank 14 / Aroclor 1016/1260 Standard Sample 12 hr. / Last sample 1st injection past 12 hr. / Instrument blank 2nd injection past 12 hr. / Aroclor 1016/1260 standard Subsequent samples Another 12 hrs. / Last sample 1st injection past 12 hr. / Instrument blank 2nd injection past 12 hr. / Aroclor 1016/1260 standard 3rd injection past 12 hr. / Sample is updated to: "Analytical Sequence All acceptable samples must be analyzed within a valid analysis sequence as given below: **Time** / **Injection #** / **Material Injected** 1-12 **(or 5-points of all Aroclors)** / First 12 steps of theinitial calibration (or 5-points of all Aroclors) 0 hr. / 13 / Instrument blank 14 / Aroclor 1016/1260 Standard ***15*** / **Additional Aroclor CS3 Standard (optional)** ***16*** / **Subsequent Samples** 12 hr. / Last sample 1st injection past 12 hr. / Instrument blank 2nd injection past 12 hr. / ***Aroclor 1016/1260 Standard*** **3rd injection past 12 hr.** / **Detected Aroclor CS3 Standard *(as required)*** **14 hr.** / **4th injection past 12 hr.** / **Detected Aroclor CS3 Standard *(as required)*** Subsequent Samples Another 12 hrs. / Last sample 1st injection past 12 hr. / Instrument blank 2nd injection past 12 hr. / Aroclor 1016/1260 standard 3rd injection past 12 hr. / Sample

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 26 Exhibit D – Aroclor: Section 10.3.2.1.1	The following Section: "The first 12 hours are counted from injection #13, not from injection #1. Samples may be injected until 12:00 hours have elapsed. All subsequent 12-hour periods are timed from the injection of the instrument blank that brackets the front end of the samples. If more than 12 hours elapse between the injections of two instrument blanks that bracket a 12-hour period in which samples or required blanks are analyzed, then the time between the injection of the instrument blank and the preceding sample may not exceed the length of one chromatographic run. While the 12-hour period may not be exceeded, the laboratory may run instrument blanks and standards more frequently, for instance, to accommodate staff working on 8-hour shifts. No more than 14 hours may elapse from the injection beginning the opening CCV (instrument blank) and the injection ending the closing CCV (Aroclor Standard)." is updated to: **"Injections #1 through #12 in Section 10.3.2.1 may be expanded to include all injections of initial calibration standards as specified in Option 2 and 3 in Section 9.2.3.5.** The first 12 hours are counted from injection #13, not from injection #1**, in the initial calibration sequence Option 1 detailed in Section 10.3.2.1. Alternately, the first 12 hours will be counted from the injection of the instrument blank of an opening CCV when performed immediately after completion of the initial calibration Options 2 and 3.** Samples may be injected until 12:00 hours have elapsed. All subsequent 12-hour periods are timed from the injection of the instrument blank that brackets the front end of the samples. If more than 12 hours elapse between the injections of two instrument blanks that bracket a 12-hour period in which samples or required blanks are analyzed, then the time between the injection of the instrument blank and the preceding sample may not exceed the length of one chromatographic run. While the 12-hour period may not be exceeded, the laboratory may run instrument blanks and standards more frequently, for instance, to accommodate staff working on 8-hour shifts. No more than 14 hours may elapse from the injection beginning the opening CCV (instrument blank) and the injection ending the closing CCV (Aroclor Standard)."

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 27 *Exhibit D – Aroclor: Section 10.3.3.2*	*The following:* *"If the **response** of the largest peak for any Aroclor is greater than the **response** of the same peak in the high-point standard in the initial calibration for both columns, then the sample must be diluted to have the **response** of the largest peak of the lower of the two column analyses be between the low and high calibration standards."* *Is updated to:* *"If the **concentration** of the largest peak for any Aroclor is greater than the **concentration** of the same peak in the high-point standard in the initial calibration for both columns (the largest peak on the second column may be a different peak), then the sample must be diluted to have the **concentration** of the largest peak of the lower of the two column analyses be between the low and high calibration standards."*
Aro-Item 28 *Exhibit D – Aroclor: Section 10.3.3.8*	The following: "Use the results of the original analysis to determine the approximate DF required to get the largest analyte peak (for the lower of the two column ***responses***) within the initial calibration range." Is updated to: "Use the results of the original analysis to determine the approximate DF required to get the largest analyte peak (for the lower of the two column ***concentrations***) within the initial calibration range."
Aro-Item 29 Exhibit D – Aroclor: Section 11.1.1.4	The following Section: "When an Aroclor other than 1016 or 1260 is detected in a sample, a valid five-point calibration curve specific to that Aroclor must be run, followed by reanalysis of the sample or appropriately diluted sample with the detected Aroclor present. The Mean Calibration Factor ($\overline{CF}$) will be used to quantitate the analyte in the sample." is updated to: "When an Aroclor other than 1016 or 1260 is detected in a sample**, using a single point calibration,** a valid five point calibration of the specific Aroclor must be **performed**, followed by reanalysis of the sample or appropriately diluted sample **(if the sample concentration of Aroclor exceeded calibration)** with the Aroclor detected initially. **If a valid five-point calibration curve is available for an Aroclor other than 1016 or 1260, the Mean Calibration Factor ($\overline{CF}$) will be used for quantitation of the Aroclor in the sample, however, quantitation of the surrogate compounds using *surrogate data from* the initial five-point Aroclor 1016/1260 or from Aroclor 1016 if analyzed as a separate mixture.** **Note: An estimated concentration (reported with an "S" flag) of the initial detection for an Aroclor other than 1016 or 1260, using a single point calibration standard will be quantitated using the Calibration Factor (CF), of at least 3 major peaks, from the specific single point calibration standard. The surrogates will be quantitated using the initial five-point Aroclor 1016/1260 or from Aroclor 1016 if analyzed as a separate mixture.**

EXHIBIT/SECTION(S)	MODIFICATION (S)

Aro-Item 30

Exhibit D – Aroclor: Section 11.2.1.1.1, Equation 7

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

$$\text{Concentration } \mu g/L = \left(\frac{A_x}{\overline{CF}}\right)\left(\frac{DF}{V_i}\right)\left(\frac{V_t}{V_o}\right)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

A_x = Peak area or peak height of the compound to be measured.

$\overline{CF}$ = Mean Calibration Factor determined from the initial calibration for the compound to be measured, in area/ng.

DF = Dilution Factor.

V_i = Volume of extract injected in µL.

V_t = Volume of extract produced by the preparation process (extraction and concentration), and before cleanup, in µL.

V_o = Volume of the original water sample extracted in mL. Note: for instrument blanks and sulfur blanks assume a volume of 1000mL.

CV_{out} = Volume of extract produced by a cleanup process (cleanup and concentration), in µL.

CV_{in} = Volume of extract subjected to a cleanup process, in µL.

E = The efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step (e.g. 50% efficiency must be expressed as 0.50)

Aro-Item 31

Exhibit D – Aroclor: Section 11.2.1.2.1, Equation 9

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

$$\text{Concentration } \mu g/kg = \left(\frac{A_x}{\overline{CF}}\right)\left(\frac{DF}{V_i}\right)\left(\frac{V_t}{W_t \times D}\right)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

***A_x, $\overline{CF}$, DF, V_i, V_t, CV_{out}, CV_{in}, and E** are the same as Equation 7 above.*

W_t = Weight of the original soil sample extracted in g.

$$D = \frac{100 - \%\text{Moisture}}{100}$$

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 32 Exhibit D – Aroclor: Section 11.2.2	The following Section: "Target Compounds The quantitation of Aroclors must be accomplished by comparing the heights or the areas of each of a minimum of 3 major peaks of the Aroclor in the sample with the $\overline{CF}$ for the same peaks established during the specific five-point calibration. The concentration of multi-component analytes is calculated by using Equations 7 and 9, where A_x is the area for each of the major peaks of the Aroclor. The concentration of each peak is determined and then a mean concentration for a minimum of 3 major peaks is determined on each column." is updated to: "Target Compounds **Except for an estimated value reported for an Aroclor other than 1016 or 1260,** The quantitation of Aroclors must be accomplished by comparing the heights or the areas of each of a minimum of 3 major peaks of the Aroclor in the sample with the $\overline{CF}$ for the same peaks established during the specific five-point calibration. The concentration of multi-component analytes is calculated by using Equations 7 and 9, where A_x is the area for each of the major peaks of the Aroclor. The concentration of each peak is determined and then a mean concentration for a minimum of 3 major peaks is determined on each column."
Aro-Item 33 Exhibit D – Aroclor: Section 11.2.2.1	The following Section: "Note that the $\overline{CF}$s used for the quantitation of Aroclors are the $\overline{CF}$s from the concentration of the specific five-point calibration." is updated to: **"To quantitate and report the estimated concentration of an Aroclor other than 1016 or 1260, use the Calibration Factor (CF) for a minimum of 3 major peaks, from the single point Aroclor calibration standard used for the Aroclor pattern recognition. It will be necessary to substitute the single Calibration Factor (CF) for the Mean CF ($\overline{CF}$) in Equations 7, 8, 9 and 10.** **Note: The** $\overline{CF}$s used for the quantitation of **target** Aroclors are the $\overline{CF}$s from the concentration of the specific five-point calibration."

EXHIBIT/SECTION(S)	MODIFICATION (S)

Aro-Item 34

Exhibit D – Aroclor: Section 11.2.3.1, Equation 12

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

EQ. 12 Adjusted CRQL Calculation for Water Samples

$$\text{Adjusted CRQL} = (\text{Contract CRQL})\left(\frac{V_x}{V_o}\right)\left(\frac{V_t}{V_y}\right)(DF)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \ldots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

Contract CRQL	=	**The CRQL value reported in Exhibit C – Aroclors (µg/L).**
V_x	=	**Contract sample volume (1000 mL).**
V_o	=	**Volume of water extracted in mL. Note: for instrument and sulfur blanks assume a volume of 1000mL.**
V_t	=	**Volume of water *concentrated extract* in µL.**
V_y	=	**Contract concentrated extract volume (10,000 µL).**
DF	=	**Dilution Factor.**
CV_{out}	=	**Volume of extract produced by a cleanup process (cleanup and concentration), in µL.**
CV_{in}	=	**Volume of extract subjected to a cleanup process, in µL.**
E	=	**The efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step (e.g. 50% efficiency must be expressed as 0.50).**

EXHIBIT/SECTION(S)	MODIFICATION (S)

Aro-Item 35

Exhibit D – Aroclor: Section 11.2.3.2 Equation 13

The equation is further expanded to allow for greater flexibility in the preparation and cleanup steps as follows:

EQ. 13 Adjusted CRQL Calculation for Soil/Sediment Samples

$$\text{Adjusted CRQL} = (\text{Contract CRQL})\left(\frac{W_x}{W_s \times D}\right)\left(\frac{V_t}{V_y}\right)(DF)\left(\frac{CV_{out}}{CV_{in} \times E}\right)_1\left(\frac{CV_{out}}{CV_{in} \times E}\right)_2 \cdots \left(\frac{CV_{out}}{CV_{in} \times E}\right)_n$$

where,

Contract CRQL = The CRQL value reported in Exhibit C – Aroclors (µg/Kg).

W_x = Contract sample weight (30 g).

W_s = Weight of sample extracted in grams (g).

D = $\frac{100 - \%\text{Moisture}}{100}$

V_t = Volume of the concentrated extract in µL.

V_y = Contract concentrated extract volume (10,000 µL).

DF = Dilution Factor.

CV_{out} **= Volume of extract produced by a cleanup process (cleanup and concentration), in µL.**

CV_{in} = Volume of extract subjected to a cleanup process, in µL.

E = The efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step (e.g. 50% efficiency must be expressed as 0.50).

Aro-Item 36 Exhibit D – Aroclor: Section 11.2.4	The following Section : "The concentrations for surrogate compounds can be calculated by using Equation 7 (for waters) and Equation 9 (for soils) and the $\overline{CF}$ from the most recent initial calibration." is updated to: "The concentrations for surrogate compounds can be calculated by using Equation 7 (for waters) and Equation 9 (for soils) and the $\overline{CF}$ from **a valid initial five-point calibration of Aroclor 1016/1260 or from Aroclor 1016 if analyzed as a separate mixture."**

EXHIBIT/SECTION(S)	MODIFICATION (S)
Aro-Item 37 Exhibit D – Aroclor: Section 11.3.5	The following Section: "The RT for each of the surrogates must be within the RT window (Section 9.2.4.3) for both GC columns." is updated to: **"Surrogate compounds Retention Time (RT) must be compared to the window established during a valid initial five-point calibration of Aroclor 1016/1260 or from Aroclor 1016 if analyzed as a separate mixture.** The RT for each of the surrogates must be within the RT window (Section 9.2.4.3) for both GC columns."
Aro-Item 38 Exhibit D – Aroclor: Section 12.3.4.2	The following Section: "Calculate individual compound recoveries of the LCS using Equation 14" is updated to: "Calculate individual compound recoveries of the LCS using **Equation 15**".

EXHIBIT H	
EXHIBIT/SECTION(S)	**MODIFICATION (S)**
H-Item 1 Exhibit H: Section 5.2, Organic General DTD	In the PreparationPlusCleanup node, the data element Efficiency is added as follows: "<!ELEMENT PreparationPlusCleanup (AliquotAmount| AliquotAmountUnits| Analyst| BottleID| CleanedUpDate| CleanupBatch| CleanupType| ClientMethodID| ClientMethodName| ClientMethodSource| Comment| **Efficiency|** FinalAmount| FinalAmountUnits| InitialAmount| InitialAmountUnits| LabMethodID| LabMethodName| LotNumber| PreparationBatch| PreparationPlusCleanupType| PreparationType| PreparedDate| ProcedureID| ProcedureName)*>"
H-Item 2 Exhibit H: Section 5.2, Organic General DTD	The data element Efficiency is added as follows: "… <!ELEMENT DilutionFactor (#PCDATA)> <!ELEMENT EDDID (#PCDATA)> <!ELEMENT EDDImplementationID (#PCDATA)> <!ELEMENT EDDImplementationVersion (#PCDATA)> <!ELEMENT EDDVersion (#PCDATA)> **<!ELEMENT Efficiency (#PCDATA)>** <!ELEMENT EquipmentBatch (#PCDATA)> <!ELEMENT ExpectedResult (#PCDATA)> <!ELEMENT ExpectedResultUnits (#PCDATA)> <!ELEMENT FinalAmount (#PCDATA)>…."

H-Item 3: Exhibit H: Section 6.0, Table 1, Samples and Blanks

The data element Efficiency is added as follows:

Node and Data Elements	Applicability: Sample	MB SB IB	MS MSD	Instructions
PreparationPlusCleanup	X	X	X	
AliquotAmount	X	X	X	Report the sample amount in grams to at least three significant figures for Soil/Sediment.
AliquotAmountUnits	X	X	X	Report "g".
Analyst				Not required.
BottleID				Not required.
CleanedUpDate				Not required.
CleanupBatch				Not required.
CleanupType				Not required.
ClientMethodID	X	X	X	Report "SOM01.2”.
ClientMethodName				Not required.
ClientMethodSource	X	X	X	Report "USEPA_CLP".
Comment				Not required.
Efficiency				**Not required.**
FinalAmount				Not required.
FinalAmountUnits				Not required.
InitialAmount	X	X	X	Report the Soil Extract Volume in microliters to at least two significant figures (for Medium Soils).
InitialAmountUnits	X	X	X	Report "uL".
LabMethodID				Not required.
LabMethodName				Not required.
LotNumber				Not required.
PreparationBatch	X	X	X	Links all samples that were prepared together. Report the Lab File ID of the associated Method Blank.
PreparationPlusCleanupType	X	X	X	Report "Preparation" or "Cleanup" as applicable.
PreparationType				Not required.
PreparedDate	X	X	X	Report the date and time the sample was extracted (medium soils).
ProcedureID				Not required.
ProcedureName				Not required.

H-Item 4: Exhibit H: Section 6.0, Table 2, Samples and Blanks

The data element Efficiency is added as follows:

Node and Data Elements	Applicability: Sample	MB	MS MSD	Instructions
PreparationPlusCleanup	X	X	X	
AliquotAmount	X	X	X	Report the sample amount used for this analysis to at least three significant figures.
AliquotAmountUnits	X	X	X	Report "g" for Soil/Sediment and "mL" for Water.
Analyst				Not required.
BottleID				Not required.
CleanedUpDate	X	X	X	Report the date and time the sample was cleaned up.
CleanupBatch	X	X	X	Links all samples that were cleaned up together. Report the Lab File ID of the associated blank or other unique identifier.

CleanupType	X	X	X	Report "GPC", "Silica_Gel", or "Alumina" as applicable.
ClientMethodID	X	X	X	Report "SOM01.2".
ClientMethodName				Not required.
ClientMethodSource	X	X	X	Report "USEPA_CLP".
Comment				Not required.
Efficiency	**X**	**X**	**X**	**Report the efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step, in decimal percent (e.g. 50% efficiency must be expressed as 0.50). Leave blank if cleanup is not performed.**
FinalAmount	X	X	X	Report the Final Amount of material produced upon completion of this Prep or Cleanup in microliters.
FinalAmountUnits	X	X	X	Report "uL".
InitialAmount	X	X	X	Report the initial amount of extracted sample used for this cleanup method in microliters.
InitialAmountUnits	X	X	X	Report "uL".
LabMethodID				Not required.
LabMethodName				Not required.
LotNumber				Not required.
PreparationBatch	X	X	X	Links all samples that were extracted together. Report the Lab File ID of the associated Method Blank.
PreparationPlusCleanupType	X	X	X	Report "Preparation" or "Cleanup" as applicable.
PreparationType	X	X	X	Report "Sonication", "Soxhlet", or "Pressurized_Fluid" for Soil/Sediment. Report "Liq_Liq" or "Liq_Membrane" for Water.
PreparedDate	X	X	X	Report the date and time the sample was extracted.
ProcedureID				Not required.
ProcedureName				Not required.

H-Item 5: Exhibit H: Section 6.0, Table 3, Samples and Blanks

The data element Efficiency is added as follows:

Node and Data Elements	Applicability						Instructions
	Sample	MB	CB	IB	MS	MSD	LCS	NCS	
PreparationPlusCleanup	X	X		X			X		
AliquotAmount	X	X		X			X		Report the sample amount used for this analysis to at least three significant figures.
AliquotAmountUnits	X	X		X			X		Report "g" for Soil/Sediment and "mL" for Water.
Analyst									Not required.
BottleID									Not required.
CleanedUpDate	X	X		X			X		Report the date and time the sample was cleaned up.
CleanupBatch	X	X		X			X		Links all samples that were cleaned up together. Report the Lab File ID of the associated blank or other unique identifier.
CleanupType	X	X		X			X		Report "GPC", "Florisil", "Sulfur", "Silica_Gel", "Alumina", or "Acid_Base_Partition" as applicable.
ClientMethodID	X	X		X			X		Report "SOM01.2".
ClientMethodName									Not required.
ClientMethodSource	X	X		X			X		Report "USEPA_CLP".
Comment									Not required.
Efficiency	**X**	**X**		**X**			**X**		**Report the efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step, in decimal percent (e.g. 50% efficiency must be expressed as 0.50). Leave blank if cleanup is not performed.**
FinalAmount	X	X		X			X		Report the Final Amount of material produced upon completion of this Prep or Cleanup in microliters.
FinalAmountUnits	X	X		X			X		Report "uL".
InitialAmount	X	X		X			X		Report the initial amount of extracted sample used for this cleanup method in microliters.
InitialAmountUnits	X	X		X			X		Report "uL".
LabMethodID									Not required.
LabMethodName									Not required.
LotNumber	X	X		X			X		Report the manufacturer's lot number for the Florisil cartridges used.
PreparationBatch	X	X		X			X		Links all samples that were extracted together. Report the Lab File ID of the associated Method Blank.
PreparationPlusCleanupType	X	X		X			X		Report "Preparation" or "Cleanup" as applicable.
PreparationType	X	X		X			X		Report "Sonication", "Soxhlet", or "Pressurized_Fluid" for Soil/Sediment. Report "Sep_Funnel", "Liq_Liq", or "Liq_Membrane" for Water.

H-Item 5: Exhibit H: Section 6.0, Table 3, Samples and Blanks *(Cont.)*

The data element Efficiency is added as follows:

Node and Data Elements	Applicability: Sample	MB	CB	IB	MS	MSD	LCS	NCS	Instructions
PreparedDate	X		X		X		X		Report the date and time the sample was extracted.
ProcedureID									Not required.
ProcedureName									Not required.

H-Item 6: Exhibit H: Section 6.0, Table 3, Instrument QC

The data element Efficiency is added as follows:

Node and Data Elements	Applicability: IPC	ICAL	CCV	FLO	GPC	Instructions
PreparationPlusCleanup				X		
AliquotAmount						Not required.
AliquotAmountUnits						Not required.
Analyst						Not required.
BottleID						Not required.
CleanedUpDate				X		Report the date and time the sample was cleaned up.
CleanupBatch				X		Links all samples that were cleaned up together. Report the Lab File ID of the associated cleanup blank.
CleanupType				X		Report "GPC" or "Florisil" as applicable.
ClientMethodID				X		Report "SOM01.2".
ClientMethodName						Not required.
ClientMethodSource				X		Report "USEPA_CLP".
Comment						Not required.
Efficiency				**X**		**Report the efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step, in decimal percent (e.g. 50% efficiency must be expressed as 0.50). Leave blank if cleanup is not performed.**
FinalAmount				X		Report the Final Amount of material produced upon completion of this Prep or Cleanup in microliters.
FinalAmountUnits				X		Report "uL".
InitialAmount				X		Report the initial amount of extracted sample used for this cleanup method in microliters.
InitialAmountUnits				X		Report "uL".
LabMethodID						Not required.
LabMethodName						Not required.
LotNumber				X		Report the manufacturer's lot number for the Florisil cartridges used.
PreparationBatch						Not required.
PreparationPlusCleanupType				X		Report "Cleanup".
PreparationType						Not required.
PreparedDate						Not required.
ProcedureID						Not required.
ProcedureName						Not required.

H-Item 7: Exhibit H: Section 6.0, Table 4, Samples and Blanks

The data element Efficiency is added as follows:

Node and Data Elements	Applicability: Sample	MB	CB	IB	MS	MSD	LCS	NCS	Instructions
PreparationPlusCleanup	X	X		X			X		
AliquotAmount	X	X		X			X		Report the sample amount used for this analysis to at least three significant figures.
AliquotAmountUnits	X	X		X			X		Report "g" for Soil/Sediment and "mL" for Water.
Analyst									Not required.
BottleID									Not required.
CleanedUpDate	X	X		X			X		Report the date and time the sample was cleaned up.
CleanupBatch	X	X		X			X		Links all samples that were cleaned up together. Report the Lab File ID of the associated blank or other unique identifier.
CleanupType	X	X		X			X		Report "GPC", "Florisil", "Sulfuric_Acid", "Silica_Gel", "Alumina", or "Acid_Base_Partition" as applicable.
ClientMethodID	X	X		X			X		Report "SOM01.2".
ClientMethodName									Not required.
ClientMethodSource	X	X		X			X		Report "USEPA_CLP".
Comment									Not required.
Efficiency	**X**	**X**		**X**			**X**		**Report the efficiency of the cleanup process expressed as a fraction of material that passes through or is not mechanically lost during the cleanup step, in decimal percent (e.g. 50% efficiency must be expressed as 0.50). Leave blank if cleanup is not performed.**
FinalAmount	X	X		X			X		Report the Final Amount of material produced upon completion of this Prep or Cleanup in microliters.
FinalAmountUnits	X	X		X			X		Report "uL".
InitialAmount	X	X		X			X		Report the initial amount of extracted sample used for this cleanup method in microliters.
InitialAmountUnits	X	X		X			X		Report "uL".
LabMethodID									Not required.
LabMethodName									Not required.
LotNumber	X	X		X			X		Report the manufacturer's lot number for the Florisil cartridges used.
PreparationBatch	X	X		X			X		Links all samples that were extracted together. Report the Lab File ID of the associated Method Blank.
PreparationPlusCleanupType	X	X		X			X		Report "Preparation" or "Cleanup" as applicable.
PreparationType	X	X		X			X		Report "Sonication", "Soxhlet", or "Pressurized_Fluid" for Soil/Sediment. Report "Sep_Funnel", "Liq_Liq", or "Liq_Membrane" for Water.

H-Item 7: Exhibit H: Section 6.0, Table 4, Samples and Blanks *(Cont.)*

The data element Efficiency is added as follows:

	Applicability							
Node and Data Elements	Sample	MB	CB	IB	MS	MSD	LCS	NCS	Instructions
PreparedDate	X	X		X			X		Report the date and time the sample was extracted.
ProcedureID									Not required.
ProcedureName									Not required.

H-Item 8: Exhibit H: Section 6.0, Table 1, Samples and Blanks

The data element ServicesID in the SamplePlusMethod node is marked with an "X" in the "MB SB IB" column as follows:

	Applicability					
Node and Data Elements	Sample	MB	SB	IB	MS	MSD	Instructions
ServicesID	X	X			X		Report the Modification Reference Number, if applicable.

H-Item 9: Exhibit H: Section 6.0, Table 2, Samples and Blanks

The data element ServicesID in the SamplePlusMethod node is marked with an "X" in the "MB" column as follows:

	Applicability				
Node and Data Elements	Sample	MB	MS	MSD	Instructions
ServicesID	X	X	X		Report the Modification Reference Number, if applicable.

H-Item 10: Exhibit H: Section 6.0, Table 3, Samples and Blanks

The data element ServicesID in the SamplePlusMethod node is marked with an "X" in the "MB CB IB" column and "LCS" column as follows:

	Applicability								
Node and Data Elements	Sample	MB	CB	IB	MS	MSD	LCS	NCS	Instructions
ServicesID	X	X		X	X		X		Report the Modification Reference Number, if applicable.

H-Item 11: Exhibit H: Section 6.0, Table 4, Samples and Blanks

The data element ServicesID in the SamplePlusMethod node is marked with an "X" in the "MB CB IB" column and "LCS" column as follows:

	Applicability								
Node and Data Elements	Sample	MB	CB	IB	MS	MSD	LCS	NCS	Instructions
ServicesID	X	X		X	X		X		Report the Modification Reference Number, if applicable.