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Title: Written communication from Darin Lundquist, Central California Almond Growers Association, to Dallas Safriet, US EPA

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Central California Almond Growers Association

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Phone (209) 251-1050 FAX 209.251.8642
July 9, 1993

Mr. Dallas W. Safriet, Environmental Engineer
USEPA
Emission Inventory Branch (MD-14)
Research Triangle Park, North Carolina 27711

Dear Mr. Safriet:

As you requested in our telephone conversation today, I have enclosed copies of the AP-42 draft we discussed. I have made some notes and a few comments which I feel are important if reporting is to be accurate. There are great variations in the type and arrangement of almond huller/shellers, from very small family operations that service only one orchard and operate less than two weeks a year to large operations which serve several counties and operate several months a year.

I feel communication between people in our industry and government regulators is the only way to achieve fair and accurate guidelines under which to work.

With reference to our source test information used in your AP-42 draft, we did, in fact, document production rates during the times of testing. Certified weigh tickets with printed times and weights are available; the registered professional engineer who wrote the test protocol and supervised testing can stamp the tickets, if you require further verification.

Enclosed also is a stamped and signed copy of the flow diagram of our tested facility.

I would be pleased to show you a variety of facilities in our San Joaquin Valley that demonstrate the range of activity in the hulling/shelling industry with respect both to processing methods and air pollution control methods if you could arrange to visit during our season which we anticipate will begin in mid-August this year.

I look forward to meeting with you in person.

Sincerely,

Darin Lundquist
Manager

prevent charring of the peanuts on the bottom. Oil is constantly monitored for quality and frequent filtration, neutralization, and replacement is necessary to maintain quality. Coconut oil is preferred, but other oils such as peanut and cottonseed are frequently used.

Cooling also follows oil roasting so that a uniform roast can be achieved. Cooling is achieved by blowing large quantities of air over the peanuts on either conveyors or in cooling boxes.

2.2.2 Almond Harvesting and Processing

Almond processing facilities consist of ~~three~~ FIVE basic operations: harvesting, hulling Shelling ~~hulling~~ and processing, and roasting. Each is described below. Major steps are included in the process flow diagram, Figure 2-1, although differences exist between operators in nut processing and in air pollution control practices and equipment.

2.2.2.1 Almond Harvesting—

The almond harvest and process season runs from 2 to 4 months and usually starts in August. The beginning and the length of the season varies with the weather and the size of the crop.

Almonds are harvested either by knocking the nuts from each limb with a long pole or by mechanically shaking them from the tree. The almonds are swept into rows. Mechanical pickers gather the contents of the rows and load them into special trailers for transport to the almond huller. Approximately 25% of the material in the rows may be orchard debris, such as leaves, grass, twigs, pebbles, and soil.

2.2.2.2 Almond Hulling and ~~Processing~~ Shelling

Almond processing is part of the Salted and Roasted Nuts and Seeds industry (SIC 2068). Almond hulling is the part of almond processing in which almonds are cleaned and the ~~almond nut meat is separated from the hull~~. After the almonds are hulled/shelled ~~hulled~~, they are ready for further processing (roasting and salting) or raw consumption. Waste almond hulls are used in a variety of products as an abrasive. almond shell is used for co-generation fuel.

Inshell almonds are removed from the hull. Almond meats are then removed from the shell. (over) →

Some facilities produce In-shell almonds only.
Some facilities produce In-shell almonds first, then from the inshell produce meats.
Some facilities produce almond meats in one process removing & separating hull & shell simultaneously and separating all products.

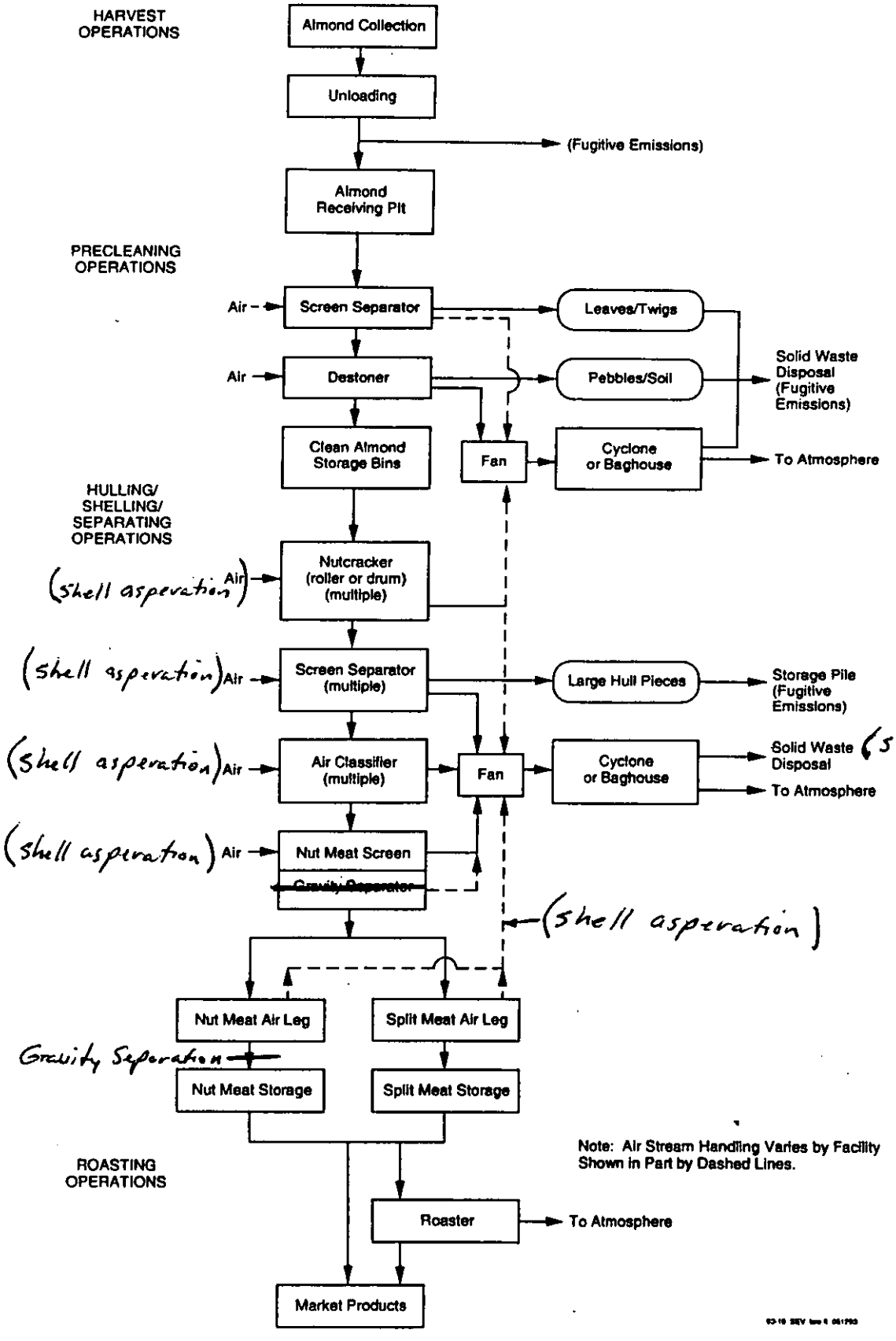

Figure 2-1. Representative almond processing flow diagram.

Precleaning—Almonds arrive at the almond hulling facility via trailers from the orchards. The almonds are loaded into a receiving hopper or trench, and transferred to a set of vibrating screens. The screens remove the orchard debris (leaves, soil, pebbles, etc.). The unhulled almonds then are conveyed to destoning units which remove stones and other larger debris. Particulate matter in the air stream from the destoning units is removed by a cyclone or a baghouse for disposal. The precleaned almonds are then stored in storage bins for further processing.

Hulling—Almonds are conveyed from the in-process storage bins on belt and bucket conveyors to sheer rollers or tined drums which crack the almond hulls. The cracked almonds are then discharged to the separating section.

Separating or Shelling—Cracked almonds are passed through a series of vibrating screens which loosen and separate hulls from the almond meat. The separating section may consist of one or more screens. The number of passes and the combinations of equipment vary from facility to facility. The screen shakes the unshelled almonds loose from their hulls and the nut meats fall to a vibrating conveyor. The remaining unhulled almonds pass through additional sheer rolls or tined drums and screen separators.

The hulled/shelled almonds (meats) and small hull pieces are conveyed on vibrating conveyor belts and bucket elevators to an air classifier that separates hull pieces from the meat. The almond meats then typically move through a series of gravity separators which sort meats by lights, middlings, goods, and heavies. Dust emitted from the sheer rollers, separating screens, and air classifier is transferred to a cyclone or baghouse for collection and disposal.

Final Processing—Almond meats are now ready either for market or for further processing, such as slicing, roasting and salting, or smoking. Small pieces may be made into meal or pastes for bakery products, etc. Roasting is done by gradually heating the almonds in a rotating drum. This process must be done slowly to prevent the skins and outer layers from burning. The flavor which develops corresponds to the color of the roast. To obtain a light brown color and a medium roast to the almonds, a 500-lb roaster fueled with natural gas would take about 1¼ h at 245°F.

Reference 9

This 1991 test focused on determination of PM-10 emissions and volumetric flow rates for two baghouses at a central California almond growers association, Kerman, California. The devices were designated as the precleaner baghouse (24-in and 60-in outlets) and the huller baghouse (22-in, 36-in, and 70-in outlets), but a process flow diagram was not provided. Sampling was performed using EPA Method 201A: PM-10 and CARB Method 1-4: Volumetric Flow Rates.

The report provided the following testing data.

	Precleaner baghouse		Huller baghouse		
	24-in duct	60-in duct	22-in duct	36-in duct	70-in duct
Airflow, dscfm	16,300	57,900	7,900	16,000	101,200
Total PM, gr/dscf	0.031		0.001		

Process rate information was not provided in the report, but a private communication from Eckley Engineering[11] revealed that field weights (uncleaned, unhulled) and 24-h almond meat production were recorded. Huller/sheller input weight of precleaned almonds was not available. This communication also indicated the precleaner baghouse test results were declared invalid because of a split in one bag. For the huller/sheller, from the sum of mean airflows, an average particulate loading of 0.0012 gr/dscf, and an almond meat production rate of 6.18 tons/h, Eckley estimated an emission factor of 0.21 lb TSP/meat ton. The factor on a field weight basis would be about one-fifth of this value, or 0.04 lb/FWT.

This reference is assigned a rating of B since it is based on a limited number of baghouses and lack of verifiable process information.

4.2 EMISSION FACTOR DEVELOPMENT

Emission factors for total particulate emissions were developed for the almond precleaning and hulling processes. Because of the substantial differences in process air stream handling between facilities, the uncertainties in much of the available data