

Seeing the writing on the wall: Old newspapers to new insulation

Demand for that quintessential recycled product, cellulose insulation, is growing almost too fast for industry to respond.

by Steve Apotheker
Resource Recycling

"It was the best of demand, it was the worst of supply" sums up the feelings of many cellulose insulation manufacturers.

Because demand for their recycled product, made predominantly from old newspapers (ONP), has never been greater, cellulose insulation plants have been running flat out since the summer of 1993. Improved manufacturing equipment has made cellulose insulation even more competitive with other insulation alternatives. That's the good news.

The bad news is that a tightness in the availability of ONP and soaring scrap paper prices are offsetting improved manufacturing efficiencies. In some cases, it is putting a damper on production increases and new plant construction.

Louisiana-Pacific Corporation (Portland, Oregon), one of the nation's largest cellulose insulation manufacturers, has put its expansion plan on hold. The company's four-year goal is to have a national network of at least 13 cellulose insulation plants so that every U.S. household is within 300 miles of an L-P facility.

Some manufacturers, like L-P, are unwilling to pay the high prices for ONP that have topped \$90 per ton this year (see "Hot markets, high prices," also in this issue). In other cases, manufacturers have seen their suppliers break agreements and the ONP sold to other, higher priced markets.

Nevertheless, Fred Henderson with Nu-Wool, Inc. (Jenison, Missouri), which was

founded in 1949 and is one of the oldest manufacturers, reports that the industry is thriving as it passes from its initial phase in the late 1970s and 1980s of over 700 "mom and pop" operations, to the '90s with about 65 larger, more experienced players with greater resources, diversified products and more sophisticated marketing plans.

This article explores some of the structural, technical and economic changes occurring in an industry that is ideally situated to consume greater volumes of ONP, while serving as an attractive candidate for new recycling market development.

Settling down

According to the *Handbook on Cellulose In-*

sulation (1989) by Sarfraz A. Siddiqui, the patent for cellulose insulation was issued in the 1800s. A key patent, issued in 1929, describes the use of fire-retardant blown paper insulation. In the early 1900s, Canadians were using untreated, shredded paper for insulating homes. The cellulose insulation industry found a firm foothold in the U.S. market after World War II by retrofitting attics and existing wood-frame sidewalls. The advent of electric heat boosted interest in cellulose insulation, because electric utilities found that insulation made their higher cost heat more economical.

The industry received a shot in the arm with the energy shortages of the 1970s. Insulation retrofits for economic savings supplemented the original demand for the product, which was driven by comfort.

Almost overnight, hundreds of operators entered an industry that was largely unregulated. Farmers in particular were attracted because these early plants used modified farm equipment for grinding the fiber, adding the chemicals and bagging or baling the finished product. The peak demand period for insulation in the cold months also coincided with the farmers' off-season.

The downside of the entrepreneurial heyday was that vendors of poorly manufactured cellulose insulation put out a product that was susceptible to fire, corrosiveness and settling.

Cellulose warms up

- ✓ Market stratification and the development of product standards have led to fewer manufacturers and more diversified products.
- ✓ Some industry insiders believe that cellulose insulation can capture 20 percent of the insulation market by 2000, up from just 5 percent in 1990.
- ✓ Manufacturers are beginning to tout the fact that their product is made from recycled newspapers.
- ✓ Despite federal guidelines and legislation, the federal government is not leading the way for increased purchases of cellulose insulation for its projects.
- ✓ Fiber substitution and lower profits have resulted from steep rises in the cost of ONP.

Following the typical development pattern of an American industry, the blossoming, free-wheeling period of small entrepreneurs was

followed by the reality check of developing product standards, which occurred in the late 1970s through the mid-1980s.

These regulations and standards help the development of a product with consistent quality, but also resulted in an industry shake-out. Membership was reduced by tenfold, to 77 companies, at the beginning of this decade.

The typical survivor company operated one plant serving a radius of 350 miles. It produced over 5,000 tons of insulation annually, but often supplemented this staple item with other fiber-based commodities, such as animal bedding, hydroseed mulch and industrial fiber applications. Annual revenues from all products averaged less than \$5 million.

In 1980, the average producer had less than two years of operating experience. Ten years later, the surviving companies averaged 15 years of experience, testimony to the companies' tenacity.

Going downtown

After the turbulence of the 1980s, the current decade began inauspiciously enough for the cellulose insulation industry. In 1990, the 77 locally based producers of cellulose insulation producers shared about 5 percent of the \$2.0 billion building insulation pie. In contrast, the nationally based behemoths of fiber-

glass insulation commanded a market share of over 70 percent.

The cellulose insulation producers were undercapitalized, with the whole kit and caboodle worth about \$100 million. They lacked the economies of scale and the national marketing efforts enjoyed by their fiberglass competitors. The "Pink Panther" brand produced by one fiberglass manufacturer became synonymous for that commodity, whereas cellulose insulation lacked identity and understanding by the public.

But the growing demand for recycling collection and for recycled products presented an opportunity for one major corporation whose entry has affected the entire field. In 1990, Louisiana-Pacific, a major manufacturer of building products, industrial wood products and pulp, and owner of two million acres of timberland, acquired cellulose insulation plants in Missouri and Ohio. The flame-retardant insulation was a perfect match for the company's product line of building materials from recoverable materials and fit with the company's goal of constructing the optimal fire-resistant house.

With \$2.5 billion in company sales, L-P has the wherewithal to put cellulose insulation on a level playing field with its fiberglass competitors. Although the company could have purchased every cellulose plant in the U.S. using one of its credit lines, it has cho-

sen to pursue greenfield plants. New plants have been built in San Diego and Baltimore.

L-P is also spending millions of dollars on the industry's largest marketing program, according to Rick Davenport, national sales manager for L-P's cellulose product. According to Davenport, a poll of four major U.S. cities found that about 90 percent of respondents, consumers and builders alike, recognized and reacted very favorably to insulation advertised as being made from recycled paper. The favorable rating level fell to 50 percent of the sample when the product was simply labeled "cellulose insulation."

In the past, cellulose insulation manufacturers had not used the fact that cellulose insulation is made from old newspapers as a marketing point because of negative connotations about paper, i.e., that it bums. Based on their polling research, however, L-P is actively promoting the connection between old newspapers and new insulation.

L-P's promotional campaign and growing public awareness about the cellulose product promises to reap benefits for all the producers. Davenport believes that the industry can claim a 20 percent market share within the next five years, with L-P accounting for a majority of the sales.

Strength in numbers

Another approach to create a national presence for cellulose insulation is being taken by several existing manufacturers, which have joined forces under the umbrella of a publicly traded holding company.

GreenStone Industries, Inc. (Cabin John, Maryland) was founded in April 1993 to acquire cellulose insulation and specialty fibers manufacturers. In June 1994, it acquired United Fibers Corporation (Chandler, Arizona and Portland, Oregon) and Parco, Inc. (Norfolk,

Nebraska). In October, GreenStone acquired American Environmental Products (Elkwood, Virginia), giving the company an East Coast presence.

Cellulose insulation accounted for over 80 percent of GreenStone's 1993 revenues of \$15 million, with the balance generated by sales of specialty fibers and fire-retardant chemicals used for the cellulose insulation industry (see box). In 1994, sales are up 32 percent for the first six months, which are normally the slow part of the year.

The company's four plants have an annual production of 120,000 tons for all finished products. Capacity utilization has been over 85 percent thus far in 1994.

Doing more with less

Moving from modified farm machinery to equipment specific to the manufacture of cellulose insulation has improved the economics and performance of the product.

The typical manufacturing process for cellulose insulation starts with ONP. The paper is chopped up into pieces several inches in diameter. The product is then finished in one of several ways. The oldest method uses a hammermill whose swinging hammers beat the paper into pieces small enough to fall through a screen, typically 3/8" or smaller. Disk refiners, an equipment alternative, use two rotating plates to produce small pieces. In 1990, the typical settled density of insulation produced by hammermills and disk screeners was 2.0 pounds per cubic foot.

Fiberization, a process on the market for only about three years, pulls out the individual fibers, in contrast to the fast two processes, which rip or tear the fibers. The fiberizer, with an action similar to that of a corn mill, uses a rotor between two stationary plates to separate the fibers. The density of the output

is about 30 percent less than that from a hammermill and can go as low as 1.4 pounds per cubic foot.

For a given weight of product, the fiberized insulation provides better coverage, more air-trapping capacity, better economics and less dust. Several industry observers believe that all hammermills will be out of the insulation business, though not necessarily out of all plants, within three years; companies that make other fiber-based products, such as hydroseed mulch, will still favor the hammermill product.

With many manufacturers experiencing healthy cash flows, equipment upgrades to fiberizers are moving quickly. One equipment manufacturer reports sales of three to four units through September of this year and expects to double sales in the last quarter alone.

Insulated policy

Although the private sector has shown a greater interest in using cellulose insulation, there has been little increase in demand from federal agencies, despite the direction provided by the Resource Conservation and Recovery Act.

RCRA directs federal agencies and any recipients of federal funds for projects using insulation to purchase designated materials, such as cellulose insulation, that have the highest recycled content and are the most envi-

Diversifying into other cellulose fiber products

According to the July 1994 prospectus for GreenStone Industries, the specialty fibers market is estimated to have annual sales of \$20 million to \$25 million. This area includes industrial fibers, hydroseed mulch, acoustical products and other applications, such as bedding for poultry and other animals.

Industrial fibers use cellulose fibers as fillers, thickeners and reinforcements in products such as asphalt paving, artificial slate products, roof coatings, floor tile cement, paints, epoxies, caulks and tennis court coatings. Annual sales are less than \$10 million and offer growth potential.

Hydroseed mulch was manufactured by about half of the cellulose insulation companies in 1990. The product is used as a substitute for tar and straw by landscapers to hold down and serve as a germinating medium for grass seed. About 50,000 tons were produced in 1990 by these companies,

a volume that has probably doubled by 1994, according to one producer.

Paper composes about 85 percent of the mulch, which is usually dyed green to mark application boundaries. One ton can cover two acres.

Hydroseed mulch brings a price of about \$140 per ton for the lower grade, less aesthetic product suitable for mine reclamation. Commingled residential mixed paper is suitable for this application. More visible end uses command prices that are 50 percent higher.

Acoustical spray is being introduced by GreenStone Industries this year. The product provides a seal within a wall cavity and reduces sound transmission.

Animal **bedding** was produced by one-fifth of cellulose insulation manufacturers in 1990. This market is expected to grow, especially with the new demand from the poultry industry that did not exist four years ago.

ronmentally preferable. Exemptions to the policy are provided if economic hardship or the inability to meet performance standards can be demonstrated.

The reality is that the guideline for cellulose insulation has not been implemented to the extent that it should be. "Government

procurement is business as usual," says Dan Lea, the executive director of the Cellulose Insulation Manufacturers Association (Dayton, Ohio), which has 23 members representing 85 percent of the industry's capacity.

Lea points out that cellulose insulation already captures over 90 percent of the weath-

erization market that receives federal funding. However, many projects involving new construction are bypassing the federal policy to use cellulose insulation.

According to one inside observer of the RCRA implementation process, the departments of Defense, Energy, Housing and Urban Development, and Health and Human Services have been particularly deficient in accelerating purchases of cellulose insulation for new construction.

Even the federal executive order of October 1993, which directs agencies to fully implement a buy recycled program and the RCRA guidelines, has not had the desired ef-

fect. Max Meinel with Fiber Master/ThermoCon (Monroe, Louisiana) says, "People basically ignore the federal proclamation."

Lea and members of his organization can reel off example after example of projects that ignored the federal mandate to consider cellulose insulation, particularly military projects. A 1,200-unit family housing project in Landover, Maryland for Navy and Air Force families selected fiberglass insulation. The reason given was that the project was built by a private developer; Lea points out, however, that the federal government has entered into a long-term lease arrangement for the properties.

An Air Force housing project in Alaska consumed several hundred thousand square feet of insulation and did not use cellulose, ignoring the availability of a local cellulose insulation manufacturer and the pleading of the U.S. Environmental Protection Agency.

In the case of the U.S. Army, the military branch has a policy that clearly expresses a bias against the use of cellulose insulation, citing reasons that contradict the basic scientific literature on insulation and even the findings of its sister agency, the Department of Energy.

A lack of accountability riddles the implementation process from beginning to end. When large government building jobs are bid out, there is little specification of individual components of projects, such as insulation. In short, the federal agencies are lax in instructing contractors and fund recipients to use recycled products.

Enforcement of RCRA is a problem. When an insulation bid ignores cellulose, there is "no place we can go to petition for a review," says Bill Winds, public relations manager for L-P's western division. This may change with the recent appointments of the federal environmental executive and recycling coordinators for the federal agencies.

Stretching your dollar

The availability of lower density cellulose insulation products, due in large part to the development of fiberizers, has significantly improved the economics of the market. The result is higher sales revenues for the same volume of product. Industry members are projecting revenues to increase by 50 percent in 1994, even though the amount of product will go up by only 30 percent (see Table 1).

Money magazine (October 1994) recently editorialized in favor of the economic and environmental benefits of cellulose insulation over the the more expensive, better promoted "pink stuff" supplied by the fiberglass industry. This endorsement is ecstatically received in an industry that has seen few price increases until last year. Because of the necessity to keep prices at or below fiberglass insulation, profit margins have been small for the manufacturers.

One factor that has dampened profit margins has been the skyrocketing cost of raw materials. Manufacturers have seen ONP prices double and triple since the spring. Many companies are paying over \$80 per ton to obtain their raw material, a No. 6 grade of ONP. Raw material cost as a percentage of total product cost has almost doubled, from 15 percent to over 25 percent.

Feeding frenzy

Cellulose insulation manufacturers are ploring alternative fiber sources and SUP agreements to mitigate future price surges ONP

Southern Cellulose, Inc. (Atlanta) faced

the problem of high-priced ONP over 10 years ago. The company operates in the backyard of Southeast Paper Manufacturing Co. (Dublin, Georgia), the world's largest recycled newsprint mill. Southern Cellulose was having a hard time competing with Southeast Paper for ONP at prices the insulation manufacturer could afford.

According to Ivan Smith, owner of Southern Cellulose, one day in 1983 a representative of a telephone directory publisher offered him 10 rail cars of old telephone directories (OTD) from Florida, delivered to his door at no cost. It seems the landfill that had always received the over-issue books decided it no longer wanted to accept the bulky items.

Smith had to overcome many challenges, but was eventually successful in modifying the traditional ONP processing system to use OTD instead. He now uses OTD for over 90 percent of his paper needs. Because the directory publishers are generating fewer over-issue books, his dependence on post-consumer OTD collection has increased. About half of the 7,000 tons of OTD used annually by his company are post-consumer books.

One successful OTD collection program targeted businesses in the Atlanta area. According to Kathryn Burns, marketing manager for Southern Cellulose, local waste haulers picked up OTD from businesses that had more than 15 books, at a cost that was

less than the charge to dispose of them. The program generated 575 tons of OTD this year.

Using OTD has allowed Smith to pay less for his raw material. He currently buys OTD for \$60 per ton, about two-thirds the price of ONP, but four times what he has historically paid to get this material.

United Fibers' facility in Chandler, Arizona uses old corrugated containers (OCC) as part of its insulation feedstock.

It is used to supply a product for contractors that has a lower density than one made from just ONP. The company uses some waxed OCC and is looking at residential mixed paper as OCC prices have gone up. It would like to substitute alternative scrap grades for 20 percent of its furnish.

One step backward, two steps forward
Most cellulose manufacturers acknowledge the need to develop closer alliances with their sources of ONP

L-P is evaluating a number of different options. In Samoa, California, the company

Table 1 Profile of the cellulose insulation industry (1)

	1984	1990	1993	1994
Plants	160	77	68-72	68-72
Shipments, in tons	620K	414K	425K	550K
Shipments, tons per plant	3,875	5,375	6,071	7,857
Sales, in dollars	\$145M	\$96M	\$125M	\$180M
Sales, dollars per ton	\$234	\$232	\$294	\$327

K = Thousands.

M = Millions.

(1) Data from 1984 and 1990 are from industrywide surveys conducted by In-Cide Technologies, The figures for 1993 and 1994 are estimates from selected company interviews.

Sources: In-Cide Technologies, Inc., February 1991; *Resource Recycling*, October 1994.

worked with a waste hauler to develop curbside recycling collection by providing bins to the residents. In San Diego, the company has a supply agreement to take 500 tons per month at the bargain price of \$25 per ton. If the company could get more ONP at that price, it would add a third shift to its local plant.

"I don't think we are scratching the surface for getting recycled paper," says Davenport. The company is considering a strategy to provide ongoing assistance to civic and charitable groups to expand paper drives and drop-off collection programs.

United Fibers has gone one step further

and has integrated a materials recovery facility with its manufacturing operation in Chandler. The MRF affiliate, Valley Recycling, Inc., competitively won the three-year contract to process the materials from Tempe's curbside recycling collection program that began in 1993 for 35,000 homes. It now processes recyclables from a half-dozen other communities.

ONP and OCC go directly to the manufacturing plant located on the same site as the MRF. Under a five-year agreement, the MRF is guaranteed a floor price for ONP of \$64 per ton and it has to provide a minimum of 1,500 tons per month to United Fibers.

Closing the loop

With the increased demand for cellulose insulation, there is the potential for local governments to create new markets for their recovered paper and some new jobs as well. The areas with the hottest potential for new cellulose insulation facilities are the Southeast and Texas, followed by the Mid-Atlantic, Midwest and Northwest regions.

A group of three rural Georgia counties has already taken the first step. The North Georgia Waste Management Authority, doing business as ACR Industries, has purchased a cellulose insulation plant in Comelia for \$500,000. With the counties paying \$33 per ton to have waste hauled away, and all local

landfills closing soon, it seemed worthwhile to ensure a local market for scrap paper. The counties have sited trailers to accept mixed paper from the 50,000 residents.

The plant has an annual capacity of 3,500 tons. It will produce four products: cellulose insulation, poultry litter, hydroseed mulch and absorbents for hazardous waste spills.

Because the plant is located in the heart of chicken country, poultry houses represent a major market. The cellulose product is seeing increased demand for litter, as well as for insulation.

The fire-resistant property of the cellulose makes it a much more attractive litter than sawdust or wood shavings, which are increasing in price anyway as manufactured wood products compete for this raw material. The boron treatment that provides the fire resistance also acts as a pest control agent for the darkling beetle that infests poultry houses in the region. Finally, applications of cellulose insulation are better able to withstand the vibrations of the large fans used in the poultry houses than the traditional fiberglass product.

Down the road

Most of the projections for the cellulose insulation industry look good.

Jim Blasius, vice president of In-Cide Technologies, Inc. (Phoenix), a major sup-

plier of boron-based chemicals to the cellulose insulation industry, sees 1995 as a strong year. Industry consolidation will make it more competitive with the fiberglass companies. Already four companies, operating 11 plants, are responsible for over 40 percent of the industry's shipments (see Table 2). After a decade of shakeout, he believes the next five years will see a number of new plants built.

Smith is also optimistic about 1995. He can't explain why demand for cellulose insulation turned on like a light in June 1993, but the momentum has not subsided. Sales should rise as the industry penetrates new markets, such as manufactured homes, the fastest growing segment of the new construction industry.

If there is a dark cloud on the horizon, Meinel believes it is the possibility that construction will tail off next year, causing a dip in cellulose demand.

Programs offered by L-P and Orkin Exterminating Co. (Atlanta) should increase the positive perception and market share of cellulose insulation. L-P is marketing a national program that guarantees a cap on heating bills for three years to households that install the company's insulation. Similar programs have been offered by other insulation manufacturers at a local level.

Orkin is in the middle of a three-year testing program of a pest control insulation that

seen around for almost a decade. Like L-P, Orkin has the resources to take the program nationwide. If testing is successful, Orkin will guarantee a home to be pest-free for a defined period.

Interest in pest control insulation has increased as other, more toxic control chemicals have been taken off the market. The use of recycled materials has also made the product more attractive to sell, comes with a 10 percent price premium over standard cellulose insulation. Another benefit is that the installation period for in-situ coincides with the off-season for pest control work, allowing Orkin to resolve a labor problem and keep employees working year-round.

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