CELANESE
FIBERS COMPANY

September 8, 1981

JCP-81-194

National Air Pollution Control Techniques Advisory Committee
c/o U. S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

Gentlemen:

Proposed New Source Performance Standard
Synthetic Fiber Production Facilities

Celanese Fibers Company is a major producer of acetate and triacetate fibers in the United States, and as such, has a vital interest in the proposed New Source Performance Standard (NSPS) for Synthetic Fiber Production Facilities. Our plants have provided a great deal of data to EPA over the last several months during the development of the NSPS, much of which appears in the Background Information Document (BID). While we are in general agreement with many of the conclusions, and to a great extent already have in operation the solvent emission reduction techniques that are recommended, we still would like to take this opportunity to point out specific concerns, and, to question the need for this standard.

Our comments are aimed toward the following key issues:

1) Market projections which indicate that new acetate production facilities will be built in the next few years are seriously overstated; thus the projected nationwide reduction in solvent emissions is overestimated.

2) The assumed solvent recovery efficiency for the various proposed containment techniques is unrealistically high.

3) Capital cost estimates for the proposed solvent containment and recovery installations are understated.

4) The operating benefit based on recovered solvent is overstated, due to the assumed recovery efficiencies and the estimated price of the solvent.

5) While the proposed (adjusted) emission standard is technically feasible for an acetone spinning process, it is questionable whether a process using a more volatile solvent can achieve this emission rate.

Each of these issues is discussed in more detail in subsequent sections of this document.

(1) Market Projections

The draft of the proposed rule states on page four that "The proposed standard would reduce projected 1987....emissions....by as much as 32 gigagrams per year." That statistic comes from Table 7-3 of B.I.D. and is based on the production forecasts shown in the left-hand columns. However, those projections are highly suspect.

The "X's" in Figure 1 show actual production volumes of filtration tow for the 1970-1979 period. The dotted line projects the volume to 1987.

The "O's" in Figure 1 show actual production volumes of total cellulose acetate for the same period. Declining sales in the textile area, as detailed in the MMFPA presentation, caused below normal production of total acetate for several years despite increases in filtration tow. The dotted lines for total cellulose acetate show trend lines for the latest five years and the latest ten years.

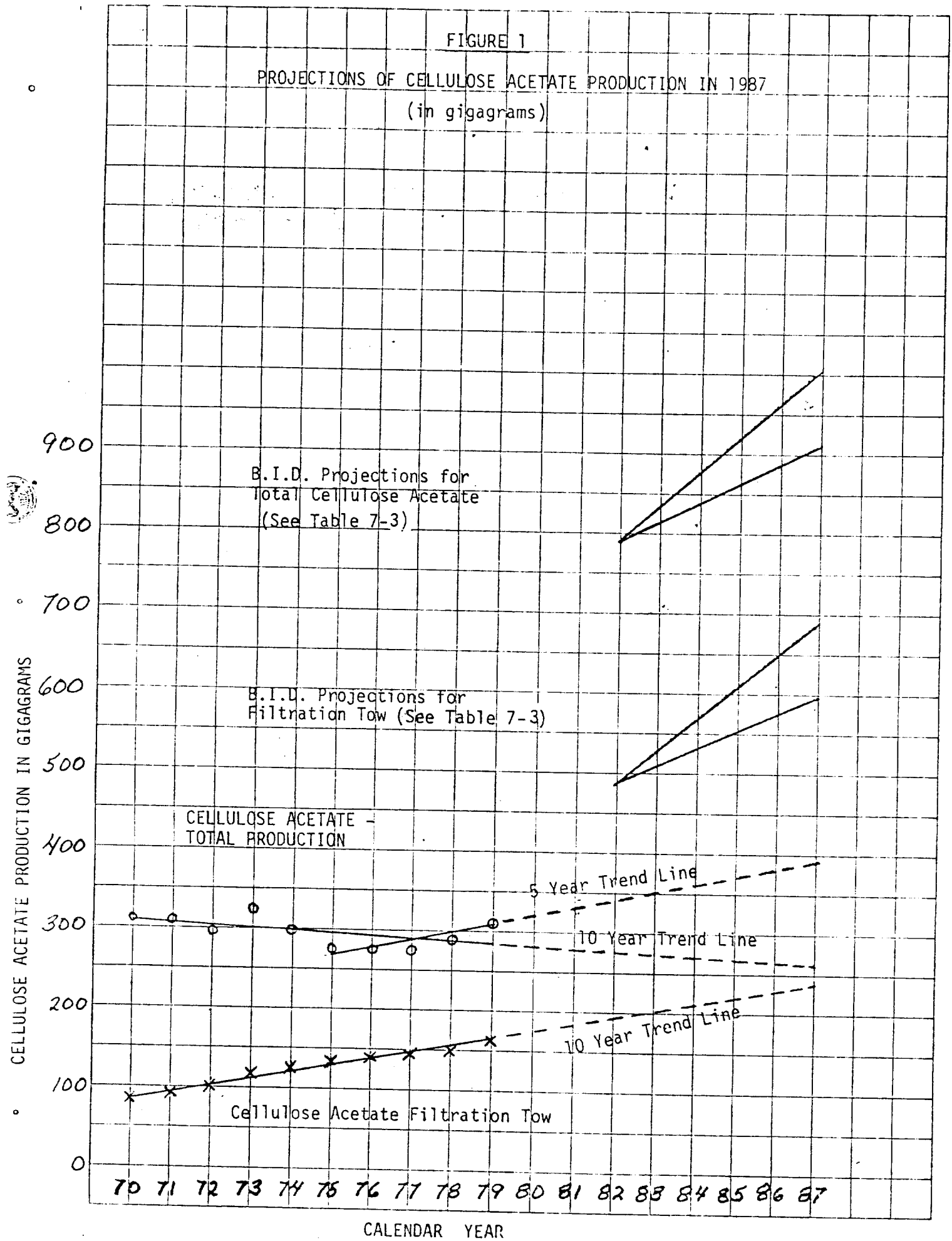
B.I.D. projections are shown for comparison. Neither trends nor projected 1987 volumes are comparable, even though the historical data shown in Figure 1 are consistent with those in Table 9-22 of the B.I.D.

Figure 1 indicates that B.I.D. projections for total cellulose acetate production in 1987 are in error by as much as a factor of four.

FIGURE 1

PROJECTIONS OF CELLULOSE ACETATE PRODUCTION IN 1987

(in gigagrams)



(2) Containment and Recovery Efficiencies

The BID assumes a 98% recovery efficiency for solvents emitted from a tow dryer (p. 6-31). Several years of experience at the Celanese plant at Narrows, Virginia has shown a consistent recovery efficiency of 92% for this stream. There are three reasons for this lower efficiency:

a) The solvent content of this vapor laden air stream is relatively low, on the order of 25-35% of the lower explosive limit. Dilute solvent streams do not adsorb as efficiently on activated carbon beds.

b) This stream is saturated with moisture (steam) which adversely affects the adsorption process.

c) A significant quantity of the finish oil on the tow volatilizes in the dryer. This oil carries over to the carbon adsorption system and coats the surface layer of the beds, rendering this portion of the carbon incapable of adsorbing the solvent.

To achieve further reduction of emissions from the cigarette tow area, the BID recommends enclosures around the tow line to the dryer. The assumed efficiency of 98% (p. 6-56) is far in excess of that achievable. Measured performance of a pilot enclosure in a (non-Celanese) foreign plant is closer to 80%. Further, it is impractical to install tow line enclosures beyond the crimper entrance because (a) the crimpers must be replaced every 2-3 months for maintenance and (b) the operators must be able to get to the crimpers and snaker chutes many times during a shift for adjustments.

A major reason that the enclosures cannot achieve greater than an 80% containment is that the operators must reach into the enclosures repeatedly to make guide adjustments. Thus the enclosures must have many doors (which tend to leak) and the doors are often open for inspection and adjustments.

For reduction of emissions from the filament manufacturing process, the BID recommends that room air be conveyed from low (solvent) concentration areas such as beaming and coning, to the higher concentration extrusion area. This air management scheme is used very effectively in Celanese plants, with overall recovery efficiencies ranging from 90-95%. However, it is also proposed that a large quantity of extrusion room air be vented directly to solvent recovery to enhance overall recovery. We believe the assumed increase in recovery efficiency of 64% to 83% of the remaining 5-10% now emitted is very optimistic. A more realistic range would be 25-40% improvement. In our plants, we have tried venting extrusion room air directly to solvent recovery, usually to reduce operator exposures to the extrusion solvent. The effect on overall solvent recovery efficiency in these cases has been minimal.

(3) Capital Cost Estimates

Tables 8-12 thru 8-15 in the BID summarize the capital cost estimates to install the various emission control systems. These estimates are very much on the low side -- by as much as a factor of 3.

Referring to Tables 8-12 and 8-13, the cost of a carbon bed recovery unit is considerably underestimated. One of our plants recently (1977) installed a 70,000 cfm unit with distillation capability. In 1981 dollars, that installation would cost $5 million. Table 8-12 assumes a need to handle 15,000 cfm -- on a simple proportional basis the recovery unit would cost $1 million. Add to that the cost of ducting to the dryers and other auxiliaries, and the cost would approach $1.5 million. For Table 8-13, a larger quantity of vapor laden air must be handled, plus very complex enclosures installed around tow lines. In this case, we would estimate the cost to be at least $3.5 million.

In the case of emission controls for a filament extrusion process, a major cost that appears to have been neglected is that for conditioning make-up air for the additional 25,000-50,000 cfm of room air that is vented to the recovery unit. To accomplish this, air handling equipment, a water chiller, cooling tower, pumps, piping, electrical and other auxiliaries must be added. We estimate that $0.8 million must be added to Table 8-14, and $1.5 million added to Table 8-15.

(4) Cost Benefits - Recovered Solvent

Referring to Tables 8-23 thru 8-26, annualized costs must be adjusted for a revised capital recovery cost. Beyond that, the credit for recovered solvent is overstated because of the assumed recovery efficiency and the estimated cost of acetone.

Looking first at the cost of acetone, July 1981 cost was $0.23/lb. or $0.51/kg. This compares with the BID estimate of $0.66/kg.

Calculating the solvent savings based on more realistic recovery efficiencies yields the following annual savings:

		BID	Revised
Tow	- dryer exhaust to recovery	$1,034,000	$ 745,000
	- dryer exhaust plus tow line enclosures	$1,993,000	$1,320,000
Filament	- 25 mcfm air to recovery	$1,139,000	$ 338,000
	- 50 mcfm air to recovery	$1,558,000	$ 542,000

(5) Applicability of Standard to Other Solvent Systems

In two of the Celanese plants, acetate and triacetate yarns are run interchangeably on spinning machines. The only difference in these two processes is the solvent used. In the case of acetate, acetone is used, while with triacetate, a combination of methylene chloride and methanol is the solvent needed. A common solvent recovery system is employed for all the extrusion machines. Yet we find that the overall solvent losses for the triacetate process are about double those of the acetate.

We believe the primary reason for this is the difference in volatility of the solvents -- the greater the volatility the more difficult the solvent is to capture. Thus, fugitive emissions and losses are much greater for the methylene chloride/methanol system.

Looking at the loss ratio for one of our plants making both products, we find that monthly losses/input solvent for the triacetate system ranged from 27.5 to 40.1 during 1980, with an average of 34.1 for the year. This plant makes considerable use of air management techniques, and directly exhausts several thousand cfm of extrusion room air to the recovery system. Yet, during 1980, this process would have been out of compliance with the proposed standard ratio of 31.0 for 9 months out of the year.

The point to be made here is that if a standard is promulgated, some consideration must be given to the characteristics of the solvents used, because even the proposed solvent containment and recovery recommendations may not achieve the emission rate standard expected.

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In conclusion, Celanese Fibers Company believes that the acetate tow/yarn business will not be growing at nearly the rate projected in the BID. Thus, the need for this NSPS is questionable, as the reduction in VOC emissions over the next five years will be minimal.

The predicted reduction in emissions will be further eroded by overoptimistic assumptions on recovery efficiency of the proposed control techniques. The costs/benefits need to be recalculated, and consideration needs to be given to the effectiveness of the proposed requirement on processes using different solvents.

We thank the (NAPCTAC) committee for this opportunity to comment on the various aspects of this New Source Performance Standard.

Very truly yours,

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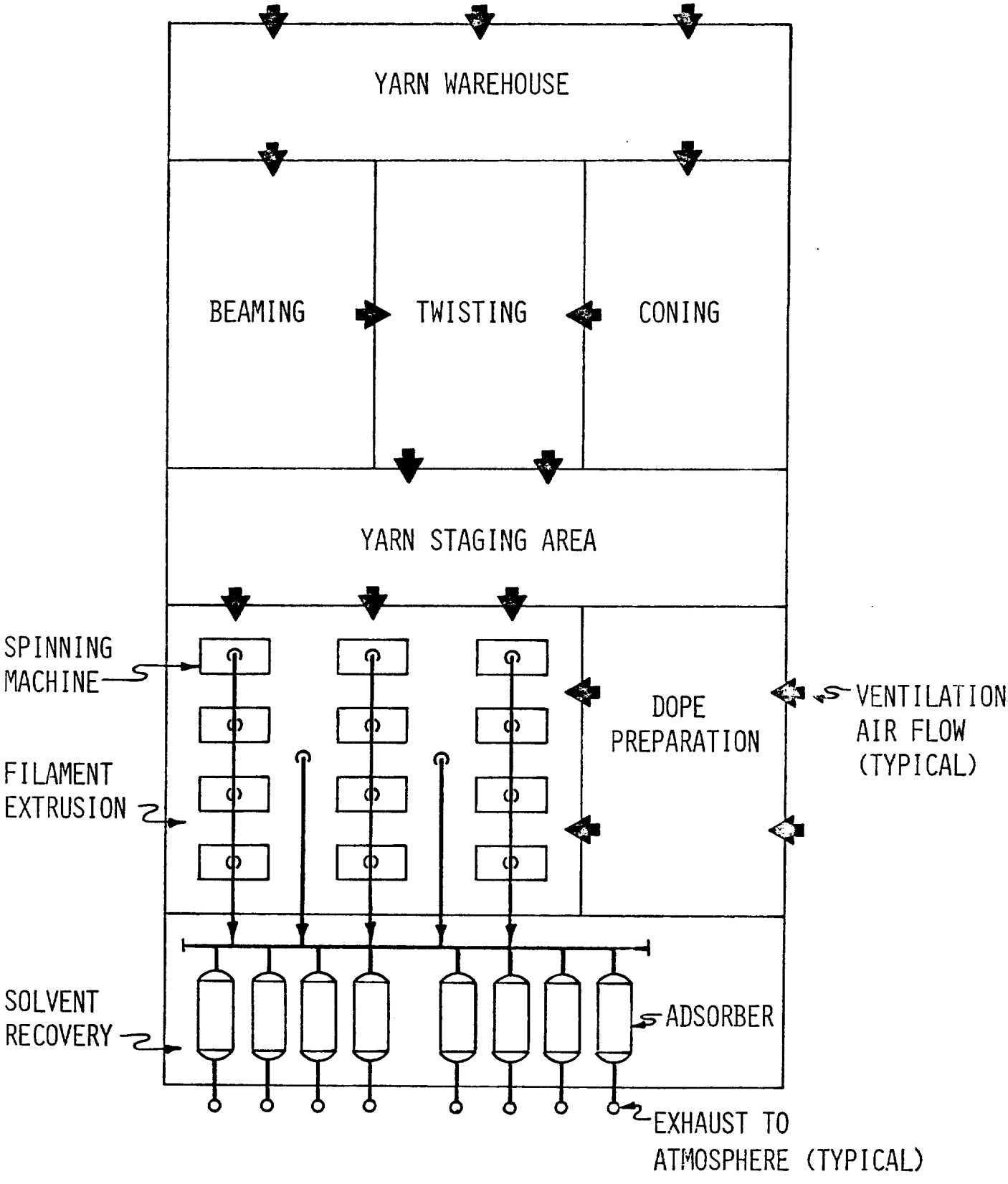
TYPICAL ACETATE FILAMENT ROOM AIR
SOLVENT MANAGEMENT FLOW PATTERN



TYPICAL CIGARETTE TOW SPINNING, CRIMPING AND DRYING LAYOUT.