



**Analytical method for bensulfuron-methyl in water**

- Reports:** ECM: EPA MRID No.: 49588205. Raithatha, A. 2014. ANALYTICAL METHOD VALIDATION FOR THE DETERMINATION OF BENSULFURON METHYL CONCENTRATION IN SURFACE WATER GROUND WATER AND DRINKING WATER. JRF Study No.: 228-2-12-933 (Final Report). Report prepared by Jai Research Foundation (JRF), Gujarat, India, and sponsored and submitted by RICECO LLC, Memphis, Tennessee; 70 pages (including 1 unpaginated blank page). Final report issued October 7, 2014.
- ILV: EPA MRID No. 50161801. LaMonaca, S.M. 2015. Independent Laboratory Validation of JRFI Analytical Method for the Determination of Bensulfuron-methyl in Surface Water, Ground Water, and Drinking Water. JRF America Study No.: AU-2014-08. Report prepared by JRF America (JRFA), Audubon, Pennsylvania, sponsored and submitted by RICECO International, Memphis, Tennessee; 100 pages. Final report issued May 27, 2015.
- Document No.:** MRIDs 49588205 & 50161801
- Guideline:** 850.6100
- Statements:** ECM: The study was conducted in accordance with OECD and Indian Good Laboratory Practice (GLP) standards and JRF Standard Operating Procedures (SOP), which are considered to be comparable to SEPA FIFRA GLP standards (40 CFR Part 160; pp. 3-4; Appendix 5, p. 69 of MRID 49588205). Signed and dated No Data Confidentiality, GLP, and Quality Assurance statements were provided (pp. 2-5; Appendix 5, p. 69). A statement of the authenticity of the study report was included with the GLP statement (p. 4).
- ILV: The study was conducted in accordance with USEPA FIFRA GLP standards (p. 3 of MRID 50161801). Signed and dated No Data Confidentiality, GLP, Quality Assurance, and Authenticity statements were provided (pp. 2-5).
- Classification:** This analytical method is classified as **unacceptable**. An amended ECM should be submitted to include the ILV modifications and/or sufficient chromatographic support for the ECM (JRFI) method. Communications between the ILV and ECM Study Monitor were not detailed in the ILV. The LOD was not reported in the ILV.
- PC Code:** 128820

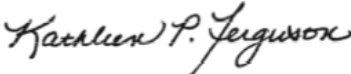
**EFED Primary Reviewer:** Kristy Crews, PhD, Chemist

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**CDM/CSS-Dynamac JV Reviewers:** Lisa Muto,  
Environmental Scientist

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Kathleen Ferguson, Ph.D.,  
Environmental Scientist

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Date: 9/12/17

*This Data Evaluation Record may have been altered by the Environmental Fate and Effects Division subsequent to signing by CDM/CSS-Dynamac JV personnel.*

## Executive Summary

The analytical method, JRF Study No.: 228-2-12-933 (Final Report), is designed for the quantitative determination of bensulfuron-methyl in water at the LOQ of 0.05 µg/L using LC/MS/MS. The LOQ is less than the lowest toxicological level of concern in water (1.4 µg a.i./L for *Lemna gibba* (duckweed)) for bensulfuron-methyl. The ECM and ILV validated the method using characterized surface, ground and drinking water. The ILV validated the method for drinking and ground water matrices in the first trial and for surface water matrix in the second trial with minor modifications to the analytical instrumentation and parameters. All ILV and ECM data regarding repeatability, accuracy, precision, and linearity were satisfactory for bensulfuron-methyl in all three matrices. All ILV data regarding specificity were satisfactory; however, the specificity of the method was not supported in the ECM because no LOQ and 10×LOQ representative chromatograms were provided. An amended ECM should be submitted to include the ILV modifications and/or sufficient chromatographic support for the ECM method. Although the ILV summarized several aspects of the ILV laboratory which would ensure independence from the ECM, communications between the ILV (JRFA) and ECM (JRFI) were not detailed. The LOD was not reported in the ILV.

**Table 1. Analytical Method Summary**

Analyte(s) by Pesticide	MRID		EPA Review	Matrix	Method Date (dd/mm/yyyy)	Registrant	Analysis	Limit of Quantitation (LOQ)
	Environmental Chemistry Method	Independent Laboratory Validation						
Bensulfuron-methyl	49588205 <sup>1</sup>	50161801 <sup>2</sup>		Water	07/10/2014	RICECO International	LC/MS/MS	0.05 µg/L

<sup>1</sup> In the ECM, the surface (river) water (pH 7.68; 196 mg/L as CaCO<sub>3</sub> hardness; 20.23 mg/L total organic carbon) obtained from the Daman Ganga River near N.H. No. 8 (near Jai Research Foundation, Gujarat, India), ground water (pH 7.71; 298 mg/L as CaCO<sub>3</sub> hardness; 15.18 mg/L total organic carbon) obtained from Jai Research Foundation (Gujarat, India), and drinking water (pH 7.12; 28 mg/L as CaCO<sub>3</sub> hardness; 4.62 mg/L total organic carbon) obtained from Bisleri International Pvt. Ltd. (Batch No. 210) were used in the study (pp. 11, 15 of MRID 49588205).

2 In the ILV, the surface (river) water (JRFA ID 105125; pH 8.3; 184 mg as CaCO<sub>3</sub> hardness; 4.7 ppm total organic carbon) obtained from Skippack Creek at Hoy Park in Collegeville, Pennsylvania, ground (well) water (JRFA ID 105123; pH 6.5; 198 mg as CaCO<sub>3</sub> hardness; 198 ppm total organic carbon) obtained from a well at the Bennet residence in West Chester, Pennsylvania, and drinking (bottled) water (JRFA ID 25791; pH 6.2; < 1 mg as CaCO<sub>3</sub> hardness; 1.0 ppm total organic carbon) obtained as bottled Aquafina water from Walmart in Audubon, Pennsylvania, were used in the study (pp. 12-13; Appendices B-C, pp. 81-83 of MRID 50161801). The water samples were characterized by Agvise Laboratories, Northwood, North Dakota.

## I. Principle of the Method

Samples (1.00 mL) were fortified, as necessary, with 0.01 mL of 5.00 or 49.96 µg/L of the bensulfuron-methyl fortification solution and analyzed directly by LC/MS/MS (pp. 14, 19-20 of MRID 49588205).

Samples were analyzed for bensulfuron-methyl by Nexera X2 HPLC system coupled with an AB MDS Sciex API 4000 Q Trap MS (Waters X-Bridge C-18 column, 4.6 mm x 150 mm, 3.5 µm column; column temperature not reported) using an isocratic mobile phase of acetonitrile:0.1% formic acid in water (60:40, v:v) with MS/MS-ESI (electrospray ionization; temperature 550°C) detection in positive ion mode and multiple reaction monitoring (MRM; pp. 20-21 of MRID 49588205). Injection volume was 10 µL. Bensulfuron-methyl was identified using two ion transitions; one for quantitation (Q) and one for confirmation (C). Ion transitions monitored were  $m/z$  411.1→149.2 (Q) and  $m/z$  411.1→182.3 (C). Approximate retention time was 3.40 minutes (Appendix 1, p. 48).

In the ILV, the ECM was performed as written, except for minor modifications to the analytical instrumentation and parameters (pp. 17-19, 24 of MRID 50161801). A Waters Acquity UPLC System (Waters X-Bridge C-18 column, 4.6 mm x 150 mm, 3.5 µm; column temperature not reported) was coupled to an AB MDS Sciex API 4000 Q Trap MS with TurboIonSpray for analyte identification. The following modifications of the ECM (JRFI) analytical method were made: injection volume was 15 µL; curtain gas was 25 psi (JRFI used 10 psi); MS temperature was 600°C; GS1 was 60.00 psi (JRFI used 50 psi); and GS2 was 40.00 psi (JRFI used 60 psi). All other analytical parameters were the same as the ECM. Bensulfuron-methyl was identified using two ion transitions; one for quantitation (Q) and one for confirmation (C). Ion transitions monitored were  $m/z$  411.216→149.000 (Q) and  $m/z$  411.216→182.100 (C). Approximate retention time was 3.48 minutes (Appendix A, p. 33).

The Limit of Quantitation (LOQ) for bensulfuron-methyl in water was 0.05 µg/L in the ECM and ILV (pp. 10-11, 22 of MRID 49588205; pp. 6, 22 of MRID 50161801). The Limit of Detection (LOD) for water was reported as 0.01 µg/L in the ECM; the LOD was not reported in the ILV.

## II. Recovery Findings

ECM (MRID 49588205): Mean recoveries and relative standard deviations (RSDs) were within guideline requirements (mean 70-120%; RSD ≤20%) for analysis of bensulfuron-methyl in three water matrices at fortification levels of 0.05 µg/L (LOQ) and 0.5 µg/L (10×LOQ; Tables 9-14,

pp. 31-36). Bensulfuron-methyl was identified using two ion transitions. 10×LOQ performance data (recovery results) from primary and confirmatory analyses were comparable; primary and confirmatory analyses were less comparable in the LOQ performance data. The surface (river) water (pH 7.68; 196 mg/L as CaCO<sub>3</sub> hardness; 20.23 mg/L total organic carbon) obtained from the Daman Ganga River near N.H. No. 8 (near Jai Research Foundation, Gujarat, India), ground water (pH 7.71; 298 mg/L as CaCO<sub>3</sub> hardness; 15.18 mg/L total organic carbon) obtained from Jai Research Foundation (Gujarat, India), and drinking water (pH 7.12; 28 mg/L as CaCO<sub>3</sub> hardness; 4.62 mg/L total organic carbon) obtained from Bisleri International Pvt. Ltd. (Batch No. 210) were used in the study (pp. 11, 15).

ILV (MRID 50161801): Mean recoveries and RSDs were within guideline requirements for analysis of bensulfuron-methyl in three water matrices at fortification levels of 0.05 µg/L (LOQ) and 0.5 µg/L (10×LOQ; pp. 7, 21). Bensulfuron-methyl was identified using two ion transitions. performance data (recovery results) from primary and confirmatory analyses were comparable, although consistently slightly higher for the confirmation analysis. The surface (river) water (JRFA ID 105125; pH 8.3; 184 mg as CaCO<sub>3</sub> hardness; 4.7 ppm total organic carbon) obtained from Skippack Creek at Hoy Park in Collegeville, Pennsylvania, ground (well) water (JRFA ID 105123; pH 6.5; 198 mg as CaCO<sub>3</sub> hardness; 198 ppm total organic carbon) obtained from a well at the Bennet residence in West Chester, Pennsylvania, and drinking (bottled) water (JRFA ID 25791; pH 6.2; < 1 mg as CaCO<sub>3</sub> hardness; 1.0 ppm total organic carbon) obtained as bottled Aquafina water from Walmart in Audubon, Pennsylvania, were used in the study (pp. 12-13; Appendices B-C, pp. 81-83). The water samples were characterized by Agvise Laboratories, Northwood, North Dakota. The method was validated for drinking and ground water matrices in the first trial and for surface water matrix in the second trial with minor modifications to the analytical instrumentation and parameters (pp. 8, 24).

**Table 2. Initial Validation Method Recoveries for Bensulfuron-methyl in Water<sup>1,2</sup>**

Analyte	Fortification Level (µg/L)	Number of Tests	Recovery Range (%)	Mean Recovery (%)	Standard Deviation (%) <sup>3</sup>	Relative Standard Deviation (%)
<b>Surface (River) Water</b>						
Quantitation ion						
Bensulfuron-methyl	0.05 (LOQ)	5	80.00-100.00	96.00	8.94	8.00
	0.5	5	90.00-92.00	91.20	1.10	1.09
Confirmatory ion						
Bensulfuron-methyl	0.05 (LOQ)	5	80.00-100.00	88.00	10.95	12.50
	0.5	5	88.00-96.00	91.20	3.03	3.26
<b>Ground Water</b>						
Quantitation ion						
Bensulfuron-methyl	0.05 (LOQ)	5	80.00-100.00	84.00	8.94	10.00
	0.5	5	86.00-90.00	88.80	1.79	2.05
Confirmatory ion						
Bensulfuron-methyl	0.05 (LOQ)	5	80.00-100.00	92.00	10.95	10.00
	0.5	5	86.00-92.00	88.40	2.61	2.95
<b>Drinking Water</b>						
Quantitation ion						
Bensulfuron-methyl	0.05 (LOQ)	5	80.00-100.00	88.00	10.95	12.50
	0.5	5	98.00-102.00	100.00	1.41	1.40
Confirmatory ion						
Bensulfuron-methyl	0.05 (LOQ)	5	100.00	100.00	0.00	0.00
	0.5	5	98.00-104.00	100.80	2.28	2.20

Data (uncorrected recovery results) were obtained from Tables 9-14, pp. 31-36 of MRID 49588205.

1 The surface (river) water (pH 7.68; 196 mg/L as CaCO<sub>3</sub> hardness; 20.23 mg/L total organic carbon) obtained from the Daman Ganga River near N.H. No. 8 (near Jai Research Foundation, Gujarat, India), ground water (pH 7.71; 298 mg/L as CaCO<sub>3</sub> hardness; 15.18 mg/L total organic carbon) obtained from Jai Research Foundation (Gujarat, India), and drinking water (pH 7.12; 28 mg/L as CaCO<sub>3</sub> hardness; 4.62 mg/L total organic carbon) obtained from Bisleri International Pvt. Ltd. (Batch No. 210) were used in the study (pp. 11, 15).

2 Two ion transitions were monitored (quantitation and confirmatory, respectively) as follows: *m/z* 411.1→149.2 and *m/z* 411.1→182.3.

3 Standard deviations were reviewer-calculated using the data in the study report since the study author did not report these values (see DER Attachment 2).

**Table 3. Independent Validation Method Recoveries for Bensulfuron-methyl in Water<sup>1,2,3</sup>**

Analyte	Fortification Level (µg/L)	Number of Tests	Recovery Range (%)	Mean Recovery (%)	Standard Deviation (%)	Relative Standard Deviation (%)
<b>Surface (River) Water</b>						
Quantitation ion						
Bensulfuron-methyl	0.05 (LOQ)	5	86.0-100.1	92.5	5.734	6.203
	0.5	5	79.8-95.4	90.0	6.194	6.879
Confirmatory ion						
Bensulfuron-methyl	0.05 (LOQ)	5	82.1-107.3	94.9	9.433	9.944
	0.5	5	79.9-90.0	85.0	3.687	4.324
<b>Ground (Well) Water</b>						
Quantitation ion						
Bensulfuron-methyl	0.05 (LOQ)	5	89.0-103.4	94.3	5.511	5.846
	0.5	5	81.9-95.9	90.6	5.243	5.785
Confirmatory ion						
Bensulfuron-methyl	0.05 (LOQ)	5	94.3-102.6	99.8	3.326	3.334
	0.5	5	85.2-115.1	95.8	11.882	12.404
<b>Drinking (Bottled) Water</b>						
Quantitation ion						
Bensulfuron-methyl	0.05 (LOQ)	5	97.6-108.2	104.8	4.492	4.286
	0.5	5	98.6-107.6	103.8	3.539	3.409
Confirmatory ion						
Bensulfuron-methyl	0.05 (LOQ)	5	97.6-119.2	108.0	8.235	7.622
	0.5	5	100.8-113.1	109.2	6.796	6.223

Data (uncorrected recovery results, pp. 19-20) were obtained from p. 7 of MRID 50161801.

1 The surface (river) water (JRFA ID 105125; pH 8.3; 184 mg as CaCO<sub>3</sub> hardness; 4.7 ppm total organic carbon) obtained from Skippack Creek at Hoy Park in Collegeville, Pennsylvania, ground (well) water (JRFA ID 105123; pH 6.5; 198 mg as CaCO<sub>3</sub> hardness; 198 ppm total organic carbon) obtained from a well at the Bennet residence in West Chester, Pennsylvania, and drinking (bottled) water (JRFA ID 25791; pH 6.2; < 1 mg as CaCO<sub>3</sub> hardness; 1.0 ppm total organic carbon) obtained as bottled Aquafina water from Walmart in Audubon, Pennsylvania, were used in the study (pp. 12-13; Appendices B-C, pp. 81-83). The water samples were characterized by Agvise Laboratories, Northwood, North Dakota.

2 Two ion transitions were monitored (quantitation and confirmatory, respectively) as follows: *m/z* 411.216→149.000 and *m/z* 411.216→182.100.

### III. Method Characteristics

The LOQ for bensulfuron-methyl in water was 0.05 µg/L in the ECM and ILV (pp. 10-11, 22 of MRID 49588205; pp. 6, 22 of MRID 50161801). In the ILV, the LOQ was justified as the second lowest calibration standard. No justification was provided in the ECM, but signal-to-noise ratios were calculated as 10.0 to 13.9 for the three matrices (ions combined; Tables 7-8, pp. 29-30 of MRID 49588205). The LOD for water was reported as 0.01 µg/L in the ECM (pp. 10-11, 22). No justification was provided in the ECM, but signal-to-noise ratios were calculated as 2.6 to 3.5 for the three matrices (ions combined; Tables 7-8, pp. 29-30). The LOD was not reported in the ILV. No calculations were reported to justify the LOQ or LOD for the method in the ECM and ILV.

**Table 4. Method Characteristics**

Analyte <sup>1</sup>		Bensulfuron-methyl		
		Surface Water	Ground Water	Drinking Water
Limit of Quantitation (LOQ)	ECM	0.05 µg/L		
	ILV			
Limit of Detection (LOD)	ECM	0.01 µg/L		
	ILV	Not reported		
Linearity (calibration curve $r^2$ and concentration range)	ECM <sup>1</sup>	$r^2 = 0.9962$ (Q) $r^2 = 0.9974$ (C)	$r^2 = 0.9992$ (Q) $r^2 = 0.9958$ (C)	$r^2 = 0.9984$ (Q & C)
		0.04-1.00 µg/L		
	ILV	$r^2 = 0.9961$ (Q) $r^2 = 0.9964$ (C)	$r^2 = 0.9994$ (Q) $r^2 = 0.9997$ (C)	$r^2 = 0.9994$ (Q) $r^2 = 0.9990$ (C)
		0.025-0.50 ng/mL		
Repeatable	ECM <sup>2</sup>	Yes at LOQ and 10×LOQ (characterized surface, ground, and drinking water matrices)		
	ILV <sup>3,4</sup>			
Reproducible		Yes at LOQ and 10×LOQ		
Specific	ECM	No LOQ and 10×LOQ representative chromatograms were provided. Some minor baseline noise interfered with peak integration in the 2×LOQ representative chromatograms. Only insignificant matrix interferences were observed in the controls.		
	ILV	Some minor baseline noise and non-uniform peak integration was observed. A minor contaminant peak (<10% of the LOQ based on peak height) was near the LOQ peak in surface water. <sup>5</sup>		

Data were obtained from pp. 10-11, 22; Tables 1-6, pp. 27-28 (calibration coefficients), Tables 7-8, pp. 29-30 (LOQ/LOD); Tables 9-14, pp. 31-36 (recovery data); Figures 1-6, pp. 37-42 (calibration curves); Appendix 1, pp. 43-52 (chromatograms) of MRID 49588205; pp. 6-7, 19, 22-23 (recovery data & calibration coefficients); Appendix A, pp. 27-32 (calibration curves); Appendix A, pp. 43-48, 59-64, 75-80 (chromatograms) of MRID 50161801. Q = Quantitation ion transition; C = Confirmation ion transition.

1 Correlation coefficients ( $r^2$ ) values were reviewer-calculated from  $r$  values provided in the study report (Tables 1-6, pp. 27-28 of MRID 49588205; DER Attachment 2). Matrix-based calibration standards were used.

2 In the ECM, the surface (river) water (pH 7.68; 196 mg/L as CaCO<sub>3</sub> hardness; 20.23 mg/L total organic carbon) obtained from the Daman Ganga River near N.H. No. 8 (near Jai Research Foundation, Gujarat, India), ground water (pH 7.71; 298 mg/L as CaCO<sub>3</sub> hardness; 15.18 mg/L total organic carbon) obtained from Jai Research Foundation (Gujarat, India), and drinking water (pH 7.12; 28 mg/L as CaCO<sub>3</sub> hardness; 4.62 mg/L total organic carbon) obtained from Bisleri International Pvt. Ltd. (Batch No. 210) were used in the study (pp. 11, 15 of MRID 49588205).

3 In the ILV, the surface (river) water (JRFA ID 105125; pH 8.3; 184 mg as CaCO<sub>3</sub> hardness; 4.7 ppm total organic carbon) obtained from Skippack Creek at Hoy Park in Collegeville, Pennsylvania, ground (well) water (JRFA ID 105123; pH 6.5; 198 mg as CaCO<sub>3</sub> hardness; 198 ppm total organic carbon) obtained from a well at the Bennet residence in West Chester, Pennsylvania, and drinking (bottled) water (JRFA ID 25791; pH 6.2; < 1 mg as CaCO<sub>3</sub> hardness; 1.0 ppm total organic carbon) obtained as bottled Aquafina water from Walmart in Audubon, Pennsylvania, were used in the study (pp. 12-13; Appendices B-C, pp. 81-83 of MRID 50161801). The water samples were characterized by Agvise Laboratories, Northwood, North Dakota.

4 The ILV validated the method for drinking and ground water matrices in the first trial and for surface water matrix in the second trial with minor modifications to the analytical instrumentation and parameters (pp. 8, 24 of MRID 50161801).

5 Appendix A, pp. 77-78 of MRID 50161801.

#### IV. Method Deficiencies and Reviewer's Comments

1. An amended ECM should be submitted to include the ILV modifications and/or sufficient chromatographic support for the ECM (JRFI) method. Satisfactory chromatographic support was only provided for the ILV analytical instruments and parameters; therefore, the ILV analytical method was the only one which was validated.

The ILV validated the method for drinking and ground water matrices in the first trial and for surface water matrix in the second trial with minor modifications to the analytical instrumentation and parameters (pp. 8, 24 of MRID 50161801). The following modifications of the ECM (JRFI) analytical method were made: injection volume was 15  $\mu$ L (JRFI used 10  $\mu$ L); curtain gas was 25 psi (JRFI used 10 psi); MS temperature was 600°C (JRFI used 550°C); GS1 was 60.00 psi (JRFI used 50 psi); and GS2 was 40.00 psi (JRFI used 60 psi; pp. 17-19, 24). The ILV study author specifically noted that the increase of the injection volume was done to enhance sensitivity and reproducibility of the peak signal (p. 25).

The specificity of the method was not supported in the ECM because no LOQ and 10 $\times$ LOQ representative chromatograms were provided (Appendix 1, pp. 43-52 of MRID 49588205). Only solvent blanks, matrix controls and matrices fortified at 0.1 g/L (2 $\times$ LOQ; calibration standard) were provided for review. Minor baseline noise interfered with peak integration in the 2 $\times$ LOQ representative chromatograms; the reviewer believed that the magnitude of the peak interference may increase in the LOQ chromatograms and affect the specificity of the method. Representative chromatograms of the LOQ and 10 $\times$ LOQ fortifications should be provided to support the method by showing peak attenuation and magnitude compared to the baseline noise.

2. The communications between the ILV and ECM were not detailed in the ILV (pp. 6, 24 of MRID 50161801). The communication between the Study Director and Sponsor Monitor during validation was reportedly documented and maintained in the raw data, but no synopsis of that communication was reported in the ILV study report. The ILV reported that the independence of the ILV laboratory was ensured because the Study Director, instruments, chemicals, analytical standards, etc., were distinct and operated separately and without collusion for the validation portion. Also, the Study Director had no prior experience with the method. Although the ILV summarized these aspects of the ILV laboratory which would ensure independence from the ECM, the reviewer believed that communications between the Study Director and Sponsor Monitor during validation should have been provided since both laboratories were part of Jai Research Foundation (JRF).
3. In the ILV, a minor contaminant peak (<10% of the LOQ based on peak height) was near the LOQ peak in surface water (Appendix A, pp. 77-78 of MRID 50161801).
4. The estimations of LOQ and LOD in ECM and ILV were not based on scientifically acceptable procedures as defined in 40 CFR Part 136 (pp. 10-11, 22 of MRID 49588205; pp. 6, 22 of MRID 50161801). In the ILV, the LOQ was justified as the second lowest



calibration standard. No justification was provided in the ECM, but signal-to-noise ratios were calculated as 10.0 to 13.9 for the three matrices (ions combined; Tables 7-8, pp. 29-30 of MRID 49588205). No justification for the LOD was provided in the ECM, but signal-to-noise ratios were calculated as 2.6 to 3.5 for the three matrices (ions combined). The LOD was not reported in the ILV. No calculations were reported to justify the LOQ or LOD for the method in the ECM and ILV.

5. It was reported for the ILV that one sample set of 13 samples required *ca.* 6-8 hours, including the calculation and reporting of all data under GLP (p. 22 of MRID 50161801).

## V. References

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

40 CFR Part 136. Appendix B. Definition and Procedure for the Determination of the Method Detection Limit-Revision 1.11, pp. 317-319.

**Attachment 1: Chemical Names and Structures****Bensulfuron-methyl****IUPAC Name:** Methyl  $\alpha$ -[(4,6-dimethoxypyrimidin-2-ylcarbamoyl)sulfamoyl]-o-toluate**CAS Name:** Methyl 2-[[[[[(4,6-dimethoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]methyl]benzoate**CAS Number:** 83055-99-6**SMILES String:** n1c(OC)cc(OC)nc1NC(=O)NS(=O)(=O)Cc2ccccc2C(=O)OC