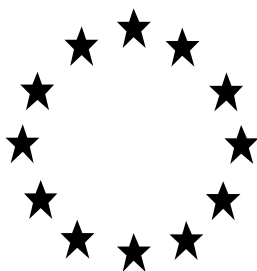


Draft Renewal Assessment Report
under Regulation (EC) 1107/2009



FORAMSULFURON
Formulation: FRS + IDF OD 45
(Equip OD 45)
Volume 3
Annex B.8
Environmental fate and behaviour and
exposure assessment

Rapporteur Member State: Finland
Co-Rapporteur Member State: Slovakia

March 2015

Volume 1

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List of Endpoints

Version History

When	What
2015/March	First Draft RAR

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B.8. ENVIRONMENTAL FATE AND BEHAVIOUR

B.8.1. FATE AND BEHAVIOUR IN SOIL

This document contains updated calculations for the predicted environmental concentrations of foramsulfuron and its metabolites in soil and water. Equip OD 45 is an oil dispersion formulation. For the purposes of this risk assessment it was assumed that formulation additives do not influence the fate and behaviour of an active substance in the environment and were not considered further.

Use pattern considered in the environmental exposure and risk assessment

Table 8- 1: Intended application pattern

Crop	Timing of application (range)	Number of applications	Application interval [days]	Maximum label rate (range) [L/ha]	Maximum application rate, individual treatment (ranges) [g/ha]	
					Foramsulfuron	Isoxadifen-ethyl
Maize	BBCH 12-18	1	-	2.6	60	60
Maize	BBCH 12-18	2	7	1.3	30	30

Definition of the residue for risk assessment

Justification for the residue definition for risk assessment is provided in Vol 1 Level2 for the active substance data.

Table 8- 2: Definition of the residue for risk assessment

Compartment	Compound / Code
Soil	Foramsulfuron AE F092944 AE F130619 AE F153745
Groundwater	Foramsulfuron AE F092944 AE F130619 AE F153745
Surface water	Foramsulfuron AE F092944 AE F130619 AE F153745 AE 0338795 AE F099095 4-Amino-N-methylbenzamide 4-Formamido-N-methylbenzamide Foramsulfuron sulfamic acid

B.8.1.1. Route and rate of degradation in soil

Fate and behaviour of foramsulfuron in soil were assessed in Vol 3 Annex B.8 of the RAR based on the application of the active substance in laboratory studies. Field studies with the application of a formulation were not considered since the laboratory degradation data showed that the DT50-values of the active substance were less than the specified triggers, i.e. 60 days at 20°C and 90 days at 10°C with moisture being in the range of pF 2 to pF 2.5

B.8.1.2. Mobility in soil

The adsorption of the foramsulfuron and its metabolites has been evaluated at least in four soils. Please refer to Vol 3 Annex B.8.1.2.

B.8.2. PREDICTED ENVIRONMENTAL CONCENTRATIONS IN SOIL (PEC_S)

Annex point:	KCP 9.1.3/01
Document No:	M-456836-01-1
Report No:	EnSa-13-0395
Authors:	Schmitt, W.; Mikolasch, B.
Title:	FSN: PECsoil EUR - Use in maize in Europe. Foramsulfuron (AE F130360), AE F130619, AE F153745, AE F092944
Date:	18 th June 2013
Guidelines:	EU Commission, 2000, Guidance Document on Persistence in Soil (Working Document), 9188/VI/97 rev.8 FOCUS 1997, Soil persistence models and EU registration FOCUS, 2002, Generic Guidance for FOCUS Groundwater Scenarios, Version 1.1
GLP/GEP:	no
Deviations:	Deviation not specified

Material and Methods

The predicted environmental concentrations in soil (PEC_S) for foramsulfuron (AE F130360) and its main soil metabolites AE F130619, AE F153745 and AE F092944 were calculated based on a first tier approach using a Microsoft[®] Excel spreadsheet. A bulk density of 1.5 kg/L and a soil mixing depth of 5 cm were used as recommended by FOCUS (1997) and EU Commission (1995, 2000). Application data of foramsulfuron in the intended crop – maize, was set according to Good Agricultural Practice under European cropping conditions (Table 8.2-1). Further relevant substances input parameters are summarized in Table 8.2-2.

Table 8.2-1: Application pattern used for PEC_S of foramsulfuron calculation

Crop		Application		BBCH Stage	Interception [%]	Amount Reaching Soil [g a.s./ha]
Individual	FOCUS	Rate per Season [g a.s./ha]	Interval [days]			
Maize	maize	1 x 60	-	12–18	25	1 x 45
Maize	maize	2 x 30	7	12–18	2 x 25	2 x 22.5

Substance Specific Parameters:

PECsoil calculations were based on the maximum DT₅₀ of laboratory studies; normalized to 20°C and field capacity according to FOCUS (2000). Further compound specific input parameters are summarized below.

Table 8.2-2: Input parameters for PEC_S of foramsulfuron and its metabolites calculation

Substance	DT ₅₀ * [days]	Max. Occurrence in Soil [%]	Molar Mass [g/mol]	Molar Mass Correction Factor	Application Rate on Soil** for Application Rate	
					60 g a.s./ha	30 g a.s./ha
foramsulfuron	82.00	100.0	452.49	1.0000	45	22.5
AE F130619	25.70	29.1	424.44	0.9380	12.28	6.14
AE F153745	3.68	7.8	271.30	0.5996	2.1	1.05
AE F092944	147.60	17.8	155.16	0.3429	2.75	1.37

* Maximum (the worst-case) DT₅₀ of laboratory studies normalized to 20°C according to FOCUS 2000 (for details refer please. to KCA 7.1.2.1.1/05 resp. KCA 7.1.2.1.2/08)

** Application Rate on Soil = Application Rate x Molar Mass Correction Factor x Max. Occurrence in Soil x (100 - Interception)/10000

Results and discussion

The maximum PEC_S values for foramsulfuron and its metabolites AE F130619, AE F153745 and AE F092944 are summarised in the following Table 8.2-3. Initial, short-term and long-term PEC_S values and the time weighted average values are provided for two use patterns: Maize, application rate 1 x 60 g a.s./ha per season and Maize, application rate 2 x 30 g a.s./ha per season (Tables 8.2-4 – 8.2-7).

Table 8.2-3: Maximum PEC_S of foramsulfuron and its metabolites

Use pattern	Maximum PEC _S			
	foramsulfuron	AE F130619	AE F153745	AE F092944
Maize. 1x60 g a.s./ha	0.060	0.016	0.003	0.004
Maize. 2x30 g a.s./ha	0.058	0.015	0.002	0.004

Table 8.2-4: PEC_S (actual) and TWAC_S of foramsulfuron (DT₅₀max = 82d)

Use pattern		Maize. 1 x 60 g/ha		Maize. 2 x 30 g/ha	
Time since application		PEC _S	TWAC _S	PEC _S	TWAC _S
[period]	[days]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]
Initial	0	0.060	-	0.058	-
Short term	1	0.059	0.060	0.058	0.058
	2	0.059	0.059	0.057	0.058
	4	0.058	0.059	0.056	0.057
Long term	7	0.057	0.058	0.055	0.057
	14	0.053	0.057	0.052	0.055
	21	0.050	0.055	0.049	0.053
	28	0.047	0.053	0.046	0.052
	42	0.042	0.051	0.041	0.049
	50	0.039	0.049	0.038	0.048
	100	0.026	0.040	0.025	0.039

Table 8.2-5: PEC_S (actual) and TWAC_S of metabolite AE F130619 (DT₅₀max = 25.7d)

Use pattern		Maize. 1 x 60 g/ha		Maize. 2 x 30 g/ha	
Time since application		PEC _S	TWAC _S	PEC _S	TWAC _S
[period]	[days]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]
Initial	0	0.016	-	0.015	-
Short term	1	0.016	0.016	0.015	0.015
	2	0.016	0.016	0.014	0.015
	4	0.015	0.016	0.013	0.014
Long term	7	0.014	0.015	0.012	0.014
	14	0.011	0.014	0.010	0.012
	21	0.009	0.013	0.008	0.011
	28	0.008	0.011	0.007	0.011
	42	0.005	0.010	0.005	0.009
	50	0.004	0.009	0.004	0.008
	100	0.001	0.006	0.001	0.005

Table 8.2-6: PEC_s (actual) and TWAC_s of metabolite AE F153745 (DT50_{max} = 3.68d)

Use pattern		Maize. 1 x 60 g/ha		Maize. 2 x 30 g/ha	
Time since application		PEC _s	TWAC _s	PEC _s	TWAC _s
[period]	[days]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]
Initial	0	0.003	-	0.002	-
Short term	1	0.002	0.003	0.001	0.002
	2	0.002	0.002	< 0.001	0.001
	4	0.001	0.002	< 0.001	0.001
Long term	7	< 0.001	0.002	< 0.001	< 0.001
	14	< 0.001	< 0.001	< 0.001	< 0.001
	21	< 0.001	< 0.001	< 0.001	< 0.001
	28	< 0.001	< 0.001	< 0.001	< 0.001
	42	< 0.001	< 0.001	< 0.001	< 0.001
	50	< 0.001	< 0.001	< 0.001	< 0.001
	100	< 0.001	< 0.001	< 0.001	< 0.001

Table 8.2-7: PEC_s (actual) and TWAC_s of metabolite AE F092944 (DT50_{max} = 147.6)

Use pattern		Maize. 1 x 60 g/ha		Maize. 2 x 30 g/ha	
Time since application		PEC _s	TWAC _s	PEC _s	TWAC _s
[period]	[days]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]
Initial	0	0.004	-	0.004	-
Short term	1	0.004	0.004	0.004	0.004
	2	0.004	0.004	0.004	0.004
	4	0.004	0.004	0.004	0.004
Long term	7	0.004	0.004	0.003	0.004
	14	0.003	0.004	0.003	0.003
	21	0.003	0.003	0.003	0.003
	28	0.003	0.003	0.003	0.003
	42	0.003	0.003	0.003	0.003
	50	0.003	0.003	0.003	0.003
	100	0.002	0.003	0.002	0.003

Potential accumulation in soil:

The accumulation potential of foramsulfuron and its metabolites AE F130619, AE F153745 and AE F092944 after long term use was also assessed, employing a larger soil depth for the calculation of the background concentration in cases where tillage is relevant. The results are presented below for as a standard mixing depth of 5 cm (Table 8.2-8) as a non-standard mixing depth of 20 cm (Table 8.2-9).

Table 8.2-8: PEC_s of foramsulfuron and its metabolites for the uses assessed. taking the effect of accumulation into account (standard mixing depth of 5 cm – non-tillage situation)

Use Pattern	PEC _s	Foramsulfuron	AE F130619	AE F153745	AE F092944
Maize	plateau	0.003	<0.001	<0.001	<0.001
1 x 60 g a.s./ha	total*	0.063	0.016	0.003	0.004
Maize	plateau	0.003	<0.001	<0.001	<0.001
2 x 30 g a.s./ha	total*	0.061	0.015	0.002	0.004

* total = plateau (background concentration after multi-year use) + max. PEC_s (see Table 8.2-3)

Table 8.2-9: PEC_s of foramsulfuron and its metabolites for the uses assessed. taking the effect of accumulation into account (non-standard mixing depth of 20 cm – tillage considered)

Use Pattern	PEC _s	Foramsulfuron	AE F130619	AE F153745	AE F092944
Maize 1 x 60 g a.s./ha	plateau	< 0.001	< 0.001	< 0.001	< 0.001
	total*	0.061	0.016	0.003	0.004
Maize 2 x 30 g a.s./ha	plateau	< 0.001	< 0.001	< 0.001	< 0.001
	total*	0.059	0.015	0.002	0.004

* total = plateau (background concentration after multi-year use) + max. PEC_s (see Table 8.2-3)

Conclusion

Predicted environmental concentrations for foramsulfuron and its metabolites AE F130619, AE F153745 and AE F092944 in soil (PEC_s) were calculated in accordance with EU Commission. 2000. Guidance Document on Persistence in Soil (Working Document; 9188/VI/97 rev.8 and FOCUS guidelines (FOCUS 1997, 2002). Soil accumulation was investigated for both the 0 – 5 cm and 0 – 20 cm soil layer based on two use patterns: Maize, application rate 1 x 60 g a.s./ha per season and Maize, application rate 2 x 30 g a.s./ha per season.

The initial PEC_s values for foramsulfuron at application rate of 1 x 60 g a.s./ha and 2 x 30 g a.s./ha were 0.060 mg/kg and 0.058 mg/kg respectively. Maximum plateau PEC_s values for the 5 cm soil depth were calculated to be 0.003 mg/kg for both use patterns. For distribution over the 20 cm soil depth, the values were predicted to be < 0.001 mg/kg for both use patterns.

The initial PEC_s values for metabolite AE F130619 at application rate of 1 x 60 g a.s./ha and 2 x 30 g a.s./ha were 0.016 mg/kg and 0.015 mg/kg respectively. Maximum plateau PEC_s values for the 5 cm soil depth were calculated to be < 0.001 mg/kg for both use patterns. For distribution over the 20 cm soil depth, the values were predicted to be < 0.001 mg/kg for both use patterns.

The initial PEC_s values for metabolite AE F153745 at application rate of 1 x 60 g a.s./ha and 2 x 30 g a.s./ha were 0.003 mg/kg and 0.002 mg/kg respectively. Maximum plateau PEC_s values for the 5 cm soil depth were calculated to be < 0.001 mg/kg for both use patterns. For distribution over the 20 cm soil depth, the values were predicted to be < 0.001 mg/kg for both use patterns.

The initial PEC_s values for metabolite AE F092944 at application rate of 1 x 60 g a.s./ha and 2 x 30 g a.s./ha were 0.004 mg/kg for both use patterns. Maximum plateau PEC_s values for the 5 cm soil depth were calculated to be < 0.001 mg/kg for both use patterns. For distribution over the 20 cm soil depth, the values were predicted to be < 0.001 mg/kg for both use patterns.

RMS comment

The PEC_{soil} values were calculated according to guideline.

However, slight deviations were discovered between the results of calculations published in EnSa-13-0395 report and Co-RMS calculations in case of PEC_s (actual) and TWAC_s of metabolite AE F153745 as values of PEC_s in 3 cases and TWAC_s in five cases should be 0.001 instead of < 0.001. Corrections are indicated in the following table by bold typeface (compare. please. with Table 8.2-6)

Table 8.2-6.1: PEC_S (actual) and TWAC_S of metabolite AE F153745 (DT₅₀max = 3.68d)

Use pattern		Maize. 1 x 60 g/ha		Maize. 2 x 30 g/ha	
Time since application		PEC _S	TWAC _S	PEC _S	TWAC _S
[period]	[days]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]
Initial	0	0.003	-	0.002	-
Short term	1	0.002	0.003	0.001	0.002
	2	0.002	0.002	0.001	0.001
	4	0.001	0.002	0.001	0.001
Long term	7	0.001	0.002	< 0.001	0.001
	14	< 0.001	0.001	< 0.001	0.001
	21	< 0.001	0.001	< 0.001	< 0.001
	28	< 0.001	0.001	< 0.001	< 0.001
	42	< 0.001	< 0.001	< 0.001	< 0.001
	50	< 0.001	< 0.001	< 0.001	< 0.001
	100	< 0.001	< 0.001	< 0.001	< 0.001

B.8.3. PREDICTED ENVIRONMENTAL CONCENTRATIONS IN GROUND WATER (PEC_{GW})

Following the latest guidance on PEC_{GW} modelling and considering compound related input parameters from new experimental studies and kinetic evaluations (KCA 7.1.2.1.1/05 resp. KCA 7.1.2.1.2/08) new PEC_{GW} values have been calculated therefore superseding the previous data.

Annex point:	KCP 9.2.4.1/01
Document No:	M-455495-01-1
Report No:	EnSa-13-0336
Authors:	Schmitt, W.; Mikolasch, B.
Title:	FSN: PEC _{GW} EU - Predicted Environmental Concentrations in Groundwater Recharge Based on Model FOCUS PEARL and FOCUS PELMO - Use in maize in Europe. Foramsulfuron (AE F130360), AE F130619, AE F153745. AE F092944
Date:	5 th June 2013
Guidelines:	FOCUS 2000, SANCO/321/2000 rev. 2 FOCUS 2009, SANCO/13144/2010 v. 1 FOCUS 2012, Generic Guidance for Tier 1 FOCUS Groundwater Assessments. v. 2.1
GLP/GEP:	no
Deviations:	Deviation not specified

Material and Methods

The predicted environmental concentrations in ground water (PEC_{GW}) of foramsulfuron (AE F130360) and its metabolites AE F130619, AE F153745 and AE F092944 were calculated using simulation models FOCUS PEARL version 4.4.4 and FOCUS PELMO version 4.4.3. PEC_{GW} were evaluated as the 80th percentile of the mean annual leachate concentration at 1 m soil depth.

Application dates for the simulation runs were defined following the crop event dates of the respective crop – maize and scenario as given by FOCUS (2009). Crop interception was taken into account according to the BBCH growth stage as recommended by FOCUS (2012). Respective application data used for PEC_{GW} calculation are summarized in Table 8.3-1 and 8.3-2. The simulations were carried out

over 26 years for pesticides which are applied every year. The first 6 years were so called ‘warm up’ period.

Table 8.3-1: First application dates and related information for foramsulfuron as used for the simulation runs

Individual crop	Maize		
Repeat Interval for App. Events	Every Year		
Application Technique	Spray		
Absolute / Relative to	Emergence		
Scenario	1 st App. Date	(Julian day)	Offset
Chateaudun	06 May	(126)	5
Hamburg	10 May	(130)	5
Jokioinen			
Kremsmuenster	10 May	(130)	5
Okehampton	30 May	(150)	5
Piacenza	20 May	(140)	5
Porto	06 May	(126)	5
Sevilla	12 Mar	(71)	5
Thiva	25 Apr	(115)	5

Table 8.3-2: Application pattern used for PEC_{GW} of foramsulfuron calculation

Crop		Application		BBCH Stage	Interception [%]	Amount reaching soil [g a.s./ha]
Individual	FOCUS	Rate per Season [g a.s./ha]	Interval [days]			
Maize	maize	1 x 60	-	12–18	25	1 x 45
Maize	maize	2 x 30	7	12–18	2 x 25	2 x 22.5

Substance specific and model related input parameters upgraded in accordance with results of the newest laboratory studies were evaluated in Vol 3 B.8.1.1 and in Vol 3 B.8.2.1 and are summarised in Tables 8.3-3 and 8.3-4. All the metabolites were run together with the active substance in one simulation in both models.

Table 8.3-3: Input parameters for PEC_{GW} of foramsulfuron and its metabolites calculation

Substance	Molar mass [g/mol]	Water Solubility [mg/L]	Vapour Pressure [Pa]	Freundlich Exponent*
Foramsulfuron	452.49	3293	4.20E-11	0.870
AE F130619	424.44	35.5	5.80E-13	0.930
AE F153745	271.30	5830	3.47E-08	0.970
AE F092944	155.16	5484	3.72E-02	0.670

* arithmetic mean of 1/n values from different soils (for details refer. please to Vol3 B.8.2.1)

Table 8.3-4: Substance specific and model related input parameter for PEC_{GW} calculation (model parameters not listed are kept as default)

Parameter	Unit	Foramsulfuron	AE F130619	AE F153745	AE F092944
PEARL parameters					
DT50**	[days]	13.5	2.3	0.9	25.9
Molar activ. energie	[kJ/mol]	65.4	65.4	65.4	65.4
K _{om} ***	[mL/g]	40.700	36.6	27.8	360.0
Kf	[mL/g]	-	-	-	-
Degradation fraction from:					
➤ foramsulfuron to metabolite		-	0.92	0.22	0.22
PELMO parameters					
Rate Constant **	[1/day]	0.06980	0.30137	0.81547	0.02676
Q10	[-]	2.58	2.58	2.58	2.58
K _{oc} ***	[mL/g]	69.7	63.2	48.0	621.0
Degradation rate from:					
➤ foramsulfuron to metabolite		-	0.047	0.011	0.011
➤ metabolite to BR/CO2		-	0.301	0.815	0.027

** geometric mean of normalised DT₅₀ in aerobic soil under laboratory conditions (for details refer please to Vol3 B.8.1.1)

*** geometric mean of K_{oc} values from different soils. The K_{oc} values were converted into K_{om} values with the standard conversion factor of 1.724 (for details refer please to Vol3 B.8.2.1).

Results and discussion

In all simulations the PEC_{GW} values (the 80th percentile of the mean annual leachate concentration at 1 m soil depth) of foramsulfuron and its metabolites AE F130619, AE F153745 and AE F092944 were below the groundwater threshold value of 0.1 µg/L¹. The results of the calculations with FOCUS PEARL 4.4.4 and FOCUS PELMO 4.4.3 are presented in Tables from 8.3-5 to 8.3-8.

Table 8.3-5: PEC_{GW} of foramsulfuron

FOCUS Scenario	PEC _{GW} [µg/L]			
	Use pattern: maize. 1 x 60 g a.s./ha		Use pattern: maize. 2 x 30 g a.s./ha	
	PEARL	PELMO	PEARL	PELMO
Châteaudun	<0.001	<0.001	<0.001	<0.001
Hamburg	<0.001	<0.001	<0.001	<0.001
Kremsmuenster	<0.001	<0.001	<0.001	<0.001
Okehampton	<0.001	<0.001	<0.001	<0.001
Piacenza	<0.001	<0.001	<0.001	<0.001
Porto	<0.001	<0.001	<0.001	<0.001
Sevilla	<0.001	<0.001	<0.001	<0.001
Thiva	<0.001	<0.001	<0.001	<0.001

¹ 80/778/EEC - COUNCIL DIRECTIVE of 15 July 1980 relating to the quality of water intended for human consumption

Table 8.3-6: PEC_{GW} of metabolite AE F130619

FOCUS Scenario	PEC _{GW} [µg/L]			
	Use pattern: maize. 1 x 60 g a.s./ha		Use pattern: maize. 2 x 30 g a.s./ha	
	PEARL	PELMO	PEARL	PELMO
Châteaudun	<0.001	<0.001	<0.001	<0.001
Hamburg	<0.001	<0.001	<0.001	<0.001
Kremsmuenster	<0.001	<0.001	<0.001	<0.001
Okehampton	<0.001	<0.001	<0.001	<0.001
Piacenza	<0.001	<0.001	<0.001	<0.001
Porto	<0.001	<0.001	<0.001	<0.001
Sevilla	<0.001	<0.001	<0.001	<0.001
Thiva	<0.001	<0.001	<0.001	<0.001

Table 8.3-7: PEC_{GW} of metabolite AE F153745

FOCUS Scenario	PEC _{GW} [µg/L]			
	Use pattern: maize. 1 x 60 g a.s./ha		Use pattern: maize. 2 x 30 g a.s./ha	
	PEARL	PELMO	PEARL	PELMO
Châteaudun	<0.001	<0.001	<0.001	<0.001
Hamburg	<0.001	<0.001	<0.001	<0.001
Kremsmuenster	<0.001	<0.001	<0.001	<0.001
Okehampton	<0.001	<0.001	<0.001	<0.001
Piacenza	<0.001	<0.001	<0.001	<0.001
Porto	<0.001	<0.001	<0.001	<0.001
Sevilla	<0.001	<0.001	<0.001	<0.001
Thiva	<0.001	<0.001	<0.001	<0.001

Table 8.3-8: PEC_{GW} of metabolite AE F092944

FOCUS Scenario	PEC _{GW} [µg/L]			
	Use pattern: maize. 1 x 60 g a.s./ha		Use pattern: maize. 2 x 30 g a.s./ha	
	PEARL	PELMO	PEARL	PELMO
Châteaudun	<0.001	<0.001	<0.001	<0.001
Hamburg	<0.001	<0.001	<0.001	<0.001
Kremsmuenster	<0.001	<0.001	<0.001	<0.001
Okehampton	<0.001	<0.001	<0.001	<0.001
Piacenza	<0.001	<0.001	<0.001	<0.001
Porto	<0.001	<0.001	<0.001	<0.001
Sevilla	<0.001	<0.001	<0.001	<0.001
Thiva	<0.001	<0.001	<0.001	<0.001

Conclusion

As in all above described simulations PEC_{GW} values of foramsulfuron and its metabolites AE F130619, AE F153745 and AE F092944 were below the groundwater threshold value of 0.1 µg/L. It can be concluded that the use of foramsulfuron in accordance with the use patterns is not likely to pose an unacceptable risk to groundwater.

RMS comment

RMS considers the simulations as acceptable.

B.8.4. FATE AND BEHAVIOUR IN WATER AND SEDIMENT

Laboratory studies assessing the fate and behaviour of the preparation in water and sediment have not been performed. The fate and behaviour of foramsulfuron in aquatic environment were assessed in the Annex B.8 of the current RAR, based on laboratory studies with application of the active substance. The endpoints derived from these studies are considered appropriate to assess the exposure of foramsulfuron after application of the formulation FSN+IDF OD 45 (22.5+22.5).

B.8.4.1. Aerobic mineralisation in surface water

Experimental studies with the formulation have not been performed. See separate Annex B.8 for the active substance data.

B.8.4.2. Water/sediment study

Experimental studies with the formulation have not been performed. See separate Annex B.8 for the active substance data.

B.8.4.3. Irradiated water/sediment study

Experimental studies with the formulation have not been performed nor with the active substance.

B.8.5. PREDICTED ENVIRONMENTAL CONCENTRATIONS IN SURFACE WATER AND SEDIMENT (PEC_{sw}, PEC_{sd})

Annex point:	KCP 9.2.5.1/01
Document No:	M-458837-02-1
Report No:	EnSa-13-0365
Authors:	Schmitt. W.; Mikolasch. B.
Title:	Foramsulfuron (FSN) and metabolites: PEC _{sw, sed} FOCUS EUR - Use in maize in Europe - Foramsulfuron (AE F130360) AE F130619, AE F092944, AE F153745, AE 0338795, AE F099095 - Foramsulfuron-4-amino-N-methylbenzamide - Foramsulfuron-4-formylmido-N-methylbenzamide - Foramsulfuron-sulfamic acid
Date:	5 th June 2013
Guidelines:	FOCUS 2003, SANCO/4802/2001 rev 2 FOCUS 2000, SANCO/321/2000/rev. 2 FOCUS 2007, SANCO/10422/2005 v. 2.0
GLP/GEP:	no
Deviations:	Deviation not specified

Materials and Methods:

Predicted environmental concentrations in surface water and sediment (PEC_{sw} and PEC_{sed}) of foramsulfuron and its metabolites AE F130619, AE F092944, AE F153745, AE 0338795, AE F099095, 4-amino-N-methylbenzamide, 4-formamido-N-methylbenzamide and foramsulfuron-sulfamic acid have been calculated for the use in maize in Europe.

At FOCUS step 2 the application period was set to March to May and calculations considered the use in Northern and Southern Europe. Details of the application pattern used in the Step 2 calculations are summarised in Table 8.5-1.

Table 8.5-1. Application pattern used in PEC_{sw} calculations (for FOCUS step1 & 2)

Individual Crop	FOCUS Crop Used for Interception	Application				Amount Reaching the Soil per Season application [g a.s. /ha]
		Rate per Season	Interval	Plant Interception	Growth Stage	
		[g a.s. /ha]	[days]	[%]		
Maize	Maize (arable crops)	1 × 60	-	Minimal crop cover (25%)	12-18	1 × 45.0
Maize	Maize (arable crops)	2 × 30	7	Minimal crop cover (25%)	12-18	2 × 22.5

At FOCUS step 3, actual application dates were determined by the PAT (pesticide application timer) included within SWASH. Details of the parameters used in the Step 3 calculations are summarised in Table 8.5-2.

Table 8.5-2: Application dates of foramsulfuron for the FOCUS Step 3 calculations (Emg. stands for the emergence date)

Parameter	Maize 1 x 60 g/ha		Maize 2 x 30 g/ha	
PAT start date rel./absolute	Emg., 0 days		Emg., 0 days	
Appl. method (appl. type)	ground spray (CAM 2)		ground spray (CAM 2)	
No of appl.	1		2	
PAT window range	30		var. Range	
Appl. interval	1		7	
Application Details	PAT Start Date (Julian Day)	Appl. Date	PAT Start Date (Julian Day)	1 st Appl. Date
D3 (1st)	05-May (125)	04-May	05-May (125)	04-May 14-May
D4 (1st)	10-May (130)	30-May	10-May (130)	30-May 06-Jun
D5 (1st)	10-May (130)	11-May	10-May (130)	11-May 27-May
D6 (1st)	20-Apr (110)	23-Apr	20-Apr (110)	23-Apr 03-May
R1 (1st)	03-May (123)	03-May	03-May (123)	08-May 15-May
R2 (1st)	01-May (121)	07-May	01-May (121)	07-May 20-May
R3 (1st)	01-May (121)	18-May	01-May (121)	18-May 01-Jun
R4 (1st)	10-Apr (100)	10-Apr	10-Apr (100)	10-Apr 20-Apr

Compound specific input data are summarised below for FOCUS Steps 1-2 (Table 8.5-3 and Table 8.5-4) and FOCUS Steps 3-4 (Table 8.5-5).

Table 8.5-3. Substance parameters used for foramsulfuron and its metabolites at Steps 1-2 level

Parameter	Unit	Foramsulfuron	AE F130619	AE F092944	AE F153745	AE 0338795
Molar Mass	g/mol	452.49	424.44	155.16	271.3	438.42
Water Solubility	mg/L	3293	35.5	5484	5830	200000
Koc	mL/g	69.7 ¹⁾	63.2 ¹⁾	621 ¹⁾	48 ¹⁾	17.67 ²⁾
Degradation						
Soil	days	13.5 ³⁾	2.3 ³⁾	25.9 ³⁾	0.9 ³⁾	1000 ⁴⁾
Total System	days	32.9 ⁵⁾	15.7 ⁵⁾	110 ⁵⁾	72.1 ⁵⁾	65.4 ⁵⁾
Water	days	32.9 ⁵⁾	15.7 ⁵⁾	110 ⁵⁾	72.1 ⁵⁾	65.4 ⁵⁾
Sediment	days	32.9 ⁵⁾	15.7 ⁵⁾	110 ⁵⁾	72.1 ⁵⁾	65.4 ⁵⁾
Max Occurrence						
Water / Sediment	%	100	10.7	26.5	24.6	23.7
Soil	%	100	29.1	17.8	7.8	0.001

¹⁾ Geometric mean Koc ²⁾ Estimated by calculation using KOCWIN (US EPA, 2000) ³⁾ Normalised geometric mean value

⁴⁾ Default value (worst case) ⁵⁾ Geometric mean of total system

Table 8.5-4: Substance parameters used for the foramsulfuron metabolites at Steps 1-2 level

Parameter	Unit	AE F099095	4-amino-N-methylbenzamide	4-formamido-N-methylbenzamide	Foramsulfuron-sulfamic acid
Molar Mass	g/mol	198.18	150.18	178.19	278.24
Water Solubility	mg/L	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾
Koc	mL/g	351 ²⁾	0 ¹⁾	0 ¹⁾	0 ¹⁾
Degradation					
Soil	days	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾
Total System	days	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾
Water	days	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾
Sediment	days	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾	1000 ¹⁾
Max Occurrence					
Water / Sediment	%	35.2	12.8	19.7	17.6
Soil	%	0.001	0.001	0.001	0.001

¹⁾ Default value

²⁾ Geometric mean Koc – study was submitted in the dossier for Annex I inclusion of Mesosulfuron; agreed Koc values are listed in SANCO/10298/2003-Final of 25 June 2004.

Table 8.5-5: Substance specific and model related input parameter for PEC_{sw} calculation of foramsulfuron and metabolite at Step 3-4 level (model parameters not listed are kept as default)

Parameter	Unit	Foramsulfuron	AE F130619
Company Code	-	AE F130360	AE F130619
SWASH Code	-	Foram2	F619
General Parameters			
Molar Mass	g/mol	452.5	424.4
Water Solubility	mg/L	3293.0	35.5
Vapour Pressure	Pa	4.2E-11	5.8E-13
Plant Uptake Factor	-	0.0	0.0
Wash-Off Factor PRZM	l/cm	0.5	0.5
Wash-Off Factor MACRO	l/mm	0.05	0.05
Sorption			
Koc	mL/g	70 ¹⁾	63 ¹⁾
Freundlich Exponent	-	0.87 ²⁾	0.93 ²⁾
Degradation			
Soil	days	13.5 ³⁾	2.3 ³⁾
Form. Frac. PRZM	molar basis	-	0.920
Form. Frac. MACRO	mass basis	-	0.863
Water	days	32.9 ⁴⁾	15.7 ⁴⁾
Sediment	days	1000 ⁵⁾	1000 ⁵⁾
Walker Exponent	-	0.7	0.7
Effect of Temperature			
Activation Energy	J/mol	65400	65400
Exponent	1/K	0.095	0.095
Q10	-	2.58	2.58

¹⁾ Geometric mean Koc²⁾ Arithmetic mean 1/n³⁾ Normalised geometric mean value⁴⁾ Geometric mean of total system⁵⁾ Default value (worst case)

Results

Step 1 and 2: The maximum PEC values for Steps 1 and 2 are given in the tables below for foramsulfuron and its metabolites.

Table 8.5-6: Maximum PEC_{sw} and PEC_{sed} values for foramsulfuron and metabolites at Step 1& 2

Use pattern	FOCUS scenario	Foramsulfuron		AE F130619		AE F092944	
		PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
Maize 1× 60 g a.s./ha	Step 1	18.85	12.75	5.071	3.182	0.682	4.147
	Step 2						
	N-EU Single	2.713	1.842	0.255	0.155	0.099	0.601
	S-EU Single	4.948	3.368	0.481	0.298	0.189	1.156
Maize 2× 30 g a.s./ha	Step 1	18.85	12.75	5.071	3.182	0.682	4.147
	Step 2						
	N-EU Multi	2.291	1.556	0.149	0.090	0.090	0.547
	S-EU Multi	4.189	2.851	0.276	0.170	0.172	1.055
	N-EU Single	1.357	0.921	0.128	0.078	0.049	0.300
	S-EU Single	2.474	1.684	0.241	0.149	0.094	0.578

Table 8.5-7: Maximum PEC_{sw} and PEC_{sed} values for foramsulfuron and metabolites at Step 1& 2

Use pattern	FOCUS scenario	AE F153745		AE 0338795		AE F099095	
		PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
Maize 1× 60 g a.s./ha	Step 1	0.961	0.422	0.127	<0.001	0.085	<0.001
	Step 2						
	N-EU Single	0.081	0.038	0.127	0.021	0.085	0.203
	S-EU Single	0.087	0.041	0.127	0.021	0.085	0.203
Maize 2× 30 g a.s./ha	Step 1	0.961	0.422	0.127	<0.001	0.085	<0.001
	Step 2						
	N-EU Multi	0.068	0.031	0.107	0.018	0.066	0.179
	S-EU Multi	0.070	0.033	0.107	0.018	0.066	0.179
	N-EU Single	0.041	0.019	0.063	0.010	0.043	0.101
	S-EU Single	0.044	0.020	0.063	0.010	0.043	0.101

Table 8.5-8: Maximum PEC_{sw} and PEC_{sed} values for foramsulfuron and metabolites at Step 1& 2

Use pattern	FOCUS scenario	4-amino-N-methylbenzamide		4-formylmido-N-methylbenzamide		Sulfamic acid	
		PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
Maize 1× 60 g a.s./ha	Step 1	0.024	<0.001	0.043	<0.001	0.060	<0.001
	Step 2						
	N-EU Single	0.023	<0.001	0.043	<0.001	0.060	<0.001
	S-EU Single	0.023	<0.001	0.043	<0.001	0.060	<0.001
maize 2× 30 g a.s./ha	Step 1	0.024	<0.001	0.043	<0.001	0.060	<0.001
	Step 2						
	N-EU Multi	0.021	<0.001	0.038	<0.001	0.053	<0.001
	S-EU Multi	0.021	<0.001	0.038	<0.001	0.053	<0.001
	N-EU Single	0.012	<0.001	0.021	<0.001	0.030	<0.001
	S-EU Single	0.012	<0.001	0.021	<0.001	0.030	<0.001

Step 3:

The maximum PEC_{sw} and PEC_{sed} values for relevant FOCUS Step 3 scenarios are given in the tables below. Time-weighted average concentrations are not included in this summary, because they are not used in the risk assessment.

Table 8.5-9: Maximum PEC_{sw} and PEC_{sed} of foramsulfuron and the metabolite AE F130619 for all scenarios at Step 3 following application to maize (1 x 60 g a.s./ha)

Use pattern:	Maize, 1 x 60 g a.s./ha				
	Foramsulfuron			AE F130619	
FOCUS scenario	Entry route*	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
D3 (ditch)	S	0.314	0.075	0.032	0.006
D4 (pond)	S	0.013	0.022	0.001	0.002
D4 (stream)	S	0.271	0.017	0.001	<0.001
D5 (pond)	S	0.015	0.031	0.002	0.003
D5 (stream)	S	0.251	0.012	<0.001	0.001
D6 (ditch)	S	0.316	0.072	0.032	0.006
R1 (pond)	R	0.025	0.047	0.004	0.005
R1 (stream)	R	1.284	0.230	0.081	0.013
R2 (stream)	R	0.972	0.226	0.106	0.021
R3 (stream)	R	2.225	0.411	0.178	0.028
R4 (stream)	R	2.341	0.550	0.202	0.041

* Entry route: letters S, D, and R correspond to the dominant entry path – spray drift, drainage, and runoff

Table 8.5-10 Maximum PEC_{sw} and PEC_{sed} of foramsulfuron for all scenarios at Step 3 following application to maize (2 x 30 g a.s./ha, 7 d interval)

Use pattern:	Maize, 2 x 30 g a.s./ha, 7 d interval					
FOCUS scenario	Foramsulfuron, single application			Foramsulfuron, multiple application		
	Entry route	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	Entry route	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
D3 (ditch)	S	0.157	0.039	S	0.136	0.044
D4 (pond)	S	0.006	0.011	S	0.010	0.019
D4 (stream)	S	0.136	0.009	S	0.118	0.010
D5 (pond)	S	0.007	0.016	S	0.013	0.037
D5 (stream)	S	0.126	0.006	S	0.117	0.017
D6 (ditch)	S	0.158	0.037	S	0.138	0.050
R1 (pond)	R	0.013	0.026	R	0.062	0.102
R1 (stream)	R	0.622	0.116	R	1.281	0.259
R2 (stream)	R	0.456	0.111	R	0.456	0.111
R3 (stream)	R	1.084	0.209	R	1.084	0.208
R4 (stream)	R	1.151	0.282	R	1.315	0.375

* Entry route: letters S, D, and R correspond to the dominant entry path – spray drift, drainage, and runoff

Values in bold are maximum of single and multiple application.

Table 8.5-11: Maximum PEC_{sw} and PEC_{sed} of the metabolite AE F130619 for all scenarios at step 3 following application to maize (2 x 30 g a.s./ha, 7 d interval)

Use pattern:	Maize, 2 x 30 g a.s./ha, 7 d interval			
FOCUS scenario	AE F1130619 single application		AE F1130619 multiple application	
	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
D3 (ditch)	0.016	0.003	0.014	0.003
D4 (pond)	<0.001	<0.001	<0.001	0.002
D4 (stream)	<0.001	<0.001	0.001	<0.001
D5 (pond)	<0.001	0.001	0.001	0.004
D5 (stream)	<0.001	<0.001	0.001	0.002
D6 (ditch)	0.016	0.003	0.014	0.005
R1 (pond)	0.002	0.002	0.010	0.010
R1 (stream)	0.040	0.006	0.099	0.017
R2 (stream)	0.052	0.010	0.052	0.013
R3 (stream)	0.089	0.014	0.089	0.014
R4 (stream)	0.101	0.021	0.121	0.029

Values in bold are maximum of single and multiple application.

In order to distinguish long-term exposure scenarios from peak exposure scenarios the temporal patterns of PEC-figures (Vrbka 2013; M-468841-02-1) were analysed. This report Vrbka 2013 (KCP 10.2/01) supplements the original document and provides graphical representation of time evolution of PEC_{sw} concentrations for all calculated uses and scenarios at Step3 level for parent and its metabolite AE F130619.

Report:	KCP 10.2 /01; Vrbka, L.; 2013; M-468841-02; Amended: 2013-11-18
Title:	Foramsulfuron (FSN) and metabolite: PEC _{sw} ,sed FOCUS EUR (graphical outputs) - Use in maize in Europe

Report No:	EnSa-13-0880
Document No:	M-468841-02-1
Guidelines:	not applicable
GLP/GEP:	no

Peak scenarios showed a dominant peak (primary peak) that lasted not longer than 24 hours. In some scenarios this primary peak was followed by one or a few smaller peaks called secondary peaks in the following text. The following scenarios were considered as peak-scenarios: D4 stream, D5 stream, D6 ditch, R1 stream, R2 stream, R3 stream and R4 stream (see Appendix 1: Figures 8.5-1 to 8.5-20).

Step 4: At Step 4, the mitigation according to the FOCUS Landscape and Mitigation Factors report (FOCUS 2007) is assessed. For this purpose, calculations using mitigation measures for drift and runoff were defined. The relevant parameters are summarised in Table 8.5-12 and Table 8.5-13.

Table 8.5-12: Mitigation approaches used

Crop	Buffer length	Mitigation type	Drift red. nozzles
maize	10 m	Spray drift and run off	0 %
	20 m	Spray drift and run off	0 %

Table 8.5-13: Runoff mitigation parameters used for the assessment

Crop	Fractional reduction in:		10 m	20 m
maize	Run off	Volume	0.6	0.8
		Flux	0.6	0.8
	Erosion	Mass	0.85	0.95
		Flux	0.85	0.95

Vegetated filter strips, which intercept runoff water and eroded sediment prior to entry into surface water, are considered as an appropriate mitigation option for runoff following the recommendations of the FOCUS Landscape and Mitigation Working Group (FOCUS 2007). Buffer strips reduce runoff loadings by reducing the runoff water volume (i.e., by partial infiltration of runoff water into the ground) as well as by a reduction of the runoff flux (i.e., by sorption and other processes resulting in a reduction of the concentration of the chemical in the runoff).

Based on published European runoff trials which showed high variability in the runoff reduction efficiency, the FOCUS Landscape and Mitigation Working Group gives some recommendations for the efficiency of 10 - 12 m and 18 - 20 m buffer strips using the 90th percentile worst-case values.

The maximum PEC_{sw} and PEC_{sed} values for relevant FOCUS Step 4 scenarios considering different buffer zones are given in the tables below.

Table 8.5-14: Maximum PEC_{sw} and PEC_{sed} values of foramsulfuron and the metabolite AE F130619 at Step 4 with mitigation options after single application in maize (1 x 60 g/ha)

Step 4		Maize, 1 x 60 g a.s./ha			
Buffer Width & Type	FOCUS Scenario	Foramsulfuron		AE F130619	
		PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
10m (SD & RO)	D3 (ditch)	0.055	0.015	<0.001	<0.001
	D4 (pond)	0.008	0.015	<0.001	0.001
	D4 (stream)	0.061	0.005	0.001	<0.001
	D5 (pond)	0.010	0.024	<0.001	0.002
	D5 (stream)	0.057	0.008	<0.001	0.001
	D6 (ditch)	0.058	0.029	0.008	0.004
	R1 (pond)	0.012	0.025	<0.001	<0.001
	R1 (stream)	0.547	0.101	0.035	0.005
	R2 (stream)	0.426	0.101	0.046	0.009
	R3 (stream)	1.006	0.192	0.080	0.013
	R4 (stream)	1.065	0.258	0.092	0.019
20m (SD & RO)	D3 (ditch)	0.028	0.008	<0.001	<0.001
	D4 (pond)	0.006	0.013	<0.001	0.001
	D4 (stream)	0.032	0.004	0.001	<0.001
	D5 (pond)	0.008	0.020	<0.001	0.002
	D5 (stream)	0.030	0.007	<0.001	0.001
	D6 (ditch)	0.032	0.028	0.008	0.004
	R1 (pond)	0.007	0.015	<0.001	<0.001
	R1 (stream)	0.279	0.053	0.018	0.003
	R2 (stream)	0.221	0.054	0.024	0.005
	R3 (stream)	0.526	0.104	0.042	0.007
	R4 (stream)	0.558	0.140	0.048	0.010

SD and RO: Spray drift and run-off buffer

Table 8.5-15: Maximum PEC_{sw} and PEC_{sed} values of foramsulfuron and the metabolite AE F130619 at Step 4 with mitigation options after single application in maize (1 x 30 g/ha)

Step 4		Maize, 1 x 30 g a.s./ha			
Buffer Width & Type	FOCUS Scenario	Foramsulfuron		AE F130619	
		PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
10m (SD & RO)	D3 (ditch)	0.027	0.008	<0.001	<0.001
	D4 (pond)	0.004	0.008	<0.001	<0.001
	D4 (stream)	0.030	0.002	<0.001	<0.001
	D5 (pond)	0.005	0.012	<0.001	<0.001
	D5 (stream)	0.028	0.004	<0.001	<0.001
	D6 (ditch)	0.029	0.013	0.004	0.002
	R1 (pond)	0.006	0.013	<0.001	<0.001
	R1 (stream)	0.265	0.051	0.017	0.003
	R2 (stream)	0.200	0.049	0.023	0.005
	R3 (stream)	0.490	0.097	0.040	0.007
	R4 (stream)	0.523	0.132	0.046	0.010

Table 8.5-15: Continued: Maximum PEC_{sw} and PEC_{sed} values of foramsulfuron and the metabolite AE F130619 at Step 4 with mitigation options after single application in maize (1 x 30 g/ha)

Step 4		Maize, 1 x 30 g a.s./ha			
Buffer Width & Type	FOCUS Scenario	Foramsulfuron		AE F130619	
		PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
20m (SD & RO)	D3 (ditch)	0.014	0.004	<0.001	<0.001
	D4 (pond)	0.003	0.007	<0.001	<0.001
	D4 (stream)	0.016	0.002	<0.001	<0.001
	D5 (pond)	0.004	0.010	<0.001	<0.001
	D5 (stream)	0.015	0.003	<0.001	<0.001
	D6 (ditch)	0.016	0.013	0.004	0.002
	R1 (pond)	0.004	0.008	<0.001	<0.001
	R1 (stream)	0.135	0.027	0.009	0.001
	R2 (stream)	0.104	0.026	0.012	0.002
	R3 (stream)	0.256	0.053	0.021	0.004
	R4 (stream)	0.274	0.072	0.024	0.005

SD and RO: Spray drift and run-off buffer

Values in bold are maximum of single and multiple application.

Table 8.5-16: Maximum PEC_{sw} and PEC_{sed} values of foramsulfuron and the metabolite AE F130619 at Step 4 with mitigation options after multiple application in maize (2 x 30 g/ha)

Step 4		Maize, 2 x 30 g a.s./ha, 7 d interval			
Buffer Width & Type	FOCUS Scenario	Foramsulfuron		AE F130619	
		PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]	PEC _{sw} [µg/L]	PEC _{sed} [µg/kg]
10m (SD & RO)	D3 (ditch)	0.022	0.008	<0.001	<0.001
	D4 (pond)	0.006	0.016	<0.001	0.002
	D4 (stream)	0.025	0.005	0.001	<0.001
	D5 (pond)	0.009	0.032	0.001	0.003
	D5 (stream)	0.026	0.014	0.001	0.002
	D6 (ditch)	0.034	0.026	0.008	0.004
	R1 (pond)	0.027	0.047	0.002	0.002
	R1 (stream)	0.580	0.120	0.045	0.008
	R2 (stream)	0.200	0.049	0.023	0.006
	R3 (stream)	0.490	0.097	0.040	0.007
	R4 (stream)	0.598	0.175	0.055	0.013
20m (SD & RO)	D3 (ditch)	0.012	0.004	<0.001	<0.001
	D4 (pond)	0.004	0.014	<0.001	0.002
	D4 (stream)	0.013	0.005	0.001	<0.001
	D5 (pond)	0.007	0.029	0.001	0.003
	D5 (stream)	0.014	0.014	0.001	0.002
	D6 (ditch)	0.034	0.026	0.008	0.004
	R1 (pond)	0.014	0.026	<0.001	<0.001
	R1 (stream)	0.303	0.065	0.024	0.004
	R2 (stream)	0.104	0.026	0.012	0.003
	R3 (stream)	0.256	0.053	0.021	0.004
	R4 (stream)	0.313	0.095	0.029	0.007

SD and RO: Spray drift and run-off buffer

RMS comments and conclusion:**Step 1 & 2**

There were measured data available for all input values needed for foramsulfuron and the soil metabolites AE F130619, AE F092944, and AE F153745 for the PEC_{sw} and PEC_{sed} calculations and correct input values were used. AE 0338795, which is formed in water/sediment system in amounts > 10 %, the K_{oc} value was estimated by calculation using KOCWIN (US EPA, 2000) and a default value for DT₅₀ of 1000 days in soil and for formation fraction of 0.001 % in soil were used. Default values are according to the FOCUS (2003) guidance and are accepted.

For the metabolites that were only formed in photolysis studies in amounts > 10 % e.g. AE F099095 (pyrimidyl urea), Foramsulfuron-4-amino-N-methylbenzamide, Foramsulfuron-4-formylimido-N-methylbenzamide and Foramsulfuron-sulfamic acid a default value of 1000 mg/l for water solubility, a default value for DT₅₀ of 1000 days in soil and for formation fraction of 0.001 % in soil and default values for DT₅₀'s of 1000 in water, sediment and total system were used. Default values are according to the FOCUS (2003) guidance and are accepted.

Step 3 & 4

PEC_{sw} and PEC_{sed} calculations were only performed for foramsulfuron and metabolite AE F130619 at Step 3 and 4. Correct input values were used in the modelling. In Step 4 level a 10 and 20 m vegetative filter strip was used for risk mitigation purposes. The obtained max PEC_{sw} and PEC_{sed} values are used in the aquatic risk assessment and no PEC_{tw} values are reported, since these values are not needed in the risk assessment.

B.8.6. FATE AND BEHAVIOUR IN AIR

No volatility studies on the preparation have been performed. Details of volatility for the active substance are given in separate Annex B.8 for the active substance data.

B.8.6.1. Route and rate of degradation in air and transport via air

See separate Annex B.8 for the active substance data.

B.8.6.2. Predicted environmental concentrations from airborne transport

Due to the low half-life in air and the very low vapour pressure no exposure via air is expected.

B.8.7. PREDICTED ENVIRONMENTAL CONCENTRATIONS FROM OTHER ROUTES OF EXPOSURE

There are no other routes of exposure to be considered if the product is used according to good agricultural practice.

B.8.8. REFERENCES RELIED ON

Data Point / reference number	Author (s)	Year	Title Compagny Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
KCP 9.1.3 /01	Schmitt, W.; Mikolas ch, B.	2013a	Submitted for the purpose of renewal FSN: PECsoil EUR - Use in maize in Europe Bayer CropScience, Report No.: EnSa-13-0395, Edition Number: M-456836-01-1 Date: 2013-06-18 GLP/GEP: no, unpublished	N	N	Not relevant	Bayer Crop Science	N
KCP 9.2.4. 1 /01	Schmitt, W.; Mikolas ch, B.	2013b	Submitted for the purpose of renewal FSN: PECgw EU - Predicted environmental concentrations in groundwater recharge based on model Focus Pearl and Focus Pelmo - Use in maize in Europe Bayer CropScience, Report No.: EnSa-13-0336, Edition Number: M-455495-01-1 Date: 2013-06-05 GLP/GEP: no, unpublished	N	N	Not relevant	Bayer Crop Science	N
KCP 9.2.5 /01	Schmitt, W.; Mikolas ch, B.	2013c	Submitted for the purpose of renewal Foramsulfuron (FSN) and metabolites: PECsw,sed FOCUS EUR - Use in maize in Europe - Foramsulfuron (AE F130360) AE F130619, AE F092944, AE F153745, AE 0338795, AE F099095 - Foramsulfuron-4- amino-N-methylbenzamide - Foramsulfuron-4-formylmido-N- methylbenzamide - Foramsulfuron-sulfamic acid Bayer CropScience, Report No.: EnSa-13-0365, Edition Number: M-458837-02-1 Date: 2013-06-26 ...Amended: 2013-09-03 GLP/GEP: no, unpublished	N	N	Not relevant	Bayer Crop Science	N
KCP 10.2 /01	Vrbka, L.	2013	Foramsulfuron (FSN) and metabolite: PECsw,sed FOCUS EUR (graphical outputs) - Use in maize in Europe Bayer CropScience, Report No.: EnSa-13-0880, Edition Number: M-468841-02-1 Date: 2013-11-05 ...Amended: 2013-11-18 GLP/GEP: no, unpublished	N	N	Not relevant	Bayer Crop Science	N

B.8.9. APPENDIX 1: GRAPHICAL OUTPUT FOR PEC_{SW}

GRAPHICAL OUTPUT FOR REPRESENTATION OF TIME EVOLUTION OF PEC_{SW} CONCENTRATIONS FOR CALCULATED USES FOR PEAK SCENARIOS AT STEP3 LEVEL FOR PARENT AND ITS METABOLITE AE F130619.

Figure 8.5-1: D4 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - Foramsulfuron

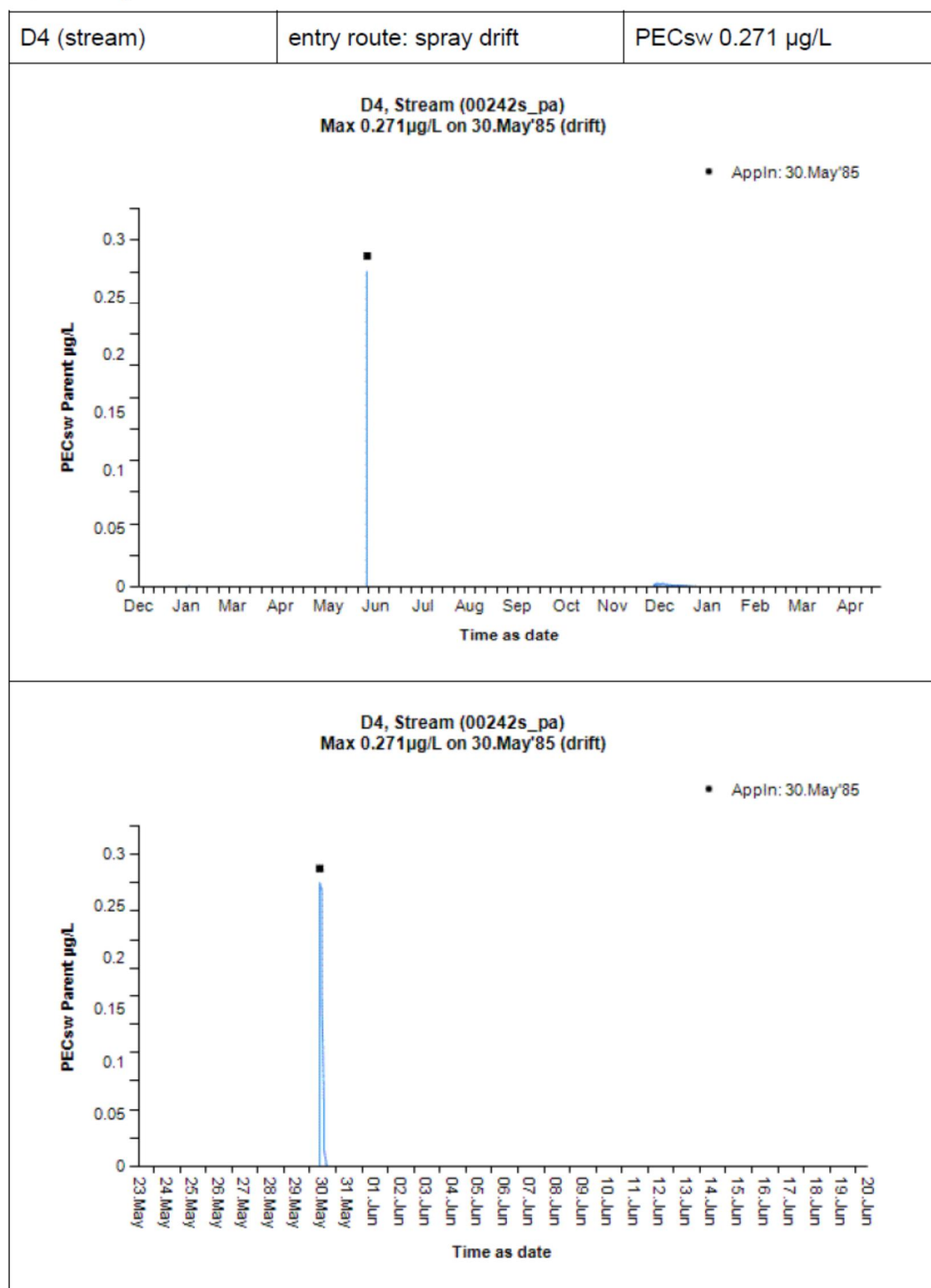


Figure 8.5-2: D5 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - Foramsulfuron

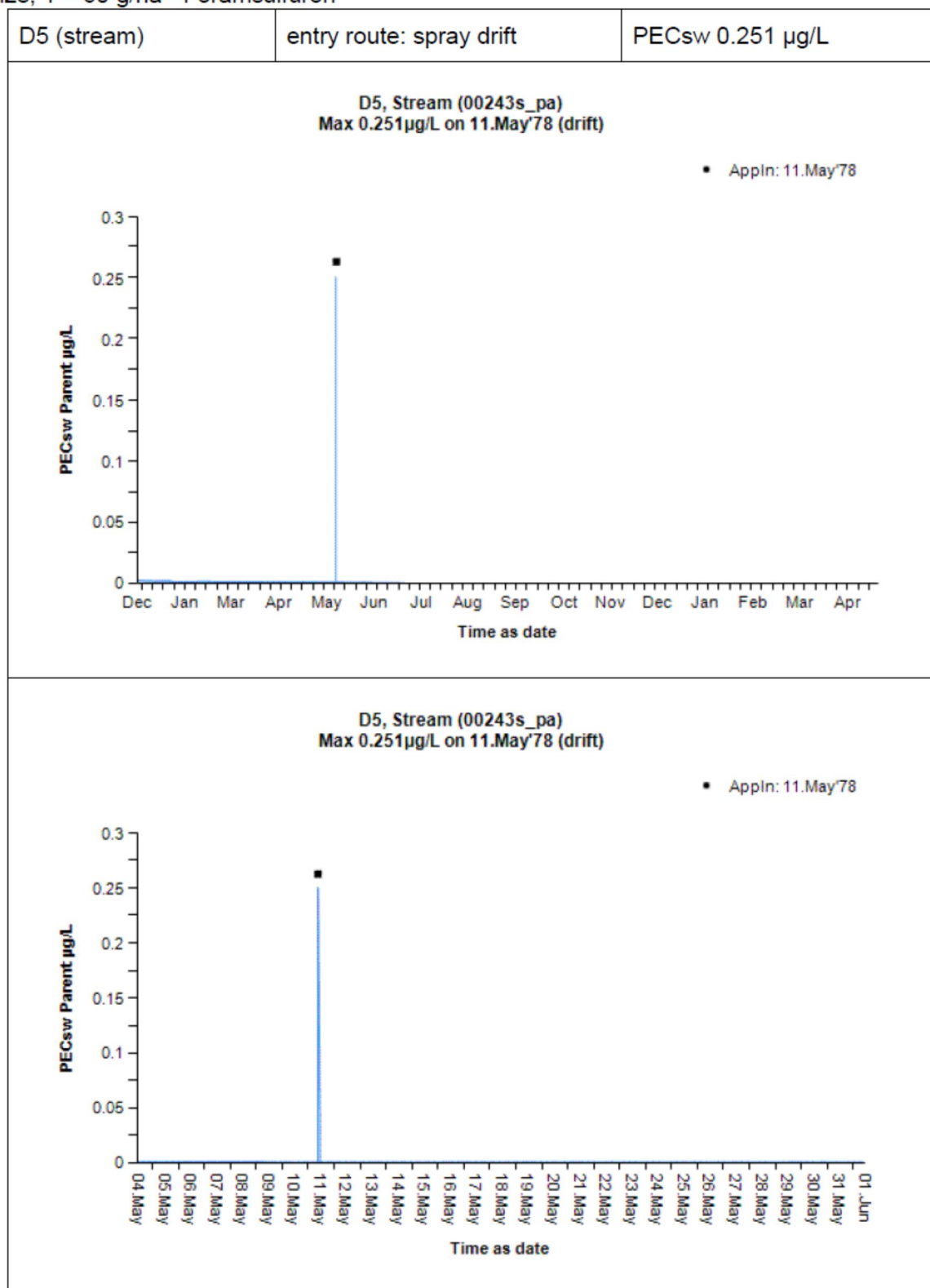


Figure 8.5-3: D6 ditch: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - Foramsulfuron

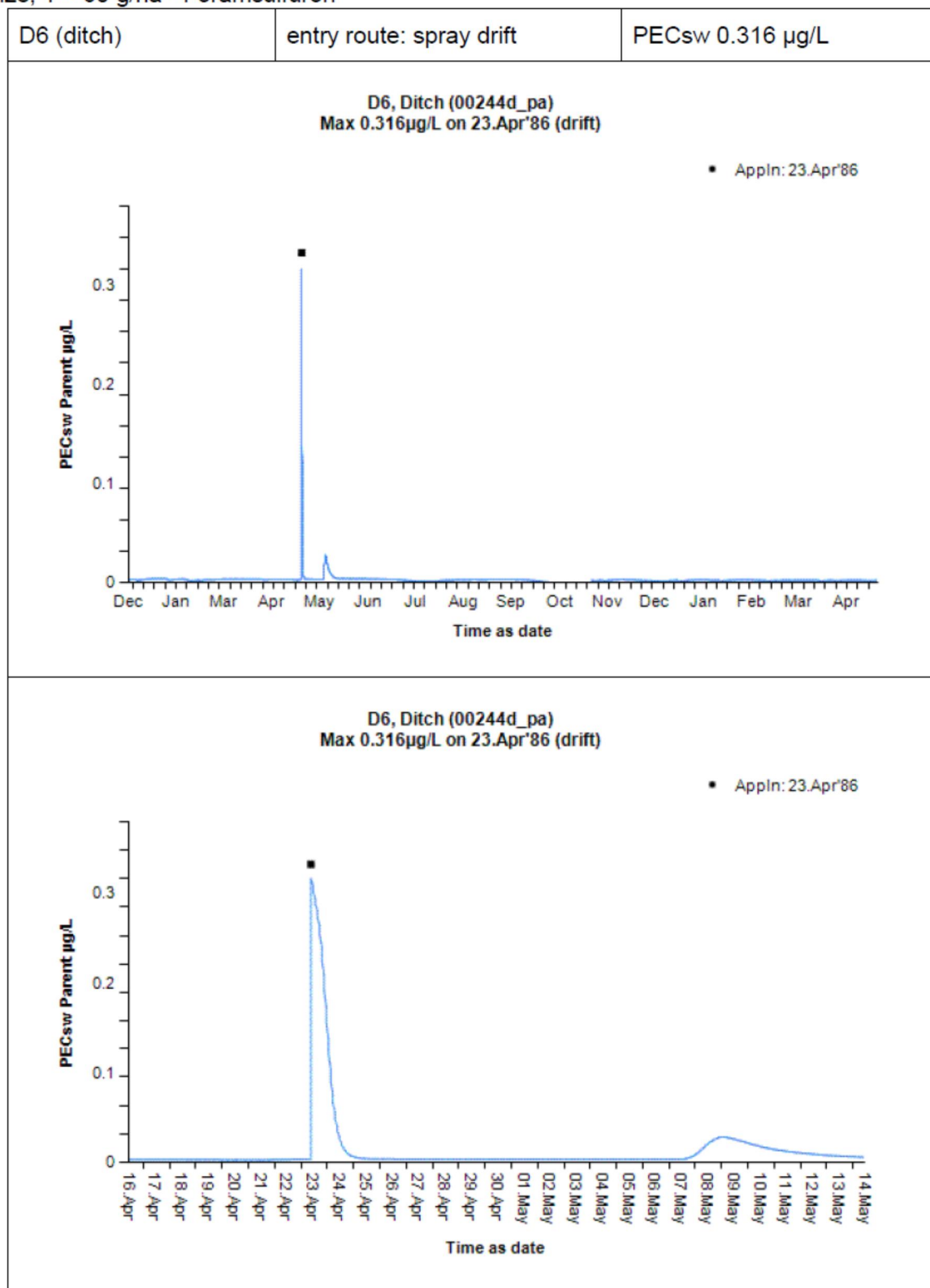


Figure 8.5-4: R1 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - Foramsulfuron

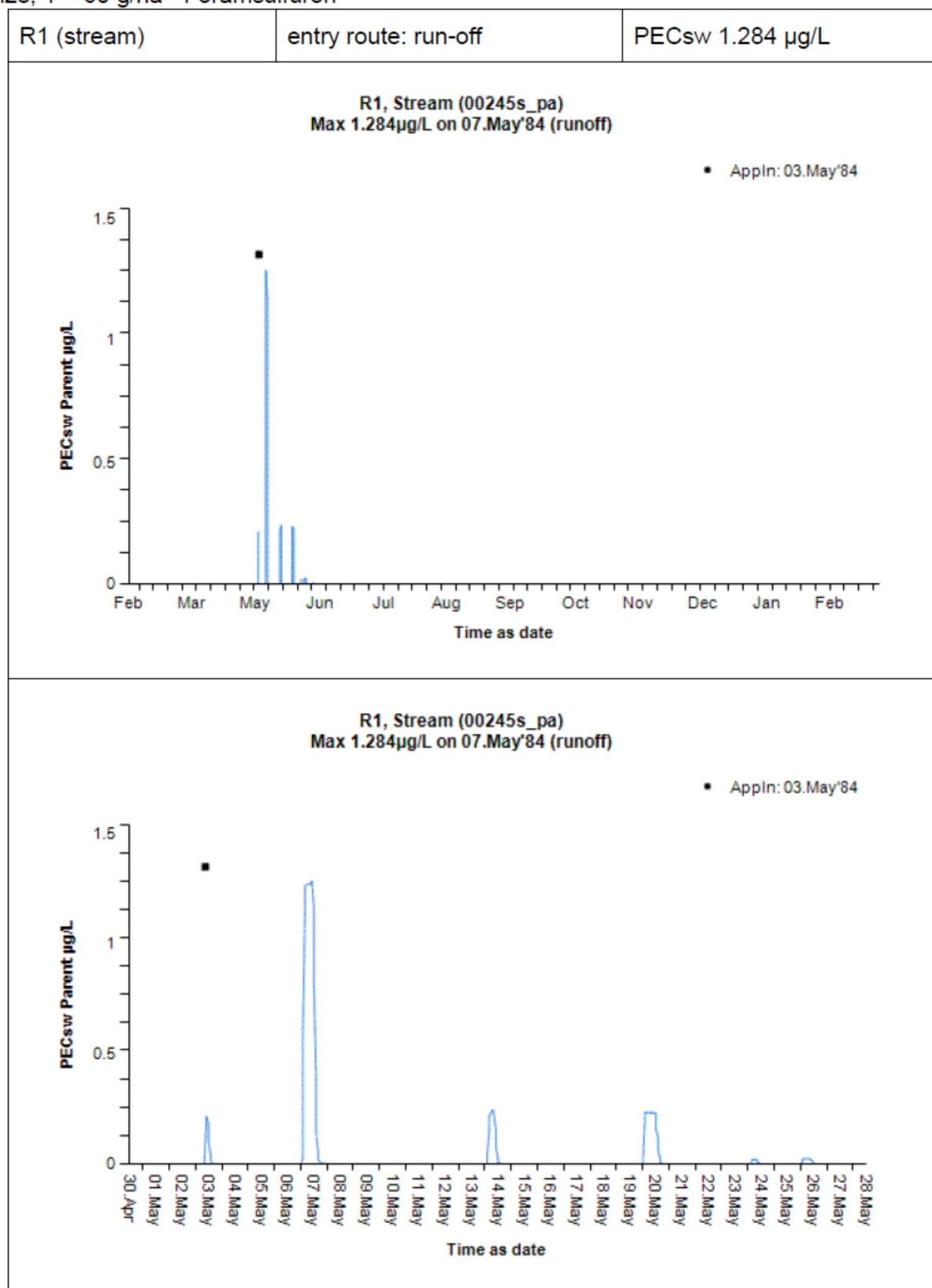


Figure 8.5-5: R2 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - Foramsulfuron

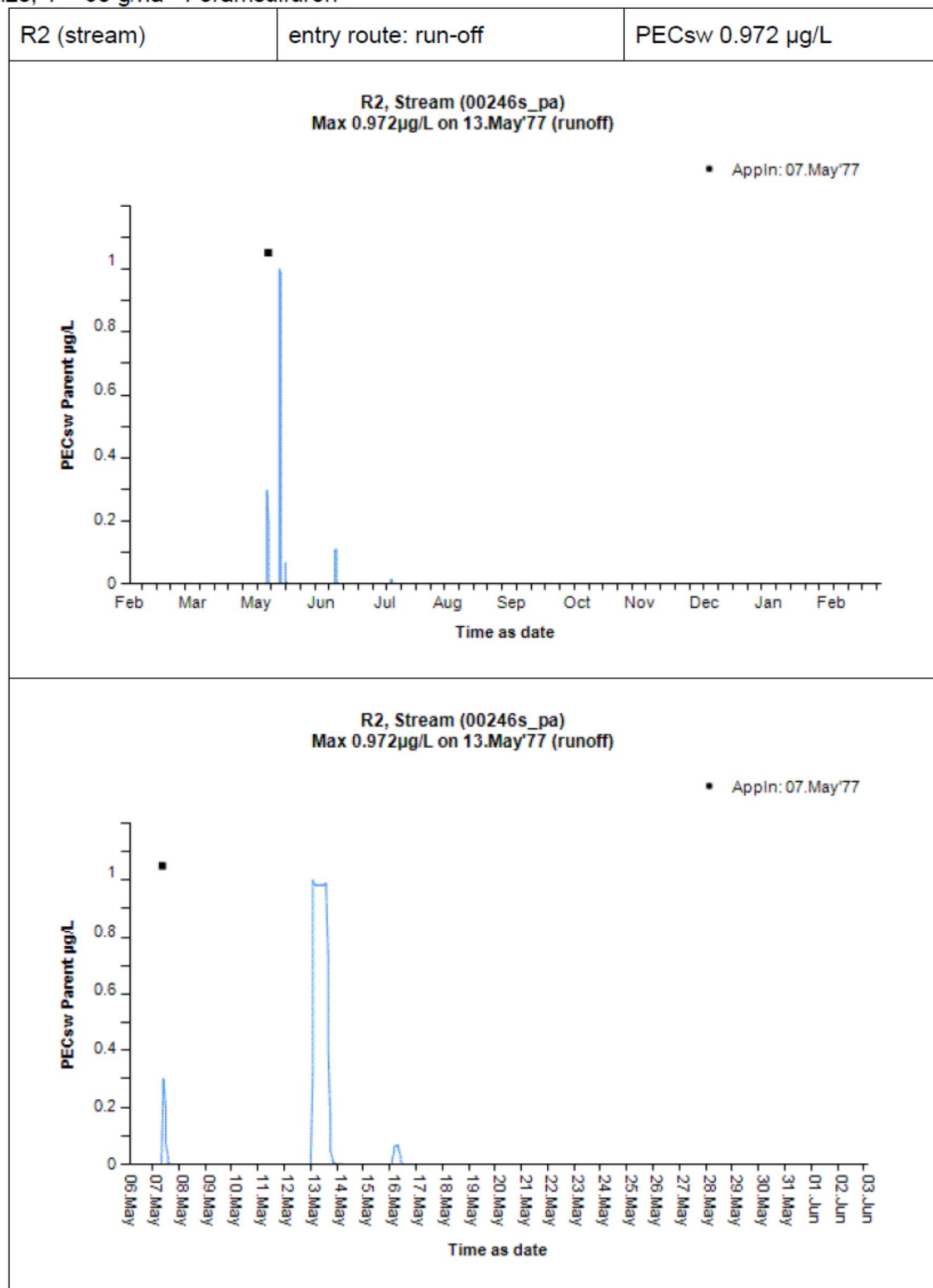


Figure 8.5-6: R3 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - Foramsulfuron

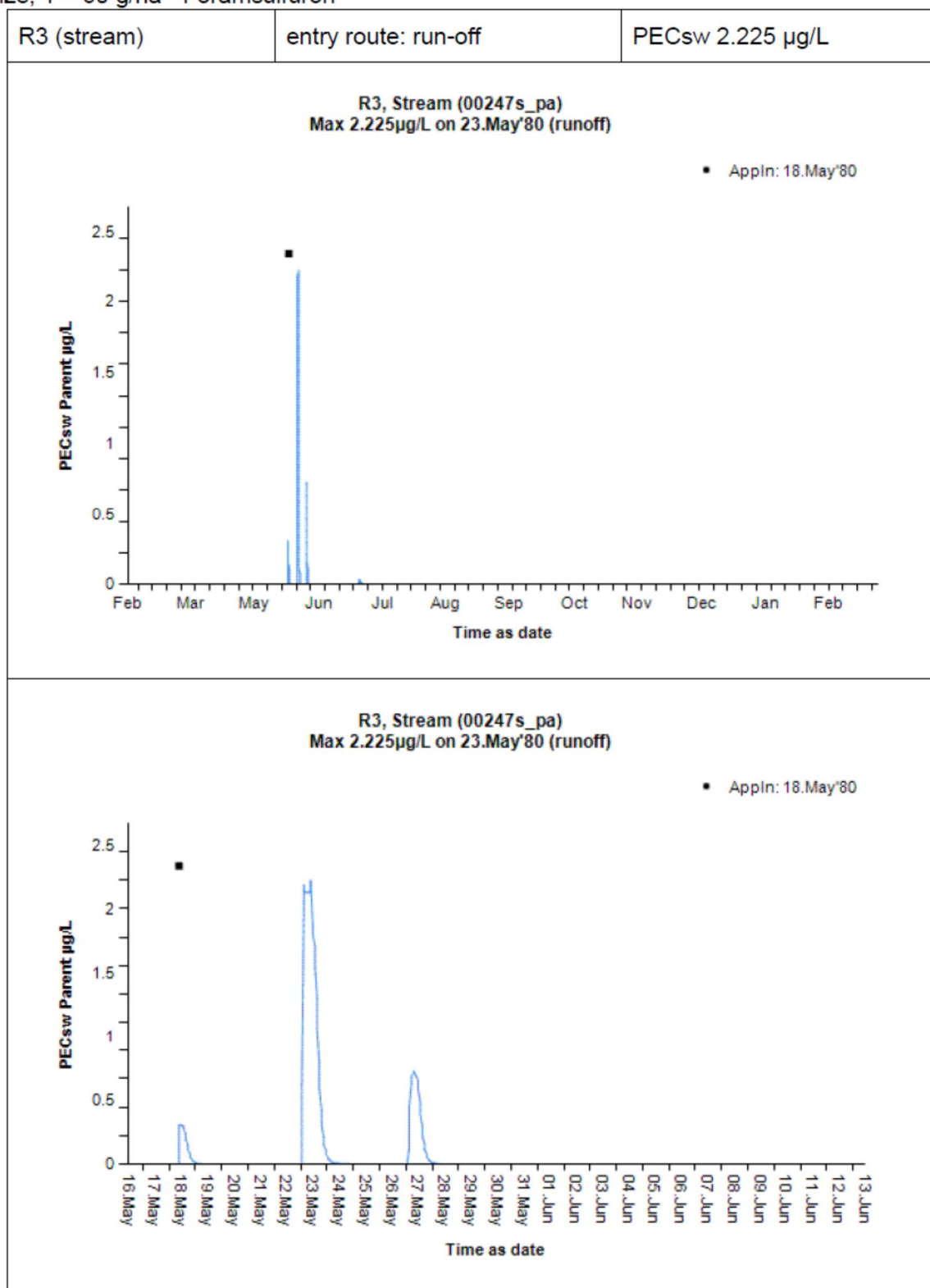


Figure 8.5-7: R4 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - Foramsulfuron

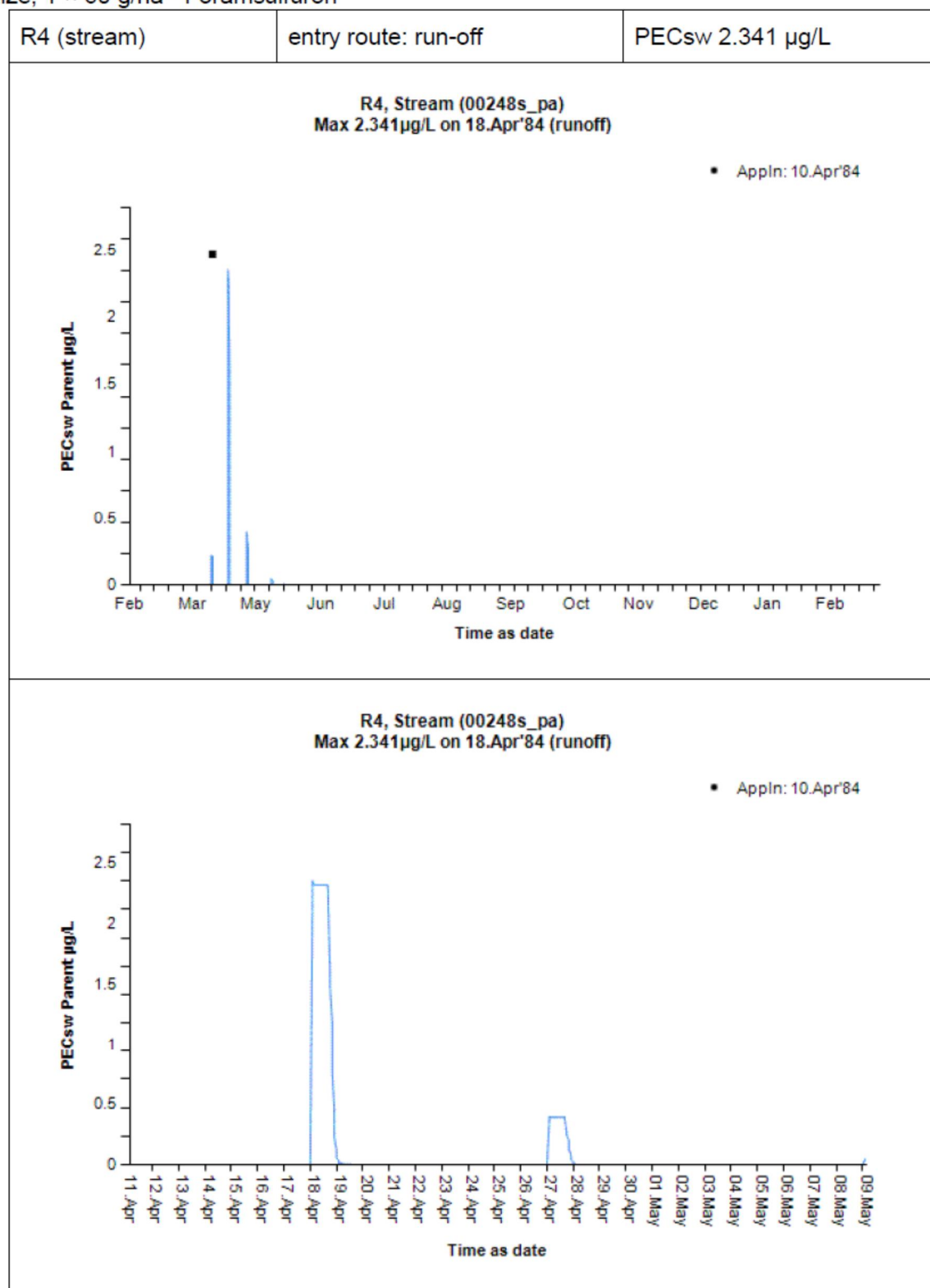


Figure 8.5-8: R2 stream: The overall time evolution of the AE F130619 concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - AE F130619

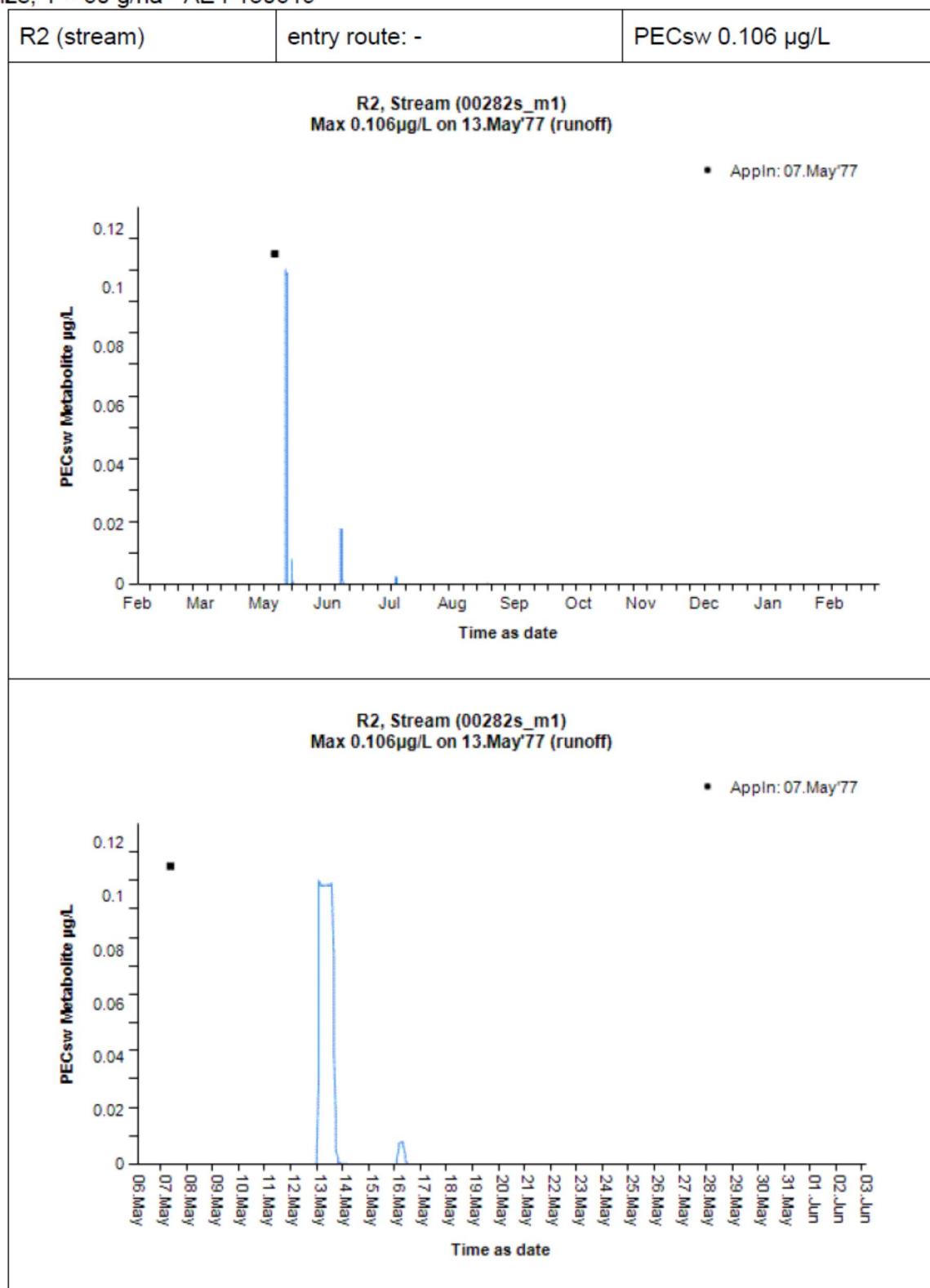


Figure 8.5-9: R3 stream: The overall time evolution of the AE F130619 concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - AE F130619

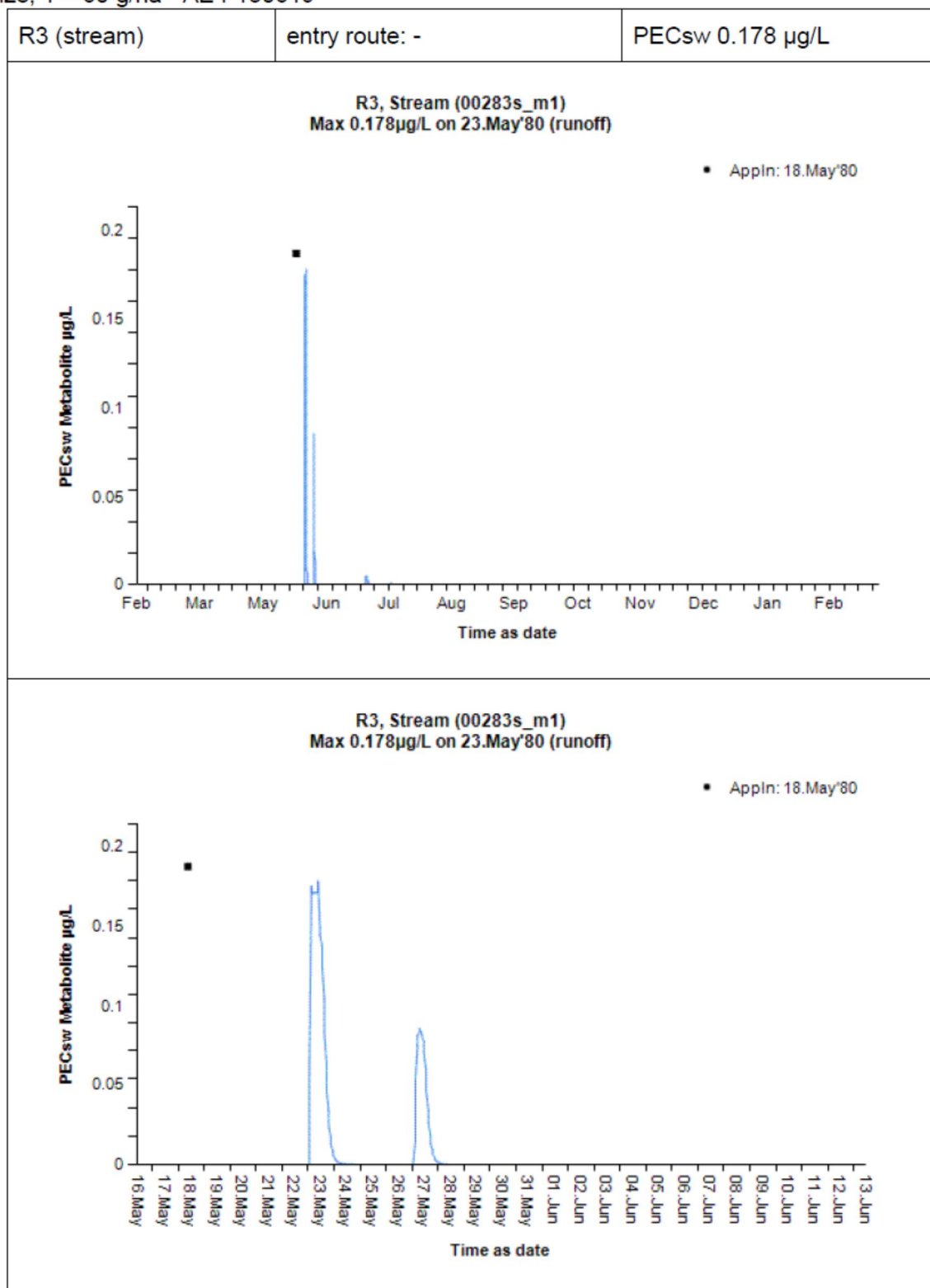


Figure 8.5-10: R4 stream: The overall time evolution of the AE F130619 concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum

Maize, 1 × 60 g/ha - AE F130619

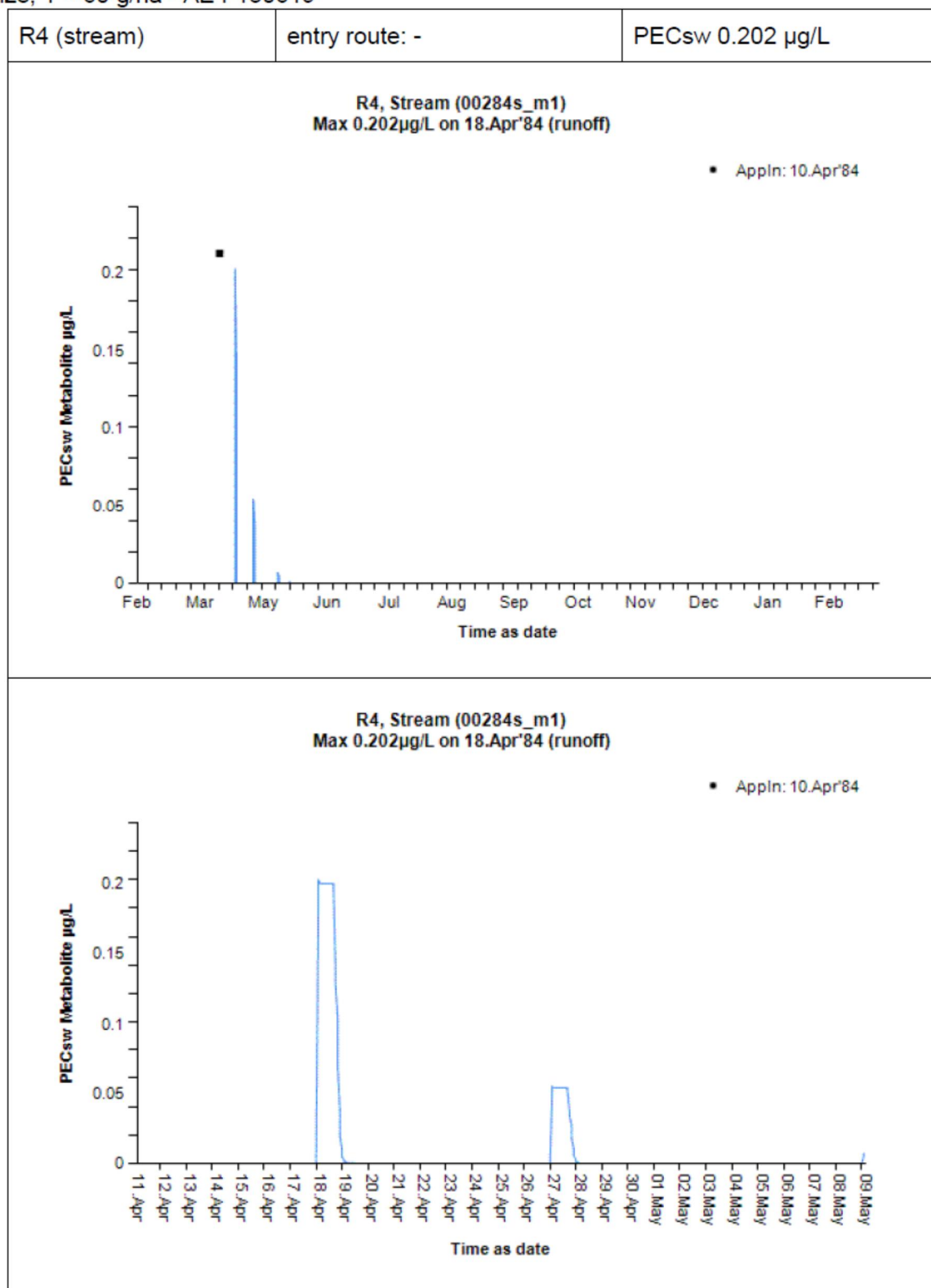


Figure 8.5-11: D4 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max single application)

Maize, 2 × 30 g/ha - Foramsulfuron

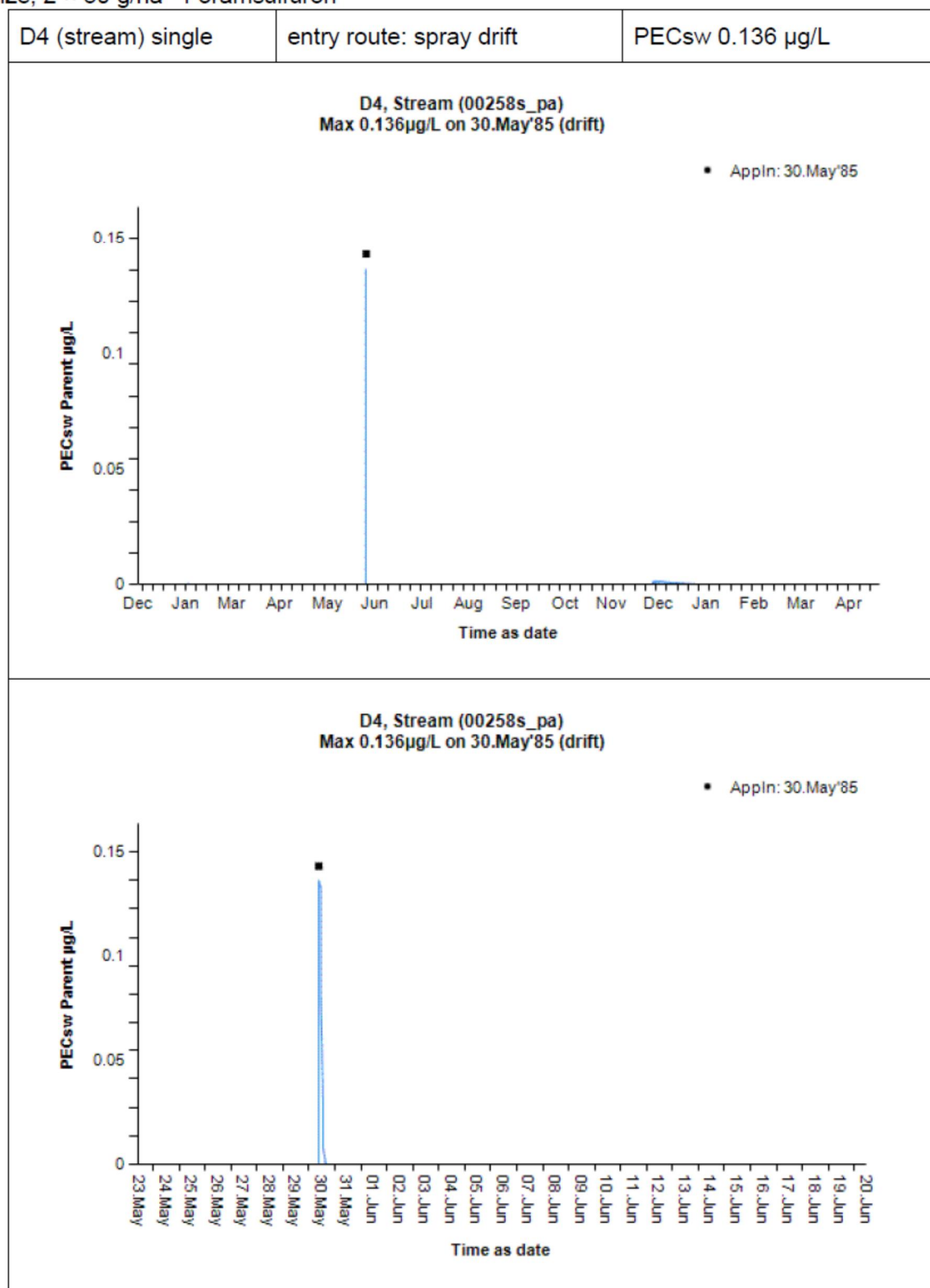


Figure 8.5-12: D5 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max single application)

Maize, 2 × 30 g/ha - Foramsulfuron

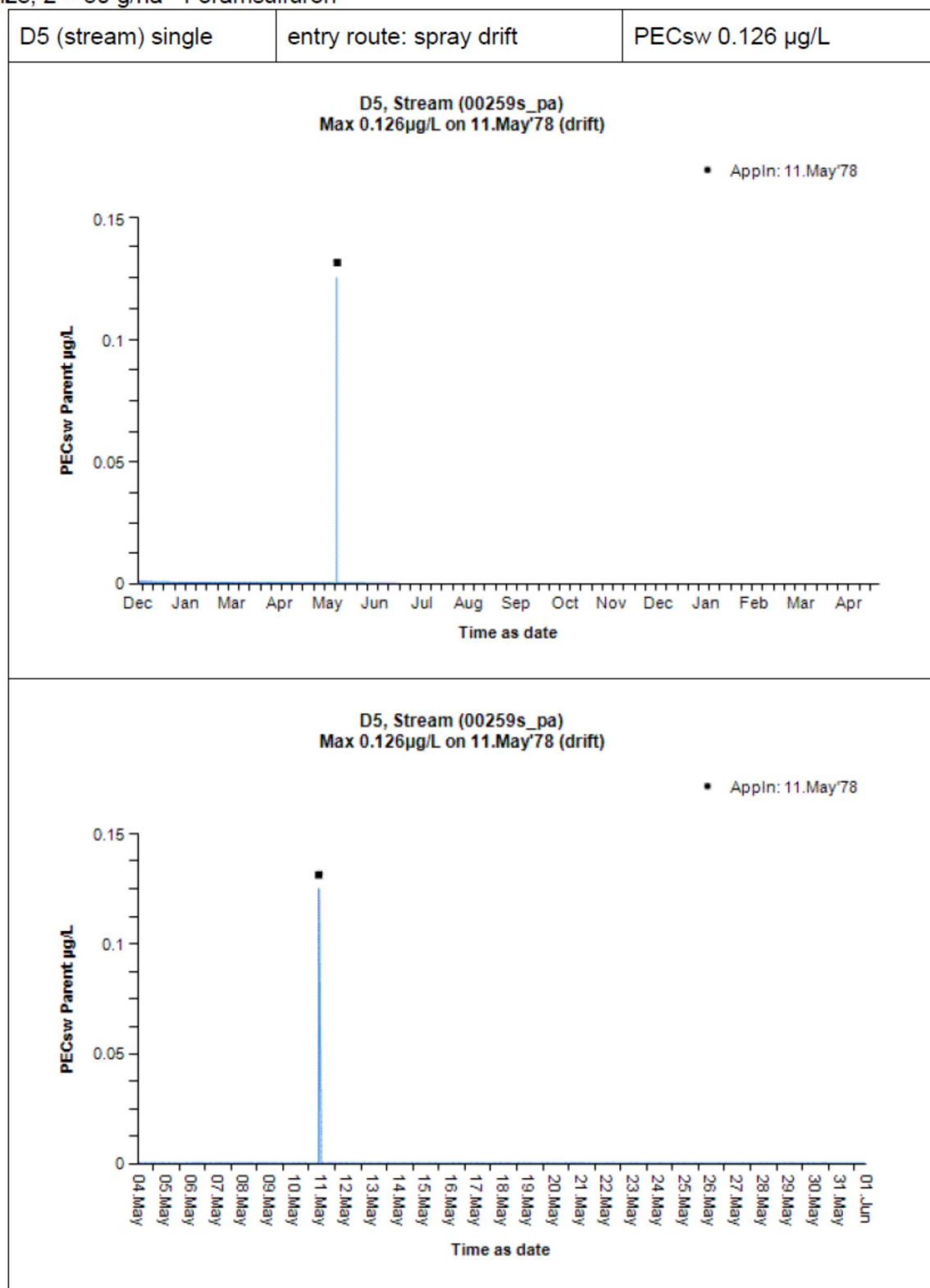


Figure 8.5-13: D6 ditch: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max single application)

Maize, 2 × 30 g/ha - Foramsulfuron

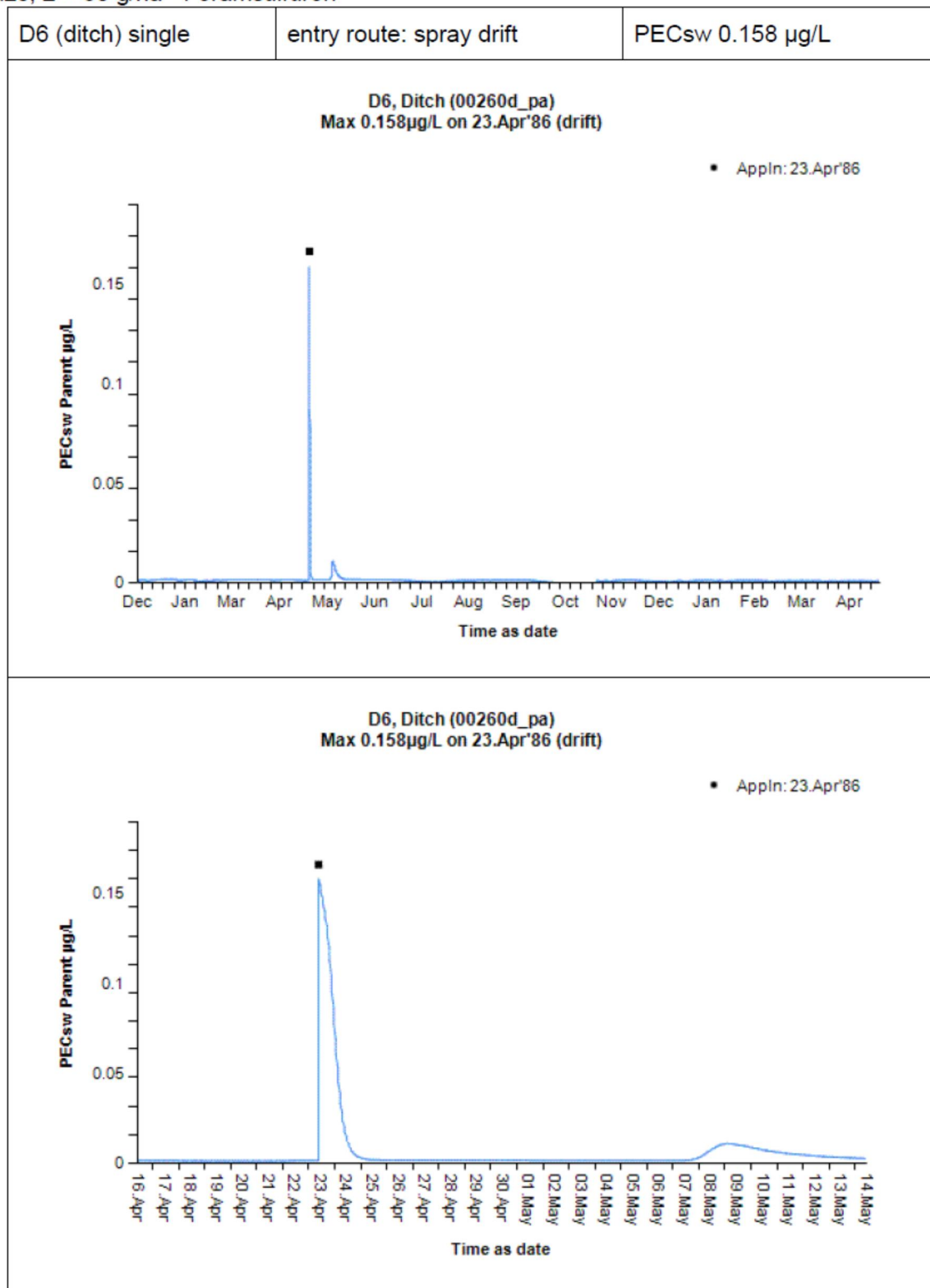


Figure 8.5-14: R1 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max multiple application)

Maize, 2 × 30 g/ha - Foramsulfuron

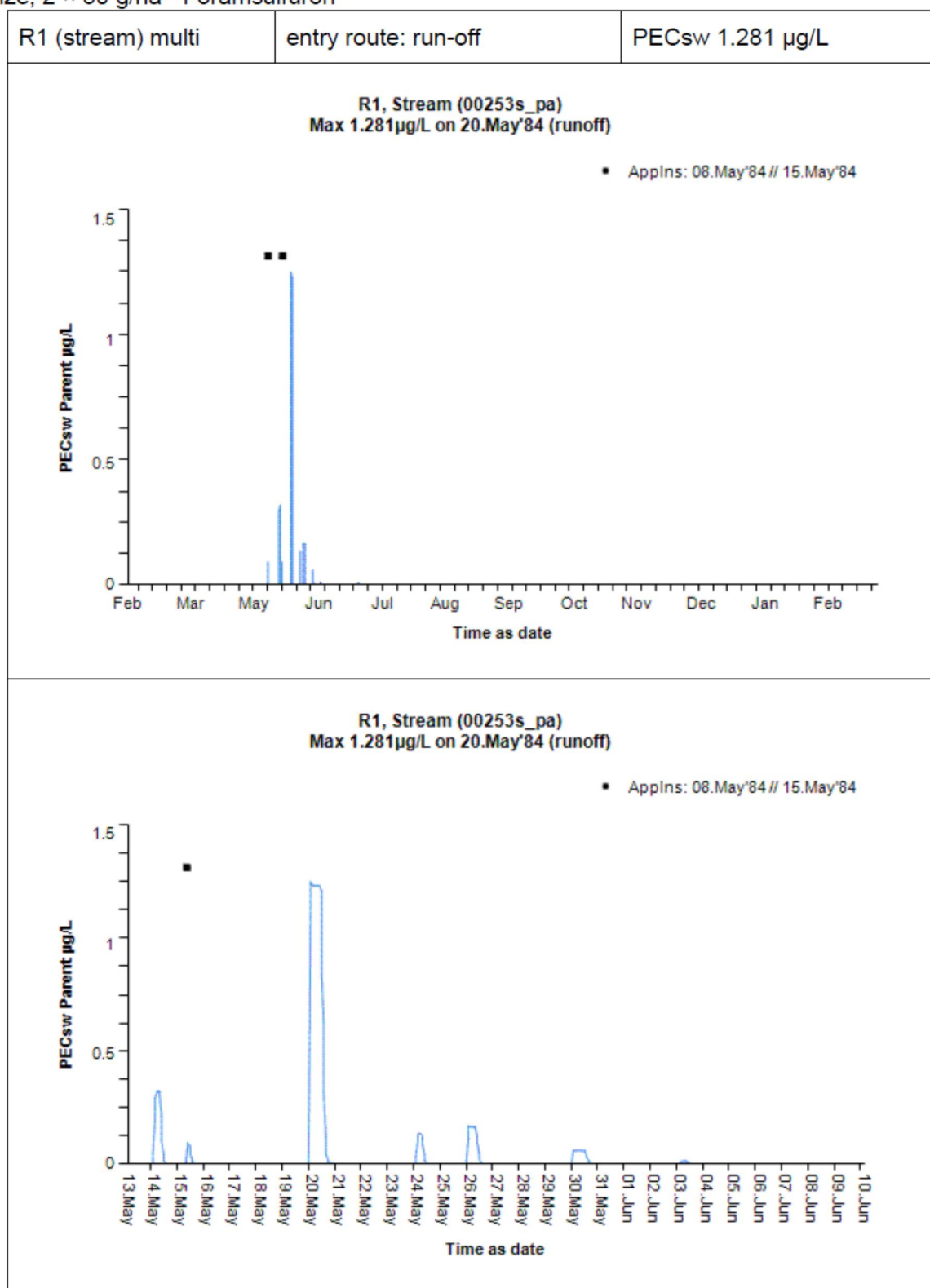


Figure 8.5-15: R2 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max multiple application)

Maize, 2 × 30 g/ha - Foramsulfuron

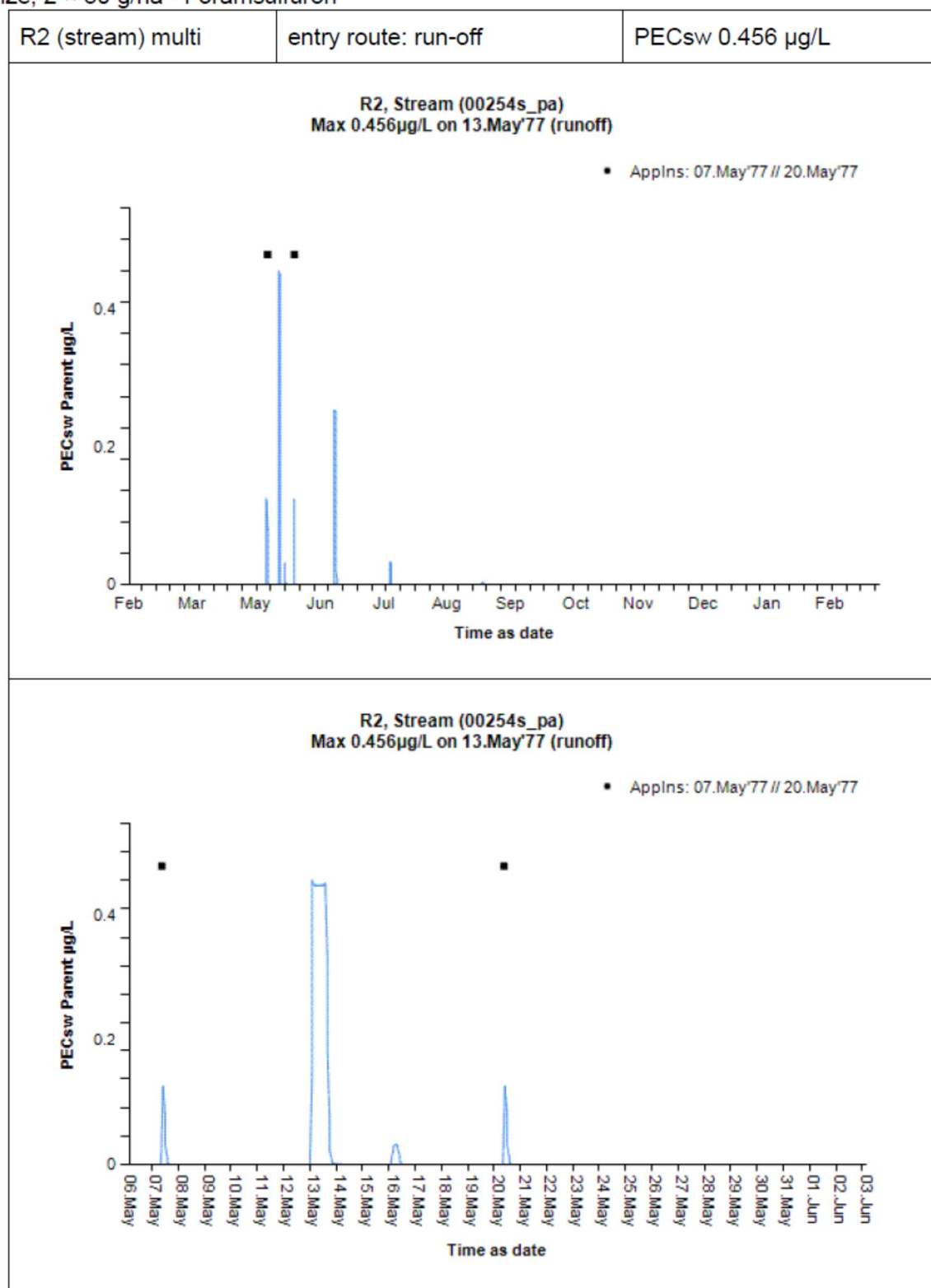


Figure 8.5-16: R3 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max multiple application)

Maize, 2 × 30 g/ha - Foramsulfuron

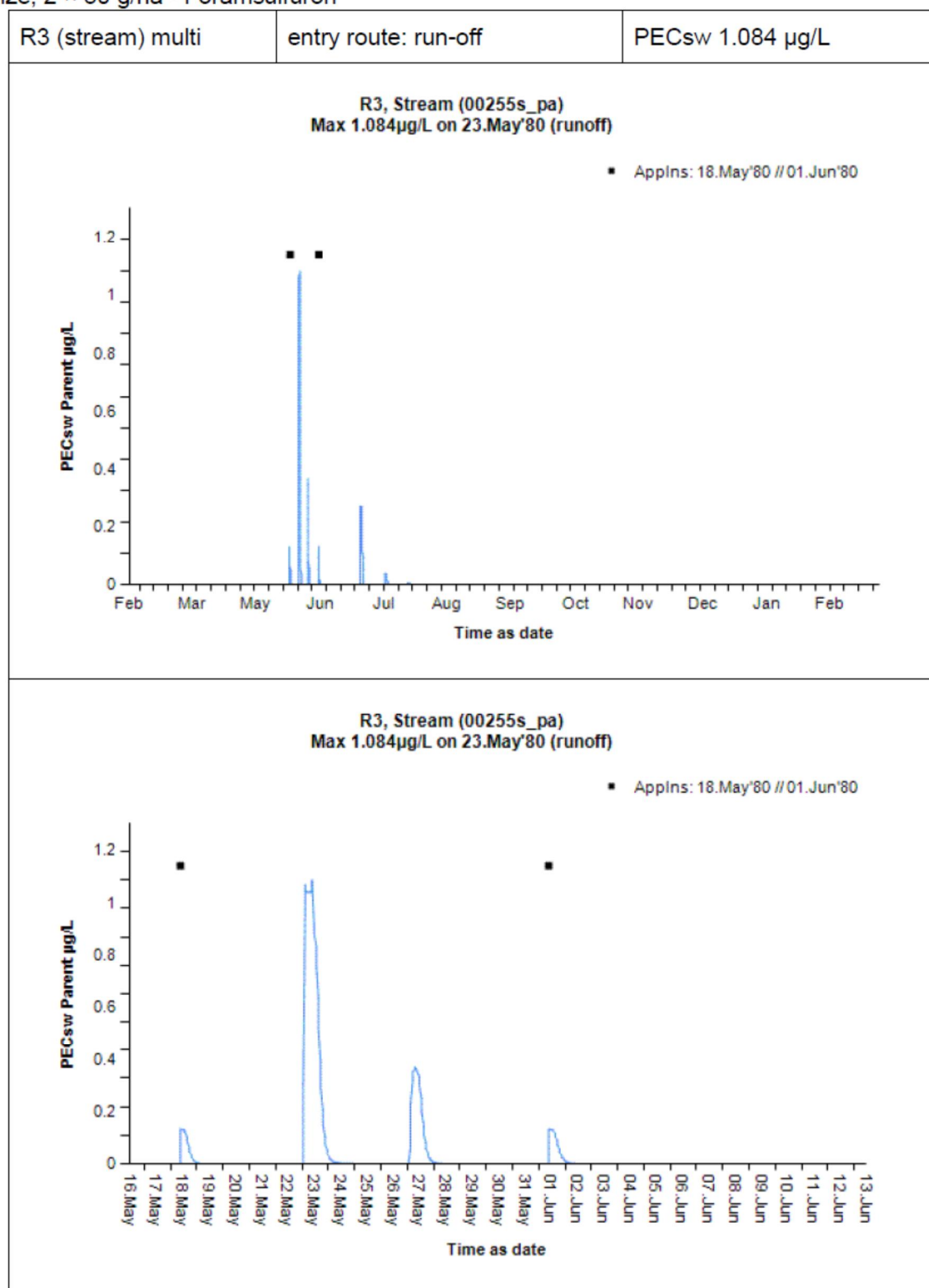


Figure 8.5-17: R4 stream: The overall time evolution of the foramsulfuron concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max multiple application)

Maize, 2 × 30 g/ha - Foramsulfuron

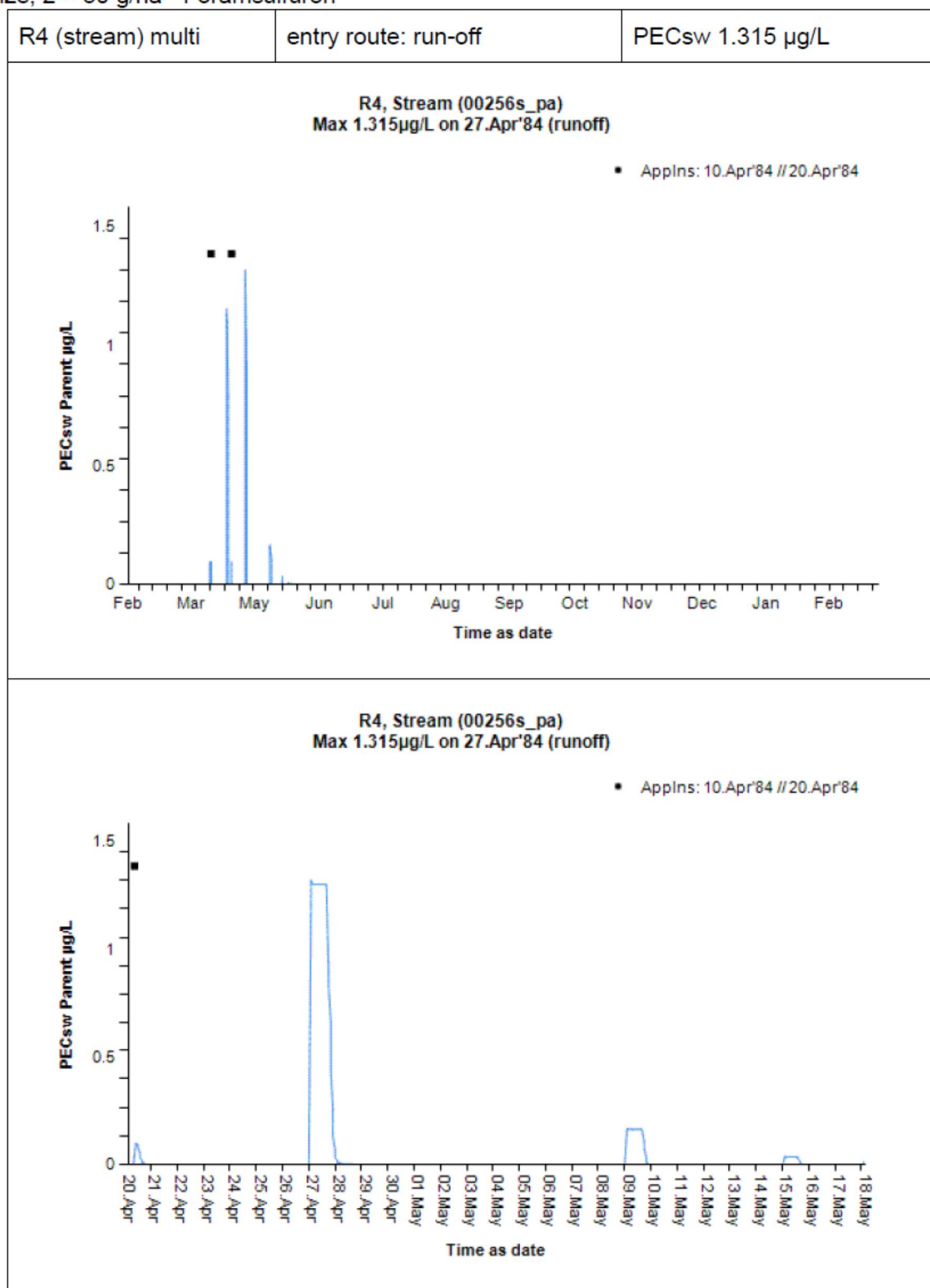


Figure 8.5-18: R1 stream: The overall time evolution of the AE F130619 concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max multiple application)

Maize, 2 × 30 g/ha - Foramsulfuron

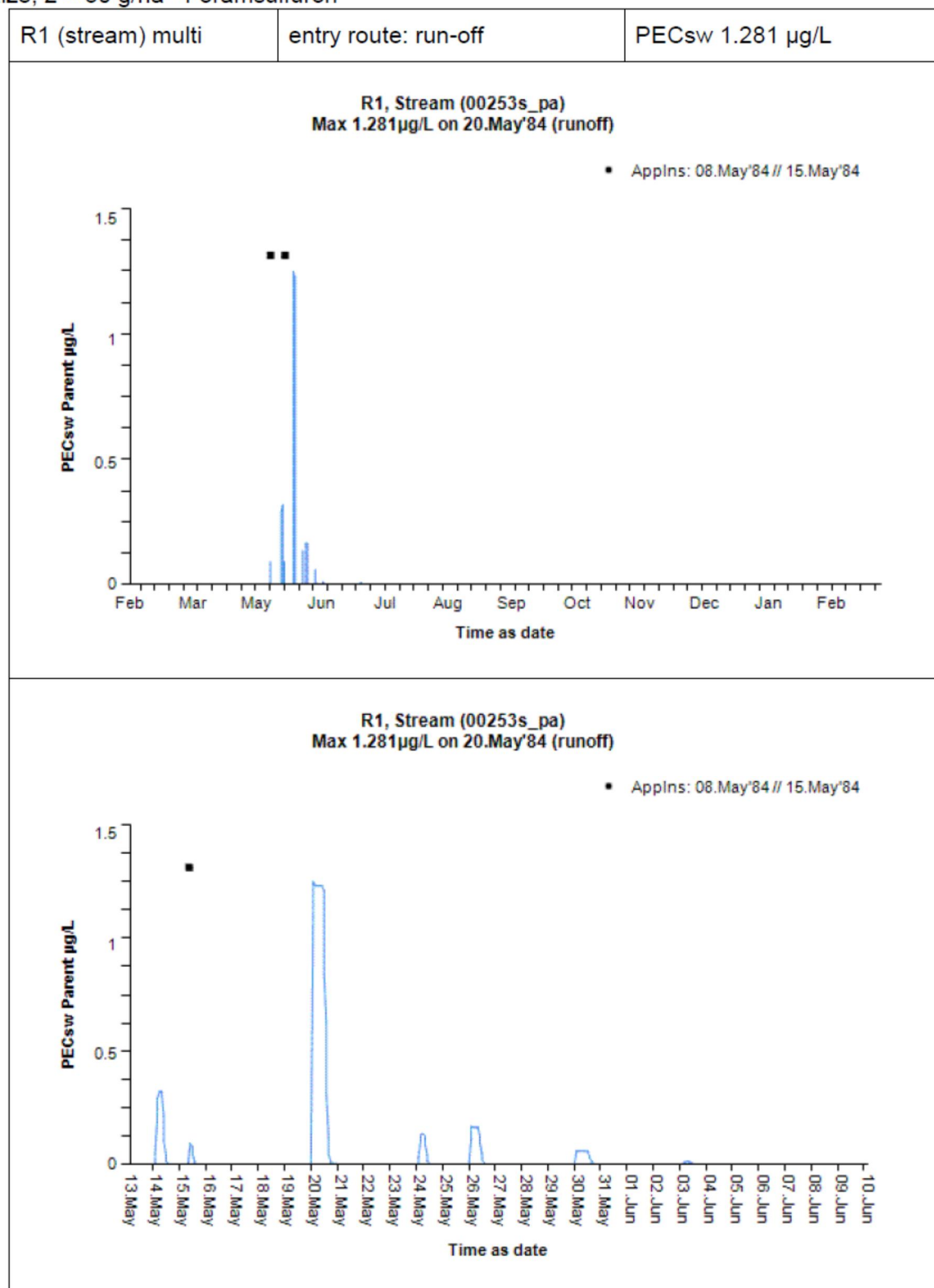


Figure 8.5-19: R3 stream: The overall time evolution of the AE F130619 concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max multiple application)

Maize, 2 × 30 g/ha - AE F130619

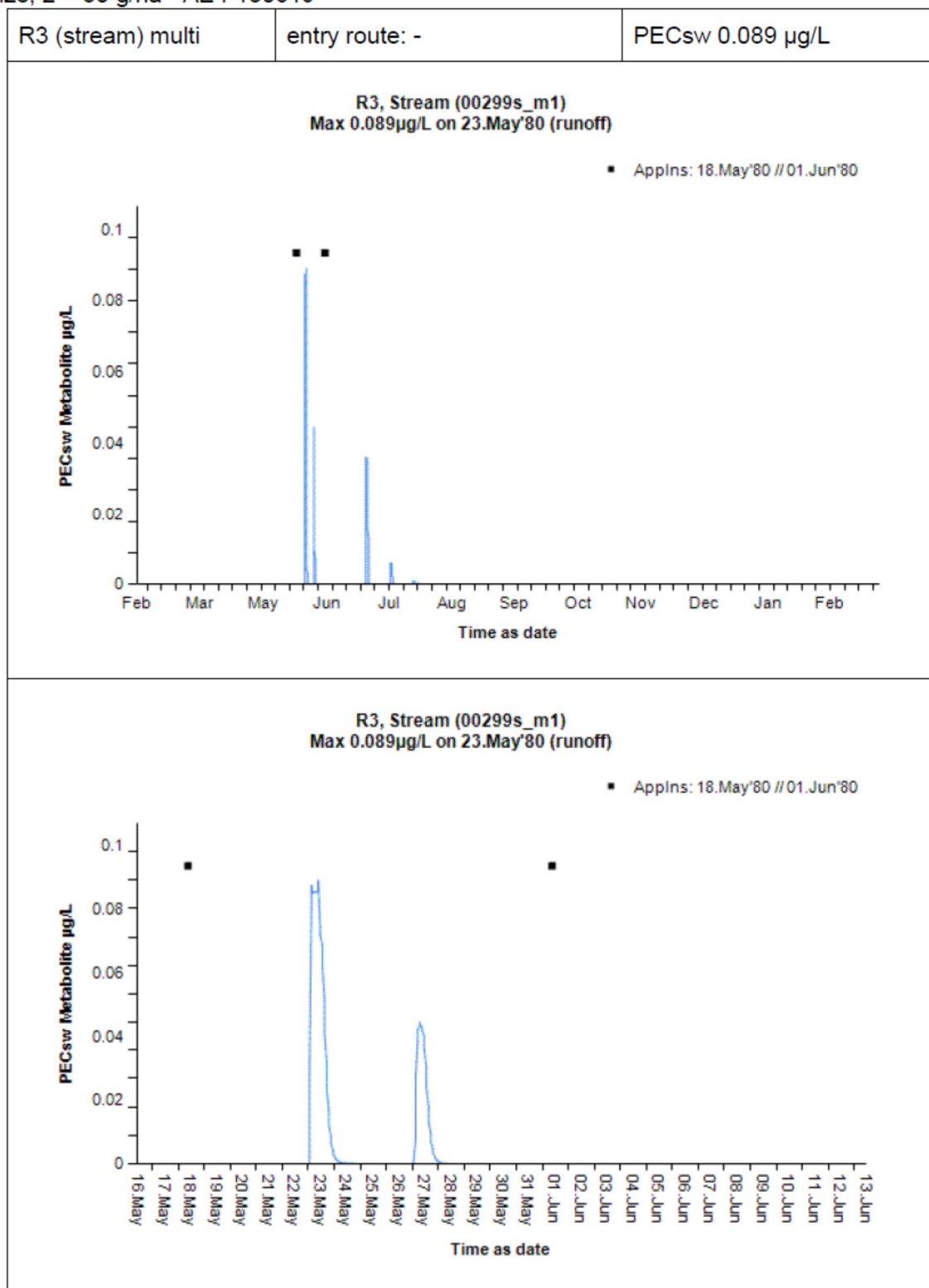


Figure 8.5-20: R4 stream: The overall time evolution of the AE F130619 concentration over the whole course of the TOXSWA simulation and detailed view at the period around the observed maximum (max multiple application)

Maize, 2 × 30 g/ha - AE F130619

