BEFORE THE DIRECTOR OF THE
DEPARTMENT OF PESTICIDE REGULATION
STATE OF CALIFORNIA

In the Matter of the Environmental Monitoring Branch
Request for Approval of
Reduced Volatile Organic Compound Emissions
Field Fumigation Method

DECISION
(California Code of Regulations, Title 3, section 6452)

DEPARTMENT OF PESTICIDE REGULATION
Environmental Monitoring Branch
1001 I Street
Sacramento, California 95814

Summary

The Environmental Monitoring Branch staff recently reviewed several studies that estimated fumigant emissions from applications that used totally impermeable film (TIF) tarps. Except for the type of tarp, fumigations with TIF tarps are identical to other methods specified by the Department of Pesticide Regulation's (DPR's) volatile organic compound (VOC) regulations. However, several of the methods using non-TIF tarps are classified as "high-emission" and are prohibited within several ozone nonattainment areas (NAAs) during May–October, under Title 3, California Code of Regulations (3 CCR) section 6447.3 et seq. The regulations include a provision for the DPR Director to grant interim approval of fumigation methods that reduce VOC emissions (3 CCR section 6452). DPR has completed its evaluation of TIF tarps as specified in 3 CCR section 6452. DPR has determined that the TIF tarp fumigation methods meet the standard for approval as an interim method, as described below. Effective May 1, 2013, DPR grants approval for interim use of the TIF tarp methods. The TIF tarp methods may be used for three years from the effective date.

Background

VOCs contribute to the formation of ozone, a major air pollutant in several regions of California. Under the federal Clean Air Act, California's State Implementation Plan for ozone includes an element to track and reduce VOC emissions from pesticides. On January 25, 2008, DPR adopted regulations to control VOC emissions from fumigants during the May–October peak ozone season in five ozone NAAs: Sacramento Metro, San Joaquin Valley, Southeast Desert, South Coast, and Ventura. The regulations include provisions that only allow fumigation methods for which DPR has adequate data to determine the VOC emission rates. However, the regulations include a provision for interim approval of fumigation methods with emissions no greater than the field fumigation methods allowed in the regulations in the respective areas (3 CCR section 6452).

Regulatory Standards and Considerations

3 CCR section 6452 sets different standards by which to evaluate whether a new fumigation method will be allowed; one for the Sacramento Metro and South Coast ozone NAAs; and one for the San Joaquin Valley, Southeast Desert, and Ventura ozone NAAs. Sacramento Metro and South Coast have a less stringent standard because no further VOC reductions from pesticides are needed in these ozone NAAs. Both "low-emission" and "high-emission" methods can be used in these two areas. Only "low-emission" methods are allowed in the San Joaquin Valley, Southeast Desert, and Ventura ozone NAAs during the May–October peak ozone season. The key information is the emission rating (percent of the fumigant applied that is emitted to the air) and the emission rate (emission rating multiplied by the maximum application rate). Either the emission rating or the emission rate can be no greater than the current methods allowed within the ozone NAAs by the regulations. Table 1 shows the standards for approval of an interim fumigation method.

Table 1. Emission criteria for approving new fumigation methods.

Maximum Allowed Emission Rating and Emission Rate	**Sacramento Metro, South Coast NAAs**	**San Joaquin Valley, Southeast Desert, Ventura NAAs**
1,3-D emission rating (%)	65	44
1,3-D emission rate (pounds/acre)	216	146
Chloropicrin emission rating (%)	64	44
Chloropicrin emission rate (pounds/acre)	256	176
Methyl bromide emission rating (%)	100	48
Methyl bromide emission rate (pounds/acre)	400	192

In assessing whether the new method meets the standard, DPR must assess the scientific data submitted to establish the emission rating, normally consisting of field monitoring data. In evaluating this data, 3 CCR section 6452 requires DPR to consider the following factors:

- whether the information is sufficient to estimate emissions.
- whether the results are valid as indicated by the quality control data.
- whether the conditions studied represent agricultural fields.

Summary and Evaluation of the Submitted Information

Environmental Monitoring Branch staff have reviewed fumigant emission data for TIF tarp applications with 1,3-dichloropropene (1,3-D), chloropicrin, and methyl bromide.[1] No emissions data is available for TIF tarp applications with methyl isothiocyanate fumigants. All of the TIF tarps included in the studies are assigned by the U.S. Environmental Protection Agency, a 60 percent buffer zone credit by labeling based on reductions in emissions.

For 1,3-D, six monitored fumigations used TIF tarps, and two were used to determine VOC emissions. For chloropicrin, 14 monitored fumigations used TIF tarps, and nine were used to determine the VOC emissions. For methyl bromide, seven monitored fumigations used TIF tarps, and five were used to determine VOC emissions. Some monitored fumigations used a combination of techniques to reduce emissions, such as TIF tarp in combination with a potassium thiosulfate amendment. Since the effect of TIF tarp alone could not be determined, these monitored fumigations were excluded. Other studies were excluded because they showed higher emissions due to the short time period before cutting the TIF tarp. The remaining studies used acceptable methods to determine emissions and the quality control data indicated valid results.

For 1,3-D, the data indicates that TIF tarp-broadcast-shank injection methods meet the 44 percent emission rating standard for low-emission methods. There is insufficient data to determine if other 1,3-D TIF tarp methods meet the 44 percent emission rating standard for low-emission methods. For chloropicrin, the data indicates that all TIF tarp methods meet the 44 percent emission rating standard for low-emission methods. For methyl bromide, the data are limited and variable. None of the methyl bromide TIF tarp methods were monitored more than once. Some of the data shows lower emissions with TIF tarp, but other data shows essentially no difference in comparison to non-TIF tarps.

Findings

For 1,3-D, the data indicates that TIF tarp-broadcast-shank injection methods have an emission rating of 10%, meeting the 44 percent standard for low-emission methods. There is insufficient data to determine if other 1,3-D TIF tarp methods meet the 44 percent emission rating for low-emission methods. For chloropicrin, all of TIF tarp data has been averaged and all methods assigned an emission rating of 7 percent, meeting the 44 percent emission rating standard for low-emission methods. For methyl bromide, due to the limited and variable TIF tarp data, none of the emission ratings have been revised. The following tables show the emission rating

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[1] 1,3-D: memorandum from Bruce Johnson to Randy Segawa, dated April 12, 2013
Chloropicrin: memorandum from Terrell Barry to Randy Segawa, dated April 10, 2013
Methyl bromide: memorandum from Terrell Barry to Randy Segawa, dated April 16, 2013

assigned to each TIF tarp method. Table 2 lists the low-emission TIF tarp methods that can be used in all five ozone NAAs. Table 3 lists the high-emission TIF tarp methods that are prohibited in the San Joaquin Valley, Southeast Desert, and Ventura ozone NAAs during May-October. The fumigation method codes for pesticide use reports should identify all applications that use a TIF tarp, including applications where the emission rating is the same as non-TIF tarp. This will allow DPR to retroactively adjust its VOC emission estimates if future studies demonstrate a decrease in emissions with TIF tarps and a revised emission rating is assigned.

Table 2. Low-emission TIF tarp fumigation methods.

Regulation Section*	Field Fumigation Method	Emission Rating (%)	Fumigation Method Code
6447.3.	**Methyl Bromide Fumigation Methods**		
6447.3(a)(3)	TIF/Shallow/Broadcast – Nobel Plow	48**	1143
6447.3(a)(5)	TIF/Deep/Broadcast	48**	1147
6448.1.	**1,3-Dichloropropene Fumigation Methods**		
6448.1(d)(2)	TIF/Shallow/Broadcast	10	1242
6448.1(d)(4)	TIF/Shallow/Bed/Three Water Treatment	44**	1245
6448.1(d)(6)	TIF/Deep/Broadcast	10	1247
	TIF/Deep/Bed	26**	1248
6448.1(d)(7)	TIF/Chemigation (Drip System)	29**	1259
6449.1	**Chloropicrin-Fumigation Methods**		
6447.3(a)(3)	TIF/Shallow/Broadcast – Nobel Plow	7	1143
	TIF/Shallow/Broadcast – Nobel Plow – Strip	7	1144
	TIF/Shallow/Broadcast–Closing shoes, compaction roller	7	1145
6447.3(a)(4)	TIF/Shallow/Bed	7	1146
6447.3(a)(5)	TIF/Deep/Broadcast	7	1147
	TIF/Deep/Broadcast – Strip	7	1148
6448.1(d)(2)	TIF/Shallow/Broadcast	7	1242
	TIF/Shallow/Bed	7	1243
6448.1(d)(4)	TIF/Shallow/Bed/Three Water Treatment	7	1245
6448.1(d)(6)	TIF/Deep/Broadcast	7	1247
	TIF/Deep/Bed	7	1248
6448.1(d)(7)	TIF/Chemigation (Drip System)	7	1259

* The listed regulation section specifies the other method requirements in addition to TIF tarp. These section numbers may change once the regulations are amended to include TIF methods.

** Emission rating same as non-TIF tarp due to insufficient data for TIF tarp.

Table 3. High-emission TIF tarp fumigation methods. These emission ratings are the same as non-TIF tarps due to insufficient data for TIF tarps.

Regulation Section*	Field Fumigation Method	Emission Rating (%)	Fumigation Method Code
6447.3.	**Methyl Bromide Fumigation Methods**		
6447.3(a)(3)	TIF/Shallow/Broadcast – Nobel Plow – Strip	74	1144
6447.3(a)(3)	TIF/Shallow/Broadcast–Closing shoes, compaction roller	100	1145
6447.3(a)(4)	TIF/Shallow/Bed	100	1146
6447.3(a)(5)	TIF/Deep/Broadcast – Strip	74	1148
6447.3(a)(6)	TIF/Drip System - Hot Gas	100	1149
6448.1.	**1,3-Dichloropropene Fumigation Methods**		
6448.1(d)(2)	TIF/Shallow/Bed	65	1243

* The listed regulation section specifies the other method requirements in addition to TIF tarp. These section numbers may change once the regulations are amended to include TIF methods.

Conclusions

The available data supports approval of all TIF tarp fumigation methods. Effective May 1, 2013, the methods listed in Table 2 are approved for use in the San Joaquin Valley, Southeast Desert, and Ventura ozone NAAs with the following restrictions during May 1–October 31:

- All fumigation method requirements specified in the cited 3 CCR sections of Table 2 still apply. The only change is that a TIF tarp must be used.
- The TIF tarp used for a specific fumigation must meet the requirements for a 60 percent buffer zone credit on the product label.
- TIF tarps cannot be cut or perforated sooner than 9 days after fumigation, and cannot be removed sooner than 24 hours after tarp cutting or perforation.
- For products containing chloropicrin as an active ingredient in combination with 1,3-D or methyl bromide, the more restrictive emission rating applies. If the fumigation method is designated as low-emission for chloropicrin, but high-emission for 1,3-D or methyl bromide, the method is considered high-emission.
- Pesticide users should report TIF tarp applications using the field fumigation method codes shown in Table 2 immediately or as soon as their pesticide use reporting vendor updates its software. County agricultural commissioners may use enforcement discretion when reviewing field fumigation method codes on use reports since there will be a lag time to inform all affected parties of these changes and to update vendor's pesticide use reporting software.

Effective May 1, 2013, the methods listed in Tables 2 and 3 are approved for use in the Sacramento Metro and South Coast ozone NAAs with the following restrictions during May 1–October 31:

- All fumigation method requirements specified in the cited 3 CCR sections of Tables 2 and 3 still apply. The only change is that a TIF tarp must be used.
- The TIF tarp used for a specific fumigation must meet the requirements for a 60 percent buffer zone credit on the product label.
- TIF tarps cannot be cut or perforated sooner than 9 days after fumigation, and cannot be removed sooner than 24 hours after tarp cutting or perforation.
- Pesticide users should report TIF tarp applications using the field fumigation method codes shown in Table 2 and 3 immediately or as soon as their pesticide use reporting vendor updates its software. County agricultural commissioners may use enforcement discretion when reviewing field fumigation method codes on use reports since there will be a lag time to inform all affected parties of these changes and to update vendor's pesticide use reporting software.

DPR grants interim approval of these fumigation methods for three years from the effective date.

By: Brian R Leahy Date: 4/29/2013
Brian R. Leahy, Director
Department of Pesticide Regulation