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*& Associates*

**Report # 030102**

**Impact of Mandatory Recycling Ordinances and Disposal Bans on  
Commercial Fiber Recycling**

**Final Report**

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Prepared for:

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## EXECUTIVE SUMMARY

Metro's Solid Waste and Recycling Department (SW&R) has a recovery goal of 62% by 2005. To reach this goal, Metro must increase waste reduction dramatically.

The commercial waste stream represents a significant portion of MSW, and recyclable fiber accounts for a large fraction of commercial waste, e.g., old corrugated containers (OCC), office paper, newsprint, and coated paper. SW&R is considering whether mandatory recycling ordinances (MROs) and disposal bans (DBs) should be implemented for commercial fiber and what impact these regulations may have on the quantity, quality and price of recycled commercial fiber.

Mandatory recycling ordinances (MROs) typically require generators to source separate certain materials for recycling collection or a certain percentage or number of the materials they generate. Enforcement of MROs typically is directed at the generator.

Disposal bans (DBs) forbid disposal of certain materials and/or of MSW loads containing a given percentage of those materials. Enforcement of DBs usually is directed at collectors, but can focus on generators and/or disposal facilities such as transfer stations.

SW&R retained Moore & Associates to complete this assessment of the impact of MROs and DBs on commercial fiber recycling. Moore & Associates investigated five jurisdictions in North America that had adopted MROs and/or DBs that applied to commercial fiber. The jurisdictions investigated were:

- Dane County, Wisconsin.
- Durham, North Carolina.
- Onondaga County, New York.
- Greater Vancouver Regional Disposal, British Columbia.
- San Diego County and Chula Vista, California.

Telephone interviews were conducted with government officials, collectors, processors, and end users with two objectives in mind:

- Determine the impact on commercial recovered fiber quantity, quality, and price.
- Identify policies, strategies, program elements, and market-based factors that affect quantity, quality, and price of the recovered fiber.

Moore & Associates reached the following conclusions based on the research:

1. MROs and DBs increase the amount of commercial fiber recovered.
2. MROs and DBs have limited impact on commercial fiber quality.
3. MROs and DBs have not had an impact on the price for commercial recycled paper.

In addition, Moore & Associates identified a number of factors that affect commercial recovered fiber quantity, quality, and price. These issues (listed below according to

recycling industry service sector) should be considered carefully if Metro chooses to design and implement an MRO or DB.

**Government:**

- Program outreach – education, technical assistance and promotion – is essential to increasing recovery and controlling quality.
- Outreach efforts need to include broad-based activities as well as sector-specific programs.
- Both volume-based fees, which are universal in the Metro region, and high waste disposal costs create a strong economic incentive to recycle regardless of whether there is an MRO or DB.
- Recycling collection costs for small generators tend to be prohibitive. Jurisdictions that regulate collection should identify and implement strategies that help reduce the economic burden for these generators, e.g., volume-based rates that include the cost of recycling service, recycling boxes shared by several businesses versus individual roll carts, and franchised commercial service areas.
- Enforcement is essential. It must be integrated with outreach activities and not simply punitive. The governments that regulate collection and disposal should have primary responsibility for enforcement versus placing the burden directly on private service providers.
- DBs are a viable option for Metro because it has control of most key transfer/disposal facilities and has regulatory authority over private sector transfer stations.

**Collectors:**

- MROs and DBs increase the “demand” for recycling services and thus tend to increase competition among collection service providers.
- “Old line” commercial paper collector/processors (such as the Metro area’s Weyerhaeuser) face competition from single-stream, “anything that tears,” and dirty MRF services, which tend to reduce overall fiber quality in exchange for convenience and service price.
- Small generators and multi-tenant locations, such as retail malls, small office buildings, and multi-family dwellings, have limited space and need individual technical assistance to place paper recycling bins.
- Small generators, food service establishments and multi-tenant buildings (see definition in previous bullet) tend to be the primary potential sources of contamination in commercial fiber. OCC recovered from construction sites is another source that tends to have contamination problems.
- Collectors advocate the following techniques to control contamination: locked recycling bins, slotted openings to exclude trash from recycling bins, color-coded

containers, prominent and multi-lingual signs, regular inspection of recycling containers, and direct feedback by collection crews to generators.

- Ongoing customer education and monitoring are essential.

**Processors:**

- MROs and DBs have motivated some private processors to expand their business. “Old-line” paper packers, however, have continued to rely on their traditional customer base, such as printers, large OCC generators, large office complexes, etc.
- MROs and DBs encourage some companies whose core business is solid waste to get into commercial recycling. The new entrants compete against established paper packers, but may not possess the same level of dedication to recycling, product quality and customer service.
- Processors stated that MROs or DBs for office paper appear to increase the amount of Mixed Office Paper produced compared to other higher value grades.
- Small- and medium-sized businesses that did not recycle previously are the primary source of new tonnage from MROs and DBs. The recovery of higher value grades separated from high-volume generators does not appear to increase significantly.
- Processors have experienced some increase in contamination after MROs and DBs are implemented; however, this contamination has not exceeded what they can handle. Processors continue to be able to readily meet market specifications for the paper grades they produce.
- Processors reject or discount loads that have contamination greater than what they can handle. They try to put the burden back on the collector to work with generators. In all the jurisdictions studied, the major commercial paper packers’ own collection services are their primary source of fiber; therefore, they do not compete for incoming tonnage from haulers.
- By trying to encourage and control commercial fiber recycling, a jurisdiction can step over into the private recyclers’ traditional domain and affect their business for better and worse. For example, public investments in outreach, education and infrastructure can benefit the private recyclers by increasing business opportunities. Private recyclers, however, are wary of direct municipal efforts to control commercial recycling services, such as commercial collection franchises, which are traditionally the private sector’s domain.
- Processors in all the jurisdictions studied are able to access a variety of markets that allow them to sell increased tonnage and new grades of the types of scrap paper they produce.

**End users:**

- End users are generally “insulated” from local program issues, because they draw supply from many sources and because local processors must deal with problem loads. Major end users of commercial fiber from the five jurisdictions, with the one exception noted below, could not identify specific quality problems due to MROs and/or DBs implemented by the five jurisdictions in this study.
- A major end user found that residential old newspapers (ONP) from Durham, North Carolina, were too contaminated to use at its recycled newsprint mill; however, the end user stated that the problem is due to the way the collector/processor handles fiber and not the DB per se. The end user also stated that commercially generated ONP is not the problem, because it is collected and handled separately from residential recyclables.
- One end user expressed a general concern that, as recovery rates increase, there is bound to be some increase in contamination. If processors cannot remove this contamination, it will be passed along to mills where it either increases converting costs or reduces product quality.
- Of particular concern to some end users is the movement toward single-stream collection of recyclables and the impact it can have on recycled fiber quality. While no one in the surveyed communities has quantitative data about quality problems caused by single-stream loads, end users are concerned that any increase in contamination will lead to higher costs at the mill—equipment wear-and-tear, residue disposal, cost incurred for purchasing contaminants in fiber, and purchase of higher quality over-issue ONP to dilute the contaminants in residential ONP.
- End users acknowledge that the concerns expressed regarding single-stream and other efforts to maximize diversion and minimize collection costs are not directly linked to MROs and DBs.
- One end user expressed two concerns about DBs that target fiber grades with already high recovery rates, e.g., ONP and OCC. First, it was stated that there is a theoretical maximum recovery rate for recyclables. Recovery beyond a certain point is not practical because the remaining fiber is too contaminated and/or too dispersed to be recovered. DBs need to allow an exception for generators that produce small and/or contaminated quantities of these materials. Second, DBs may put some types of packaging at a competitive disadvantage if product manufacturers, retailers or customers see the DB as a problem. The one respondent who expressed this concern cited no actual incidents of package-switching, e.g., from Gaylords to pallet wrap.

## INTRODUCTION

Metro is the regional government in the Portland, Oregon metropolitan area. Its jurisdiction includes a population of approximately 1.3 million people in three counties and 24 cities. Metro's Solid Waste and Recycling Department (SW&R) coordinates the region's solid waste management system. The SW&R's work includes:

- Regional solid waste management planning.
- Implementing waste reduction programs.
- Providing solid waste technical assistance.
- Regulating disposal of solid waste.

Metro owns and operates two recycling and transfer stations and contracts for hauling and disposal of municipal solid waste (MSW) at a landfill in Arlington, Oregon.

Metro has a recovery goal of 62% by 2005. In 2001, the Metro region generated 2,248,747 tons of MSW and had a recovery rate of 55%. To reach its goal, Metro must increase recovery by an estimated 270,000 tons, with 80,000 of those tons projected to come from commercial scrap paper currently disposed.

The SW&R is considering whether mandatory recycling ordinances (MROs) and disposal bans (DBs) should be implemented to increase waste reduction.

Mandatory recycling ordinances (MROs) typically require generators to source separate certain materials for recycling collection or to recycle a certain percentage or number of the materials they generate. Enforcement of MROs typically is directed at the generator.

Disposal bans (DBs) forbid disposal of certain materials and/or of MSW loads containing a given percentage of those materials. Enforcement of DBs usually is directed at collectors, but can focus on generators and/or disposal facilities such as transfer stations.

Specifically, the SW&R wishes to evaluate the recovery impact of MROs and DBs that apply to commercial fiber. The commercial waste stream represents a significant portion of MSW, and recyclable fiber accounts for a large fraction of commercial waste. Commercial fiber includes significant amounts of corrugated containers, office paper, newsprint and coated paper.

Moore & Associates is a private consulting company that specializes in work with the recycled paper industry. SW&R retained Moore & Associates to complete this assessment of the impact of MROs and DBs on commercial fiber recycling.

## **OBJECTIVES AND METHODOLOGY**

The purpose of this project is to investigate the impact of MROs and DBs implemented in five other local government jurisdictions. The specific research objectives of this project were:

- Determine the impact on commercial recovered fiber quantity, quality and price.
- Identify policies, strategies, program elements and market-based factors that impact quantity, quality and price.

Moore & Associates obtained information via 35 telephone interviews including with eight government officials, nine collectors, 10 processors, and eight end users. The jurisdictions investigated were:

- Dane County, Wisconsin.
- Durham, North Carolina.
- Onondaga County, New York.
- Greater Vancouver Regional Disposal, British Columbia.
- San Diego County and Chula Vista, California.

A list of the interview questions is provided in the Appendix.

## **RESULTS**

In this section of the report, Moore & Associates summarizes the information obtained from each jurisdiction.

### **Dane County, Wisconsin**

#### **Overview**

Dane County has implemented both MROs and DBs. The DB implementation dates for commercial fiber were:

- Newspaper in 1987.
- OCC in 1991.
- Magazines and office paper in 1995.

The DBs apply to any waste delivered to the County-owned landfill. The county undertakes sporadic and limited enforcement of the DBs at the landfill, where it may issue warnings and fines to collectors. Because the individual municipalities do little enforcement of the mandates and bans, outreach and technical assistance are the primary strategies for boosting commercial fiber recovery.

The county does not engage in collection or hauling of solid waste – local government is the responsible unit for implementation. The county has a contract with a Recycle America material recovery facility (MRF) to handle recyclables. The contract includes a fixed annual fee paid to the contractor, a fee per ton handled, and revenue-sharing provisions.

Dane County does not monitor commercial recycling tonnage, so there are no hard data available. Similarly, reliable information is not available from local governments within the county because commercial waste management is handled on an individual subscription basis.

Based on waste composition studies conducted at the landfill, the county estimated that the recovery rate was 93% for corrugated containers (OCC) from commercial generators and 78% for commercial-source newspaper (ONP). Both these rates were higher than for residential OCC (62%) and ONP (67%). Although data are not available for the period before the MROs and DBs, most sources believe recovery increased.

### Government

The county recycling manager believes that commercial recycling is widespread in the county. Although the MROs and DBs have been a factor, the manager credits program achievements to extensive outreach and education programs undertaken by the county and local jurisdictions. Additionally, the economic benefits of fiber recycling have led many commercial generators to recycle.

The recycling manager is in regular contact with the local processors that handle commercial recycled fiber. He has not heard of any difficulties regarding fiber quality that might be attributed to the MRO/DBs. Nor has he been aware of any problems encountered by the processors regarding the marketability of commercial paper grades from the county.

### Collectors

A small number of private collection companies dominate the local commercial market in Dane County – Recycle America, Peltz Group, Pellitteri, and Green Valley Disposal. Recycle America and Peltz provide both collection and processing services. These two companies recently merged nationwide. Commercial collection services offered in Dane County include recycling roll carts, recycling boxes, baled fiber pickup, and a buy-back program. Together, the two companies handle more than 70% of commercial tonnage – actual quantities are considered proprietary information.

The DBs did increase the amount of commercial fiber recycled, although not as much as in the residential sector. Many commercial generators, especially large ones, were already recycling fiber before the DBs due to economic factors. Because OCC and office

paper represent a large fraction of their waste, many commercial customers could reduce solid waste costs by implementing recycling.

After the DBs were implemented, contamination increased somewhat, attributable to complex market-based factors and not to the DBs alone. The DBs encouraged traditional waste collectors to offer recycling services, increasing competition. In an effort to control costs, collection services such as single-stream, commingling, and “anything that tears” programs were offered. These methods increase convenience and reduce collection costs, but they also tend to increase contamination.

### Processors

The two major processors of commercial fiber in Dane County are Recycle America and Madison Recycling Center (Peltz Group). The two facilities receive commercial fiber primarily from their own collection services, but also from other private haulers and drop-off customers.

Some increase in contamination was encountered after the DBs were implemented; however, this appears to be due to market-based factors and not the DBs per se (see preceding discussion). One interesting problem encountered was “sharps” found in the recycled fiber from small health care facilities and clinics. Targeted education and outreach might have been effective in preventing this problem from occurring.

Overall, contamination problems were minor. The processors have had no problems in meeting specifications for the paper grades they produce. The Peltz Group produces nearly 20 different grades of recycled paper. OCC, ONP, and CGS (coated groundwood sections) are the primary commercial bulk grades, plus numerous specialty grades.

Companies whose core business is waste handling and not recycling have been the primary source of problems with recycled paper quality and contamination in Dane County. This appears to be caused by their inexperience and a different business focus.

The market prices of recovered paper apparently have not been affected by the MRO and DBs. Initially, regional mill buyers tried to take advantage of the anticipated increase in tonnage, offering prices below the broader market; however, the strategy was not successful because processors have access to end users outside the regional supply basin.

### End users

Commercial fiber from Dane County is marketed to a wide array of end users. Significant domestic consumers of OCC include Smurfit and Weyerhaeuser. Various recycled tissue and free-sheet mills throughout the Midwest consume the office grades. There is also a fair amount of export to Canada and Mexico, and even overseas.

End users contacted were not able to determine the quantities of fiber consumed from Dane County. Mill buyers and procurement departments typically buy from a wide array of packers and brokers that are each active in multiple areas; therefore, it is difficult to determine quantities from a given jurisdiction.

End users were not aware of any specific quality problems associated with materials from Dane County.

## **Durham, North Carolina**

### Overview

Durham has implemented both a MRO and DB for residential and commercial generators. The DB, adopted in 1997, includes corrugated containers and newspaper. The ban was implemented on a voluntary basis for two years beginning with 1998. Enforcement was delayed several times to allow the city more time to provide education and technical assistance to residents and businesses. The city began enforcement in 2000.

The city contracts with a private company to operate the transfer station and haul MSW to the landfill. Commercial haulers that deliver recyclables mixed with solid waste are charged double the regular tipping fee.

The city has a recycling collection service contract for residents and some commercial establishments. Private companies provide most of the commercial waste collection service on an individual subscription basis.

The city does not monitor commercial recycling tonnage; however, estimates made by the regional Recycling Business Assistance Center (RBAC) indicate that overall recycling tonnage increased 25% after the DB was adopted in 1997 and that there was a comparable increase in business recycling. Neither the city nor the RBAC could judge whether there has been any increase in commercial fiber tonnage since 2000 when enforcement began.

### Government

The city conducts recycling outreach and technical assistance for businesses, including a recycling awards program designed to promote commercial recycling; however, enforcement is limited in the commercial sector because the city lacks the needed staff.

The RBAC office has not heard reports of any problems with recycled fiber quality associated with the DB, nor have local processors indicated any problems handling the increased tonnage of recycled commercial fiber. In fact, it appears that some processors are considering expanding their operations due to the steady and increased supply.

### Collectors

Major recycling collection companies in Durham include Tidewater Fibers, Orange Recycling Services, and Paper Stock Dealers. Tidewater serves mostly residential customers, while the other two serve commercial customers. Commercial fiber collection services include recycling roll carts, recycling boxes, and baled pickup from large OCC generators. Orange Recycling also offers secure document destruction. The vast majority of commercial recycling service uses eight-cubic-yard boxes for OCC and/or mixed paper.

Collectors corroborate that OCC recycling increased because of the DB, but quantitative data are not available. Commercial collectors were unable to comment on changes in recovery of other commercial fiber, such as mixed paper or commercially generated newspaper.

The DB has not adversely affected commercial fiber quality. Collectors have implemented various strategies to control contamination. The key to success is for the hauler to work directly with commercial generators to make sure they are trained properly and that they receive ongoing feedback and training. Recycling boxes with locked lids and slotted openings are effective in preventing contamination. Boxes made partly from expanded steel allow collection crews to see inside to check for contamination before collection. Ongoing customer education and training are also essential to good separation.

One company involved in both collection and processing indicated that expanding the ban to include office paper would improve the economic benefits for many commercial generators, as well as increase Durham's diversion rate. The company representative stated that bans focusing on fiber tend to be easier to implement than those for other materials, because the fiber collection infrastructure is relatively easy to develop/expand.

### Processors

The major processors of commercial fiber in Durham are the same companies that dominate recycling collection services – Paper Stock Dealers, Orange Recycling, and Tidewater. In general, these facilities handle recycled fiber from their own collection services plus fiber from smaller hauling companies. Paper Stock Dealers is the supply arm of Sonoco Products and also brokers OCC handled by other processors in the area.

Commercial fiber processors have encountered some contamination issues since the DB was implemented; however, they have not threatened the viability of OCC and commercial fiber recycling. The processors are still able to produce OCC and other commercial paper grades that meet the most stringent mill specifications.

OCC from food service establishments has been most prone to contamination, e.g., food waste, non-recyclable waxed corrugated boxes, and mixed waste. Food services typically face challenges caused by staff turnover, low educational levels, and language barriers. In addition, OCC recycling containers from C&D sites are prone to contamination. The companies have addressed problems with training and education.

Durham's DBs have not affected the marketability or price for OCC and commercial paper grades. According to one processor, Durham does not stand out in relation to other jurisdictions where the company works. The broader market, not local supply, controls the price and movement of OCC and other commercial paper grades.

Problems with Durham's ONP reported by the major end user have been associated with the processor of residential recyclables – not the major commercial paper processors. The limited amount of newspaper recovered in commercial mixed paper is generally packed in mixed paper grades that are not consumed by the ONP end user.

#### End users

Commercial fiber from Durham is marketed to domestic mills or exported. Sonoco Products and Weyerhaeuser are major domestic consumers of OCC and commercial mixed paper recycled in Durham. The mills typically received trailer-load quantities of baled fiber. Durham provides only a small fraction of the OCC that the mills consume.

One end user experienced problems with contamination (food waste and waxed cardboard in OCC) after the ban was implemented; however, these problems were overcome. There have been some price deductions for OCC produced by suppliers in Durham that do not have adequate quality control and customer education programs in place. Otherwise, there have been no changes in the price of Durham's OCC and commercial mixed paper relative to the broader market.

The major ONP end user in the region (SP Newsprint) stated that it has been unable to use *residential* ONP from Durham; however, the company representative stated that this problem is caused by the single-stream collection and processing method of the residential collector/processor, and not the DB. SP's concerns with Durham's ONP include how it is collected and processed, and the level of contaminants present in single-stream ONP. Their ban-specific concerns were that: 1) the collector/processor was placed in charge of enforcing the ban; and 2) the ban did not exempt contaminated ONP.

The SP spokesperson also expressed a philosophical concern about the impact of DBs on the marketplace. Specifically, the company representative stated that DBs could affect the kind of packaging that companies choose for their products. By putting disposal restrictions on some packaging materials and not others, public policy may put certain types of packaging at a competitive disadvantage. This respondent cited no actual incidents of package-switching, e.g., from Gaylords to pallet wrap.

SP's representative noted an important difference between its mills in Dublin, Georgia and Newberg, Oregon. The Dublin mill produces 100% recycled-content newsprint using a washing deinking process only; therefore, it must consume a much cleaner and higher quality "true" No. 8 ONP, i.e., with a very low percentage of coated groundwood. The Dublin mill consumes a large amount of pre-consumer over-issue ONP to dilute contamination. The Newberg mill is 50% recycle and has a washing and flotation deinking system; therefore, it is able to consume lower quality ONP without as much impact on the finished sheet compared to Dublin. In fact, the Newberg mill consumes a percentage of ONP processed from single-stream loads at SP's Clackamas facility.

Southeast Paper has a general policy opposing DBs for recyclable fibers that are already close to theoretical maximum recovery rates, such as ONP and OCC. According to a company official, the material that remains in the waste stream tends to be low quality, contaminated or dispersed to such a degree that recovery of acceptable quality fiber is not feasible. The company believes that bans may be more appropriate, if at all, for recyclables with low recovery rates.

Another end user expressed a similar concern that DBs increase the tonnage recycled, and that with any increase in tonnage, there is a tendency for greater contamination. From the mills' perspective, any degradation in recycled fiber quality increases their converting cost and/or reduces their product quality. Ultimately, the recycle mills must be able to compete against virgin mills on both quality and price.

## **Onondaga County, New York**

### Overview

Onondaga County has had a MRO since the early 1990s that applies to all generators of MSW. The mandate requires households and businesses to recycle corrugated cardboard and paper, as well as other recyclables, if the quantity generated economically justifies separate collection. Waste audits are conducted at businesses to determine which materials they will be required to recycle. The Onondaga County Resource Recovery Authority (OCRRA), which coordinates the county solid waste program, has documented that more than 95% of all households and more than 90% of the estimated 15,000 businesses participate in the program.

OCRRA provides transfer, recycling and disposal facilities and has contracts with two private MRFs, which handle the majority of recycled commercial fiber. Local jurisdictions are responsible for residential collection. Most commercial waste services are provided on an individual contract basis.

OCRRA is the responsible reporting unit for recycling data and prepares annual recycling estimates. Commercial fiber recovery for 2002 was approximately 110,000 tons – the majority of which was OCC. Because the MRO has been in place for more than a decade, no meaningful before/after comparison can be made; however, OCRRA

estimates its overall recycling/waste diversion rate is 70%. A 1999 generator survey found that 82 percent of all businesses reported recycling four or more materials, an increase from 55 percent in 1996. The recovery rate in the commercial sector went from 46 percent in 1996 to 54 percent in 2000.

### Government

OCRRA staff believes that the MRO definitely has contributed to high commercial recycling rates; however, the most important element has been the County's education and outreach program. Keys to success have been: 1) two full-time enforcement officers at the incinerator to spot loads with large amounts of recyclables; and 2) constant and ongoing outreach to commercial generators provided by business recycling specialists (two full-time employee equivalents). The inspectors also spend time in the field doing spot checks at commercial generators' waste bins.

The enforcement officers spend most of their time at the OCRRA waste-to-energy plant inspecting incoming loads of waste. They first issue warnings that can escalate to fines for repeated violations if a hauler continues to bring in unacceptable levels of banned recyclables in the waste. It is the responsibility of the hauler to determine the source of contamination and enforce proper source separation at the point of generation. The inspectors and business recycling specialists can offer education and assistance to generators not complying with the ban.

OCRRA staff is not aware of any negative impact on commercial paper grades (OCC and office paper) quality or marketability that can be attributed to the MRO. Countywide outreach has helped ensure quality and quantity.

### Collectors

The major recycling collection service providers in the county are Recycle America (Waste Management) and Feher Rubbish Removal. These companies provide a full spectrum of commercial fiber collection options, including recycling roll carts, recycling boxes, compactors, and bale collection. Together they handle more than 1,000 tons per month of commercial fiber.

One company believes that the MRO has helped to increase fiber recycling, although the county outreach and education have been instrumental, as well. The other company stated that increased commercial recycling probably is due more to the desire to avoid high disposal costs than to the MRO.

Although the collectors were not able to provide any quantitative comparisons, they say they are not experiencing fiber quality problems. Contamination is present, but it does not threaten their recycling services' viability. OCRRA's broad-based outreach program has helped maintain public awareness and commitment. The biggest challenge the

collectors identified concerns turnover in the generators' staffs. Ongoing education and regular communication with customers is essential.

The collectors have not experienced any problem finding processors that are able to take their commercial fiber. One company representative did stress that proper planning is needed to make sure there are processing facilities ready to handle increased volumes of recyclables.

### Processors

The major handlers of commercial fiber in Onondaga County are Recycle America and Naef Recycling. Recycle America's MRF recently was converted to single-stream. Naef's facility is a two-stream operation (mixed fibers, mixed containers). Both facilities handle a mix of residential and commercial tonnage. OCC accounts for the majority of commercial fiber handled by the facilities. The Recycle America MRF has a 50-50 mix of commercial and residential tonnage. The commercial recycling is predominantly OCC with less than 10% being office paper. Naef Recycling's commercial fiber is essentially all OCC. Other private packers handle office paper and specialty grades outside of the OCRRA system.

The two MRFs have different perspectives with regard to contamination. One has found that the commercial fiber is relatively clean, with no more contamination than would be seen in other recycling programs. This MRF is part of a company that offers both collection and processing services in the region. The majority of incoming recycled commercial fiber comes from its own collection routes. Therefore, it can exercise greater control over quality at the point of generation.

The other facility complained about contaminated OCC. Some incoming loads are too contaminated to recycle, but have too much OCC to get past OCRRA inspectors at the waste-to-energy facility. This MRF receives much of its tonnage from small, independent haulers. It has no direct control over the collection services, except the ability to reject or discount loads that are contaminated. The company official attributes the problems to a breakdown in OCRRA's public education program. The following concerns were identified: OCRRA business recycling specialists are unable to address all the needs for education and technical assistance, and small haulers need additional help and resources to properly separate commercial recycled fiber.

Both facilities have the same opinion regarding quality and marketability of the paper grades they produce. Both are readily able to meet end-user specifications and have no problems finding markets. Onondaga County is home to a large Solvay Paperboard mill that consumes OCC and mixed paper. Both MRFs send their OCC and a portion of their mixed paper to Solvay.

End users

Solvay Paperboard consumes approximately 5,000 tons per month of fiber from Onondaga County, primarily OCC and mixed paper. Solvay purchases from four separate MRFs/paper packers plus a significant percentage that is “mill direct” from large industrial generators (e.g., seconds, trim). Solvay is aware of some problems encountered by the processors rejecting highly contaminated loads. Ultimately, the fiber they sell to Solvay is all good quality fiber.

The local supply of OCC and mixed paper from Onondaga County does not affect Solvay’s price structure, which is determined by large regional market factors. The company maintains a uniform price structure in their supply basin to prevent inequities and maintain relationships with all its suppliers. Solvay’s decision to site paper machines in Onondaga County was not influenced by the local recycling infrastructure, but was based on optimizing transportation logistics for in-bound tonnage and out-bound product.

**Greater Vancouver Regional District, British Columbia**Overview

The Greater Vancouver Regional District (GVRD) implemented DBs in recent years that apply to both residential and commercial waste, including:

- OCC in 1997.
- Office paper in 1998.
- Newspaper in 1999.

The district has concentrated its efforts on outreach and technical assistance and has not begun to actively enforce the bans.

GVRD controls transfer and disposal facilities, while local jurisdictions oversee residential collection. Private haulers and processors provide commercial recycling services. Most residential recyclables go to private MRFs.

Although the district collects data on commercial recycling activity, GVRD does not consider the data either accurate or comparable pre- and post-DB. There has been a potential for double-counting commercial tonnage due to the complexity of the commercial recycling sector. A recent change in research methodology by GVRD has tried to eliminate double counting, which may account for the reported drop in recycling tonnage. For example, OCC recycling dropped from 121,500 tpy in 1996 (pre-ban) to 81,900 tpy in 2001 (post-ban). As the following table shows, commercial mixed paper recycling dropped from 78,300 tpy in 1997 to 70,500 tpy in 2001.

*Commercial Sector Recycling in GVRD – 1996 to 2001*

	1996	1997	1998	1999	2000	2001
ONP	40,164	35,398	32,181	20,995	40,297	26,762
OCC	121,512	118,648	124,321	106,053	104,389	81,866
Mixed Paper	68,269	78,344	92,685	96,362	117,763	70,456

GVRD staff stated that a more accurate way to assess the change in fiber recovery is to measure per capita fiber disposal (similar to the method used in Dane County to assess recovery based on composition of waste at the landfill). When measured this way, GVRD noted the following decrease in per capita fiber disposal:

- 1993: 207 kg/capita/year
- 1998: 169 kg/capita/year
- 2000: 124 kg/capita/year

Government

The district has a well-developed outreach and education program aimed at the commercial sector. The DBs and recycling efforts are integrated into a comprehensive sustainable business initiative to addresses energy, environment and solid waste.

The district staff has heard no expression of concern or problems with contamination or marketing commercial fiber since the DBs were adopted.

Collectors

Commercial recycling companies in the GVRD provide both collection and processing services. The major service providers are Metro Waste, Belkin Paper Stock, and Canadian Waste. Commercial fiber is collected by a variety of methods: roll carts, boxes, compacting roll-offs, etc. Metro Waste (through a predecessor company) and Belkin Paper Stock were major collectors and processors of commercial fiber long before the DBs were adopted.

According to the collector/processors, the DBs definitely have increased the amount of commercial fiber recycled. DBs created a steady base flow of tonnage regardless of market prices. In the past, tonnage tended to fluctuate more in response to market prices and demand.

There has been a limited increase in contamination since the DBs were adopted. Small generators new to recycling tend to be the major sources of contamination. The collectors address this challenge through customer training and careful monitoring on collection routes. The best operational strategies for controlling contamination are locking bins and slotted openings. One company official stated that an important

business strategy for maintaining a sustainable recycling collection operation is to establish fair collection rates and revenue sharing.

### Processors

Metro Waste operates three packing plants, while Belkin and Canadian Waste each have one plant in the GVRD. They receive commercial fiber from their own collection trucks as well as from small independent collectors and scavengers.

Processors make a variety of paper grades from commercial fiber collected in the GVRD. The primary grades are OCC, mixed office paper, coated book stock, and mixed paper. There are many specialty grades produced from the many printers located in the area.

One processor noted that the DBs appear to have improved the commercial fiber market by establishing a more consistent supply, which has led to more stable prices because local price pressure is not needed to “turn on and turn off” supply. Collectors and processors have now established regular fee structures across the board for recycling as a result of the DB, according to one collector/processor.

Although on a theoretical level less elastic supply should have a negative effect on price, processors have not observed an impact on price, because broader regional and international demand is more than adequate to absorb supply. Indeed, prices for recovered paper grades are determined primarily by the broader market and local supply/demand factors.

The DBs have led to some increase in contamination, but the problems have not affected marketing or prices. One processor explained that, in response to the DBs, certain small, local waste haulers offered to recover recyclables through mixed waste processing (dirty MRF sorting). This was the least costly way for them to offer recycling service. When these services ran into financial problems during poor paper markets, the haulers switched over to source separating fiber and containers and bringing the fiber to well-established paper packers; however, the quality of fiber from these waste haulers is still poor due to their limited recycling knowledge and dedication to customer education. Nevertheless, the processor who identified this issue stated that the contamination problems are minor and handled through standard procedures, e.g., load rejection, load discounts, and sorting to meet mill specifications.

GVRD’s experience leads to the conclusion that DBs need to be accompanied by technical assistance and outreach aimed not just at the generators, but also at the small haulers that are entering the recycling business for the first time.

One processor noted that OCC quality has declined somewhat, but stated that it is a market-based issue not wholly attributable to the DBs. Regardless of the DBs, collectors are striving to increase convenience and reduce collection cost. Consequently, they offer collection strategies like single-stream recycling and “anything that tears” paper

recycling. This demonstrates that overarching trends in the recycling industry, like single-stream recycling, need to be considered at the local level and dealt with in the policy and programs implemented to support a DB or MRO.

#### End users

Major end users of recycled paper from the Vancouver area include Norampac , Newstech and overseas mills. Norampac consumes approximately 500 tons per day of OCC and mixed paper, most of which comes from packers in the Vancouver area. Newstech consumes primarily ONP from residential programs.

The mills have not experienced any problems with recovered paper quality. Quality issues are addressed at the processors, which must meet specifications to secure markets. Likewise, there is not much impact on prices that mills pay for recovered paper, because this price is determined by larger market dynamics and not local concerns.

### **San Diego County/Chula Vista, California**

#### Overview

San Diego County adopted a DB in 1991 that included OCC and office paper. At the same time, the county and cities adopted MROs. In 1997, the county was forced to sell its transfer and disposal facilities, due to its legal inability to control flow to them and the resulting revenue shortfall. The DB thus became obsolete because the ban was applicable only to County-controlled transfer and disposal facilities.

In the unincorporated areas, the county oversees solid waste management. Commercial waste collection services (including recycling collection and processing) are provided by 29 companies under a non-exclusive franchise system. The MRO applies to commercial generators only if the building area is greater than 20,000 square feet.

Chula Vista is the second largest city in the county (City of San Diego is the largest). The City of Chula Vista has a single exclusive franchise for commercial waste services; however, if a commercial generator can market its recyclables for a net positive value, it is not required to use the franchised hauler.

#### Government

The county currently lacks the staff to implement the MRO effectively – the MRO had relied on the DB as the enforcement provision. The county is currently gearing up to enforce the MRO through spot-checking for source-separation at the point of generation.

No quantitative data exist on commercial fiber recycling tonnage. Private haulers are recycling fiber where it makes economic sense and is competitive within the non-exclusive franchise structure. The county recycling specialist is confident, however, that the MRO has had a positive impact on commercial fiber recycling tonnage and quality, because the MRO gives the county the authority to require source separation and provide technical assistance. There have been no reports to the county concerning problems with quality or marketability of recycled commercial fiber.

The city does not have records of commercial recycling tonnage. Records are limited to those provided by the franchised hauler and do not include large amounts of commercial recyclables, which are marketed directly by the generator; therefore, the city's records are not an accurate reflection of the recycling rate. The city's special operations manager estimates that less than 50% of the recycled commercial fiber is handled by the franchised hauler.

According to the city official, one key to making an MRO work is enforcement combined with education. The commercial program does not "take off" by itself – the specialists' outreach is crucial. The city has two specialists whose job is to enforce commercial recycling and provide outreach and technical assistance. They perform periodic checks on commercial waste loads at the point of generation and work directly with businesses to implement and improve recycling programs. If repeated violations are encountered, the case is handed over to the city's code enforcement office and fines imposed.

Another aspect of city policy provides a strong incentive to recycle. In March 2002, the city switched to a volume-based rate structure. The rate structure is set up so that the small waste container and recycling services are subsidized by charges for larger waste container service, which creates a strong economic incentive to recycle.

### Collectors

The city's franchised collector (Pacific Waste Services) provides recycling services to small- and medium-sized enterprises. Large commercial generators typically recycle fiber directly outside of the franchise system. The collection company provides both recycling roll cart and box services, collecting approximately 10 to 12 tons per day of fiber. All recycled fiber collected by Pacific Waste is taken to the EDCO Waste & Recycling MRF.

According to Pacific Waste Services, the MRO has had a positive impact on commercial fiber tonnage, but the city's recycling service price structure provides the greatest incentive. Businesses can receive weekly pick-up of OCC and mixed paper in an eight-cubic-yard box for \$25 per month. Another strong economic incentive to recycle has been a dramatic increase in waste tip fees, which was exacerbated in 1997 when the county lost control of its transfer and disposal facilities.

Contamination cannot be attributed to the MRO per se. For many small- and medium-sized generators, the person who takes out the recyclables and trash is poorly educated and not well trained. The company addresses fiber contamination in various ways, including ongoing education, multi-lingual signs, locked recycling containers with slotted openings, and color-coded containers. In addition, collection crews get to know which customers tend to have contamination problems, and they regularly spot check containers and notify the customer of problems.

Both the city and Pacific Waste stated that finding space for recycling containers is a problem, especially for small generators and multi-tenant buildings. Many strip malls were designed with only one waste enclosure and limited storage space. The city and collector need to work one-on-one to find solutions in many cases.

### Processors

Two major paper processors in San Diego County are Allan Company and EDCO Recycling. Allan Company operates three recycling facilities in the county and is a major recovered paper broker in Southern California. EDCO handles recyclables from many of the communities in San Diego County, including Chula Vista. The company also handles a large portion of the fiber collected directly from large commercial generators. The processors produce a variety of paper grades from commercial fiber, including OCC, ONP, SOP (sorted office paper), Mixed Paper, and various other pre- and post-consumer office grades.

One processor offered the general observation that the higher the diversion rate, the greater the level of contamination, regardless of how that diversion rate is achieved. Nevertheless, contamination problems have been minor and both companies have no problem meeting end-user specifications for the paper grades they produce. Contamination tends to come from small generators and from establishments that are being forced to recycle without adequate technical assistance. One processor expressed concern over the public sector's involvement in commercial recycling. The company considers recycled commercial fiber as a commodity that some jurisdictions are placing under franchise control by extending recycling collection and processing franchises to include commercial generators.

The processors have had no problems handling the quantity of recycled fiber and marketing the paper grades produced. One processor observed that MROs and DBs have increased the quantity of Mixed Paper more than other grades, because mixed office paper collection becomes the standard practice for small- and medium-sized businesses, which account for much of the new recycling tonnage.

The price and marketability of all these recycled paper grades have not been affected by the MROs. There have been no problems with "flooding the market." Price and demand are driven by broader market dynamics. The quality of recovered paper from the area is able to compete in that market.

End users

Recovered paper from San Diego County is consumed by mills in the U.S., Mexico, Canada and overseas. Primarily, domestic and Mexican mills consume OCC. ONP goes to domestic, Canadian and overseas mills. Domestic tissue mills generally consume office grades. Mixed Paper is mostly shipped to overseas consumers.

There has been no noticeable change in recovered paper quality during implementation of MROs in the county. Nor has price been affected. There are many potential end users, both domestic and international, that compete for supply.

One end user expressed a broad concern about the future supply of fiber. The push in California to meet the state-mandated 50% recycling goal has pressed jurisdictions and waste haulers to use dirty MRFs. End users are concerned about this trend. If the future is more dirty MRFs, fiber recovery may actually decrease, because of the dirty MRFs' inability to achieve high recovery rates, and the quality of the fiber recovered may be poor.

## SUMMARY

The table following the text below summarizes key information regarding the five jurisdictions surveyed for this report. Regarding the key concerns of quantity, quality and price related to MROs and DBs, the survey made these findings:

### **Impact on Fiber Quantity**

*Mandatory recycling ordinances (MROs) and disposal bans (DBs) increase the quantity of commercial recovered fiber.* Although there is a strong consensus among governments, collectors and processors in this survey that MROs and DBs increased commercial fiber recovery, only a couple of the target jurisdiction can provide reliable quantitative data to support this assertion.

Collecting data on commercial recycling activities is very difficult for many reasons (including confidentiality, absence of reporting requirements for commercial recycling, lack of waste reporting from large generators that market directly to end users, and potential double-counting when collectors and processors handle tonnage from outside the jurisdiction). MROs and DBs create a steady “base flow” of recycled fiber that does not fluctuate as much as it would otherwise, due to market prices. The “base flow” encourages investment, expansion and competition.

### **Impact on Fiber Quality**

*MROs and DBs have limited impact on commercial fiber quality.* Contamination does increase somewhat, but these problems have not threatened viability of the recycling programs. Contamination problems are encountered from certain types of generators (small businesses, food services and multi-tenant commercial properties) and commercial haulers (small, local waste haulers entering the recycling business for the first time in response to the MRO or DB).

Many strategies have been implemented to ensure quality from these as well as other sources of commercial fiber. Generator problems have been addressed with ongoing communication and education of employees; inspection of “problem” customers’ recycling containers before collection; and collection container designs that limit potential for contamination (e.g., color-coding, extensive signage, locks, and restricted openings). Processors have addressed contamination problems with inspection of incoming loads and standard financial strategies such as special processing charges, disposal charges and load rejection. No mill cited ongoing quality problems due to commercial DBs.

Processors and mills do express concern about quality problems related to other recycling industry trends that have emerged unrelated to MROs and DBs, such as single-stream collection, dirty MRFs and inexperienced collectors. Also, smaller generators and multi-

tenant dwellings and office buildings may present new quality challenges for collectors and local governments.

### **Impact on Recycled Paper Price**

*MROs and DBs do not affect the price for commercial recovered paper.* Although the argument may be made that inelastic supply and/or high contamination levels can lead to lower prices, in reality the end-market recyclers (mills and processors) have not experienced any such impact. Processors are able to meet mill specifications. Recycled paper grades are nationally and internationally traded commodities, therefore local supply and demand did not impact price in the jurisdictions we studied.

*Summary Matrix of Jurisdictions Commercial Fiber Recycling Programs*

	<i>Dane County, WI</i>	<i>Durham, NC</i>	<i>Onondaga County, NY</i>	<i>Greater Vancouver Regional District, BC</i>	<i>Chula Vista, CA</i>
Disposal ban/ Mandatory recycling ordinance?	MRO and DBs	MRO and DBs	MRO	DBs	MRO (County DB not enforceable)
Fiber materials & dates:	ONP DB (1987) OCC DB (1991) Magazine & Office Paper DB (1995)	OCC and ONP DB (1997)	OCC, ONP, Mixed Paper, Office Paper, magazines, and paperboard (1990)	OCC (1997) Office Paper (1998) ONP (1999)	OCC (1991) Office Paper (1991)
Method of enforcement:	Limited inspection at landfill.	Transfer station inspection.	Inspection at waste-to-energy facility.	Limited inspection at transfer stations and landfills.	Periodic checks of commercial waste at transfer station & point of generation.
Commercial recycling collection responsibility:	Individual subscription – open market.	Individual subscription – open market.	Individual subscription – open market.	Individual subscription – open market.	Single franchised hauler.
Commercial recycling processing responsibility:	Open market – multiple facilities.	Open market – multiple facilities.	Open market – multiple facilities.	Open market – multiple facilities.	Single franchised processor.
Single-stream used to handle commercial fiber?	No.	No. (Residential – yes.)	Yes.	No.	No.
Reported commercial fiber quality concerns:	- Minor problems with small waste haulers. - No impact on marketability.	- Problems primarily from food service & C&D sites. - No impact on marketability.	- Minor problems from small, local haulers. - No impact on marketability.	- Minor increases in contamination from small, local haulers. - No impact on marketability.	- Minor problems encountered primarily from small generators. - Able to meet specs.
Other key factors affecting commercial fiber recycling:	- Promotion & education. - Lower total waste management costs. - Well-established recycling infrastructure.	- Avoided disposal cost. - Strong regional demand for OCC.	- Education & outreach program. - Enforcement. - Avoid disposal cost.	- Comprehensive education & outreach program. - Lower total waste management costs. - Well-established recycling infrastructure.	- Commercial volume-based fees subsidize recycling service. - Rapid increases in disposal rates during 1990s. - Large generators that can market recyclables directly exempt from using franchises.

## Strategies and Factors that Impact Quantity, Quality, and Price

### Government

- Program outreach – education, technical assistance and promotion – is essential to increasing tonnage and controlling quality.
- Outreach efforts need to include broad-based activities for the entire commercial sector, as well as sector-specific programs aimed at large-volume sources (e.g., packing and shipping, office buildings, etc.) and “problem” sources (e.g., food service and multi-tenant).
- Recycling collection costs and logistical problems for small generators tend to be prohibitive. Moreover, it is difficult for small generators to achieve savings from reduced trash service to offset their recycling costs. The jurisdiction should work to identify viable strategies such as shared bins, commercial rates that include the cost of recycling services, distributing and sharing costs among larger and smaller generators, drop-off sites, etc. that help reduce the economic burden for small- and medium-sized enterprises.
- Enforcement is essential. It must be integrated with outreach activities and not simply punitive.
- Volume-based fees, if the jurisdiction can implement them, create a very strong economic incentive to recycle, regardless of whether there is an MRO or DB.
- Disposal bans only work if the jurisdiction controls the transfer and disposal sites. San Diego County’s DB is irrelevant, because it lost control of county facilities. Similarly, in areas where private transfer stations and disposal facilities are able to handle commercial waste independently, DBs may not be enforceable.

### Collectors

- Ongoing customer education and monitoring are essential. Generator staff that handles waste is prone to turnover, limited education, and language barriers, so proper separation must be reinforced continually.
- Multi-tenant locations and small generators (e.g., strip malls, small office buildings) have limited space and need individual technical assistance to establish the proper space for placing paper recycling bins.
- Small generators, food service establishments and multi-tenant buildings tend to be the primary potential sources of contamination. Specific efforts must be made to monitor and continually educate these customers.

- Collectors advocate the following techniques to control contamination: locked recycling bins, slotted openings to exclude trash from recycling bins, color-coded containers, prominent and multi-lingual signs, regular inspection of recycling containers, and direct feedback by collection crews.
- Companies that have historically specialized in commercial recycling face greater competition from single-stream, “anything that tears”, and dirty MRF services. These services tend to reduce overall fiber quality in exchange for convenience and price; however, these fully mixed strategies likely are due to evolution of the recycling industry, and not MROs and DBs per se.
- MROs and DBs increase the “demand” for recycling services and thus tend to increase competition among collection service providers. Traditional waste collection companies have more incentive to offer recycling services and compete against established commercial fiber recycling companies.

#### Processors

- MROs and DBs have motivated some private processors to expand their business. “Old-line” paper packers, however, have continued to rely on their traditional customer base, such as printers, large OCC generators, large office complexes, etc.
- Processors have experienced some increase in contamination after implementation of MROs and DBs, but not beyond what they can handle. Processors continue to be able to readily meet market specifications for the paper grades they produce.
- Processors in all the jurisdictions studied are able to access a variety of markets that allow them to move increased tonnage and changes in the types of paper grades they produce.
- Processors reject or discount loads that have contamination greater than what they can handle. They try to put the burden back on the collector to work with generators.
- MROs and DBs encourage some companies whose core business is commercial waste management to get into recycling and processing. Established paper packers can face increased competition from these new entrants that do not possess the same level of dedication to recycling, product quality and customer service. The new entrants may compete for customers by offering mixed waste processing. Although this concern was expressed by one processor, no evidence was found that the long-term stability of the region’s commercial recycling infrastructure was affected.

- One processor/broker expressed concern regarding public sector engagement in the commercial recycling “marketplace.” By trying to encourage and control commercial fiber recycling through MROs and DBs (as well as franchises that extend to the commercial sector), a jurisdiction can step over into the private recyclers’ traditional domain and affect their business for better or worse.

#### End users

- End users are generally “insulated” from local program issues. They draw supply from many sources, and local processors must deal with problem loads. Those contacted could not identify specific quality problems due to the MROs and/or DBs implemented by the five jurisdictions in this study.
- End users expressed a general concern that, as recovery rates increase, there is bound to be some increase in contamination, especially for fiber grades that are approaching theoretical maximum recovery levels, such as ONP and OCC. What fiber remains in the waste stream tends to be highly contaminated, widely dispersed and not economically recoverable. DBs and MROs that force diversion of such fiber will increase contamination, unless there are provisions to allow for disposal of unacceptable quality fiber.
- One end user expressed a broad concern of the paper industry, opposing DBs in general, because DBs might impact the kind of packaging that companies choose for their products. By putting disposal restrictions on some packaging materials and not on others, public policy may put certain types of packaging at a competitive disadvantage.
- Of particular concern to some end users is the movement toward single-stream commercial recycling and the impact it will have on recycled fiber quality. There is also concern that increased reliance on dirty MRFs may actually reduce commercial fiber recovery; however, these concerns are not directly linked to MROs and DBs.

**APPENDIX**

**Interview Questions**

Government personnel:

- Records on quantity of commercial recovered fiber before and after mandate/ban.
- List of permitted and/or franchised collection service providers.
- Markets to which paper is sold.
- Observations regarding any change in quality of paper grades before and after
- Mandate/ban.
- Observations regarding marketability of jurisdiction's commercial fiber.

Collection service providers:

- Method(s) of collection.
- Quantity of commercial recovered fiber handled from jurisdiction.
- Changes in quantity of recovered fiber after mandate/ban.
- Location to where recovered fiber is delivered.
- Observations regarding any change in quality of paper grades after mandate/ban.

Paper packers and MRFs:

- Quantity of material handled from jurisdiction.
- Method(s) of delivery, handling, and processing.
- Contamination issues encountered before and after mandate/ban.
- Paper grades produced from jurisdiction's commercial fiber.
- Observations regarding any change in quality of paper grades after mandate/ban.
- Markets to which paper is sold.
- Observations regarding marketability of jurisdiction's commercial fiber.
- Observations regarding any change in price of jurisdiction's paper grades relative to the broader market.

Brokers and end users:

- Quantity of commercial paper grades handled from jurisdiction.
- Method(s) of transportation and delivery.
- Observations regarding any change in quality of paper grades before and after mandate/ban.
- Observations regarding any change in price of jurisdiction's paper grades relative to the broader market.

**Survey Results**

The results of Moore & Associates research are compiled in an Access database that has been transmitted electronically to Metro.