

MEMORANDUM

DATE: November 28, 2000

SUBJECT: Public Comments and EPA Responses to the Proposed NESHAP for Solvent Extraction for Vegetable Oil Production

FROM: Chuck Zukor and Melanie Taylor
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TO: NESHAP: Solvent Extraction for Vegetable Oil Production Project File

The purpose of this memorandum is to provide EPA's responses to the public comments received on the proposed national emission standards for hazardous air pollutants (NESHAP) for solvent extraction for vegetable oil production (65 FR 34252). A total of eight letters commenting on the proposed standard were received. A list of commenters, their affiliations, and the EPA docket number assigned to their correspondence are given in Table 1.

Table 1. List of Public Commenters

Docket Number	Commenter	Affiliation	Date
IV-D-1	J. Smith	Institute of Clean Air Companies	July 14, 2000
IV-D-2	A. Jirik	Corn Products International, Inc.	July 21, 2000
IV-D-3	J. Aaronson	Bell, Boyd & Lloyd, LLC	July 24, 2000
IV-D-4	R. Randolph	Missouri Dept. of Natural Resources, Air Pollution Control Program	July 24, 2000
IV-D-5	P. Wakelyn, K. Lanclos, and J. Kersey	National Cotton Council	July 25, 2000
IV-D-6	J. De Simone	University of North Carolina - Chapel Hill, NSF Science & Technology Center for Environmentally Responsible Solvents and Processes	July 25, 2000
IV-D-7	D. Ailor	National Oilseed Processors Association	July 25, 2000
IV-D-8	D. Ailor	National Oilseed Processors Association	November 3, 2000

Summary of Public Comments and EPA Responses

1. Rule Applicability

Comment: Commenter IV-D-3 requested confirmation that the proposed rule would not apply to any facility producing vegetable oils solely from agricultural products other than the eight oilseeds listed in the regulation. The listed oilseeds include: corn germ, cottonseed, flax, peanuts, rapeseed (for example, canola), safflower, soybeans, and sunflower.

Response: As stated in §63.2832(b)(3) of the rule, if a vegetable oil production facility processes only “other agricultural products” and does not process any of the eight oilseeds listed in the regulation, then the regulation does not apply to the facility.

2. Determination of Oilseed Inventories

Comment: Commenters IV-D-5 and IV-D-7 requested the EPA to confirm that the three basic methods for determining the quantity of oilseed processed (i.e., oilseed crush) are acceptable to demonstrate compliance with the rule. Each method will determine the quantity of oilseed processed on an “as received” basis. The as received basis corresponds to characteristics of oilseeds as delivered to the front gate of a vegetable oil production facility prior to any type of oilseed preparation. A brief description of each basic method is provided below:

1. Direct measurement of the oilseed inventory: This method starts with a beginning storage inventory of oilseed as received by the facility. All shipments or other additions to the oilseed inventory are then weighed as received and added to the beginning inventory over the relevant time period. An ending oilseed inventory is then determined and subtracted from the sum of the beginning inventory and all additions to derive the total quantity of oilseed processed.
2. Direct measurement of the production outputs: This method starts by calculating the total vegetable meal production and total oil production (both by weight) and summing the two values. Next, oilseed moisture losses and dry product handling losses during the production operation are calculated. The total production value is summed with the calculated moisture and dry handling losses to derive the total quantity of oilseed processed on an as received basis.

3. Direct measurement of oilseed fed into the process: This method starts by determining the total mass of oilseed fed directly into the process. This procedure is typically accomplished with the use of a scale to weigh the oilseed. Oilseed samples are taken to determine the average moisture content of the oilseed entering the process. The total as received processed value is calculated by converting the "oilseed to process" to "oilseed as received" by correcting for the difference in moisture content and using a predetermined dry handling loss factor.

Response: Each of the above methods is acceptable for demonstrating compliance with the rule, as long as each source includes in its Plan for Demonstrating Compliance the items specified by the regulation in §§63.2851(a)(3) through (a)(7). For example, the source must:

1. Provide a detailed description of all methods of measurement the source will use to determine the solvent loss, the HAP content of the solvent, and the tons of each type of oilseed processed (§63.2851(a)(3)).
2. Specify the frequency in which each measurement will be made (§63.2851(a)(4)).
3. Provide examples of each calculation that will be used in determining the compliance status, and examples of how data values are converted when measured with one parameter to other terms for use in the compliance determination (§63.2851(a)(5)).
4. Provide examples of all recordkeeping such as logs showing how data will be recorded (§63.2851(a)(6)).
5. Provide a quality assurance/control plan to ensure that gathered data meet the compliance demonstration needs (§63.2851(a)(7)).

Comment: Commenter IV-D-2 requested confirmation that accounting months may be used instead of calendar months for determining the monthly quantity of oilseed processed and solvent loss to demonstrate compliance. The commenter states that the official quantity of oilseed processed at the source is determined each "accounting" month which consists of 4 or 5 calendar weeks. The

end of an accounting month may not correspond exactly to the end of a calendar month. Thus, an accounting month may end before or after a corresponding calendar month. However, 12 accounting months correspond exactly to a calendar year.

Response: The regulation has been revised to clarify that monthly determinations of solvent loss and the amount of oilseed crush can coincide with monthly accounting practices, as long as each accounting month is approximately equal in duration and there are exactly twelve monthly determinations in a calendar year. This clarification can be found in §63.2853(a) and §63.2855(a) of the revised rule. Regardless of which determination period type a source may choose, calendar or accounting month, all sources must develop and implement a written Plan for Demonstrating Compliance as required in §63.2851(a) of the rule. The Plan for Demonstrating Compliance must provide all the detailed procedures that will be used to monitor and record data necessary for demonstrating compliance.

3. Determination of HAP Content

Comment: Commenter IV-D-7 stated that a certificate of analysis from the manufacturer of the extraction solvent is a reasonable source for determining the HAP content of the extraction solvent. The commenter therefore recommended that the term “manufacturer’s certificates of analysis” should be added to the third sentence of §63.2854(b)(1).

Response: After reviewing this comment, the EPA requested additional information from industry representatives concerning the manufacturer’s certificate of analysis (docket item IV-C-1). In response to EPA’s enquiry, commenter IV-D-8 provided a letter from an extraction solvent manufacturer which describes a certificate of analysis as a legal and binding document. The purpose of a certificate of analysis is to list the test method and analytical results that determine chemical properties of the solvent and the volume percentage of all components present in the solvent. The regulation requires sources to record the volume fraction of HAP present in extraction solvents at concentrations greater than one percent by volume. The test method for the certificate of analysis is more than sensitive enough to determine and identify all components present at greater than one percent by volume.

Given the definition of manufacturer's certificate of analysis provided by the commenter, EPA agrees that it is a reasonable source for determining the HAP content of the extraction solvent. In §63.2854(b)(1), the term "hazardous air pollutant data sheet" was changed to "manufacturer's certificate of analysis" which is a more appropriate term for the solvent extraction for vegetable oil production industry. Thus, the final rule will allow affected sources to use either material safety data sheets or manufacturer's certificates of analysis to determine HAP content of the extraction solvent.

4. Maximum Achievable Control Technology (MACT)

Comment: Commenters IV-D-4 and IV-D-6 suggested that the EPA should consider the use of pollution prevention techniques as a means to comply with the proposed HAP emission limits. Commenter IV-D-4 suggested the use of a leak detection and repair (LDAR) program, and commenter IV-D-6 recommended the use of an alternative extraction solvent such as supercritical carbon dioxide.

Response: While not specifically requiring the prior mentioned techniques, the proposed rule does not exclude the use of these or other pollution prevention techniques which may assist a source in complying with the proposed HAP emission limits. The proposed rule is structured to offer each source flexibility by requiring compliance with an overall HAP emission limit for the entire source instead of requiring a specific means of control for specific emission points. It will be the responsibility of each affected source to identify and develop its own unique set of techniques to demonstrate compliance with the proposed HAP emission limits. Therefore, the overall HAP emission limit format of this rule allows each source to develop a compliance plan that is most cost effective and appropriate for that source.

5. MACT Floor Determination

Comment: Commenter IV-D-4 requested clarification as to why the EPA used model vegetable oil production plants for determining the source category MACT floor instead of using the best performing 12 percent of existing sources.

Response: The commenter misunderstood the approach used by EPA to determine the MACT floor. The MACT floor represents the minimum level of stringency allowed under section 112 of the Clean Air Act as amended. The methodology used for determining the

MACT floor is described in the memorandum, "MACT Floor Determination for Existing and New Sources in the Vegetable Oil Production Source Category," docket number A-97-59, item II-B-19. The EPA did not use model plants for the MACT floor determination. For existing sources, the EPA determined the MACT floor for each of the 12 oilseed or process operations as the average of the HAP loss performance levels corresponding to the actual top performing 12 percent of sources (or the top five for oilseeds or operations with fewer than 30 sources). For new sources, the EPA determined the MACT floor as the performance level corresponding to the actual top ranking source. For example, the MACT floor for the 55 existing conventional soybean oil production sources is based on the top performing 7 (top 12 percent) sources. The EPA developed vegetable oil production model plants only to aid in efforts to estimate environmental and economic impacts corresponding to compliance with the proposed rule.

Comment: Commenter IV-D-7 stated that assumptions used in the cost analysis for the "above-the-MACT floor" regulatory option resulted in underestimating control costs and, hence, underestimating the cost-effectiveness of this control option. Specifically, the volumetric flow rates of exhaust gas were underestimated, the control efficiency of the catalytic incinerator was overestimated, and costs for duct work were not included.

Response: The EPA has reevaluated the methodology used to estimate control costs associated with the regulatory alternative more stringent than the MACT floor. The more stringent regulatory alternative included complying with the MACT floor plus installing a fabric filter and a catalytic incinerator to treat the combined exhaust from the meal dryer and the cooler vents. The fabric filter is required to remove particulate matter upstream of the catalyst bed.

The EPA has reviewed the available data and has made the following changes:

1. Increased the estimate volumetric flow rates exiting meal dryer and cooler vents for the model plants by 5 to 25 percent.
2. Decreased the estimated HAP reduction efficiency of the model catalytic incinerators from 95 percent by weight to values ranging between 66 and 83 percent by weight. The decreased HAP reduction efficiencies result from the limits of

the control technology to reduce dilute concentrations of HAP in high volumetric flow streams.

3. Increased the capital cost of both the fabric filter and catalytic incinerator to include costs for additional duct work to convey exhaust gas from the vegetable oil production operation to the proposed control devices.

The revised cost estimate for the regulatory alternative more stringent than the MACT floor has increased from approximately \$185 million/yr to almost \$205 million/yr. The corresponding cost effectiveness of this regulatory alternative has increased from \$13,800 per ton of HAP to \$18,400 per ton of HAP.

The EPA's revised cost estimate for the more stringent regulatory alternative accounts for some underestimated cost factors, but there are still uncertainties surrounding other cost factors. For example, cost information is not available to address unique design, operation, and safety requirements for each specific site. In addition, costs have not been estimated to resolve problems with operating the control equipment in a new application. No one in the vegetable oil production industry has installed HAP (or VOC) emission controls on the meal dryer or cooler vents. Therefore, the cost is based on treating typical gas volumes obtained from operating companies and vendors in control devices used for similar applications.

A description of the revised costing methodology is provided in the following memoranda:

1. "Final Model Plant Cost Estimates for Above the MACT Floor Control Techniques." docket number A-97-59, item number IV-B-1.
2. "Final Summary of Emission Reductions and Control Costs Associated with Achieving the MACT Floor and a Control Option Above the MACT Floor," docket number A-97-59, item number IV-B-2.

Comment: Commenter IV-D-1 maintained that \$13,800 per ton of HAP emission reduction is not sufficiently high to justify rejection of the regulatory alternative more stringent than the MACT floor. The commenter also mentioned that control of dryer and cooler vents would decrease emissions of VOC.

Response: The regulatory alternative more stringent than the MACT floor was rejected because of (1) uncertain reductions of HAP emissions; (2) increased power usage to operate the catalytic incinerator and the fabric filter; (3) the large quantity of natural gas required to operate the catalytic incinerator; (4) the emissions of pollutants such as sulfur oxides, carbon monoxide and particulate matter associated with the increased energy consumption; (5) the emissions of greenhouse gases including carbon dioxide, nitrogen oxides and methane; and (6) as explained in the previous response, the uncertainties with the estimated compliance costs.

The HAP reduction associated with installing fabric filters and catalytic incinerators on dryer/cooler vents is estimated to be over 70 percent higher than the floor. However, the estimated reduction may well be lower due to:

1. Increased use of solvents with significantly lower HAP contents,
2. Lower reduction efficiencies associated with treating exhaust streams with dilute HAP concentrations, and
3. Increased use of solvent recovery techniques upstream in the process operation.

The annual costs are over sixteen times higher than the floor with approximately 80 percent of the increase is due to natural gas and electricity consumption. Moreover, the emissions associated with the additional energy consumption include 2.7 million tons/year of greenhouse gases (CO₂, NO_x and methane), 600 tons/year of SO₂, 800 tons/year of CO, and 900 tons/year of particulate matter. The memorandum, "Summary of Environmental and Energy Impacts for the "Above the MACT Floor" Regulatory Option," docket number A-97-59, item number IV-B-2, provides more detail concerning these emissions.

The commenter also mentioned the additional benefit of VOC reductions by controlling the dryer and cooler vents. This rule only requires reductions of HAP emissions. Reductions of VOC are not required and may not occur if a source complies with the HAP emission limits by substituting the current hexane-based solvents with a lower n-hexane content solvent. If this occurs, HAP emissions would be reduced without any reduction in VOC emissions.

6. Economic Impact Analysis

Comment: One commenter (IV-D-7) asserted that the oilseed crushing industry has suffered major declines in prices and income over the last few years due to an increasingly competitive international market. According to the commenter, several companies have gone out of business and facilities of other companies have closed due to low company profitability levels. The commenter provided an up-to-date list of companies and facilities operating in the domestic oilseed processing industry. The commenter further asserted that these market conditions have seriously weakened the industry and made it more difficult to absorb increased regulatory costs.

Response: The EPA has incorporated the updated listing of companies and facilities provided by the commenter into the *Economic Impact Analysis for the Final Vegetable Oil Processing NESHAP* (hereinafter referred to as the EIA) Section 2 of the EIA reports changes in the facilities and companies comprising the domestic oilseed processing markets since the baseline year of 1995.

A comparison of market conditions in the baseline year of 1995 and 1999 shows that gross margins per ton of oilseeds processed for many oilseeds have declined since 1995. Gross margins for many oilseeds peaked in 1994 and have declined somewhat subsequently. The profitability of oilseed processing markets do fluctuate from year to year depending upon crop yields and international and domestic market conditions. Sufficient data are only available for 1995 to conduct the market analysis used to assess the impacts of the rule. However, the EPA conducted a cost-to-sales analysis using 1999 data to address the issue of the representativeness of the 1995 baseline year. This analysis used market prices of oil and meal in 1999 to estimate annual revenues. The annual cost of the regulation adjusted to 1999 dollars using the Producer Price Index (PPI) was compared to the estimated 1999 revenues. The cost-to-sales ratio analysis for 1999 shows little difference when compared to the analysis conducted for the baseline year. Only one facility switched from the 0 to 1 percent to the 1 to 2 percent cost-to-sales ratio category, and all other facilities had increased cost-to-sales ratios of less than 0.1 percent. This analysis suggests that the results of the EIA, which are based on a 1995 baseline year, would not change substantially if a more recent baseline year were used.

Comment: Commenter IV-D-7 alleged that the EIA prepared by the EPA uses cost-to-sales ratios as a primary tool to assess the impact of the regulation on domestic oilseed processing facilities and companies owning these facilities. The commenter stated that relying on these cost-to-sales ratios, the EPA concluded that "individual facility impacts are expected to be minimal for the proposed regulatory alternative of the MACT floor." The commenter contended that this methodology is flawed and suggested that the cost of the regulation be compared to gross margin, net profits, or production costs of affected firms. The commenter added that data required to conduct such an analysis are "readily available." The commenter further asserted that the analysis conducted by the EPA does not properly recognize the international competition faced by the domestic oilseed processing industry.

Response: The commenter's assertion that the EPA used cost-to-sales ratios as a primary tool to assess market impacts of the regulation is incorrect. The primary tool used by the EPA to assess the impact of the proposed regulation is a market-based approach that is based on standard microeconomic theory, employs a comparative static approach, and assumes certainty in relevant markets. The EPA contends that a market-based approach is superior to comparison of financial ratios because such a model incorporates firm behavior and considers market-based factors such as international trade impacts. In this approach producers are assumed to seek maximum profits. When faced with the cost of complying with a regulation, these firms make the choice to continue producing the regulated product by selecting the profit maximizing quantity to produce or choose to exit the marketplace if it is no longer profitable to continue production. This model provides estimates of changes in market price, quantities produced and sold, industry revenues, industry employment levels, international trade flows, consumer and producer surplus and reports potential facility closures that may occur as a result of the regulation. The EPA found that the regulation is likely to cause market price increases ranging from 0.1 percent to 0.5 percent (with the percentage increase depending upon the oilseed product). Domestic production decreases ranged from 0.1 percent to 0.4 percent. Import increases and export decreases are likewise expected to be substantially less than 1 percent for the different oilseed products. No facility closures are anticipated as a result of the regulation.

Cost-to-sales ratios (CSR) were evaluated for the regulation as a supplementary screening tool. The EPA calculated the ratio of

estimated annualized emission control costs relative to baseline 1995 sales revenue for each small company expected to be impacted by the proposed rule. While the CSR has different significance for different market situations, it is a good rough gauge of potential impact. If costs for the individual firm (or group of firms) are completely passed on to the purchasers of the good(s) being produced, the ratio is an estimate of the price increase (in percentage form after multiplying the ratio by 100). If costs are completely absorbed by the producer, this ratio is an estimate of the decrease in pretax profits (in percentage form after multiplying the ratio by 100). The distribution of cost to sales ratios across the whole market, the competitiveness of the market, and profit to sales ratios are among the obvious factors that may influence the significance of any particular cost to sales ratio for an individual facility. The mean or average CSR for small companies affected by the proposed rule is 0.30 percent, with a range of CSR from a low of 0.03 percent to a high of 0.61 percent. As a result of the increased costs of emission controls, it is likely these firms will either increase the price of their products in response to a market change in price, absorb the cost increase with no price increase, or respond with a combination of these responses. Since the estimated costs as a percentage of sales is relatively minimal for the affected small oilseed processing companies, it is anticipated that the proposed rule will not have a significant impact on the affected companies' profitability.

In response to the commenter's comment that cost-to-sales ratios are not applicable for the oilseed processing industry, the EPA sought data to compare the cost of the regulation to profits, gross margins, or production costs of firms in the industry. In general, reliable independently verifiable data are unavailable to compute these ratios for this industry with the exception of limited data available in the Cottonseed Digest for cottonseed products. Of the 31 affected companies in the industry, only three are publicly held companies with readily available financial statements. The profit-to-sales ratios for these firms ranged from 4 percent to 16 percent in recent years. The EPA did compute cost-to-profit ratios for these firms by comparing the compliance cost to income before income taxes for 1995. The EPA found that the cost-to-profit ratios are less than one percent for each of these companies, which indicates that, given the available data, this alternative measure does not yield results different than the cost-to-sales ratio analysis.

Comment: Commenters IV-D-5 and IV-D-7 contended that the industry contributes to the national economy in a significant way. These

commenters asserted that mill closures could be devastating to cottonseed prices in regions where no other cottonseed oil mills are available. According to these commenters, any regulatory action that would transfer market share to competing oilseeds would have a punitive effect on farm income of cotton growers. The commenters also stated that closure of cottonseed mills could add transportation costs to the costs experienced by cotton farmers and cotton gin operators.

Commenter IV-D-5 also contended that cottonseed mills are located in economically depressed areas, are small facilities, and have declined in number in the last ten years. The commenter asserted that oilseed and agricultural market conditions and more stringent regulatory standards have placed considerable financial burdens on these facilities causing many to close.

Response: The EPA concurs with commenter IV-D-5's assessment of the importance of the industry to the economy. The EPA does recognize that a number of cotton mills have closed since 1995. The basis for these closures are the market conditions existing in the agricultural and oilseed markets including, in particular, the increased demand for cottonseed for use as a dairy feed. The market model prepared to assess the economic impact of this regulation predicts no mill closures as a result of this regulation. While the EPA recognizes that the regulation will impose additional operating costs on cottonseed oil producers, the EPA has sought to mitigate these impacts. The EPA recognizes that small and large cottonseed plants have differing emission characteristics. Smaller cottonseed plants tend to have lower HAP emissions than larger cottonseed plants when expressed on an hourly or annual basis. Based upon this information, the EPA set differing emission limits for small versus large cottonseed plants. The different emission limits will tend to mitigate the economic impacts for small cottonseed facilities.

Comment: Commenter IV-D-5 stated that the regulation will have significant economic impacts on cottonseed oil producers. The commenter asserted that "EPA incorrectly concluded that individual facility impacts are expected to be minimal for the proposed regulatory alternative of the MACT floor." Finally, the commenter contended that EPA lumped all oilseed extraction facilities together and did not evaluate four digit SIC code industries.

Response: The EPA conducted a market impact analysis and a financial ratio analysis for this regulation. In the market impact analysis, the

cottonseed oil industry is recognized as an individual market distinctly different from other oilseed markets. The analysis shows that the anticipated price and quantity changes for this regulation are less than one percent. No facility closures are anticipated as a result of this regulation. The financial ratio analysis conducted for this regulation also looked at individual cottonseed producers and at cottonseed facilities. Confidential business information (CBI) considerations prohibited the reporting of individual firm or facility impacts in the EIA. However, in the EIA, the EPA recognized that many cottonseed processing facilities are small businesses, and that the industry has experienced facility closures recently. For this reason, the EPA specifically analyzed the cost-to-sales ratios for cottonseed oil processors. The EPA found that the cost-to-sales ratios for all companies owning cottonseed facilities and for each cottonseed facility fall below one percent. Based upon the results of the EIA, the economic impacts of this regulation on cottonseed oil processors are not considered to be significant.

Comment: Commenter IV-D-5 stated that cottonseed processors operate in extremely competitive markets and have negligible ability to pass added costs on to consumers. The commenter asserted that the EPA recognized that cottonseed oils show greater price sensitivity than other oilseed, but underestimated the degree of sensitivity. The commenter stated that the EPA erred in the estimate used in the EIA for the price elasticity of demand for cottonseed oil. The commenter suggested that the EPA use the price elasticity of demand estimate available in the literature. Specifically the commenter suggested that the EPA use the elasticity estimate available in the article, "Information Health Risk Beliefs, and the Demand for Fats and Oils" published in *The Review of Economics and Statistics* in 1995. The commenter asserted that the average profit margin for the industry is -3 percent over the past six years and that a comparison of compliance costs to profits more accurately depicts the impact of this regulation on cottonseed oil processors.

Response: The EPA conducted a market analysis of the potential impacts of this regulation on cottonseed oil processors. This analysis recognizes that firms in this industry operate in a competitive market. The price elasticity of demand measure advocated by the commenter (cited in the article, "Information Health Risk Beliefs, and the Demand for Fats and Oils" published in *The Review of Economics and Statistics* in 1995) was used by the EPA in its market analysis. As previously discussed, the estimated market price and quantity changes as a result of this regulation are less

than one percent for cottonseed oils and meals. While the commenter provided information on the values used to calculate the aggregate revenue estimates for cottonseed oil production, the information the commenter provided on milling costs was not sufficiently detailed for EPA to assess its reliability in estimating profit margins. Furthermore, while many cottonseed facilities have closed in recent years, three new cottonseed facilities have opened. This suggests that some industry participants have expectations that the industry will become more profitable in the future.