Montana Talc Company
1992 Ground production 86,000 Tons
1993 Ground production 103,000 Tons
1994 estimate 110,000 Tons

AP-42 Section 11.26
Reference 6
Report Sect. 2
Reference 6

DRAFT AP-42 SECTION 8.30

8.30 TALC PROCESSING

1990 Total Ground Production 72,10T
1991 " " " 78,406 Tons

8.30.1 Process Description[1-3]

Talc, which is a soft, hydrous magnesium silicate ($3MgO{\cdot}4SiO_2{\cdot}H_2O$), is used in a wide range of industries including the manufacture of ceramics, paints, paper, and asphalt roofing. The end-uses for talc are determined by variables such as chemical and mineralogical composition, particle size and shape, specific gravity, hardness, and color. The Standard Industrial Classification (SIC) code for talc mining is 1499 (miscellaneous nonmetallic minerals, except fuels), and the SIC code for talc processing is 3295 (minerals and earths, ground or otherwise treated). There is no Source Classification Code (SCC) for the source category.

Most domestic talc is mined from open-pit operations; in 1985, 93 percent of the talc ore produced in the United States came from open-pit mines. Underground mines continue to be important sources of this mineral, however. Mining operations usually consist of conventional drilling and blasting methods. The softness of talc makes it easier to mine and process than most other minerals.

Figure 8.30-1 is a process flow diagram for a typical U.S. talc plant. Talc ore generally is hauled to the plant by truck from a nearby mine. The ore is crushed and screened, and coarse (oversize) material is sent through a gyratory crusher. Rotary dryers are used to dry the two separate fractions. Secondary grinding is achieved with pebble mills or roller mills, producing a product that is 44 to 149 micrometers (µm) (325 to 100 mesh) in size. Air classifiers (separators), generally in closed-circuit with the mills, separate the material into coarse, coarse-plus-fine, and fine fractions. The coarse and coarse-plus-fine fractions then are stored as products. The fines may be concentrated using a shaking table (tabling process) to separate product containing small quantities of nickel, iron, cobalt, or other minerals and then undergo a one-step flotation process. The resultant talc slurry is dewatered and filtered prior to passing through a flash dryer. The flash-dried product is then stored for shipment, or it may be further ground to meet customer specifications.

Talc deposits mined in the western United States contain organic impurities and must be calcined prior to additional processing to yield a product with uniform chemical and physical properties. Generally, a separate product will be used to produce the calcined talc. Prior to calcining, the mined ore passes through a crusher and is ground to a specified screen size. After calcining in a rotary kiln, the material passes through a rotary cooler. The cooled calcine (0 percent free water) is then stored for shipment, or it may be further processed. Calcined talc may be mixed with dried talc from other product lines and passed through a roller mill prior to bulk shipping.

8.30.2 Emissions and Controls[1,2,4,5]

The primary pollutant of concern in talc processing is particulate matter (PM) and PM less than 10 µm (PM-10). Particulate matter is emitted from drilling, blasting, crushing, screening, grinding, drying, calcining, classifying, and materials handling and transfer operations. Particulate matter emissions may include trace amounts of several inorganic compounds that are listed hazardous air pollutants (HAP's), including chromium, cobalt, manganese, nickel, and phosphorus.

NO

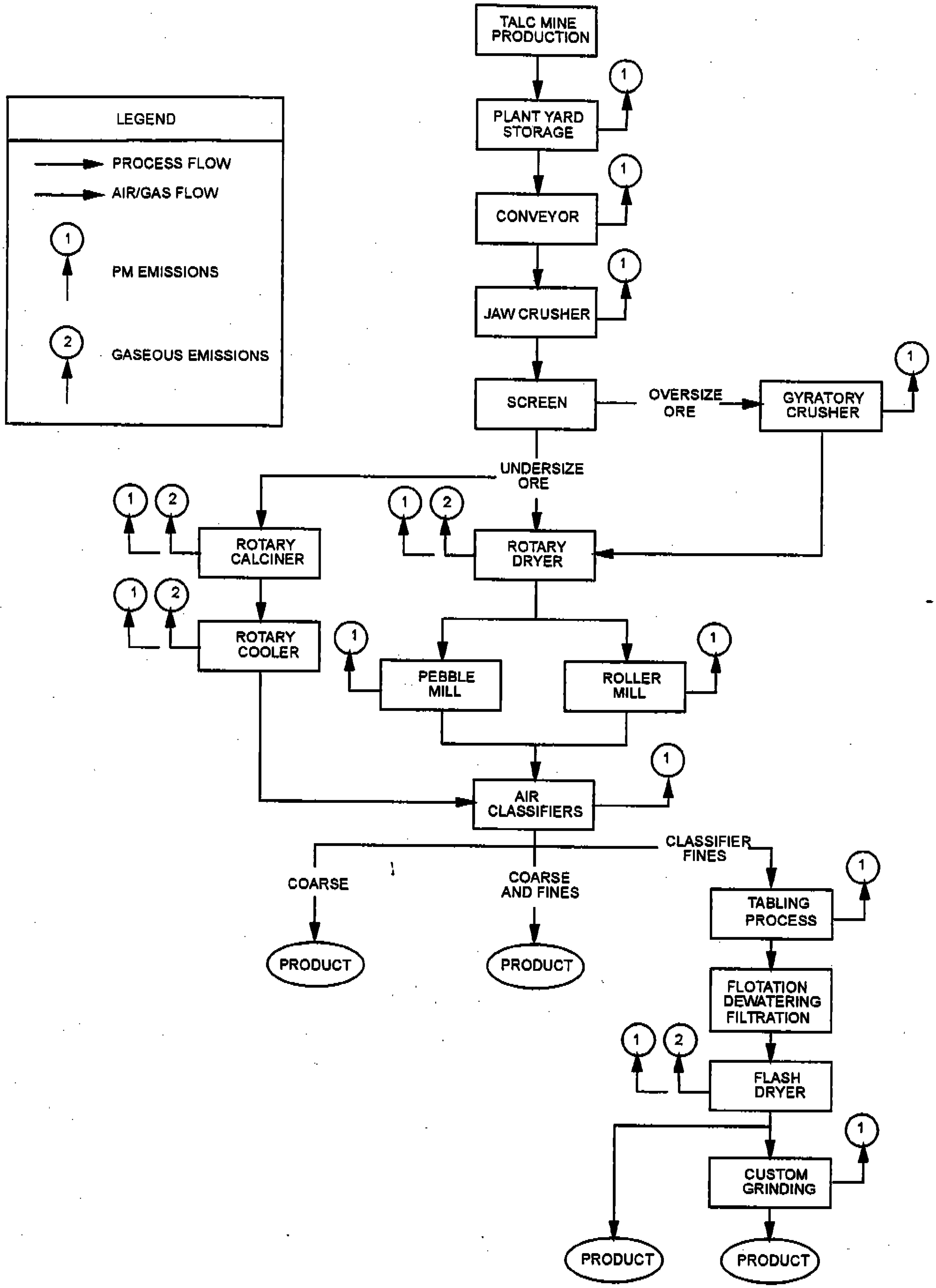


Figure 8.30-1. Process flow diagram for talc processing.[1]

The emissions from dryers and calciners include products of combustion, such as carbon monoxide, carbon dioxide, nitrogen oxides, and sulfur oxides, in addition to filterable and condensible PM. Volatile organic compounds also are emitted from the drying and calcining of western United States talc deposits, which generally contain organic impurities.

Emissions from talc dryers and calciners are typically controlled with fabric filters. Fabric filters also are used at some facilities to control emissions from mechanical processes such as crushing and grinding.

Due to a lack of availability, no emission factors for talc processing are presented.

REFERENCES FOR SECTION 8.30

1. Calciners and Dryers in Mineral Industries--Background Information for Proposed Standards, EPA-450/3-025a, U. S. Environmental Protection Agency, Research Triangle Park, NC, October 1985.

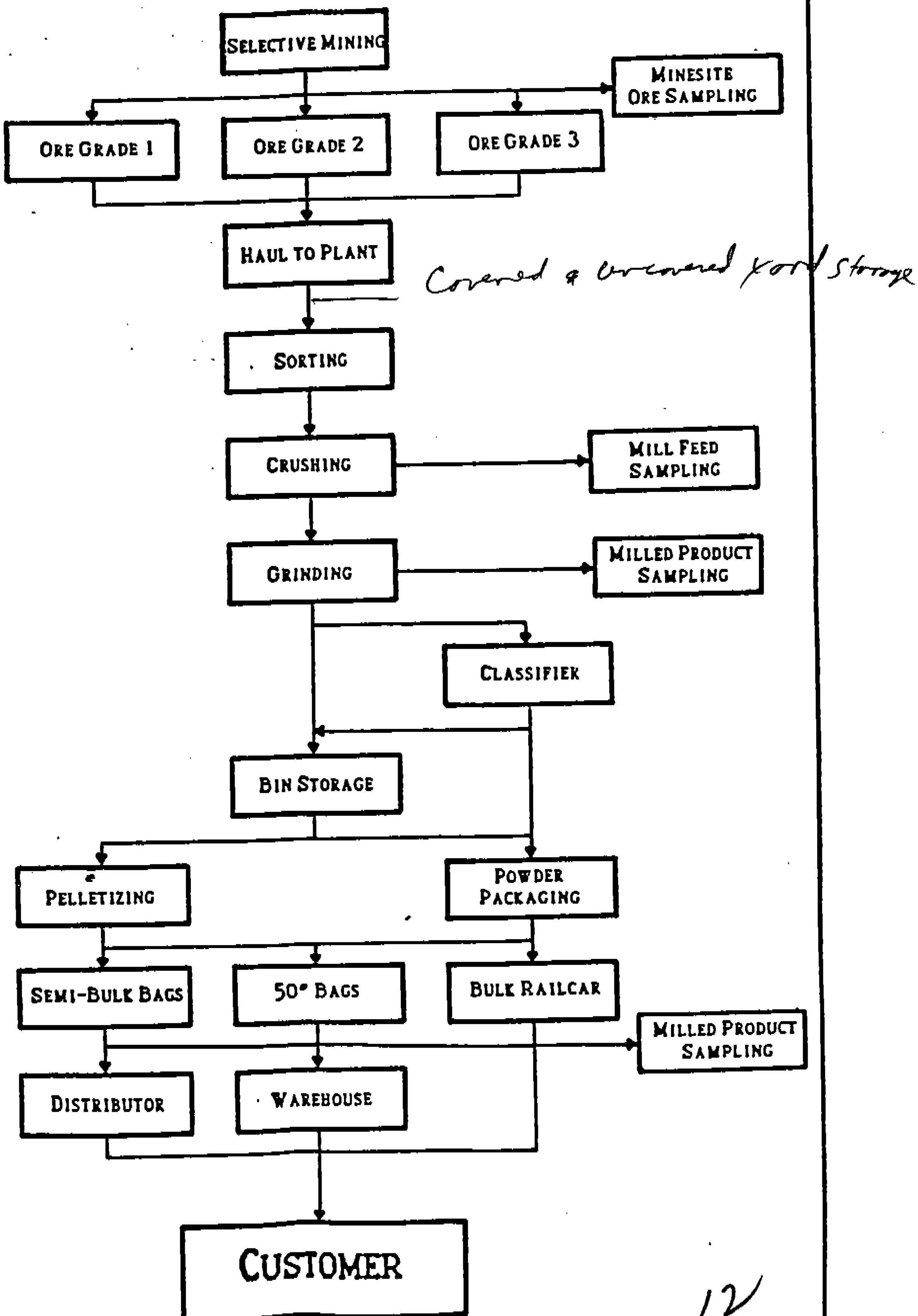
2. L. A. Roe and R. H. Olson, "Talc", Industrial Rocks and Minerals, Volume I, Society of Mining Engineers, NY, 1983.

3. R. L. Virta, The Talc Industry-An Overview, Information Circular 9220, Bureau of Mines, U.S. - Department of the Interior, Washington, DC, 1989.

4. Emission Study at a Talc Crushing and Grinding Facility, Eastern Magnesia Talc Company, Johnson, Vermont, October 19-21, 1976, Report No. 76-NMM-4, U. S. Environmental Protection Agency, Research Triangle Park, NC, 1977.

5. Investigation of Environmental Occurrence of Asbestiform Fibers in St. Lawrence County, New York State Department of Health, Bureau of Toxic Substance Assessment, February 1987.

The
Montana Talc Company
PROCESS FLOW DIAGRAM



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

MAR 3 1994

MAR 3 1994

Mr. Steve Harms
Plant Superintendent
Montana Talc Company
28769 Sappington Road
Three Forks, Montana 59752

Dear Mr. Harms:

As you may know, the Emission Inventory Branch of the U. S. Environmental Protection Agency (EPA) is in the process of updating the document *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources* (known more commonly as AP-42). As part of this process, we are now seeking comments on the draft sections that are to be included in this update of AP-42.

Chapter eight of AP-42 addresses the mineral products industry and is one of the chapters being updated. Enclosed is a copy of the draft Section 8.30, Talc Processing, and the corresponding background memorandum for the section. We would appreciate it if you or one of your associates would review the enclosed draft AP-42 section and background memorandum and would send us your comments. Unfortunately, we are on a very tight schedule, and it is important that we have all comments by March 30, 1994.

The emission factors presented in AP-42 generally are based upon results from validated tests or other emission evaluations that are similar to EPA reference test methods. As a result, the emission factors presented in AP-42 sections must be supported by equivalent documentation. We have been unable to locate test data from which we can develop emission factors for talc processing. If you are aware of emission data that we could use to develop emission factors for talc processing, we would appreciate your assistance in obtaining copies of the data.

We appreciate your cooperation and look forward to receiving your comments. If you have any questions, I can be reached by telephone at (919) 541-5407 or by fax at (919) 541-0684.

Sincerely,

Ronald E. Myers

Ronald E. Myers
Emission Factors and Methodologies Section
Emission Inventory Branch

2 Enclosures

MRI

MIDWEST RESEARCH INSTITUTE
Suite 350
401 Harrison Oaks Boulevard
Cary, North Carolina 27513-2412
Telephone (919) 677-0249
FAX (919) 677-0065

Date: February 14, 1994

Subject: Background Information for Proposed AP-42 Section 8.30, Talc Processing
Review and Update Remaining Sections of Chapter 8 (Mineral Products Industry) of AP-42
EPA Contract 68-D2-0159, Work Assignment 012
MRI Project 3612

From: Richard Marinshaw

To: Ron Myers
EPA/EIB/EFMS (MD-14)
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

I. Introduction

This memorandum presents the background information that was used to develop the proposed AP-42 Section 8.30 on talc processing. A description of the industry is presented first. A process description followed by a discussion of emissions and controls is then presented. Finally, the reference list is provided. The draft AP-42 section is provided as the attachment.

II. Industry Description[1-3]

Talc, which is a soft, hydrous magnesium silicate ($3MgO \cdot 4SiO_2 \cdot H_2O$), is used in a wide range of industries including the manufacture of ceramics, paints, paper, and asphalt roofing. The end uses for talc are determined by variables such as chemical and mineralogical composition, particle size and shape, specific gravity, hardness, and color. The Standard Industrial Classification (SIC) code for talc mining is 1499 (miscellaneous nonmetallic minerals, except fuels), and the SIC code for talc processing is 3295 (minerals and earths, ground or otherwise treated). There is no Source Classification Code (SCC) for the source category.

The word talc refers to a wide variety of rocks and rock products. Soapstone reportedly contains up to 50 percent talc. It has a slippery feeling and can be carved by hand. Steatite contains a high-purity talc suitable for making electrical insulators. These talc-containing minerals (soapstone and steatite) will be treated as talc in this section. The color of talc varies from snow-white to greenish-gray and various shades of green. The specific gravity of talc ranges from 2.6 to 2.8.

In theory, talc is composed of 63.4 percent silicon dioxide (SiO_2), 31.9 percent magnesium oxide (MgO), and 4.7 percent water (H_2O). The actual composition of commercial talc may vary widely from these levels. Talc may also contain one or more of the following oxides, ranging in concentration from a trace to several percent: iron, titanium, aluminum, calcium, chromium, cobalt, manganese, nickel, phosphorus, potassium, or sodium. For most end-uses, these impurities are undesirable and are removed to the extent feasible. Asbestiform minerals, including tremolite, anthophylite, and actinolite, are found in talc deposits, but generally not in fibrous form. Chrysotile asbestiform minerals can also be found in talc deposits, but they are found infrequently and at low levels.

Talc deposits can be found in many parts of the world. In 1992, talc minerals were mined and processed at 19 mines in 8 States, and domestic production amounted to 1,071,000 megagrams (Mg) (1,178,000 tons). Talc mines in Montana, New York, Texas, and Vermont accounted for about 96 percent of total domestic production in 1992.

The largest use of talc-group minerals is for manufacturing of ceramics (31 percent), which includes kiln furniture, sanitary ware, floor and wall tile, dinnerware glazes, and electrical porcelains. For these end-products, adding talc to the usual clay-silica-feldspar body mixtures facilitates the firing of the ware and improves the quality. The second major use of talc minerals is as a filler or a pigment for paints (17 percent of total 1992 U.S. production). The paper industry is the third major user (16 percent) of talc, followed by roofing applications (11 percent), plastics (6 percent), and cosmetics (5 percent). Talc also is used in the production of synthetic rubber, insecticides, and pharmaceuticals.

Grades of talc are most frequently identified with the end use. Some of the important desirable properties are softness and smoothness, color, luster, high slip tendency, moisture content, oil and grease absorption, chemical inertness, fusion point, heat and electrical conductivity, and high dielectrical strength.

III. Process Description[1,2,4]

Most domestic talc is mined from open-pit operations; in 1985, 93 percent of the talc ore produced in the United States came from open-pit mines. Underground mines continue to be important sources of this mineral, however. Mining operations usually consist of conventional drilling and blasting methods. The softness of talc makes it easier to mine and process than most other minerals.

Figure 1 is a process flow diagram for a typical U.S. talc plant. Talc ore generally is hauled to the plant by truck from a nearby mine. The ore is crushed and screened, and coarse

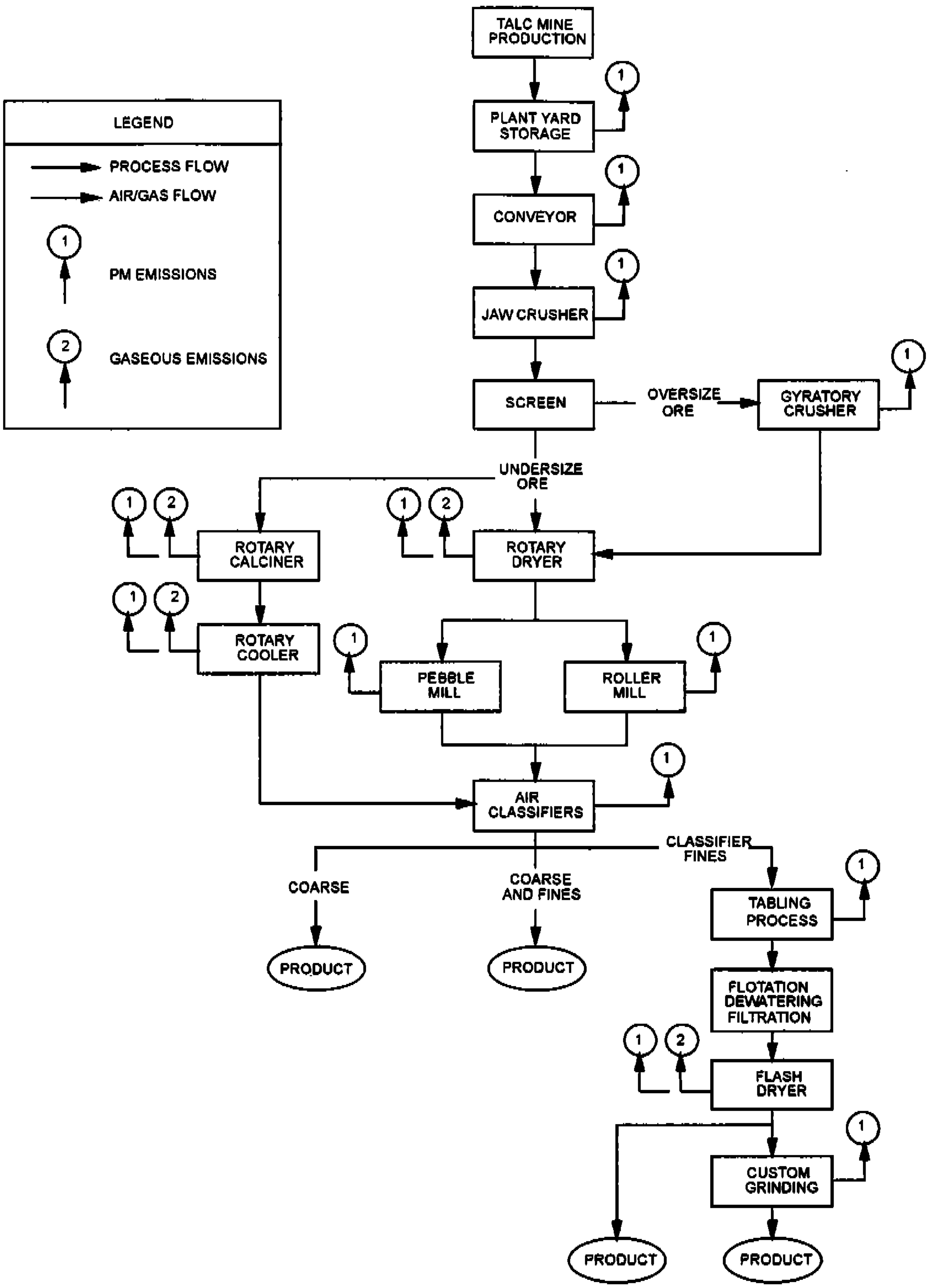


Figure 1. Process flow diagram for talc processing.[1]

(oversize) material is sent through a gyratory crusher. Rotary dryers are used to dry the two separate fractions. Secondary grinding is achieved with pebble mills or roller mills, producing a product that is 44 to 149 micrometers (μm) (325 to 100 mesh) in size. Air classifiers (separators), generally in closed-circuit with the mills, separate the material into coarse, coarse-plus-fine, and fine fractions. The coarse and coarse-plus-fine fractions then are stored as products. The fines may be concentrated using a shaking table (tabling process) to separate product containing small quantities of nickel, iron, cobalt, or other minerals, and then undergo a one-step flotation process. The resultant talc slurry is dewatered and filtered prior to passing through a flash dryer. The flash-dried product is then stored for shipment, or it may be further ground to meet customer specifications.

Talc deposits mined in the western United States contain organic impurities and must be calcined prior to additional processing to yield a product with uniform chemical and physical properties. Prior to calcining, the mined ore passes through a crusher and is ground to a specified screen size. After calcining in a rotary kiln, the material passes through a rotary cooler. The cooled calcine (0 percent free water) is then stored for shipment, or it may be further processed. Calcined talc may be mixed with dried talc from other product lines and passed through a roller mill prior to bulk shipping.

IV. Emissions and Controls[1,2,5-8]

The primary pollutant of concern in talc processing is particulate matter (PM) and PM less than 10 μm (PM-10). Particulate matter is emitted from drilling, blasting, crushing, screening, grinding, drying, calcining, classifying, and materials handling and transfer operations. Particulate matter emissions may include trace amounts of several inorganic compounds that are listed hazardous air pollutants (HAP's), including chromium, cobalt, manganese, nickel, and phosphorus.

The emissions from dryers and calciners include products of combustion, such as carbon monoxide, carbon dioxide, nitrogen oxides, and sulfur oxides, in addition to filterable and condensible PM. Volatile organic compounds (VOC's) also are emitted from the drying and calcining of western United States talc deposits, which generally contain organic impurities.

Asbestos emissions from talc mining and processing have been the subject of concern, particularly for the talc deposits located in upper New York State. However, no emission data were located that provided an indication of asbestiform fiber emission rates from talc processing. Some studies of talc mining and processing plant worker exposure to asbestiform fibers have been conducted. A National Institute for Occupational Safety and Health (NIOSH) study of worker exposure to asbestiform fibers at a talc mining and processing plant in upper New York State found fibrous tremolite and anthophylite to be major contaminants in the talc processed by the plant. The study also found that worker exposure to these fibers far exceeded Occupational Safety and Health Administration (OSHA) standards. A later study sponsored by the talc processing plant that was the subject of the NIOSH study disputed the NIOSH report results. Other than worker exposure studies, the only information located that relates asbestiform fiber emissions to talc processing is from a study by the New York State Department of Health. In that study, asbestiform fibers in low concentrations (0.064 to 0.116 fibers per cubic centimeter) were detected in ambient air samples taken in the vicinity of a talc mining area.

Emissions from talc dryers and calciners are typically controlled with fabric filters. Fabric filters also are used at some facilities to control emissions from mechanical processes such as crushing and grinding.

The only test data found on talc processing are from an emission test conducted in 1976. Uncontrolled and controlled filterable and condensible inorganic PM emissions and particle size distribution were measured. The PM emissions were measured using a modified Method 17. The particle size distribution was measured using an alundum thimble connected to the nozzle by a 12-in. steel probe, followed by a 47-millimeter-type SGA filter. The particle size distribution of the portion of the sample found to be less than 45 μm was determined using electronic particle counter methods. Table 1 summarizes the measured emission concentrations and rates, and Table 2 summarizes the particle size distribution. Because the test report did not include process operating rates, emission factors could not be developed from the emission data.

TABLE 1. SUMMARY OF PM EMISSION DATA FROM A TALC CRUSHING AND GRINDING TEST[5]

Sampling location[a]	Processes	Average concentration		Average emission rate	
		mg/dscm	gr/dscf	kg/hr	lb/hr
Fabric filter inlet No. 1	Primary/secondary crushing	20,100	8.8	387	852
Fabric filter inlet No. 2	Vertical mill	2,880	1.26	14.4	31.7
Fabric filter inlet No. 3	Storage, bagging, air classification	7,050	3.08	40.9	90.1
Fabric filter inlet No. 1A	Storage	148,000	64.6	98.7	218
Fabric filter Inlet No. 1B	Storage	20,700	9.06	21.2	46.8
Fabric filter outlet	All of the above	139	0.061	4.72	10.4

[a]Inlets 1, 2, 3, 1A, and 1B are deducted to a common fabric filter.

TABLE 2. SUMMARY OF PARTICLE SIZE DISTRIBUTION DATA FROM A TALC CRUSHING AND GRINDING FACILITY[5]

Process	Diameter, μm[a]	Cumulative weight, g	Cumulative percent less than diameter
Primary/secondary crushing	55.4	1.564	91.3
	34.9	3.932	78.2
	22.0	7.822	56.7
	17.4	9.546	47.2
	11.0	11.063	38.8
	6.9	14.197	21.4
	3.0	17.521	3.0
	2.0	17.898	0.94
	1.0	18.049	0.11
Vertical mill	29.0	0.002	100.0
	18.8	0.017	99.7
	14.9	0.031	99.4
	11.9	0.144	97.1
	9.4	0.943	80.8
	7.5	2.792	43.3
	4.7	4.554	7.5
	3.0	4.821	2.1
	1.9	4.908	0.28
	1.0	4.920	0.04
Storage, bagging, air classification	43.9	0.014	99.9
	27.7	0.339	97.9
	17.4	2.141	86.6
	13.8	4.289	73.2
	11.0	6.922	56.8
	6.9	12.108	24.5
	4.4	14.847	7.4
	3.0	15.534	3.1
	2.0	15.885	0.92
	1	16.016	0.10

[a]Optical procedures rather than inertial separators used to determine particle size distribution; data may be suspect.

IV. REFERENCES

1. Calciners and Dryers in Mineral Industries--Background Information for Proposed Standards, EPA-450/3-025a, U. S. Environmental Protection Agency, Research Triangle Park, NC, October 1985.

2. L. A. Roe and R. H. Olson, "Talc", Industrial Rocks and Minerals, Volume I, Society of Mining Engineers, New York, NY, 1983.

3. R. L. Virta, "Talc in 1992", Mineral Industry Surveys, Annual, Preliminary, Bureau of Mines, U.S. Department of the Interior, Washington, DC, January 1993.

4. R. L. Virta, The Talc Industry--An Overview, Information Circular 9220, Bureau of Mines, U.S. Department of the Interior, Washington, DC, 1989.

5. Emission Study at a Talc Crushing and Grinding Facility, Eastern Magnesia Talc Company, Johnson, Vermont, October 19-21, 1976, Report No. 76-NMM-4, U. S. Environmental Protection Agency, Research Triangle Park, NC, 1977.

6. Occupational Exposure to Talc Containing Asbestos, DHEW (NIOSH) Publication No. 80-115, National Institute for Occupational Safety and Health, U.S. Department Of Health, Education, and Welfare, Washington, DC, February 1980.

7. An Evaluation of Mineral Particles at Governeur Talc Company, 1975 and 1982: A Comparison of Mineralogical Results Between NIOSH and DGC, Dunn Geoscience Corporation, Latham, NY, January 4, 1985.

8. Investigation of Environmental Occurrence of Asbestiform Fibers in St. Lawrence County, New York State Department of Health, Bureau of Toxic Substance Assessment, February 1987.

ATTACHMENT

DRAFT AP-42 SECTION 8.30

8.30 TALC PROCESSING

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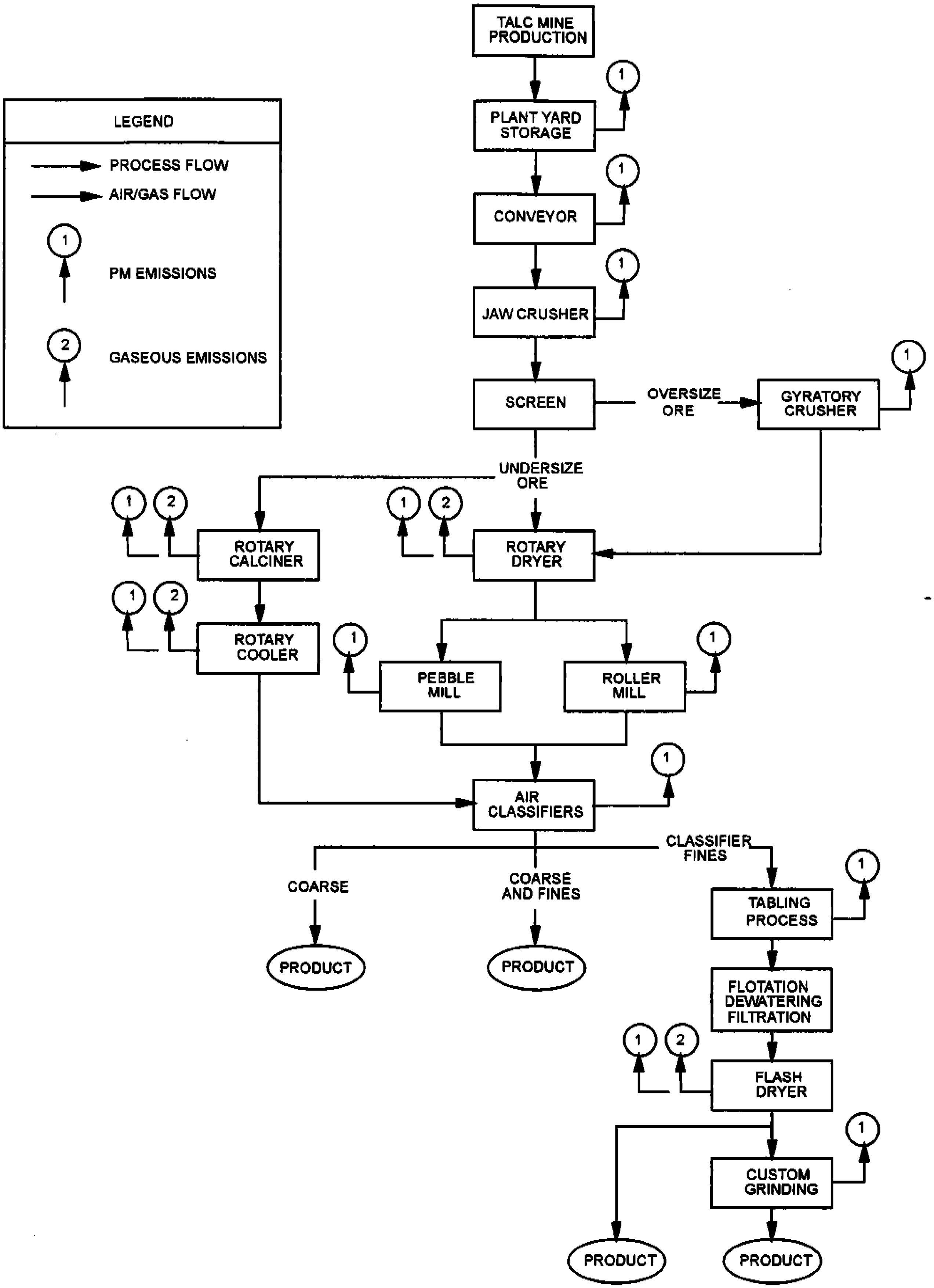

Figure 8.30-1. Process flow diagram for talc processing.[1]

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5. Investigation of Environmental Occurrence of Asbestiform Fibers in St. Lawrence County, New York State Department of Health, Bureau of Toxic Substance Assessment, February 1987.

Department of Health and Environmental Sciences
Air Quality Bureau
(406) 444-3454

Report Date: 01/19/93

EMISSION INVENTORY REPORT

GENERAL PLANT INFORMATION

PLANT INFORMATION

AIRS County/Plant ID: 031 0008 AQB Contact for 1990 Inventory: Cathy Quinones

Plant Name: Montana Talc Mill

Plant Address: 28769 Sappington Rd

County: Gallatin Co City: Three Forks Zip: 597520000

Ambient Monitoring?: __ Source Monitoring?: __

MAILING/BILLING ADDRESS

Company Name: Montana Talc Mill

Mailing Address: P.o. Box 1054

City: Three Forks State: MT Zip Code: 597520000

Year of Emission Inventory (for this information): 90

UTM Grid Coordinates: (Center of Plant)

Zone: 12 Horizontal: 4400.0 Vertical: 50715.0

Person Responsible for Report: Randy Geiger

Telephone: ( ) Property Area: 180.0

Number of Employees: 00065 Principal Product: _

Reporting Year for New Inventory: _____ Date New Inventory Completed: __________

DEPARTMENT OF HEALTH AND ENVIRONMENT SCIENCES -- AIR QUALITY BUREAU

EMISSION INVENTORY REPORT - STACK LISTING

AIRS COUNTY/PLANT ID: 031 0008
PLANT NAME: MONTANA TALC MILL

STACK NUM	POINT NUM	STACK DESCRIPTION	STACK HEIGHT (FEET)	DIAMETER (FEET)	EXIT GAS TEMP	GAS FLOW RATE (ACFM)	EXIT GAS VELOCITY (FT/SEC)	EMISSION RECORDER	UTM HORIZONTAL COORD	UTM VERTICAL COORD
001	008	ACM MILLS	25	2.00	0	7696	0		440.00	5071.50
002	010	PELLET DRYER	25	2.00	0	17186	0		440.00	5071.50

AIRS COUNTY/PLANT ID: 031 0008
PLANT NAME: MONTANA TALC MILL

POINT #	SEG #	SEGMENT DESCRIPTION	SCC	SCC DESCRIPTION	FUEL/ PROCESS RATE	FUEL/PROCESS RATE UNITS	POLLTNT	ESTIMATED EMISSIONS	UNITS	CONTROL EQUIP PRI	CONTROL EQUIP SEC	EST % EFFCY
001	01	FUGITIVE DUST HAUL ROADS	30504099	MINERAL PRODUCTS - MINING & QUARRYING OF	2955	VEHICLE MILES TRAVELED	PT	3.690	TY	061	062	70.00
						VEHICLE MILES TRAVELED	PM10	1.330	TY	061	062	.00
	02	LOADER			2172	VEHICLE MILES TRAVELED	PM10	.760	TY			.00
						VEHICLE MILES TRAVELED	PT	2.111	TY			.00
002	01	ORE STOCKPILE	30504025		92100	VEHICLE MILES TRAVELED	PT	15.200	TY	054		50.00
						VEHICLE MILES TRAVELED	PM10	5.530	TY	054		50.00
003		ORE HANDLING	30500612	MINERAL PRODUCTS - CEMENT MANUFACTURING		TONS OF ORE	PT	1.381	TY	054	061	90.00
						TONS OF ORE	PM10	.690	TY	054	061	90.00
004		FINES STOCKPILE	30502007	MINERAL PRODUCTS-STONE QUARRYING-PROCESS	49678	TONS OF FINES	PT	.819	TY	054	061	90.00
						TONS OF FINES	PM10	.298	TY	054	061	90.00
005		WASTE LOADOUT	30500612	MINERAL PRODUCTS - CEMENT MANUFACTURING	9771	TONS OF WASTE	PT	.219	TY	054	061	85.00
						TONS OF WASTE	PM10	.109	TY	054		85.00
006		PRIMARY CRUSHER	30500609		99140	TONS THRU PRIMARY CRUSHER (ORE-W	PT	.024	TY	018		99.90
						TONS THRU PRIMARY CRUSHER (ORE-W	PM10	.012	TY	018		99.90
007		SECONDARY CRUSHER	30500610		67210	TONS THRU SECONDARY CRUSHER (PRIMA	PT	.050	TY	018		99.90
						TONS THRU SECONDARY CRUSHER (PRIMA	PM10	.037	TY	018		99.90
008		ACM MILLS (#1,2 &3)	30502003	MINERAL PRODUCTS-STONE QUARRYING-PROCESS		TONS THRU ACM MILLS (#1-2)(2/3'S S	PT	.201	TY	018		99.90
						TONS THRU ACM MILLS (#1-2)(2/3'S S	PM10	.062	TY	018		99.90
010		PELLET DRYER	30500612	MINERAL PRODUCTS - CEMENT MANUFACTURING	41559	TONS THRU PELLETIZER	PT	.006	TY	018		99.90
						TONS THRU PELLETIZER	PM10	.003	TY	018		99.90
						TONS THRU PELLETIZER	VOC	.000	TY			.00
	02	NATURAL GAS-FUEL	39000689	INDUSTRIAL PROCESSES - IN-PROCESS FUEL U	27	MILLIONS OF CUBIC FEET BURNED	PT	.000	TY	018		99.90
						MILLIONS OF CUBIC FEET BURNED	CO	.270	TY			.00
						MILLIONS OF CUBIC FEET BURNED	NO2	1.350	TY			.00
						MILLIONS OF CUBIC FEET BURNED	PM10	.040	TY	018		99.90
						MILLIONS OF CUBIC FEET BURNED	SO2	.008	TY			.00
011	01	BAGGING PLANT	30500612	MINERAL PRODUCTS - CEMENT MANUFACTURING	15845	TONS BAGGED (SECONDARY-BULK)	PT	.002	TY	018		99.90
						TONS BAGGED (SECONDARY-BULK)	PM10	.001	TY	018		99.90
012		BULK LOADING			7551	TONS HANDLED	PT	.001	TY	018		99.90
						TONS HANDLED	PM10	.000	TY	018		99.90
013		RAIL LOADOUT			39076	TONS THRU RAIL LOADOUT (1/4 BAGGED	PT	.879	TY	018		85.00
						TONS THRU RAIL LOADOUT (1/4 BAGGED	PM10	.439	TY	018		85.00
014		TRUCK LOADOUT			26051	TONS THRU TRUCK LOADOUT (3/4 OF BAG	PT	.586	TY	018		85.00
						TONS THRU TRUCK LOADOUT (3/4 OF BAG	PM10	.293	TY	018		85.00
015		PELLETIZER			41558	TONS HANDLED	PM10	.062	TY	018		98.00
						TONS HANDLED	PT	.124	TY	018		98.00
016		DIESEL EXHAUST	30504099	MINERAL PRODUCTS - MINING & QUARRYING OF	3120	GALLONS OF FUEL	CO	.240	TY			.00
						GALLONS OF FUEL	NO2	.570	TY			.00
						GALLONS OF FUEL	PM10	.050	TY			.00
						GALLONS OF FUEL	PT	.050	TY			.00
						GALLONS OF FUEL	SO2	.050	TY			.00
						GALLONS OF FUEL	VOC	.050	TY			.00

DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

AIR QUALITY BUREAU

STAN STEPHENS, GOVERNOR

COGSWELL BUILDING

STATE OF MONTANA

(406) 444-3454
FAX # (406) 444-1374

HELENA, MONTANA 59620

May 14, 1992

Steve Harms
The Montana Talc Company
28769 Sappington Road
Three Forks, MT 59752

Dear Mr. Harms:

The 1991 Air Quality emission inventory for your company is enclosed. The air quality opeational permit fee for 1993 will be calculated from this inventory. Please review the information and calculations for completeness and accuracy and get back to me only if changes are needed. Any comments must be received before June 15, 1992 to be included for next year.

Thank you for your attention to this matter.

Sincerely,

Warren Norton
Warren Norton
Environmental Specialist

Enclosures

WN:tjl

The Montana Talc Company
28769 Sappington Road
Three Forks, MT 59752
Contact: Steve Harms 285-3286
30-031-0008
1991 Emission Inventory

11/25/91

TOTAL EMISSIONS 1991				Tons		
	TSP	PM-10	SOX	NOX	VOC	CO
Primary Crusher	0.02	0.01				
Secondary Crusher	0.06	0.05				
#1, #2, & #3 ACM	0.24	0.12				
Pelletizer	0.15	0.07				
Pellet Dryer	0.01	0.00				
Dryer-NatGas	0.05	0.05	0.01	1.74	0.09	0.35
Bagging Plant	0.00	0.00				
Bulk Loading	0.00	0.00				
Rail Loadout	0.01	0.01				
Truck Loadout	0.03	0.01				
Outdoor Storage	15.64	5.69				
Ore Handling	12.91	6.45				
Fines Stockpile	8.45	3.07				
Waste Loadout	0.11	0.05				
Diesel Exhaust	0.23	0.23	0.23	2.77	0.25	1.16
Fugitive Dust	4.45	1.60				
Total tons	42.4	17.4	0.2	4.5	0.3	1.5
Total tons to have fee assessed:	42		0	5	0	

Total tons of emissions :

47
========

The Montana Talc Company
28769 Sappington Road
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Contact: Steve Harms 285-3286
30-031-0008
1991 Emission Inventory

11/25/91

Primary Crusher

Production: 86,064 Tons through primary crusher.

TSP Emissions

Emission Factor: 0.50 lbs/ton {3-05-006-09, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 0.5 * 86064 * 0.001 /2000 = 0.02 tons/yr.

PM-10 Emissions:

Emission Factor: 0.26 lbs/ton {3-05-006-09, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 0.26 * 86064 * 0.001 /2000 = 0.01 tons/yr.

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Secondary Crusher

Production: 80,878 Tons of talc.

TSP Emissions

Emission Factor: 1.5 lbs/ton {3-05-006-10, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 1.5 * 80878 * 0.001 /2000 = 0.06 tons/yr.

PM-10 Emissions:

Emission Factor: 1.13 lbs/ton {3-05-006-10, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 1.13 * 80878 * 0.001 /2000 = 0.05 tons/yr.

The Montana Talc Company   11/25/91
28769 Sappington Road
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30-031-0008
1991 Emission Inventory

#1, #2, & #3 ACM Mill

Production: 78,406 Tons of talc.

TSP Emissions

Emission Factor: 6.0 lbs/ton {3-05-020-03, AFSSCC page 127}

Control Efficiency: 99.9% {Baghouse}

Emissions: 6 * 78406 * 0.001 /2000 = 0.24 tons/yr.

PM-10 Emissions:

Emission Factor: 3.10 lbs/ton {3-05-020-03, AFSSCC page 127}

Control Efficiency: 99.9% {Baghouse}

Emissions: 3.1 * 78406 * 0.001 /2000 = 0.12 tons/yr.

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Pelletizer

Production: 49,250 Tons of talc.

TSP Emissions

Emission Factor: 0.30 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 98.0% {Baghouse}

Emissions: 0.3 * 49250 * 0.02 /2000 = 0.15 tons/yr.

PM-10 Emissions:

Emission Factor: 0.15 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 98.0% {Baghouse}

Emissions: 0.15 * 49250 * 0.02 /2000 = 0.07 tons/yr.

The Montana Talc Company
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30-031-0008
1991 Emission Inventory

11/25/91

Pellet Dryer

Production: 49,250 Tons of pellets

TSP Emissions

Emission Factor: 0.30 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 0.3 * 49250 * 0.001 /2000 = 0.01 tons/yr.

PM-10 Emissions:

Emission Factor: 0.15 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 0.15 * 49250 * 0.001 /2000 = 0.00 tons/yr.

The Montana Talc Company
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1991 Emission Inventory

11/25/91

Pellet Dryer--Natural Gas

Production: 35 Million Cubic Feet of natural gas.

TSP Emissions

Emission Factor: 3.0 lbs/million cubic feet
{1-90-006-89, AFSSCC page 160}

Emissions: 3 * 34.8 /2000 = 0.05 tons/yr.

PM-10 Emissions:

Emission Factor: 3.0 lbs/million cubic feet
{1-90-006-89, AFSSCC page 160}

Emissions: 3 * 34.8 /2000 = 0.05 tons/yr.

SOX:

Emission Factor: 0.6 lbs/million cubic feet
{1-90-006-89, AFSSCC page 160}

Emissions: 0.6 * 34.8 /2000 = 0.01 tons/yr.

NOX:

Emission Factor: 100 lbs/million cubic feet
{1-90-006-89, AFSSCC page 160}

Emissions: 100 * 34.8 /2000 = 1.74 tons/yr.

VOC:

Emission Factor: 5.3 lbs/million cubic feet
{1-90-006-89, AFSSCC page 160}

Emissions: 5.3 * 34.8 /2000 = 0.09 tons/yr.

CO:

Emission Factor: 20.0 lbs/million cubic feet
{1-90-006-89, AFSSCC page 160}

Emissions: 20.0 * 34.8 /2000 = 0.35 tons/yr.

The Montana Talc Company 11/25/91
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1991 Emission Inventory

Bagging Plant (Packer)

Production: 24,092 Tons of talc.

TSP Emissions

Emission Factor: 0.30 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 0.3 * 24092 * 0.001 /2000 = 0.00 tons/yr.

PM-10 Emissions:

Emission Factor: 0.15 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 0.15 * 24092 * 0.001 /2000 = 0.00 tons/yr.

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Bulk Loading

Production: 1,817 Tons of talc.

TSP Emissions

Emission Factor: 0.30 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 0.3 *1817.2 * 0.001 /2000 = 0.00 tons/yr.

PM-10 Emissions:

Emission Factor: 0.15 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 99.9% {Baghouse}

Emissions: 0.15 *1817.2 * 0.001 /2000 = 0.00 tons/yr.

The Montana Talc Company
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1991 Emission Inventory

11/25/91

Rail Loadout

Production: 554 Tons of talc.

TSP Emissions

Emission Factor: 0.30 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 85.0% {Baghouse}

Emissions: 0.3 * 554 * 0.15 /2000 = 0.01 tons/yr.

PM-10 Emissions:

Emission Factor: 0.15 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 85.0% {Baghouse}

Emissions: 0.15 * 554 * 0.15 /2000 = 0.01 tons/yr.

Truck Loadout

Production: 1,263 Tons of talc.

TSP Emissions

Emission Factor: 0.30 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 85.0% {Baghouse}

Emissions: 0.3 *1263.2 * 0.15 /2000 = 0.03 tons/yr.

PM-10 Emissions:

Emission Factor: 0.15 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 85.0% {Baghouse}

Emissions: 0.15 *1263.2 * 0.15 /2000 = 0.01 tons/yr.

The Montana Talc Company
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30-031-0008
1991 Emission Inventory

11/25/91

Outdoor Storage

Production: 94,794 Tons of ore from mine.

TSP Emissions

Emission Factor: 0.33 lbs/ton {3-05-020-07, AFSSCC page 129}

Emissions: 0.33 * 94794 /2000 = 15.64 tons/yr.

PM-10 Emissions:

Emission Factor: 0.12 lbs/ton {3-05-020-07, AFSSCC page 129}

Emissions: 0.12 * 94794 /2000 = 5.69 tons/yr.

Ore Handling

Production: 86,065 Tons of talc.

TSP Emissions

Emission Factor: 0.30 lbs/ton {3-05-006-12, AFSSCC page 118}

Emissions: 0.3 *86064. /2000 = 12.91 tons/yr.

PM-10 Emissions:

Emission Factor: 0.15 lbs/ton {3-05-006-12, AFSSCC page 118}

Emissions: 0.15 *86064. /2000 = 6.45 tons/yr.

The Montana Talc Company
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1991 Emission Inventory

11/25/91

Fines Stockpile

Production: 51,188 Tons of fines. (54% of outdoor storage, fm 90 rpt)

TSP Emissions

Emission Factor: 0.33 lbs/ton {3-05-020-07, AFSSCC page 129}

Emissions: 0.33 * 51188 /2000 = 8.45 tons/yr.

PM-10 Emissions:

Emission Factor: 0.12 lbs/ton {3-05-020-07, AFSSCC page 129}

Emissions: 0.12 * 51188 /2000 = 3.07 tons/yr.

The Montana Talc Company 11/25/91
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1991 Emission Inventory

Waste Loadout

Production: 4,693 Tons of waste.

TSP Emissions

Emission Factor: 0.30 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 85.0% {Process Enclosed}

Emissions: 0.3 * 4693 * 0.15 /2000 = 0.11 tons/yr.

PM-10 Emissions:

Emission Factor: 0.15 lbs/ton {3-05-006-12, AFSSCC page 118}

Control Efficiency: 85.0% {Process Enclosed}

Emissions: 0.15 * 4693 * 0.15 /2000 = 0.05 tons/yr.

The Montana Talc Company
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1991 Emission Inventory

11/25/91

Diesel Exhaust

Production: 15,064 Gallons of Diesel

TSP Emissions

Emission Factor:		30.1	lbs/1000 gals {AP-42 Vol II 11-7-5}	
Emissions:	30.1 *	15.06 /2000 =		0.23 tons/yr.

PM-10 Emissions:

Emission Factor:	Assume 100% TSP is PM-10 {AP-42 & PM-10 Estimate}			
Emissions:	0.23 *	1.0	=	0.23 tons/yr.

SO2 Emissions

Emission Factor:		31.1	lbs/1000 gals {AP-42 Vol II 11-7-5}	
Emissions:	31.1 *	15.06 /2000 =		0.23 tons/yr.

NOx Emissions

Emission Factor:		368.01	lbs/1000 gals {AP-42 Vol II 11-7-5}	
Emissions:	368.01 *	15.06 /2000 =		2.77 tons/yr.

VOC Emissions

Emission Factor:		33.7	lbs/1000 gals {AP-42 Vol II 11-7-5}	
Emissions:	33.7 *	15.06 /2000 =		0.25 tons/yr.

CO Emissions

Emission Factor:		153.51	lbs/1000 gals {AP-42 Vol II 11-7-5}	
Emissions:	153.51 *	15.06 /2000 =		1.16 tons/yr.

The Montana Talc Company
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1991 Emission Inventory

11/25/91

Fugitive Emissions From Haul & Access Roads

TSP Emissions: 1.6 /0.36 = 4.5 Tons/yr. {AP-42 11.2.1-3}
(See Calculations below)

PM-10 Emissions:

Emission Factor Calculations:
(AP-42 11.2.1-3)

E,lb/vmt=

k(5.9)(s/12)(S/30)((W/3)^.7)((w/4)^.5)((365-p)/365)

10 Tn Dump Trks

k =	0.36	for <10 micron particles (AP-42 11.2.1-1)
s =	4.8	silt content (Average Value Table 11.2.1-1)
S =	15	mph
W =	21	tons
w =	6	wheels
p =	120	days (AP-42 Figure 11.2.1-1)

E,lb/vmt=

(.36)(5.9)(4.8/12)(10/30)((21/3)^.7)((6/4)^.5)((365-120)/365)

= 1.4 lb/vmt

Trip Length 2400 ft
Trips/day 3

2400 * 3 /5280 = 1.4 mi/day
Number of days operated: 260 days

Vmt = 1.4 * 260
= 354.5 Vmt

Q,tpy = 1.4 *354.54 /2000
= 0.2 tpy

The Montana Talc Company
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30-031-0008
1991 Emission Inventory

11/25/91

Loader

k =	0.36	for <10 micron particles (AP-42 11.2.1-1)
s =	4.8	silt content (Average Value Table 11.2.1-1)
S =	10	mph
s=	17.7	tons
w =	4	wheels
p =	120	days (AP-42 Figure 11.2.1-1)

E,lb/vmt=

(.36)(5.9)(4.8/12)(10/30)((17.7/3)^.7)((4/4)^.5)((365-120)/365)

= 0.7 lb/vmt

Trip Length 480 ft
Trips/day 175

480 * 175 /= 15.9 mi/day
Number of days operated: 260 days

Vmt = 15.9 * 260
= 4136.4 Vmt

Q,tpy = 0.7 *4136.3 /2000
= 1.4 tpy.

Total tons: 1.6 tons