1.0 INTRODUCTION

The purpose of this study was to validate an analytical method used to determine the content of PDMU and cPMU in surface water. The method was validated (15 January 2018) to quantify the concentrations of PDMU and cPMU present in recovery samples prepared in surface water. The analytical method was validated with regards to specificity, linearity, accuracy, precision, limit of quantitation (LOQ), limit of detection (LOD), method detection limit (MDL), and confirmation of analyte identification.

The method was validated in surface water by fortification with PDMU and cPMU at concentrations of 0.100 (LOQ) and 1.00 (High) µg/L. Recovery samples were diluted with methanol for a final composition of 20/80 methanol/surface water (v/v). The High-level recovery samples were further diluted into the calibration range with 20/80 methanol/surface water (v/v). All samples were analyzed using liquid chromatography with tandem mass spectrometry detection (LC-MS/MS).

The study was initiated on 3 January 2018, the day the Study Director signed the protocol, and was completed on the day the Study Director signed the final report. The experimental portion of the validation was conducted on 15 January 2018 at Smithers Viscient (SMV), located in Wareham, Massachusetts. All original raw data, the protocol, and the final report produced during this study are stored in Smithers Viscient's archives at the above location.

2.0 MATERIALS AND METHODS

2.1 Protocol

Procedures used in this study followed those described in the Smithers Viscient protocol entitled "Validation of an Environmental Chemistry Method for the Determination of PDMU and cPMU in Surface Water" (Appendix 1). The study was conducted under Good Laboratory Practice Standard (GLPS) regulations and principles as described in 40 CFR 160 (U.S. EPA, 1989) and

the OECD principles on GLP (OECD, 1998), and followed the guidance documents SANCO/3029/99 rev 4 (EC, 2000) and OCSPP 850.6100 (U.S. EPA, 2012).

2.2 Test Substances

The test substance, PDMU, was received on 24 August 2017 from Santa Cruz Biotechnology, Dallas, Texas. The purity analysis was conducted by Smithers Viscient. The following information was provided, with the exception of the purity and recertification date, which were determined by Smithers Viscient:

Name:	PDMU
Synonym:	1,1-dimethyl-3-phenylurea
Lot No.:	G0612
CAS No.:	101-42-8
Purity:	99.4% (Certificate of Analysis, Appendix 2)
Recertification Date:	13 November 2019

Upon receipt at Smithers Viscient, the test substance (SMV No. 9063) was stored at room temperature in a dark, ventilated cabinet in the original container. Concentrations were adjusted for the purity of the test substance.

The test substance, cPMU, was received on 24 August 2017 from Sigma Aldrich Inc., Milwaukee, Wisconsin. The purity analysis was conducted by Smithers Viscient. The following information was provided, with the exception of the purity and recertification date, which were determined by Smithers Viscient:

Name:	cPMU
Synonym:	1-(3-chlorophenyl)-3-methylurea
Lot No.:	SMV9059
CAS No.:	2094-42-5
Purity:	98.8% (Certificate of Analysis, Appendix 2)
Recertification Date:	13 November 2018

Upon receipt at Smithers Viscient, the test substance (SMV No. 9059) was stored at room temperature in a dark, ventilated cabinet in the original container. Concentrations were adjusted for the purity of the test substance.

Determination of stability and characterization, verification of the test substance identities, maintenance of records on the test substances, and archival of a sample of the test substances are the responsibility of the Study Sponsor.

2.3 Reagents

1.	0.1% Formic acid in water:	Fisher, reagent grade
2.	0.1% Formic acid in acetonitrile:	Fisher, reagent grade
3.	Methanol:	EMD reagent grade
4.	Acetonitrile:	EMD, reagent grade
5.	Purified reagent water:	Prepared from a Millipore MilliQ Direct 8 water purification system (meets ASTM Type II requirements)

2.4 Instrumentation and Laboratory Equipment

1.	Instrument:	MDS Sciex API 5000 mass spectrometer equipped with an ESI Turbo V ion source Shimadzu SIL-20ACHT autoinjector Shimadzu DGU-20A3V vacuum degasser Shimadzu DGU-20A5R vacuum degasser Shimadzu LC-20AD solvent delivery pumps Shimadzu CTO-20A column compartment Shimadzu CBM-20A communications bus Analyst 1.4.2 software for data acquisition
2.	Balance:	Mettler Toledo XSE205DU
3.	Laboratory equipment:	Positive displacement pipets, volumetric flasks, disposable glass vials, disposable glass pipets, graduated cylinders, autosampler vials, and amber glass vials with Teflon caps

Other equipment or instrumentation may be used in future testing but may require optimization to achieve the desired separation and sensitivity.

2.5 Test Matrix

The matrix used during this method validation was surface water.

The surface water used for this method validation analysis was collected from the Weweantic River (SMV Lot No. 12 July 17 Water-A, collected on 12 July 2017) in Wareham, Massachusetts. The water was collected from an area of the river with approximately 30 to 60 cm of overlying water and was determined to have a pH of 6.2 (measured using a Yellow Springs Instruments (YSI) pH 100 meter) and a dissolved oxygen concentration of 5.92 mg/L (measured using a YSI Pro20 Dissolved Oxygen meter). All documentation relating to the preparation, storage, and handling is maintained by Smithers Viscient.

2.6 Preparation of Liquid Reagents

The volumes listed in this section were those used during the validation. For future testing, the actual volumes used may be scaled up or down as necessary.

A 20/80 methanol/purified reagent water (v/v) liquid reagent solution was prepared by combining 50.0 mL of methanol and 200 mL of purified reagent water. The solution was mixed well using a stir bar and stir plate for five minutes.

A 20/80 methanol/surface water (v/v) liquid reagent solution was prepared by combining 100 mL of methanol and 400 mL of surface water. The solution was mixed well using a stir bar and stir plate for five minutes.

A 30/30/40 acetonitrile/methanol/purified reagent water (v/v/v) autosampler needle wash solution was prepared by combining 1500 mL of acetonitrile, 1500 mL of methanol, and 2000 mL of purified reagent water. The solution was mixed well before use.

2.7 Preparation of Stock Solutions

The volumes and masses listed in this section were those used during the validation. For future testing, the actual volumes and masses used may be scaled up or down as necessary.

Primary stock solutions were prepared as described in the table below:

Primary Stock ID	Amount of Substance Weighed (g), Net Weight	Amount of Substance Weighed (g), as Active Ingredient	Stock Solvent	Final Volume (mL)	Primary Stock Concentration (mg/L)	Primary Stock Use
9059-2B	0.0506	0.0500	Acetonitrile	50.0	1000	Secondary stock solution
9059-2C	0.0506	0.0500		50.0	1000	Secondary stock solution
9063-1F	0.0503	0.0500		50.0	1000	Secondary stock solution
9063-1G	0.0505	0.0502		50.0	1000	Secondary stock solution

Secondary stock solutions were prepared as per the table below:

Fortifying Stock ID	Fortifying Stock Concentration (mg/L)	Volume of Fortification (mL)	Final Volume (mL)	Stock Solvent	Stock ID	Stock Concentration (mg/L)	Stock Use
9059-2B	1000	5.00	50.0	Acetonitrile	9059-2B-1	100	Sub-stock solution
9059-2C	1000	5.00	50.0		9059-2C-1	100	Sub-stock solution
9063-1F	1000	5.00	50.0		9063-1F-1	100	Sub-stock solution
9063-1G	1000	5.00	50.0		9063-1G-1	100	Sub-stock solution

Sub-stock solutions were prepared as per the table below:

Fortifying Stock ID	Fortifying Stock Concentration (mg/L)	Volume of Fortification (mL)	Final Volume (mL)	Stock Solvent	Stock ID	Stock Concentration (mg/L)	Stock Use
9059-2C-1	100	0.0500	50.0	Methanol	Ana Stk Mix 1	0.100	Calibration standards
9063-1F-1	100	0.0500					
9059-2B-1	100	1.00	10.0		Tech Stk Mix 1	10.0	Sub-stock solution
9063-1G-1	100	1.00					
Tech Stk Mix 1	10.0	0.0500	50.0		Tech Stk Mix 2	0.0100	LOQ and High-level recovery samples

All primary and secondary stock solutions were stored refrigerated (2 to 8 °C) in amber glass bottles fitted with Teflon-lined caps. Sub-stock solutions were prepared fresh on the day of use and discarded after use.

2.8 Preparation of Calibration Standards

A set of calibration standards was prepared in 20/80 methanol/surface water (v/v) by fortifying with the 0.100 mg/L sub-stock solution to yield concentrations of 0.0500, 0.0750, 0.100, 0.200, 0.300, 0.400, and 0.500 µg/L.

2.9 Matrix Effect Investigation

The effects of matrix enhancement or suppression were evaluated through the assessment of matrix-matched calibration standards in the following manner. Calibration standards used to assess possible matrix effects were prepared as follows by fortifying matrix-matched and non matrix-matched diluent with the 0.100 mg/L sub-stock solution to yield a test substance concentration of 0.0800 µg/L.

Matrix-Matched Standards

Fortifying Stock ID	Stock Concentration (mg/L)	Fortification Volume (mL)	Final Volume (mL)[a]	Standard Concentration (µg/L)	Sample ID
Ana Stk Mix 1	0.100	0.0400	50.0	0.0800	MM-Std A
		0.0400	50.0	0.0800	MM-Std B
		0.0400	50.0	0.0800	MM-Std C

[a] Dilution solvent: 20/80 methanol/surface water (v/v)

Non Matrix-Matched Standards

Fortifying Stock ID	Stock Concentration (mg/L)	Fortification Volume (mL)	Final Volume (mL)[a]	Standard Concentration (µg/L)	Sample ID
Ana Stk Mix 1	0.100	0.0400	50.0	0.0800	Sol-Std A
		0.0400	50.0	0.0800	Sol-Std B
		0.0400	50.0	0.0800	Sol-Std C

[a] Dilution solvent: 20/80 methanol/purified reagent water (v/v)

2.10 Sample Fortification and Preparation

The recovery samples were prepared in surface water with PDMU and cPMU at concentrations of 0.100 (LOQ) and 1.00 (High) µg/L. Recovery samples were prepared separately ("de novo") at these concentrations. Five replicates were produced for each concentration level.
Two samples were left unfortified to serve as controls and were diluted in the same fashion as the LOQ concentration recovery samples. In addition, one reagent blank was prepared without matrix (using methanol only) and processed in the same manner as the control samples. The preparation procedure is outlined in the table below.

Sample ID	Stock Concentration (mg/L)	Fortification Volume (mL)	Final Volume (mL)	Fortified Concentration (µg/L)
Reagent Blank A	NA[a]	NA	8.00[b]	0.00
Control A & B	NA	NA	8.00[c]	0.00
LOQ A, B, C, D & E	0.0100	0.0800	8.00[c]	0.100
High A, B, C, D & E	0.0100	0.800	8.00[c]	1.00

[a] NA = Not Applicable
[b] Methanol
[c] Surface water

2.11 Dilution of Samples

To minimize the potential for losses of the test substance during processing, the aqueous test samples were not sub-sampled prior to dilution. The first dilution with methanol was performed by the addition of the reagent to the entire volume of the aqueous sample in the container in which it was fortified to a final composition of 20/80 methanol/surface water (v/v). The high-level recovery samples were subsequently diluted into the calibration standard range with 20/80 methanol/surface water (v/v) prior to analysis. The dilution procedures are outlined in the table below.

Sample ID	Fortified Concentration (µg/L)	Sample Volume (mL)	Final Volume[a] (mL)	Sample Volume (mL)	Final Volume[b] (mL)	Dilution Factor
Reagent Blank A	0.00	8.00	10.0	NA[c]	NA	1.25
Control A & B	0.00	8.00	10.0	NA	NA	1.25
LOQ A, B, C, D, & E	0.100	8.00	10.0	NA	NA	1.25
High A, B, C, D, & E	1.00	8.00	10.0	2.50	10.0	5.00

[a] Dilution solvent: Methanol
[b] Dilution solvent: 20/80 methanol/surface water (v/v)
[c] NA = Not Applicable

2.12 Analysis

2.12.1 Instrumental Conditions

The LC-MS/MS analysis was conducted utilizing the following instrumental conditions:

LC parameters:

Column: Waters XBridge C18 BEH, 2.5 µm, 2.1 × 50 mm
Mobile Phase A: 0.1% formic acid in water
Mobile Phase B: 0.1% formic acid in acetonitrile
Gradient:

Time (min.)	Flow rate (mL/min.)	Solvent A (%)	Solvent B (%)
1.00	0.400	90.0	10.0
1.25	0.400	50.0	50.0
2.50	0.400	0.00	100
3.50	0.400	0.00	100
3.60	0.400	90.0	10.0
5.00	0.400	90.0	10.0

Run Time: 5.0 minutes

Autosampler Wash Solvent: 30/30/40 acetonitrile/methanol/reagent grade water (v/v/v)
Column Temperature: 35 °C
Sample Temperature: 15 °C
Injection Volume: 25.0 µL
Retention Times: PDMU, approximately 2.4 minutes
cPMU, approximately 2.6 minutes

MS parameters:

Instrument: MDS Sciex API 5000 mass spectrometer
Ionization Mode: Positive (+) ESI
Ion Spray Voltage: 5500 V
Scan Type: MRM
Dwell Time: 65.0 milliseconds
Source Temperature: 450 °C
Curtain Gas: 10.0
Ion Source – Gas 1 / Gas 2: 60.0 / 60.0
Collision Gas: 8.0
Collision Cell Entrance Potential: 10.0
Resolution Q1/Q3: Unit/Unit

	PDMU		cPMU	
	Primary Transition	Confirmatory Transition	Primary Transition	Confirmatory Transition
Q1/Q3 Masses (amu):	165.2/72.0	165.2/45.9	185.1/92.9	185.1/127.9
Declustering Potential:	31.0	31.0	61.0	61.0
Collision Energy:	23.0	23.0	37.0	21.0
Collision Cell Exit Potential:	28.0	18.0	16.0	20.0

Other instrumentation may be used but may require optimization to achieve the desired separation and sensitivity. It is important to note that the parameters above have been established for this particular instrumentation and may not be applicable for other similar equipment that may be used.

2.12.2 Preparation of Calibration Standard Curve

Two sets of calibration standards were analyzed with each sample set. Calibration standards were interspersed among analysis of the recovery samples, every two to six injections. Injection

of recovery samples and calibration standards onto the chromatographic system was performed by programmed automated injection.

2.13 Evaluation of Precision, Accuracy, Specificity, and Linearity

The accuracy was reported in terms of percent recovery of the fortified recovery samples. Recoveries of 70.0 to 120% (for the individual mean concentrations) are acceptable. The precision was reported in terms of the relative standard deviation (RSD) for the recovery samples and retention times. RSD values less than 20% were considered acceptable for the recovery samples (with less than 10% considered ideal) and RSD values less than 2% were considered acceptable for the retention times. Specificity of the method was determined by examination of the control samples for peaks at the same retention times as PDMU and cPMU, which might interfere with the quantitation of the analytes. Linearity of the method was determined by the coefficient of determination (r^2), y-intercept, and slope of the regression line.

2.14 Limit of Quantitation (LOQ)

The method was validated at the LOQ. This was defined as the lowest fortification level. Blank values (reagent blanks and untreated control samples) did not exceed 30% of the LOQ.

2.15 Limit of Detection (LOD) and Method Detection Limit (MDL)

The LOD was calculated using three times the signal-to-noise value of the control samples. Representative calculations for the LOD can be found in Section 3.0.

The MDL was defined as the lowest concentration in test samples that can be detected based on the concentration of the low calibration standard and the dilution factor of the control solutions. Representative calculations for the MDL can be found in Section 3.0.

3.0 CALCULATIONS

A calibration curve was constructed by plotting the analyte concentration (µg/L) of the calibration standards against the peak area of the analyte in the calibration standards. The equation of the line (equation 1) was algebraically manipulated to give equation 2. The concentration of test substance in each recovery sample was calculated using the slope and intercept from the linear regression analysis, the detector response, and the dilution factor of the recovery sample. Equations 2 and 3 were then used to calculate measured concentrations and analytical results.

$$(1) \qquad y = mx + b$$

$$(2) \qquad DC(x) = \frac{(y - b)}{m}$$

$$(3) \qquad A = DC \times DF$$

where:

x	=	analyte concentration
y	=	detector response (peak area) from the chromatogram
b	=	y-intercept from the regression analysis
m	=	slope from the regression analysis
DC (x)	=	detected concentration (µg/L) in the sample
DF	=	dilution factor (final volume of the sample divided by the original sample volume)
A	=	analytical result (µg/L), concentration in the original sample

The LOD was calculated using the following equation:

$$(4) \qquad LOD = ((3\times(SN_{ctl}))/Resp_{LS}) \times Conc_{LS} \times DF_{CNTL}$$

where:

SN_{ctl}	=	mean noise in height of the control samples (or blanks)
$Resp_{LS}$	=	mean response in height of the two low calibration standards
$Conc_{LS}$	=	concentration of the low calibration standard
DF_{CNTL}	=	dilution factor of the control samples (smallest dilution factor used, i.e., 1.25)
LOD	=	limit of detection for the analysis

The method detection limit (MDL) is defined as the lowest concentration that can be detected by this method in test solution samples. The MDL is calculated (Equation 5) based on the concentration of the low calibration standard and the dilution factor of the control samples.

$$(5) \qquad MDL = MDL_{LCAL} \times DF_{CNTL}$$

where:

MDL_{LCAL}	=	lowest concentration calibration standard (0.0500 µg/L)
DF_{CNTL}	=	dilution factor of the control samples (smallest dilution factor used, 1.25)
MDL	=	method detection limit reported for the analysis (0.0500 µg/L × 1.25 = 0.0625 µg/L)

REFERENCES

European Commission, 2000. Residues: Guidance for the generating and reporting methods of analysis in support of pre-registration data requirements for Annex II (part V, section 4) and Annex III (part A, section 5) of Directive 91/414, SANCO/3029/99 rev.4.

OECD, 1998. OECD Series on Principles of Good Laboratory Practice and Compliance Monitoring. Number 1. OECD Principles on Good Laboratory Practice (as revised in 1997). Environment Directorate Chemicals Group and Management Committee. ENV/MC/CHEM(98)17. OECD Paris, France. 41 pp.

U.S. EPA, 1989. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Good Laboratory Practice Standards; Final Rule (40 CFR, Part 160); FR: 8/17/89; pp. 34052. U.S. Environmental Protection Agency, Washington, D.C.

U.S. EPA, 2012. Office of Chemical Safety and Pollution Prevention. Ecological Effects Guideline, OCSPP 850.6100. Environmental Chemistry Methods and Associated Independent Laboratory Validation. EPA 712-C-001. January 2012. U.S. Environmental Protection Agency, Washington, D.C.

APPENDIX 1 - STUDY PROTOCOL

Study No.:14134.6113

Validation of an Environmental Chemistry Method for the Determination of PDMU and cPMU in Surface Water

1.0 INTRODUCTION

The purpose of this protocol is to validate an analytical method used to determine the content of PDMU and cPMU in surface water. The analytical method will be validated with regards to accuracy and precision, linearity, specificity, reproducibility and limit of quantitation.

2.0 JUSTIFICATION OF THE TEST SYSTEM

This study is being conducted to support the registration of the test substance(s).

The method validations described in this protocol are designed to conform to SANCO 3029/99 rev. 8.1: Guidance Document on Pesticide Residue Analytical Methods and EPA guideline OCSPP 850.6100: Environmental Chemistry Methods and Associated Independent Laboratory Validation. .

3.0 TEST SUBSTANCE

3.1 Test Substance

Upon arrival at Smithers Viscient, the test substance (also the reference substance) will be received by the Test Material Center. Records will be maintained in accordance with GLP requirements, and a Chain-of-Custody established. The condition of the external packaging of the test substance will be recorded and any damage noted. The packaging will be removed, the primary storage container inspected for leakage or damage, and the condition recorded. Any damage will be reported to the Sponsor and/or manufacturer.

Each test and reference substance will be given a unique sample ID number and stored under the conditions specified by the Sponsor or manufacturer. The following information should be provided by the Study Sponsor, if applicable: test substance lot or batch number, test substance purity, water solubility (pH and temperature of solubility determination), vapor pressure, storage stability, methods of analysis of the test substance in water, safety data sheet (SDS), and safe handling procedures, and a verified expiration or reanalysis date.

3.1.1 PDMU

Test Substance Name: 1,1-Dimethyl-3-phenylurea (Synonym: PDMU)
Purity: 99.4%
Batch or Lot #:G0612

3.1.2 cPMU

Test Substance Name: 1-(3-Chlorophenyl)-3-methylurea (Synonym: cPMU)
Purity: 98.8%
Batch or Lot #: SMV9059

3.2 Reagents

Highly pure reagents will be used throughout the study. The actual reagent grade will depend on the manufacturer's designations. Generally these reagents will have grades, such as high purity solvent, ACS grade, or Select. The reagents used are recorded along with test chemical information at the time of preparation.

4.0 VALIDATION DESIGN

The test design will consist of an aqueous matrix (Surfacewater) fortified with the test substance at two concentrations with 5 replicates each. The surface water consists of freshwater sampled near or slightly below the surface of well aerated sections of a natural body of freshwater.The control matrix for the validation will be the appropriate untreated water matrix. The validation study levels (approximate concentrations) for test substance can be found below or will be provided by protocol amendment:

	Sample Type	Concentration	Number of Replicates
1.	10x LOQ Concentration	1.00 ppb	5
2.	LOQ Concentration	0.100 ppb	5
3.	Matrix Blank – Control Matrix	0.00 ppb	2
4.	Procedural blank – reagent blank	0.00 ppb	1

4.1 Accuracy and Precision

The accuracy of the analytical method will be determined by applying the method to five samples at the LOQ and five samples at 10X LOQ for each test substance in each matrix. The accuracy will be reported in terms of percent recovery and the difference between the mean determined and the theoretical value. Recoveries of 70.0 to 120% of nominal are acceptable.

The precision will be calculated for the fortified samples in terms of the standard deviation (SD) and relative standard deviation (RSD or coefficient of variation (CV)) calculated for the retention time, peak area based quantitation (i.e., µg/L), and the observed recovery values. The retention time should have a RSD of less than or equal to 2%. The RSD of the peak area based quantitation (i.e., µg/L) should be less than or equal to 20%. The RSD of the recovery values should be less than or equal to 20% as well.

4.2 Specificity

The specificity of the Sponsor's method will be determined by applying the method to two samples of control matrix. Chromatograms will be obtained for the control samples and examined for peaks that might interfere with the quantitation of the analyte peak of interest. Peaks attributable to the test substance should be sufficiently resolved from any peaks found in the samples of control matrix to enable quantification. LC/MS/MS is considered highly specific provided that at least two ions are monitored, primary and confirmatory transitions.

4.3 Regression Analysis

The analytical calibration will extend over a range appropriate to the lowest and highest nominal concentration of the analyte in relevant analytical solutions ± at least 20%. A minimum of five concentrations will be utilized in the determination of the calibration line. The calibration data will be subjected to a regression analysis. The equation of the calibration line and a regression parameter, e.g., the coefficient of determination (r^2), will be reported and a typical calibration plot submitted. The data should have a coefficient of determination (r^2) of not less than 0.990. Linear regression analyses may not be applicable for all method/detection types. A non-linear calibration may be used with appropriate justification, including how calibration accuracy is to be maintained, in the raw data.

4.4 Matrix Effects Determination

Determination of matrix effects should be assessed as outlined in the analytical methods for both primary and confirmatory transitions. Matrix effects should be evaluated at the LOQ level for each test substance. Only if experiments clearly demonstrate that matrix effects are not significant (i.e., matrix effects < 20%), calibration with standards in solvent may be used. In the event that there are no matrix effects, matrix matched standards may also be used if deemed appropriate.

4.5 Limits of Quantitation (LOQ)

The method will be validated at the limit of quantitation (LOQ). This will be defined as the lowest fortification level. Blank values (reagent blanks and untreated control samples) should not exceed 30% of the LOQ. If this is exceeded, it will be discussed with the Sponsor and detailed justification provided prior to processing.

4.6 Limits of Detection (LOD) and Method Detection Limit (MDL)

The limit of detection (LOD) will be calculated using three times the signal-to-noise value of the control samples. The method detection limit (MDL) will be set at the lowest concentration that can be detected in test solutions samples. The value is calculated based on the concentration of the low calibration standard and the dilution factor of the control samples.

4.7 Confirmatory Analyses

A chromatographic confirmatory method will be used to determine test solution concentrations during validation. Utilizing an LC-MS/MS system an example of a confirmatory method would be where the primary product ion and one confirmatory (secondary) product ion will be used for identification/quantification. The confirmatory method analysis will also adhere to the aforementioned method specifications (Sections 4.1 – 4.6 above).

5.0 RECORDS TO BE MAINTAINED

Records to be maintained will include, but will not be limited to, correspondence and other documents relating to the interpretation and evaluation of data as well as all raw data and documentation generated as a result of the study.

6.0 TEST SYSTEM IDENTIFICATION

Test solution preparation will be documented on data forms which include the amount of test substance, the volume or mass of the test solution, lot, batch or other sample designation of the test substance and date the solution was prepared. Individual sample containers will be labeled with a unique ID number.

7.0 SAMPLE DISPOSAL

All study specimens, and/or samples collected during the study, and test materials and reference standards, etc., provided by the sponsor, client, or customer will either be returned to the originator, shipped to a third party archival facility on behalf of the Study Sponsor who will incur the costs of shipping and archival, or disposed of according to Smithers Viscient standard operating procedures (SOPs).

8.0 REPORTING

The raw data generated at Smithers Viscient will be peer-reviewed and the final report will be reviewed by the Study Director. All values will be reported to various levels of significance depending on the accuracy of the measuring devices employed during any one process. The Quality Assurance Unit will inspect the final report to confirm that the methods, procedures, and observations are accurately and completely described, that the reported results accurately and completely reflect the raw data generated at Smithers Viscient and to confirm adherence with the study protocol. A single copy of the draft report will be submitted to the Sponsor for review. The report will be finalized according to Smithers Viscient SOPs. The final report will meet the formatting requirements of EPA's PR Notice 2011-3. All reports will include, but will not be limited to, the following information:

- The report and project numbers from Smithers Viscient and Sponsor Study number (if any).

- Laboratory and site, dates of testing and personnel involved in the study, i.e., Program Coordinator (if applicable), Study Director and Principal Investigator.
- Identification of the test substance including chemical name, additional designations (e.g., trade name), chemical designation (CAS number), empirical formula, molecular structure, manufacturer, lot or batch number, degree of purity of test substance (percent test chemical) (Sponsor supplied, if available).
- A full description of the experimental design and procedures followed and a description of the test equipment used.
- The determined accuracy, precision, specificity, linearity, reproducibility and LOQ.
- The mathematical equations and statistical methods used in generating and analyzing the data as well as calculations using these equations. Tabular and graphical representations (if appropriate) of the data.
- Description of any problems experienced and how they were resolved.
- Good Laboratory Practice (GLP) Compliance Statement signed by the Study Director.
- Date(s) of Quality Assurance reviews, and dates reported to the Study Director and management, signed by the Quality Assurance Unit.
- Location of protocol, raw data and final report.

9.0 PROTOCOL AMENDMENTS

All amendments to the approved protocol must be documented in writing and signed by both the Study Director and the Sponsor Representative. Protocol amendments and deviations must include the reasons for the change and the impact of the change on the results of the study, if any.

10.0 GOOD LABORATORY PRACTICES

All test procedures, documentation, records and reports will comply with the U.S. Environmental Protection Agency's Good Laboratory Practices as set forth under the Federal Insecticide, Fungicide and Rodenticide Act (40 CFR, Part 160) and as accepted by OECD Principles of Good Laboratory Practice.

11.0 REFERENCES

OECD, 1998. OECD Series on Principles of Good Laboratory Practice and Compliance Monitoring. Number 1. OECD Principles on Good Laboratory Practice (as revised in 1997). Environment Directorate Chemicals Group and Management Committee. ENV/MC/CHEM(98)17. OECD Paris. France. 41 pp.

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U.S. EPA, January 2012. OCSPP 850.6100: Environmental Chemistry Methods and Associated Independent Laboratory Validation [EPA 712-C-001].

European Commission, 2000. Residues: Guidance for the generating and reporting methods of analysis in support of pre-registration data requirements for Annex II (part V, section 4) and Annex III (part A, section 5) of Directive 91/414. SANCO/3029/99 rev.4.