

## **Appendix D**

### **Submersed and Emerged Weed Control Setback Tables for Renovate® 3 Herbicide in the State of New York**

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Drs. J. A. Knuteson and P. L. Havens  
Dow AgroSciences LLC, 306/A2  
9330 Zionsville Road  
Indianapolis, Indiana 46268

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### *Summary*

Application zone setback distances from potable surface water intakes are required by EPA for Renovate® 3 herbicide use in the USA. The setback distances were derived by EPA/OPP/EFED with a convection-dispersion model to maintain the annual average water concentration at an intake less than 400 ppb ( $\mu\text{g/L}$ ). Without additional review, a default maximum water concentration value in the State of New York is 50 ppb, therefore the EFED model was used to determine new setback distances.

### *Introduction*

The registration decision for aquatic uses for triclopyr, the active ingredient in Renovate® 3 herbicide<sup>1</sup>, was nearing completion in June 2002 at EPA. One of the final points of discussion with the registrant involved protection of functioning potable surface water intakes. A combination of protections could be used, including shutting off the intakes for a period of time, until measured water concentrations fell below a level of concern, or use of setback distances from the zone of application to potable surface water intakes. The target water concentration not to be exceeded was an annual average water concentration of 400 ppb ( $\mu\text{g/L}$ ).

The approach that EFED used to estimate the desired setback distance for the worst case use, submersed weeds, was based upon an internally developed simulation model designed for this purpose. An EPA internal memo<sup>2</sup> briefly described the modeling approach and justified the EFED input parameters. The memo also contained an output table defining buffer zone setback distances for various sized application areas at the maximum use rate of 2.5 ppm. These setbacks were agreed to by the registrant. The setback table on page 6 of the Renovate 3 herbicide label accurately reflects these setbacks at the 2.5 ppm application rate. The label table also provides setback distances at lesser starting application concentrations; these are simply ratios of the application rate to the 2.5 ppm values. Another feature of the label table on page 6 is an equation for deriving the setback distance for application zone sizes greater than 32 acres (the maximum that EFED modeled). This equation is a curve-fit of the EFED modeled results, and provides a convenient method to determine the setback for application zones larger than 32 acres. In a personal communication with Steve Cockreham, SePRO, January 2006, he indicated large applications typically do not exceed 100 acres.

A setback table for floating and emerged weed control is on page 5 of the Renovate® 3 herbicide label. The derivation of this table is not known but it appears that the 8 quart

per surface application rate is equivalent to one-half the setback distance of the 2.5 ppm table for submerged weeds. The lesser surface application rates are appropriately scaled in the table.

The original EFED simulation program developed by Ian Kennedy was forwarded to Dow AgroSciences as part of the re-registration effort for the aquatic use of 2,4-D in 2005. The program was coded in the Python programming language. As received, this program was used to re-create the setback distances in the 2002 EFED memo successfully. To use the EFED model, a guessed setback distance was entered into the code and the model was run. The output, the annual average water concentration at that setback distance, was manually compared against the level of concern. A time consuming trial-and-error method was used to find setback distances. Dow AgroSciences modified the EFED program, without changing key calculation algorithms, to automatically seek the setback distance to the nearest meter for a specified annual average water concentration of concern.

### *Methods and Results*

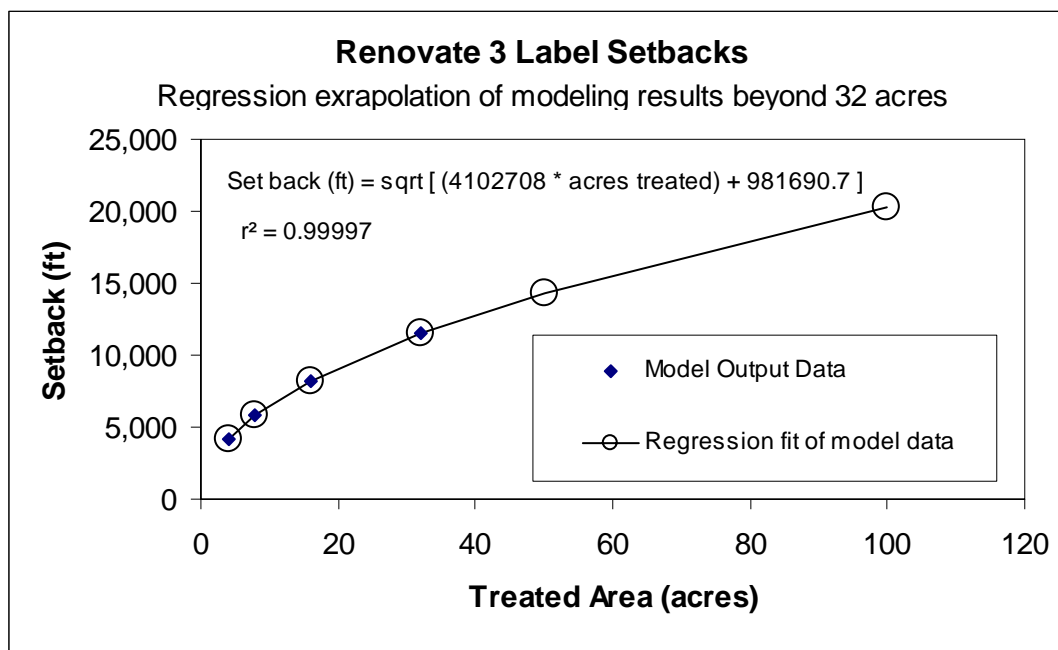
The EFED one-dimensional advection-dispersion Python simulation model was used to calculate setback distances to potable water intakes for a 50 ppm annual average water concentration level of concern. The modeled results are presented for the 2.5 ppm submersed weed control rate (**Table 1**). Setbacks for lesser starting application concentrations were proportioned to the 2.5 ppm rate as done in the federal Renovate® 3 label.

<b>Table 1. Setback Distances for Triclopyr Acid in Water (ppm a.e.) for Submerged Weed Control</b>					
	Required setback distance (ft) from potable water intake <sup>1</sup>				
Area Treated (acres)	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
4 or less	1,263	1,684	2,525	3,367	4,209
>4 – 8	1,734	2,312	3,469	4,625	5,781
>8 – 16	2,449	3,265	4,898	6,530	8,163
>16 – 32	3,451	4,601	6,902	9,202	11,503
>32 acres, calculate a setback using the formula for the appropriate rate	Setback (ft) =sqrt [ (4102708 * acres treated) + 981690.7 ]/3.33	Setback (ft) =sqrt [ (4102708 * acres treated) + 981690.7 ]/2.50	Setback (ft) =sqrt [ (4102708 * acres treated) + 981690.7 ]/1.67	Setback (ft) =sqrt [ (4102708 * acres treated) + 981690.7 ]/1.25	Setback (ft) =sqrt [ (4102708 * acres treated) + 981690.7 ]

<sup>1</sup> For protection of drinking water; not to exceed 50 ppb ( $\mu\text{g ae/L}$ ) on an annual basis.

A least-squares best-fit analysis determined that the new Python model setback distances were related to the size of the application zone, in acres, squared. Figure 1 illustrates the

ever-increasing function used to estimate setback distances for treatment areas greater than 32 acres.



**Figure 1. Empirical Fit of Python Model Output of Setback Distances to Treatment Area for Submerged Weed Control.**

An approach similar to that on the federal label was taken to create a new setback distances table for floating and emerged weed control (Table 2). The setback distance for the 8 quart per acre treatment was equated to one-half of the setback distance for the 2.5 ppm submersed weed control treatment. Then the setback distances of lesser rates were scaled to the 8 quart per acre treatment based upon application rate. Surface applications greater than 30 acres in size are uncommon.

Area Treated (acres)	Required setback distance (ft) from potable water intake <sup>1</sup>			
	2 qt/acre	4 qt/acre	6 qt/acre	8 qt/acre
4 or less	526	1,052	1,578	2,105
>4 – 8	723	1,445	2,168	2,891
>8 – 16	1,020	2,041	3,061	4,082
>16 – 32	1,438	2,876	4,314	5,752

*Discussion*

The setback distances found on the federal Renovate® 3 label are a result of conservative EFED modeling assumptions and worst case scenarios. The setback distances calculated by the EFED model and the derivative tables are considered conservative. In the above tables, rounding to the nearest one hundred foot increment would not make a real

difference in protection of water intakes, but it would simplify the use of the tables in a label document.

*References*

1. SePRO Renovate 3 Herbicide federal specimen label. EPA Reg. No. 62719-37-67690.
2. Michele Mahoney and Ian Kennedy, 17 June 2002. Revised Tier 1 Estimates for Drinking Water Concentrations Resulting from Triclopyr Use for Aquatic Weed Control. Memorandum to Jim Tompkins and Dana Vogel. PC Code: 116002, DPBarcode: D283715.