Proposed exemptions to San Joaquin Valley Ozone Nonattainment Area Use Restrictions

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Growers, pest control advisors and manufactures were surveyed regarding pest management consequences of restricting high-emission formulations of abamectin, chlorpyrifos, gibberellins and oxyfluorfen. The survey focused on the San Joaquin Valley from 1 May through 31 October and addressed the efficacy of alternatives and effects on management practices.

Abamectin – Since the industry has not had the new, low-VOC abamectin products for a full season yet, growers and PCAs have relatively little experience with the new formulations. Limited use during the 2011 season did not find any significant differences with the new formulations. Field trial data also show that the low-emission products have equivalent efficacy (Van Steenwyk, unpublished). Aside from a slight increase in cost, restricting the high-emission formulations should not cause any problems, but additional experience with the 2012 growing season is needed to confirm this. Manufacturers would be wise to educate end-users on formulation changes so that they apply the appropriate amount during the first few years of use.

Chlorpyrifos – There was general consensus that the low-emission formulation of chlorpyrifos is as efficacious as the high-emission formulations for most pests. An exemption may be necessary for some pest species, e.g., cotton aphid, which are difficult to cover with insecticides because they are concealed within the foliage. There are data on file that show lower efficacy for controlling cotton aphid with the low-emission formulation. Control can be achieved by the low-emission formulation of chlorpyrifos and other low-emission insecticides if applied before the pest species become concealed within the foliage. After aphids are protected within the foliage, only neonicotinoids can provide acceptable control. However, neonicotinoid insecticides are used early in the growing season for white fly and aphid control. Resistance to the neonicotinoid insecticides has been detected in cotton aphid and reliance on additional neonicotinoid insecticide applications late in the season will exacerbate the problem. We advise exempting the high-emission formulations for cotton aphid on cotton post boll opening (September through October). Based on 2010 PUR data, the exemption would result in 29,085 acres being treated with the high-emission formulation of chlorpyrifos.

Gibberellins – There is general consensus that the low-emission formulations of gibberellins are as efficacious as the high-emission formulations. However, there is concern regarding the difficulty of measuring small amounts of powder in the field. For example, on certain cultivars (Ruby Seedless, Crimson Seedless and other fresh market grapes) as little as 0.5 to 1 g AI/ac are recommended for thinning. Using the high-emission formulation (4% liquid), 0.5 to 1 fl oz/ac would be required. This amount is

easily measured in the field. Using the 40% powder (low-VOC) formulation, 0.097 to 0.19 oz/ac would be required, or using the 5% powder compliant formulation, 0.78 to 1.5 oz/ac would be required. It would be very difficult to measure accurately in the field using the 5% powder and practically impossible using the 40% powder.

However, 8 to 16 g AI/ac is recommended for sizing of Ruby Seedless and 4 to 8 g AI/ac for Crimson Seedless and others. These amounts are difficult to measure in the field but it is possible, particularly if the 5% powder is used. The consequence of an applying too little or too much gibberellin could be devastating to the grower since it could cause no thinning or complete fruit abortion and possibly reduce crop yields the following year. We recommend that applications of 5 - 8 g or less of high-emission formulations of gibberellin be exempt from regulations until manufacturers begin distributing powdered gibberellin products in small quantity, e.g., 1 g water dispersible bags. Based on 2010 PUR data and a 5 g/acre exemption, this would result in 55,213 acres being treated with the high-emission formulation of gibberellins.

*Oxyfluorfe*n – There is general consensus that the low-VOC formulation of oxyfluorfen is equally efficacious as a pre-emergence herbicide as compared to the high-emission formulation. However, it is also generally recognized that the low-emission formulation of oxyfluorfen is not as effective as a post-emergence herbicide. Mitigation of this problem would require the addition of a low dose of a low-emission post-emergence herbicide, i.e., paraquat, glyphosate, glufosinate, flumioxazin, carfentrazone, glyphosate, glufosinate. The combination of both the low-VOC formulation of oxyfluorfen and low-emission post-emergence herbicide would achieve the same efficacy but would increase the cost to growers.

The cost of the additional post-emergence herbicides ranges from $1.19/acre for glyphosate to $19.30/acre for saflufenacil (Table 1). For the 375,673 acres of the affected commodities, the additional cost of the low-emission post-emergence herbicide ranges from $446,000 for glyphosate to $7,250,000 for saflufenacil (Table 2).

Table 1. High-VOC oxyfluorfen (Goal 2XL) vs alternative materials. Includes $9/acre application costs. 100% of fields or orchards treated.

Active ingredient (trade name)		Lbs AI/ gallon	Cost/unit	Rate* unit/acre	Unit	Per acre/ application Materials $	Total/acre Mat +Appl $	Total $ Mat/ Treated Ac	Total/acre Mat +Appl $ Treated Area
oxyfluorfen (Goal 2XL)	**VOC**	**2**	**$69**	**0.281**	**lb AI**	**$19.41**	**$28.41**	**$19.41**	**$28.41**
oxyfluorfen (GoalTender)	Alt	4	$69	0.281	lb AI	$19.41	**$28.41**	**$19.41**	**$28.41**
glyphosate	Kicker	4	$5	0.250	lb AI	$1.19	**$1.19**	$1.19	**$1.19**
paraquat (Gramoxone Inteon)	Kicker	3	$16	0.625	lb AI	$10.21	**$10.21**	$10.21	**$10.21**
carfentrazone (Shark)	Kicker	1.9	$153	0.031	lb AI	$4.75	**$4.75**	$4.75	**$4.75**
glufosinate (Rely)	Kicker	2.34	$41	0.400	lb AI	$16.41	**$16.41**	$16.41	**$16.41**
pyraflufen-ethyl (Venue)	Kicker	0.17	$3,435	0.005	lb AI	$15.97	**$15.97**	$15.97	**$15.97**
saflufenacil (Treevix)	Kicker	0.7	$3,529	0.005	lb AI	$19.30	**$19.30**	$19.30	**$19.30**
esterified vegetable oil (Hasten)	Kicker	NA	$4	2.000	pint	$7.00	**$7.00**	$7.00	**$7.00**

*Broadcast Acre

Table 2. Increased cost for substituting GoalTender plus various kickers for Goal 2XL by crop*

Crop	# of Apps	Acres Treated	glyphosate	paraquat (Gramoxone Inteon)	carfentrazone (Shark)	glufosinate (Rely)	pyraflufen-ethyl (Venue)	saflufenacil (Treevix)	esterified vegetable oil (Hasten)
Almond	4,822	270,405	$321,106	$2,760,384	$1,283,854	$4,437,415	$4,318,030	$5,218,817	$1,892,835
Pistachio	754	51,481	$61,134	$525,535	$244,426	$844,816	$822,087	$993,583	$360,367
Walnut	1,053	28,343	$33,657	$289,335	$134,570	$465,116	$452,602	$547,020	$198,401
Grape, Wine	213	15,199	$18,049	$155,156	$72,163	$249,419	$242,709	$293,341	$106,393
Cotton	105	7,356	$8,735	$75,093	$34,926	$120,714	$117,466	$141,971	$51,492
Grape	69	2,889	$3,431	$29,492	$13,717	$47,409	$46,134	$55,758	$20,223
TOTAL	7,016	375,673	$446,112	$3,834,995	$1,783,656	$6,164,890	$5,999,028	$7,250,489	$2,629,711

* No difference in cost between Goal 2XL and GoalTender (materials and application costs)