

US EPA ARCHIVE DOCUMENT

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EAB Log Out Date: 23 NOV. 1984

Init.: _____

To: Miller
Product Manager 16
Registration Division (TS-767)

From: Carolyn K. Offutt *Carolyn K. Offutt*
Chief, Environmental Processes and Guidelines Section
Exposure Assessment Branch, HED (TS-769)

Attached, please find the estimated environmental concentration review of:

Reg./File No.: 476-2109

Chemical: ASPON

Type Product: Insecticide

Product Name: ASPON

Company Name: Stauffer Chemical

Submission Purposes: EEC calculation

Date In: 7 August 1984

Action Code: 400

Date Completed: _____

EFB#: 4500

Deferrals To:

TAIS (Level II) Days

63 1.6

XX Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

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Aspon

I. Introduction

The Ecological Effects Branch in their memo of 20 July 1984 requested that an estimated environmental concentration be calculated for ASPON. Its primary use pattern is that of chinch bug control in turf. Application is to be made by professional applicators only.

II. Chemical/Physical Properties

Common Name: Aspon

Chemical Name: O,O,O,O-Tetrapropyl dithiopyrophosphate

Additional chemical/physical information can be found on the attached "one-liner".

III. Discussion

The estimated environmental concentrations in terrestrial and aquatic systems were determined using the Simulator for Water Resources in Rural Basins (SWRRB) model and the Exposure Analysis Modeling System (EXAMS).

ASPON is applied one to two times a year, 10 to 20 days apart, in May to early June, depending upon latitude, at rates of 13.5 to 18.0 oz/acre in 125 to 200 gal. of water per 5000 ft². This scenario was followed in this EEC calculation.

Runoff

In the determination of runoff from ASPON turf application in Mississippi and Georgia, two agricultural basins scenarios were modified to reflect turf management in these areas. Both basins had the maximum of ASPON applied (18.0 oz/acre) in early and late May (day 130 and 150).

There are several problems encountered in this assessment. There are no data on degradation of the product either by hydrolysis, photolysis, or microbials. A 100 day half-life was assumed for the runoff portion of the assessment. This may result in either an over- or under-estimation of the quantity of pesticide getting to the ground and being available for runoff.

Pesticide runoff from the turf areas ranged from 0 up to 70 gm/ha/day (Table 2). (Only the results from the Yazoo basin are given and analyzed as there was upto 30% more pesticide runoff in this basin than in the Tifton basin turf area.) The quantity of material was directly related and highly correlated ($R^2 = 95\%$) with the predicted quantity of sediment exiting the fields or lawns due to a reasonably high K_d (range 35 to 61). Therefore, it would be safe to assume that most (>95%) of the pesticide will be carried by the suspended soil particles.

Water Quality

The Exposure Analysis Modeling System (EXAMS) pond scenario was used to predict the water quality of ASPON leaving a turf area and entering a nearby pond such as in the case of a pond near fairways of a golf course. The years 1971 and 1972 were modelled in the pond scenario using the runoff information directly from the SWRRB output, i.e., gm/ha/day. In this modeling effort, no degradation was assumed to occur. Therefore, the only dissipation was due to outflow and adsorption to the soil.

The greatest concentration found in the pond was equal to about 3.6 ppb as caused by the input of 69.951 gm from the 1972 runoff data (Figures 1 and 2 and Tables 3 and 4). From actual accounts, the ratio of land to pond acreage is about 5 to 1. There is a direct relation between the input and output information in EXAMS. Therefore, if 5 hectares of fairway are needed to supply a 1 hectare pond, this quantity of about 70 gm/ha would be equal to a 350 gm input and the quantity of material dissolved in the water column would equal about 18 ppb on the day of the runoff event.

The average pesticide runoff quantity ranged between 1 and 20 gm/ha. Using the assumption from above, this would produce inputs of upto 100 gm from a 5 ha fairway which would give about 5 ppb in the water column.

In this pond scenario, with ASPON, the dissipation rate from the water column is about four days. Because no degradation of ASPON was included in this water quality assessment, it must be assumed that this is a "worse case" situation.

The concentration of ASPON found in the top 2 cm of the bottom sediments ranged upto 0.231 mg/kg (with 70 gm/ha input). With a 5 ha fairway, the sediment concentration would be about 1 mg/kg.

Metabolites

Degradation of any metabolites is unknown and, therefore, EECs for metabolites were not made.

IV. Conclusion.

From normal use of APSON on lawns and golf course fairways, the concentration of ASPON that may be found in nearby pond waters may approach 18 ppb and the bottom sediments approach 1 mg/kg.



Robert W. Holst, Ph.D.
Plant Physiologist

EAB Chemical One-Liner
Chemical ASPON

Degradation - Field Half-life

	T ¹ / ₂		T ¹ / ₂
Terrestrial [Crop Site]	_____	Forestry [Crop Site]	_____
_____	_____	_____	_____
_____	_____	_____	_____
Aquatic [Crop Site]	_____	Other [Crop Site]	_____
_____	_____	_____	_____

ENVIRONMENTAL EXPOSURE

Found in Ground Water (Y/N)? _____

Site(s) _____ Level: _____

Reentry Interval Established? _____

Rotational Crop Restrictions: _____

Fish Bioaccumulation Factors

Species	Tissue		Whole Fish	Duration (Half-life)
	Edible	Viscera		
_____	<u>X</u>	<u>X</u>	<u>X</u>	_____
_____	<u>X</u>	<u>X</u>	<u>X</u>	_____
_____	<u>X</u>	<u>X</u>	<u>X</u>	_____

EXPOSURE ASSESSMENT:

Degradation Summary (including degradation product names and structures):

REFERENCES:

One-Liner Writer: R.W. Holst

Table 1. SWRRB Pesticide Input Information.

Kd = 61.0
 Foliar Half-Life = 100. (days)
 Soil Half-Life = .00693 (/day)
 Initial Residues = 0.0 gm/ha

Application Dates

1971	
130	1.200
150	1.200
1972	
130	1.200
150	1.200
1973	
130	1.200
150	1.200

Table 2. SWRRB Estimated Pesticide Runoff Quantities.

Year	Day	Rain (cm)	Runoff (Est.) (cm)	Sediment (kg/ha)	Total Pesticide (gm/ha)
1971	132	6.223	.622	.482	9.998
	157	6.579	.658	.020	7.719
	159	2.642	.264	2.700	42.153
	197	3.785	.379	.001	0.042
	198	0.178	.018	.025	0.581
	206	2.032	.203	.042	1.764
	207	1.930	.193	2.286	21.164
	209	1.473	.174	.021	0.679
	210	1.168	.117	.490	11.157
	215	1.321	.132	.003	0.366
	216	0.102	.010	.002	0.097
	217	4.496	.450	1.407	20.395
	262	4.216	.422	.016	0.271
	263	1.219	.122	.148	7.199

(Values from day 300 to the first application day of the next year will not be reported due to cold environmental conditions that may exist and produce erroneous results.)

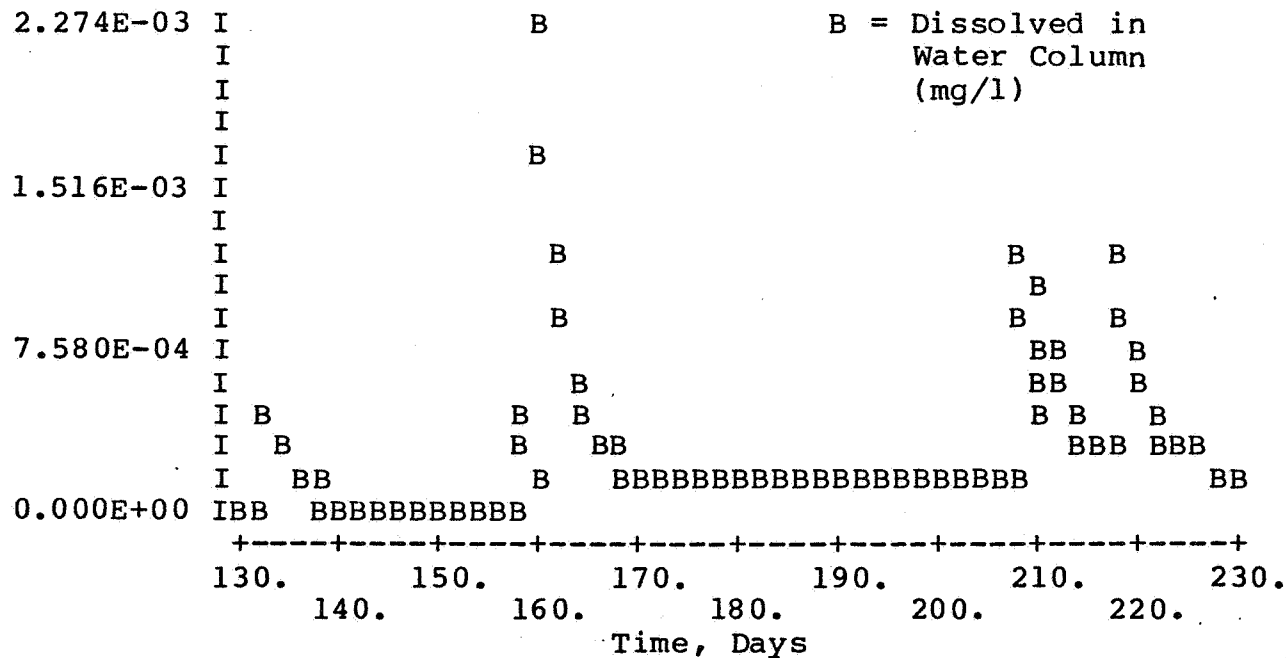
Table 2 (Con't)

Year	Day	Rain (cm)	Runoff (Est.) (cm)	Sediment (kg/ha)	Total Pesticide (gm/ha)
1972					
	133	4.445	.444	.849	4.145
	138	1.143	.114	.158	1.274
	167	2.515	.252	.105	3.997
	172	2.388	.239	.001	0.075
	185	3.988	.399	.008	0.297
	186	4.775	.478	3.716	69.951
	296	3.505	.351	.001	0.097
1973					
	185	4.013	.402	.061	3.509
	186	0.102	.010	.006	0.124
	187	0.305	.031	.078	1.852
	188	2.489	.249	.678	32.932
	211	0.483	.048	.173	1.960
	289	3.048	.305	.003	0.111

(Values from day 300 to the first application day of the next year will not be reported due to cold environmental conditions that may exist and produce erroneous results.)

Figure 1.

System: POND, AERL DEVELOPMENT PHASE TEST DEFINITION
 Chemical: ASPON



(Refer to Table 3 for input quantities.)

Table 3. Simulation results -- time-trace of chemical concentrations.
 Ecosystem: Pond, AERL Development Phase Test Definition
 Chemical: ASPON - 1971 Water Quality Assessment, Yazoo

Time Days	Average Chemical Concentrations				Mass of Chemical	
	Water Column		Bottom Sediments		Water Col	Sediments
	Free(mg/L)	Sed(mg/kg)	Pore(mg/L)	Sed(mg/kg)	Total kg	Total kg
Initial Input	0.000001 kg					
130.	4.897E-09	3.428E-06	0.000E+00	0.000E+00	1.0000E-07	0.000E+00
131.	3.491E-09	2.444E-06	5.498E-11	3.848E-08	7.1292E-08	2.600E-08
Runoff Input	0.009998 kg					
132.	4.896E-04	0.343	9.354E-11	6.548E-08	9.9981E-03	4.424E-08
133.	3.491E-04	0.244	5.497E-06	3.848E-03	7.1278E-03	2.599E-03
134.	2.503E-04	0.175	9.352E-06	6.547E-03	5.1108E-03	4.423E-03
135.	1.809E-04	0.127	1.205E-05	8.438E-03	3.6935E-03	5.701E-03
136.	1.321E-04	9.247E-02	1.395E-05	9.763E-03	2.6975E-03	6.595E-03
137.	9.782E-05	6.848E-02	1.527E-05	1.069E-02	1.9975E-03	7.221E-03
138.	7.373E-05	5.161E-02	1.619E-05	1.134E-02	1.5056E-03	7.657E-03
139.	5.680E-05	3.976E-02	1.683E-05	1.178E-02	1.1598E-03	7.961E-03
140.	4.489E-05	3.142E-02	1.728E-05	1.210E-02	9.1670E-04	8.171E-03
141.	3.652E-05	2.557E-02	1.758E-05	1.231E-02	7.4577E-04	8.315E-03
142.	3.063E-05	2.144E-02	1.779E-05	1.246E-02	6.2555E-04	8.414E-03
143.	2.649E-05	1.854E-02	1.793E-05	1.255E-02	5.4096E-04	8.480E-03
144.	2.357E-05	1.650E-02	1.802E-05	1.262E-02	4.8139E-04	8.523E-03
145.	2.152E-05	1.506E-02	1.808E-05	1.266E-02	4.3943E-04	8.550E-03
146.	2.007E-05	1.405E-02	1.812E-05	1.268E-02	4.0981E-04	8.567E-03
147.	1.904E-05	1.333E-02	1.813E-05	1.269E-02	3.8887E-04	8.575E-03
148.	1.832E-05	1.282E-02	1.814E-05	1.270E-02	3.7405E-04	8.577E-03
149.	1.780E-05	1.246E-02	1.814E-05	1.270E-02	3.6356E-04	8.576E-03
150.	1.744E-05	1.221E-02	1.813E-05	1.269E-02	3.5606E-04	8.572E-03
151.	1.717E-05	1.202E-02	1.812E-05	1.268E-02	3.5062E-04	8.566E-03
152.	1.698E-05	1.188E-02	1.810E-05	1.267E-02	3.4667E-04	8.559E-03
153.	1.684E-05	1.179E-02	1.808E-05	1.266E-02	3.4380E-04	8.551E-03
154.	1.673E-05	1.171E-02	1.806E-05	1.264E-02	3.4170E-04	8.542E-03
155.	1.665E-05	1.166E-02	1.804E-05	1.263E-02	3.4005E-04	8.533E-03
156.	1.659E-05	1.161E-02	1.802E-05	1.262E-02	3.3876E-04	8.523E-03
Runoff Input	0.007719 kg					
157.	3.945E-04	0.276	1.800E-05	1.260E-02	8.0566E-03	8.514E-03
158.	2.860E-04	0.200	2.223E-05	1.556E-02	5.8399E-03	1.051E-02
Runoff Input	0.042153 kg					
159.	2.274E-03	1.59	2.518E-05	1.763E-02	4.6435E-02	1.191E-02
160.	1.628E-03	1.14	5.042E-05	3.530E-02	3.3239E-02	2.384E-02
161.	1.174E-03	0.822	6.812E-05	4.768E-02	2.3966E-02	3.221E-02
162.	8.545E-04	0.598	8.051E-05	5.636E-02	1.7449E-02	3.807E-02
163.	6.302E-04	0.441	8.918E-05	6.243E-02	1.2870E-02	4.217E-02
164.	4.726E-04	0.331	9.523E-05	6.666E-02	9.6511E-03	4.503E-02
165.	3.618E-04	0.253	9.944E-05	6.961E-02	7.3888E-03	4.702E-02
166.	2.840E-04	0.199	1.024E-04	7.165E-02	5.7985E-03	4.841E-02
167.	2.292E-04	0.160	1.044E-04	7.306E-02	4.6804E-03	4.936E-02
168.	1.907E-04	0.133	1.058E-04	7.403E-02	3.8940E-03	5.001E-02

169.	1.636E-04	0.115	1.067E-04	7.467E-02	3.3407E-03	5.045E-02
170.	1.445E-04	0.101	1.073E-04	7.510E-02	2.9512E-03	5.073E-02
171.	1.311E-04	9.176E-02	1.077E-04	7.538E-02	2.6768E-03	5.092E-02
172.	1.216E-04	8.513E-02	1.079E-04	7.554E-02	2.4832E-03	5.103E-02
173.	1.149E-04	8.044E-02	1.080E-04	7.563E-02	2.3465E-03	5.109E-02
174.	1.102E-04	7.712E-02	1.081E-04	7.566E-02	2.2497E-03	5.111E-02
175.	1.068E-04	7.476E-02	1.081E-04	7.566E-02	2.1810E-03	5.111E-02
176.	1.044E-04	7.308E-02	1.080E-04	7.563E-02	2.1319E-03	5.109E-02
177.	1.027E-04	7.188E-02	1.080E-04	7.558E-02	2.0967E-03	5.106E-02
178.	1.014E-04	7.101E-02	1.079E-04	7.552E-02	2.0713E-03	5.102E-02
179.	1.005E-04	7.037E-02	1.078E-04	7.545E-02	2.0527E-03	5.097E-02
180.	9.985E-05	6.989E-02	1.077E-04	7.538E-02	2.0389E-03	5.092E-02
181.	9.934E-05	6.954E-02	1.076E-04	7.530E-02	2.0285E-03	5.086E-02
182.	9.894E-05	6.926E-02	1.074E-04	7.521E-02	2.0203E-03	5.081E-02
183.	9.863E-05	6.904E-02	1.073E-04	7.513E-02	2.0141E-03	5.075E-02
184.	9.838E-05	6.886E-02	1.072E-04	7.504E-02	2.0089E-03	5.069E-02
185.	9.816E-05	6.871E-02	1.071E-04	7.495E-02	2.0044E-03	5.063E-02
186.	9.797E-05	6.858E-02	1.069E-04	7.486E-02	2.0006E-03	5.057E-02
187.	9.781E-05	6.847E-02	1.068E-04	7.477E-02	1.9972E-03	5.051E-02
188.	9.766E-05	6.836E-02	1.067E-04	7.468E-02	1.9943E-03	5.045E-02
189.	9.752E-05	6.826E-02	1.066E-04	7.459E-02	1.9913E-03	5.039E-02
190.	9.738E-05	6.817E-02	1.064E-04	7.450E-02	1.9885E-03	5.033E-02
191.	9.725E-05	6.808E-02	1.063E-04	7.441E-02	1.9859E-03	5.027E-02
192.	9.713E-05	6.799E-02	1.062E-04	7.432E-02	1.9833E-03	5.021E-02
193.	9.702E-05	6.791E-02	1.060E-04	7.423E-02	1.9812E-03	5.015E-02
194.	9.690E-05	6.783E-02	1.059E-04	7.414E-02	1.9786E-03	5.008E-02
195.	9.677E-05	6.774E-02	1.058E-04	7.405E-02	1.9761E-03	5.002E-02
196.	9.665E-05	6.765E-02	1.057E-04	7.396E-02	1.9736E-03	4.996E-02
Runoff Input	0.000042	kg				
197.	9.858E-05	6.901E-02	1.055E-04	7.387E-02	2.0131E-03	4.990E-02
Runoff Input	0.000581	kg				
198.	1.263E-04	8.843E-02	1.054E-04	7.380E-02	2.5796E-03	4.985E-02
199.	1.176E-04	8.234E-02	1.056E-04	7.394E-02	2.4019E-03	4.995E-02
200.	1.115E-04	7.803E-02	1.057E-04	7.402E-02	2.2763E-03	5.000E-02
201.	1.071E-04	7.498E-02	1.058E-04	7.404E-02	2.1874E-03	5.002E-02
202.	1.040E-04	7.282E-02	1.058E-04	7.404E-02	2.1242E-03	5.001E-02
203.	1.018E-04	7.127E-02	1.057E-04	7.400E-02	2.0790E-03	4.999E-02
204.	1.002E-04	7.016E-02	1.056E-04	7.395E-02	2.0466E-03	4.996E-02
205.	9.908E-05	6.935E-02	1.056E-04	7.389E-02	2.0232E-03	4.992E-02
Runoff Input	0.001764	kg				
206.	1.846E-04	0.129	1.055E-04	7.382E-02	3.7700E-03	4.987E-02
Runoff Input	0.021164	kg				
207.	1.196E-03	0.837	1.063E-04	7.443E-02	2.4415E-02	5.028E-02
208.	8.802E-04	0.616	1.185E-04	8.297E-02	1.7973E-02	5.605E-02
Runoff Input	0.000679	kg				
209.	6.917E-04	0.484	1.270E-04	8.893E-02	1.4125E-02	6.008E-02
Runoff Input	0.011157	kg				
210.	1.073E-03	0.751	1.334E-04	9.335E-02	2.1905E-02	6.306E-02
211.	7.996E-04	0.560	1.439E-04	0.101	1.6328E-02	6.803E-02
212.	6.077E-04	0.425	1.512E-04	0.106	1.2409E-02	7.149E-02
213.	4.728E-04	0.331	1.563E-04	0.109	9.6537E-03	7.390E-02
214.	3.779E-04	0.265	1.598E-04	0.112	7.7167E-03	7.556E-02

Runoff	Input	0.000366	kg				
215.	3.291E-04	0.230		1.622E-04	0.114	6.7205E-03	7.670E-02
Runoff	Input	0.000097	kg				
216.	2.818E-04	0.197		1.640E-04	0.115	5.7541E-03	7.757E-02
Runoff	Input	0.020395	kg				
217.	1.243E-03	0.870		1.653E-04	0.116	2.5373E-02	7.817E-02
218.	9.291E-04	0.650		1.774E-04	0.124	1.8971E-02	8.387E-02
219.	7.087E-04	0.496		1.858E-04	0.130	1.4472E-02	8.784E-02
220.	5.538E-04	0.388		1.916E-04	0.134	1.1309E-02	9.059E-02
221.	4.449E-04	0.311		1.956E-04	0.137	9.0853E-03	9.249E-02
222.	3.683E-04	0.258		1.983E-04	0.139	7.5214E-03	9.379E-02
223.	3.144E-04	0.220		2.002E-04	0.140	6.4211E-03	9.467E-02
224.	2.765E-04	0.194		2.014E-04	0.141	5.6465E-03	9.525E-02
225.	2.498E-04	0.175		2.022E-04	0.142	5.1010E-03	9.563E-02
226.	2.310E-04	0.162		2.027E-04	0.142	4.7162E-03	9.586E-02
227.	2.177E-04	0.152		2.030E-04	0.142	4.4446E-03	9.598E-02
228.	2.082E-04	0.146		2.031E-04	0.142	4.2523E-03	9.604E-02
229.	2.016E-04	0.141		2.031E-04	0.142	4.1158E-03	9.604E-02
230.	1.968E-04	0.138		2.030E-04	0.142	4.0186E-03	9.601E-02

Table 4. Simulation results -- time-trace of chemical concentrations.
 Ecosystem: Pond, AERL Development Phase Test Definition
 Chemical: ASPON - 1972 Water Quality Assessment, Yazoo

Time Days	Average Chemical Concentrations				Mass of Chemical	
	Water Column		Bottom Sediments		Water Col	Sediments
	Free(mg/L)	Sed(mg/kg)	Pore(mg/L)	Sed(mg/kg)	Total kg	Total kg
Initial Input	0.000001 kg					
130.	1.968E-04	0.138	2.030E-04	0.142	4.0187E-03	9.601E-02
131.	1.934E-04	0.135	2.029E-04	0.142	3.9489E-03	9.595E-02
132.	1.909E-04	0.134	2.027E-04	0.142	3.8986E-03	9.587E-02
Runoff Input	0.004145 kg					
133.	3.921E-04	0.274	2.026E-04	0.142	8.0068E-03	9.579E-02
134.	3.325E-04	0.233	2.046E-04	0.143	6.7897E-03	9.677E-02
135.	2.905E-04	0.203	2.060E-04	0.144	5.9330E-03	9.742E-02
136.	2.610E-04	0.183	2.069E-04	0.145	5.3297E-03	9.785E-02
137.	2.402E-04	0.168	2.075E-04	0.145	4.9043E-03	9.811E-02
Runoff Input	0.001274 kg					
138.	2.879E-04	0.202	2.078E-04	0.145	5.8781E-03	9.826E-02
139.	2.595E-04	0.182	2.086E-04	0.146	5.3000E-03	9.866E-02
140.	2.396E-04	0.168	2.091E-04	0.146	4.8923E-03	9.890E-02
141.	2.255E-04	0.158	2.094E-04	0.147	4.6044E-03	9.904E-02
142.	2.155E-04	0.151	2.096E-04	0.147	4.4007E-03	9.910E-02
143.	2.084E-04	0.146	2.096E-04	0.147	4.2562E-03	9.910E-02
144.	2.034E-04	0.142	2.095E-04	0.147	4.1532E-03	9.907E-02
145.	1.998E-04	0.140	2.094E-04	0.147	4.0795E-03	9.901E-02
146.	1.972E-04	0.138	2.092E-04	0.146	4.0263E-03	9.894E-02
147.	1.953E-04	0.137	2.090E-04	0.146	3.9875E-03	9.885E-02
148.	1.939E-04	0.136	2.088E-04	0.146	3.9588E-03	9.875E-02
149.	1.928E-04	0.135	2.086E-04	0.146	3.9372E-03	9.865E-02
150.	1.920E-04	0.134	2.084E-04	0.146	3.9206E-03	9.854E-02
151.	1.914E-04	0.134	2.081E-04	0.146	3.9076E-03	9.843E-02
152.	1.908E-04	0.134	2.079E-04	0.146	3.8971E-03	9.831E-02
153.	1.904E-04	0.133	2.077E-04	0.145	3.8883E-03	9.820E-02
154.	1.900E-04	0.133	2.074E-04	0.145	3.8807E-03	9.808E-02
155.	1.897E-04	0.133	2.072E-04	0.145	3.8740E-03	9.796E-02
156.	1.894E-04	0.133	2.069E-04	0.145	3.8679E-03	9.784E-02
157.	1.891E-04	0.132	2.067E-04	0.145	3.8622E-03	9.773E-02
158.	1.889E-04	0.132	2.064E-04	0.144	3.8568E-03	9.761E-02
159.	1.886E-04	0.132	2.062E-04	0.144	3.8517E-03	9.749E-02
160.	1.884E-04	0.132	2.059E-04	0.144	3.8466E-03	9.737E-02
161.	1.881E-04	0.132	2.057E-04	0.144	3.8417E-03	9.725E-02
162.	1.879E-04	0.132	2.054E-04	0.144	3.8368E-03	9.714E-02
163.	1.877E-04	0.131	2.052E-04	0.144	3.8321E-03	9.702E-02
164.	1.874E-04	0.131	2.049E-04	0.143	3.8272E-03	9.690E-02
165.	1.872E-04	0.131	2.047E-04	0.143	3.8225E-03	9.678E-02
166.	1.870E-04	0.131	2.044E-04	0.143	3.8179E-03	9.667E-02

Runoff Input	0.003997	kg					
167.	3.825E-04	0.268	2.042E-04	0.143	7.8103E-03	9.655E-02	
168.	3.261E-04	0.228	2.061E-04	0.144	6.6582E-03	9.747E-02	
169.	2.863E-04	0.200	2.074E-04	0.145	5.8472E-03	9.808E-02	
170.	2.584E-04	0.181	2.082E-04	0.146	5.2760E-03	9.848E-02	
171.	2.386E-04	0.167	2.088E-04	0.146	4.8732E-03	9.872E-02	
Runoff Input	0.000075	kg					
172.	2.284E-04	0.160	2.090E-04	0.146	4.6637E-03	9.885E-02	
173.	2.175E-04	0.152	2.092E-04	0.146	4.4409E-03	9.893E-02	
174.	2.097E-04	0.147	2.092E-04	0.146	4.2830E-03	9.895E-02	
175.	2.042E-04	0.143	2.092E-04	0.146	4.1706E-03	9.892E-02	
176.	2.003E-04	0.140	2.091E-04	0.146	4.0902E-03	9.887E-02	
177.	1.975E-04	0.138	2.089E-04	0.146	4.0323E-03	9.880E-02	
178.	1.954E-04	0.137	2.088E-04	0.146	3.9902E-03	9.872E-02	
179.	1.939E-04	0.136	2.086E-04	0.146	3.9592E-03	9.862E-02	
180.	1.928E-04	0.135	2.083E-04	0.146	3.9360E-03	9.852E-02	
181.	1.919E-04	0.134	2.081E-04	0.146	3.9184E-03	9.841E-02	
182.	1.912E-04	0.134	2.079E-04	0.146	3.9045E-03	9.830E-02	
183.	1.907E-04	0.133	2.076E-04	0.145	3.8934E-03	9.818E-02	
184.	1.902E-04	0.133	2.074E-04	0.145	3.8842E-03	9.807E-02	
185.	1.898E-04	0.133	2.071E-04	0.145	3.8763E-03	9.795E-02	
Runoff Input	0.000297	kg					
186.	2.026E-04	0.142	2.069E-04	0.145	4.1364E-03	9.784E-02	
Runoff Input	0.069951	kg					
187.	3.624E-03	2.54	2.068E-04	0.145	7.4005E-02	9.779E-02	
188.	2.638E-03	1.85	2.451E-04	0.172	5.3864E-02	0.116	
189.	1.945E-03	1.36	2.719E-04	0.190	3.9709E-02	0.129	
190.	1.457E-03	1.02	2.906E-04	0.203	2.9761E-02	0.137	
191.	1.115E-03	0.781	3.036E-04	0.213	2.2769E-02	0.144	
192.	8.743E-04	0.612	3.127E-04	0.219	1.7853E-02	0.148	
193.	7.050E-04	0.494	3.189E-04	0.223	1.4397E-02	0.151	
194.	5.860E-04	0.410	3.231E-04	0.226	1.1966E-02	0.153	
195.	5.023E-04	0.352	3.260E-04	0.228	1.0256E-02	0.154	
196.	4.433E-04	0.310	3.279E-04	0.230	9.0526E-03	0.155	
197.	4.018E-04	0.281	3.291E-04	0.230	8.2045E-03	0.156	
198.	3.725E-04	0.261	3.299E-04	0.231	7.6063E-03	0.156	
199.	3.518E-04	0.246	3.302E-04	0.231	7.1838E-03	0.156	
200.	3.372E-04	0.236	3.304E-04	0.231	6.8846E-03	0.156	
201.	3.267E-04	0.229	3.304E-04	0.231	6.6722E-03	0.156	
202.	3.193E-04	0.224	3.303E-04	0.231	6.5208E-03	0.156	
203.	3.140E-04	0.220	3.301E-04	0.231	6.4121E-03	0.156	
204.	3.102E-04	0.217	3.298E-04	0.231	6.3333E-03	0.156	
205.	3.073E-04	0.215	3.295E-04	0.231	6.2760E-03	0.156	
206.	3.053E-04	0.214	3.292E-04	0.230	6.2334E-03	0.156	
207.	3.037E-04	0.213	3.288E-04	0.230	6.2014E-03	0.155	
208.	3.025E-04	0.212	3.284E-04	0.230	6.1766E-03	0.155	
209.	3.015E-04	0.211	3.281E-04	0.230	6.1568E-03	0.155	
210.	3.007E-04	0.211	3.277E-04	0.229	6.1410E-03	0.155	
211.	3.001E-04	0.210	3.273E-04	0.229	6.1276E-03	0.155	
212.	2.995E-04	0.210	3.269E-04	0.229	6.1160E-03	0.155	
213.	2.990E-04	0.209	3.265E-04	0.229	6.1055E-03	0.154	
214.	2.985E-04	0.209	3.261E-04	0.228	6.0960E-03	0.154	
215.	2.981E-04	0.209	3.257E-04	0.228	6.0873E-03	0.154	
216.	2.977E-04	0.208	3.253E-04	0.228	6.0789E-03	0.154	

217.	2.973E-04	0.208	3.249E-04	0.227	6.0707E-03	0.154
218.	2.969E-04	0.208	3.246E-04	0.227	6.0628E-03	0.153
219.	2.965E-04	0.208	3.242E-04	0.227	6.0551E-03	0.153
220.	2.962E-04	0.207	3.238E-04	0.227	6.0475E-03	0.153
221.	2.958E-04	0.207	3.234E-04	0.226	6.0400E-03	0.153
222.	2.954E-04	0.207	3.230E-04	0.226	6.0325E-03	0.153
223.	2.951E-04	0.207	3.226E-04	0.226	6.0251E-03	0.153
224.	2.947E-04	0.206	3.222E-04	0.226	6.0177E-03	0.152
225.	2.943E-04	0.206	3.218E-04	0.225	6.0104E-03	0.152
226.	2.940E-04	0.206	3.214E-04	0.225	6.0031E-03	0.152
227.	2.936E-04	0.206	3.210E-04	0.225	5.9958E-03	0.152
228.	2.933E-04	0.205	3.206E-04	0.224	5.9885E-03	0.152
229.	2.929E-04	0.205	3.203E-04	0.224	5.9813E-03	0.151
230.	2.926E-04	0.205	3.199E-04	0.224	5.9740E-03	0.151