

Availability, Performance, and Cost of Recycled Paper

A study by
the Division of
Pollution Prevention
and Environmental
Assistance



Published by the North Carolina Division of Pollution Prevention and Environmental Assistance:

The North Carolina Division of Pollution Prevention and Environmental Assistance (DPPEA) provides free, non-regulatory technical assistance and training on methods to eliminate, reduce, or recycle wastes before they become pollutants or require disposal. DPPEA addresses solid and hazardous waste and air and water pollution for government agencies, industries, businesses, residences, and institutions.

Acknowledgments:

The North Carolina Division of Pollution Prevention and Environmental Assistance expresses its appreciation to those who participated in this study.

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I. INTRODUCTION

The familiar recycling symbol of three chasing arrows represents the three stages of recycling: 1) collection and processing, 2) manufacturing, and 3) buying recycled products. All three activities must be completed in order to “close the recycling loop.” This report examines aspects of the third step in the process: buying recycled, specifically, recycled paper.

As of January 1, 1999, Federal Executive Order 13101 requires federal agencies to purchase copy paper and letterhead paper with at least 30% post-consumer content (PCC). According to the Office of Federal Environmental Executive, the 30% PCC level will result in a 13 percent reduction in the amount of solid waste requiring disposal.¹ Using recycled paper with post-consumer content is critical to increase the demand for recycled paper which, in theory, over time will increase supply, decrease manufacturing costs, and bring the price of recycled paper closer to that of virgin paper.

In response to federal requirements, 30% PCC dual-purpose copy paper became available on North Carolina State Term Contract 645A in January 1999. The N.C. Division of Purchase and Contract also specified only recycled copy paper on a new invitation for bids issued in April 1999. At the same time, the N.C. Division of Pollution Prevention and Environmental Assistance (DPPEA) began research to examine the parameters associated with procuring PCC recycled paper. This report summarizes the availability, performance, and cost of recycled copy and letterhead paper. In the time since DPPEA concluded its research, the Division of Purchase and Contract rebid North Carolina State Term Contract 645A to include only recycled-content office papers and envelopes. This new contract became effective July 1, 1999. New contract pricing for recycled dual-purpose and bond papers has been included in this report, where appropriate, but original price comparisons calculated in Section III using prices from the former contract remain unmodified.

The goals of this report are to: 1) compare virgin and recycled paper with regard to availability, performance, and cost; 2) address the ability of paper mills and distributors to supply copy and letterhead paper with greater than 30% PCC; 3)

review performance tests conducted on high PCC paper; and 4) estimate price variation associated with state agency purchases of high PCC paper.

The information presented in this report was obtained from published articles and government divisions, as well as discussions with paper manufacturers, distributors, paper buyers, and governmental purchasers. *The Recycled Products Guide*, *Greenseal Products Database*, and *Conservatree's Guide to Environmentally Sound Papers* were all used to locate vendor names and information about high PCC paper.²

Understanding the different types of paper and the terms used to define them was an issue while writing this report. “High post-consumer content,” used throughout, refers to greater than 30% post-consumer recycled content. The term “dual-purpose copy paper” (DP) describes reprographic, xerographic, and duplicating papers. The term “writing and bond paper” refers to letterhead paper, defined further in Section D. A comprehensive list of definitions for terms used in this report is located in Appendix A.

II. EXECUTIVE SUMMARY

This section summarizes the results of the research conducted by the N.C. Division of Pollution Prevention and Environmental Assistance during a six month period beginning in late 1998 on the availability, performance, and cost of recycled copy paper (with 30% PCC and higher) and letterhead paper with greater than 30% PCC in comparison to virgin paper. Detailed findings are discussed in the body of the report in the sections noted.

VIRGIN VS. RECYCLED

AVAILABILITY. Recycled paper has become much easier to find in recent years. Most large office supply retailers and the North Carolina state term contract for office paper carry at least one brand of recycled copy paper. In April 1999, the N.C. Division of Purchase and Contract issued Invitation for Bids (IFB) 901020 which specified only recycled paper (minimum 30% PCC) to be placed on state term contract. The Division's decision was supported by its own research into availability, which verified the ability of paper vendors to

produce recycled paper in quantities sufficient to meet state agency demand. The new State Term Contract for recycled office papers replaced the former contract on July 1, 1999.

Three federal agencies have already conducted extensive studies into the capacity of mills to manufacture recycled paper. The U.S. Environmental Protection Agency (EPA), the U.S. Government Printing Office (GPO) and the Federal General Services Administration (GSA) in recent years identified nine manufacturers capable of producing copy paper with at least 30% PCC. [Section III.A.1.]

PERFORMANCE. Four major studies on copy paper performance conducted within the past six years dispel the commonly held belief that recycled paper causes more paper jams and equipment malfunctions than virgin paper. A recent study by the GPO and the U.S. Conference of Mayors concluded that copy paper with 30% PCC performs just as well as virgin paper and paper with lower post-consumer content. The GPO reviewed the technical specifications and tested the performance of more than a dozen brands of 30% PCC paper on various models of copiers, laser printers, and ink jet printers.³

The Environmental Defense Fund (EDF) Paper Task Force published a comprehensive report on the usage of various types of paper with 20% PCC. The Task Force determined that paper jams are not caused by recycled paper but most often are a function of four factors: 1) auto-duplexing, 2) the speed and condition of the equipment, 3) the quality level of the paper, and 4) operator errors.⁴ [Section III.A.2.]

The GPO in coordination with the GSA creates qualified products lists (QPL) of various items available for purchase by federal agencies. Recycled papers placed by the GPO on the QPL must meet federal technical specifications and performance requirements and be produced/distributed in sufficient quantity for federal agencies nationwide to purchase. The GPO tested and recommends 10 brands of recycled copy paper with at least 30% PCC.⁵

PRICE. A perception held by many purchasers and end users is that recycled copy costs significantly more than comparable virgin paper.

DPPEA determined that while recycled paper sells at a higher price than virgin, the difference is not as great as commonly believed. Virgin DP paper formerly available on state contract once sold for \$18.40 per case. Its recycled equivalent sold for \$21.11 per case. Recycled DP paper available on N.C. State Term Contract 645A since July 1, 1999, sells for \$19.60 per case — a difference of only \$1.20 over the virgin paper price.

HIGH POST-CONSUMER CONTENT RECYCLED DUAL-PURPOSE PAPER

AVAILABILITY. Three mills currently manufacture recycled DP paper with greater than 30% PCC. Fort James Corporation makes copy papers with 50% or 100% PCC; Rolland, Inc., manufacturers a paper with 60% PCC; and Badger Paper Mills produces a paper with 100% PCC. Six different distributors, located in New York and North Carolina, sell and could transport recycled DP papers from these mills to North Carolina state agencies. In April 1999, the P&C included 50% and 100% PCC copy paper in its paper IFB.⁷ [Section III.B.1.]

PERFORMANCE. DPPEA's research into performance tests conducted on recycled copy paper with greater than 30% post-consumer content generated little data. The high PCC copy papers discussed in Section III.B.1., however, meet or exceed all of the technical specifications, except caliper, for the 30% PCC recycled DP paper currently available on N.C. State Term Contract 645A.⁸ Caliper is defined as the thickness of a sheet of paper expressed in units of thousandths of an inch.

The high PCC papers discussed in this report also currently meet all the technical specifications, except caliper and smoothness, outlined for DP paper by P&C.⁹ Smoothness is the degree to which a surface is free of irregularities invisible to the naked eye. [Section III.B.2.]

PRICE. Prices quoted for recycled DP paper with greater than 30% PCC range from \$22.75 to \$33 per case, a difference of \$1.64 to \$11.89 higher per case than the previous price for recycled DP paper, \$21.11 per case, formerly available on state term contract.¹⁰ Under the new contract, recycled DP paper now sells for \$19.60 per case. Actual costs to individual state agencies for the purchase

recycled copy paper at 30% or higher PCC are determined by each agency's supply and delivery requirements. [Section III.B.3.]

HIGH POST-CONSUMER CONTENT LETTERHEAD PAPER

AVAILABILITY. Five mills — Rolland, Inc., Domtar Fine Papers, Fraser Papers, Galleher Paper Corp., and Mohawk Paper Mills — currently produce high PCC writing papers (with no watermark or cotton fiber). Three mills — Rolland, Inc., New Leaf Paper, and Fox River Paper Co. — manufacture high PCC bond papers (with a watermark or cotton fiber). Five distributors, located in New York, North Carolina, and California, sell and will transport recycled letterhead papers to North Carolina state agencies. [Section III.C.1.]

PERFORMANCE. Research into performance tests conducted on recycled letterhead paper (writing or bond) with greater than 30% PCC generated little data. Only one of the high PCC recycled letterhead papers researched currently meets or exceeds the technical specifications outlined for bond paper by P&C.¹¹ Rolland's, New Life 25% Cotton contains 50% PCC, 25% cotton fiber, and a watermark. [Section III.C.2.]

PRICE. Prices quoted for recycled letterhead paper with greater than 30% PCC range from \$51.35 to \$86.75 per case, a difference of \$8.15 to \$43.55 per case higher than the previous price for recycled bond paper, \$43 per case, formerly available on state term contract. Under the new contract, recycled bond now sells for \$42 per case.¹² [Section III.C.3.]

III. RESEARCH RESULTS

A. VIRGIN VS. RECYCLED

1. Benefits of buying recycled

Buying recycled products helps to establish demand for these items as well as support recycling markets and community collection programs. Increased demand for recycled products creates incentive for manufacturers to use higher quantities of recycled feedstocks, which in turn stimulates the recovery of recyclables and reduces

the production costs for recycled-content items.

There are five main reasons why buying recycled products benefits the environment and North Carolina communities:

A. CONSERVATION OF RESOURCES AND LANDFILL SPACE:

Recent data characterizing the recycling infrastructure in North Carolina supports the need for additional effort to increase the procurement of recycled products, specifically paper and paper products, to help decrease the amount of office paper used and eventually disposed of in landfills. An assessment of recycling markets conducted by DPPEA in 1998 identifies the need to increase procurement of recycled paper by both the public and private sectors in order to increase de-inking capacity and to counter depressed prices for virgin pulp in North Carolina and the Southeast.

In 1997, only about 700,000 tons of office paper were recovered from 1.4 million total tons generated in the region. The state experienced a 17% recovery rate for mixed paper and a 30% recovery rate for office paper.¹³ The state's per capita disposal rate for fiscal year 1997-1998 increased by 4% to 1.15 tons from 1.10 in fiscal year 1996-1997.¹⁴ Using more recycled material in paper manufacturing would increase the recovery of office paper, and reduce dependency on landfills and incinerators, in turn helping North Carolina reach its waste reduction goal of 40% by June 30, 2001.

B. REDUCTION OF WASTE AND POLLUTION:

Collecting, processing, transporting, and manufacturing new products with recycled material creates less air and water pollution and less solid waste than making the same products from virgin raw material. According to EDF's *White Paper No. 10A*, incorporating de-inked fiber into uncoated freesheet paper generally reduces the amount of CO₂ from fossil fuels and total solid waste generated. Producing one ton of de-inked recovered fiber pulp removes 0.92 tons and 2.97 cubic yards of material from the solid waste stream.¹⁵

C. JOB CREATION:

The Institute for Local Self-Reliance in Washington, D.C., estimates that nine jobs are created for

every 15,000 tons of solid waste recycled into a new product. In North Carolina, recycling has lead to a net creation of jobs. For every 100 jobs created by recycling only 13 jobs were lost in solid waste and virgin material extraction sectors. The industry supports more than 8,800 jobs within the state.¹⁶

D. CONSERVES ENERGY:

The energy savings from manufacturing with recycled material can be substantial. Recycling reduces energy consumption by three times compared to virgin production and eventual disposal of products (even assuming waste-to-energy disposal methods are employed). According to a report published by DPPEA in September 1997, the recycling of bottles and cans by North Carolina local government programs helped save 1.31 billion British thermal units (Btu) of energy in fiscal year 1995-1996.¹⁷ Conserving energy reduces the nation's dependency on non-renewable energy resources and the pollution generated from the extraction and consumption of these energy resources.

E. IMPROVED COMPETITIVENESS:

Research suggests that as companies and industries use more recycled material in their products, they become more efficient and competitive in the global marketplace. An analysis conducted by the U.S. Department of Agriculture (USDA) found

that "increased paper recycling will extend U.S. fiber resources and contribute to enhanced competitiveness for the U.S. pulp and paper industry." Heightened competitiveness, according to the USDA, could increase export and decrease import of pulp and paper products and "significantly improve the U.S. balance of trade."¹⁸

North Carolina government agencies also have good reasons to purchase products, especially paper, with recycled material. The State of North Carolina recently became a WasteWise partner and established a goal to increase purchases of recycled paper and paper products by state agencies to 100% of all such products purchased.¹⁹ In fiscal year 1997-1998, North Carolina state agencies reported purchasing \$23,088,148 of recycled paper and paper products, the equivalent of only 58% of all purchases of paper and paper products.²⁰

In response to Governor Hunt's call for environmental sustainability in state government, P&C is expanding opportunities for state agencies to purchase recycled as well as environmentally preferable products from state term contracts. Most significantly, in April 1999, the Division issued an IFB that specified only recycled paper (minimum 30% PCC) to be placed on state term contract. The new office paper contract replacing State Term Contract 645A became effective on July 1, 1999. At the local level, at least 45 North

TABLE A. U.S. Government Printing Office - Qualified Products List for copy paper with at least 30% post-consumer content

BRAND	PCC	MANUFACTURER
Aspen Xerographic	30%	Boise Cascade
COPYSAVER Dual-Purpose	30%	Paper Corporation of U.S.
GeoCycle	30%	Georgia-Pacific Papers
Envirographic® 100	100%	Badger Paper Mills, Inc.
Envirographic® Bond/Offset	30%	Badger Paper Mills, Inc.
Eureka™ 30% Recycled Post-Consumer	30%	Fort James Corp.
GREAT WHITE® MultiUse 20	30%	Union Camp Corporation
Recycled Husky Xerocopy DP	30%	Weyerhaeuser
Savings® DP Item #19410-0	30%	Hammermill Papers®
Willcopy® Recycled Paper	30%	Willamette Industries, Inc.

Carolina county and municipal governments have established buy recycled policies.²¹

2. Availability of recycled paper

DPPEA researched the availability of recycled DP paper, specifically to determine manufacturers' and distributors' capacity to supply enough paper to meet the demand of state agencies through term and agency specific contracts.

Recycled paper has become much easier to find in recent years. Most large office supply retailers and the North Carolina state term contract for office paper carry one or more brands of recycled copy paper. Following the issue of its latest IFB, P&C now offers only recycled DP and letterhead paper (minimum 30% PCC) on state term contract. The Division's decision was supported by its own research into availability that verified the ability of paper vendors to produce paper in quantities sufficient to meet state agency demand.

Three federal agencies have already conducted extensive studies into the availability of recycled copy paper. In response to Federal Executive Order 13101, the EPA conducted a survey of manufacturers or distributors planning to offer copy papers (defined as dual-purpose) with at least 30% PCC to federal, state, and local government customers. Nine of 10 companies indicated their intention to sell a paper with at least 30% PCC to various government agencies. Based on this information, EPA decided that there would be sufficient competition among vendors of uncoated printing and writing grades containing 30% post-consumer fiber.²²

The GPO in coordination with the federal GSA creates Qualified Products Lists (QPL) of various items available for purchase by federal agencies. Products placed by GPO on the QPL must meet federal technical specifications and performance requirements (discussed in Section III.A.2.) and be produced or distributed in large enough quantities for federal agencies nationwide to purchase.²³ Table A. lists the QPL for brands of copy paper with at least 30% PCC.

According to the Office of the Federal Environmental Executive (OFEE), GSA contracts with various distributors to supply paper from the QPL to federal agencies. Xpedx, a distributor located in North

Carolina, carries at least four brands of 30% PCC recycled DP paper — Eureka™, GeoCycle, Great White®, and Savings DP — under contract with GSA.

3. Characteristics and performance of recycled copy paper

Despite research to the contrary, there is still a perception among the public that the quality and performance of recycled copy paper is substandard to virgin grades. Copy machine jams are the most common performance problem cited. Four major studies of copy paper performance conducted within the past six years dispel the commonly held belief that recycled paper always causes more paper jams and equipment malfunctions than virgin paper.

In 1993, the University of Wisconsin and EPA Region V conducted extensive tests that demonstrated that recycled paper with 10% PCC was equal in quality to virgin paper.²⁴

In 1995, the Environmental Defense Fund (EDF) Paper Task Force published a comprehensive report on the usage of various types of recycled paper with 20% PCC. The Task Force found that paper jams are not caused by recycled paper but most often are a function of four factors: 1) auto-duplexing, 2) the speed and condition of the equipment, 3) the quality level of the paper, and 4) operator errors. Also, the Task Force reported that uncoated, commodity-grade business papers with 20-25% post-consumer recycled content meet the functional requirements of office users. The Task Force concluded that most recycled content office papers with 20-25% PCC perform consistently well in low-, medium-, and high-speed copy machines, other office equipment, and offset presses in comparison with virgin paper.²⁵

The most recent study by the GPO, published in March 1999, concluded that copy paper with 30% PCC performs as well as virgin paper and paper with lower recycled content. The study was coordinated by Recycling at Work, a program of the U.S. Conference of Mayors. Two million sheets of paper were tested on a variety of copiers and printers. The 30% PCC paper jammed in equipment, on average, 1.5 to 3.2 times for every 100,000 sheets. Twenty percent PCC paper jammed 2.8 to 2.9 times per 100,000 sheets, and virgin paper jammed 2.9 times per 100,000

TABLE B. Specifications for dual-purpose paper with 30% post-consumer content provided by GPO

PAPER PROPERTY	TARGET SPECIFICATION
Content Moisture	4.5±.5%
Weight (Grammage)	20 lbs. or 75g/m ²
Stiffness	135 mg machine direction
Tearing Strength	36 g
Opacity	86%
Smoothness	160±30 Sheffields
Curl	Paper shall lie flat before and after processing through a high speed copier or laser printer with either no tendency to curl or with a curl that can be overcome under reasonable working conditions
Performance	There shall not be more than one paper-caused jam or one document with unacceptable image quality due to the paper per 5,000 continuous copy at atmospheric conditions of 21°C

The GPO uses the term reprographic paper, which is the same as the term dual-purpose copy paper used throughout this report. These specifications are defined in Appendix A.

sheets.²⁶

Research conducted by EPA was used to develop the 1998 Comprehensive Procurement Guidelines (CPG) for recycled paper products. The EPA designates products for the CPG that must contain recycled material when purchased by federal agencies or by contractors or state and local governments using appropriated federal funds of at least \$10,000 per year. The CPG include eight categories of recycled products that are of high quality, widely available, and cost competitive with virgin products. The EPA determined that recycled reprographic (DP) and letterhead papers with 30% PCC meet all three criteria.²⁷ Higher PCC papers, although available for purchase by federal agencies, were not evaluated by EPA.

The GPO conducts extensive performance testing on a paper before it is placed on the agency's QPL, but under agreement with paper manufacturers, test results are confidential and not available to the general public. Because of the confidential nature of the testing, specific protocols and equipment used are not known. Furthermore, GPO does not indicate which papers were provided for testing but did not meet its specifications. To be placed on the QPL all papers must meet performance requirements as well as the technical specifications shown in Table B.²⁸

Technical specifications ensure that paper meets the functionality requirements for office use of copy paper — such as adequate strength, runability, and a smooth printing surface — but do not dictate performance. As mentioned above, paper performance in office equipment more often is influenced by auto-duplexing, the condition of the equipment, the quality of the paper, and operator errors.²⁹

One concern often raised in discussions of recycled paper is its life expectancy. Government agencies, in particular, have an interest in guaranteeing that official documents do not deteriorate over time. DPPEA research conducted on the archival quality of recycled paper generated little data. EDF's *White Paper No. One* defines two terms, permanence and reversion, related to archivability. Permanence refers to the life expectancy of paper and its resistance to becoming brittle. Reversion is the discoloration (yellowing) of paper that may be caused by the presence of lignin or mechanical pulp.³⁰

As defined by P&C (formerly in State Term Contract 645A), "alkaline" paper: 1) is less polluting, 2) has improved opacity, smoothness, and ink receptivity, 3) has an extended life of more than 200 years, unlike the 50-year life span of an acid sheet, and 4) has a pH of 6.8 or higher.³¹ The

Division had, at one time, used the term to refer to virgin DP paper, although recycled DP paper available on state term contract is also alkaline. The term was not included by P&C in the latest state term contract for office papers.

According to Sarah Koonts, with the N.C. Department of Cultural Resources' Archival Division, the State does not have any laws or specifications requiring official documents to be printed on archival (permanent) paper. She also does not know of any research conducted in regards to the permanence and reversion of recycled DP paper.³²

4. The price of recycled copy paper

Perception among purchasers and end users is that recycled copy paper costs significantly more than comparable virgin paper. DPPEA's research confirmed that recycled paper generally sells at a higher price than virgin, but not to the extent commonly believed. Virgin DP copy paper formerly available on N.C. State Term Contract 645A sold for \$18.40 per case; recycled DP copy paper

for \$21.11 per case — a price difference of \$2.71.³³ Under the new contract, recycled DP paper now sells for \$19.60 per case. Actual costs to individual state agencies for the purchase of recycled copy paper at 30% or higher PCC, however, are determined by each agency's supply and delivery requirements.

DPPEA promotes source reduction as a way to decrease paper costs. Source reduction means reducing the amount of waste created in the first place, before recycling and disposal become necessary. State agencies facing higher costs for the purchase of recycled paper could offset the cost increase by source reducing paper through duplex copying or electronic communication.

B. HIGH PCC RECYCLED DUAL-PURPOSE PAPER

1. Availability of high post-consumer content copy paper

TABLE C. Manufacturers of dual-purpose paper with greater than 30% post-consumer content

MANUFACTURER	BRAND	%PCC	MILL LOCATION
Fort James Corp.	Eureka™ 50	50	Camas, Washington
Rolland, Inc.	New Life DP	60	Quebec and Ontario, Canada
Badger Paper Mills, Inc.	Envirographic® 100	100	Peshtigo, Wisconsin
Fort James Corp.	Eureka™ 100	100	Camas, Washington

TABLE D. Distributors of dual-purpose paper with greater than 30% post-consumer content

DISTRIBUTOR	CITY, STATE	BRAND	%PCC	MANUFACTURER
Xpedx	Manhattan, NY	Eureka™ 50	50	Fort James Corp.
BW Wilson Paper	Burlington, NC	New Life DP	60	Rolland, Inc.
Graphic Paper	Port Washington, NY	New Life DP	60	Rolland, Inc.
Bayer James	Greensboro, NC	Envirographic® 100	100	Badger Paper Mills
MAC Papers	Morrisville, NC	Envirographic® 100	100	Badger Paper Mills
Xpedx	Manhattan, NY	Eureka™ 100	100	Fort James Corp.
Xpedx	Manhattan, NY	Envirographic® 100	100	Badger Paper Mills
Xpedx	Morrisville, NC	Envirographic® 100	100	Badger Paper Mills

TABLE E. Paper specifications for dual-purpose paper with greater than 30% post-consumer content

		PCC	WEIGHT	BRIGHTNESS	OPACITY	CALIPER	SMOOTHNESS
Weyerhaeuser specifications for Recycled Husky 30% PCC dual-purpose paper		30%	20 lb.	none given	min=88%	min=4.2 MILS	min=155 Sheffields
N.C. Division of Purchase and Contract specifications for recycled DP copy paper		30%	20 lb.	min=83%	min=88%	min=4.2	min=175 +.01 Sheffields
MANUFACTURER BRAND		PCC	WEIGHT	BRIGHTNESS	OPACITY	CALIPER	SMOOTHNESS
Fort James Corp.	Eureka™ 50	50%	20 lb.	87%	88%	4.1 MILS	160 Sheffields
Rolland, Inc.	New Life DP	60%	20 lb.	88%	87%	4.0 MILS	150 Sheffields
Badger Paper Mills, Inc.	Envirographic® 100	100%	20 lb.	85%	88%	4.1 MILS	160 Sheffields
Fort James Corp.	Eureka™ 100	100%	20 lb.	84%	88%	4.1 MILS	160 Sheffields

According to the paper manufacturers, all of the papers in Table E. are acid-free (alkaline) to prevent premature deterioration.

DPPEA researched the availability of high PCC recycled DP paper, specifically to determine manufacturers' and distributors' capacity to supply enough paper to meet the demand of state agencies through term and agency specific contracts. Of the 25 mills DPPEA contacted for information on high PCC paper, three manufacture recycled DP paper with greater than 30% post-consumer content. Fort James Corp. makes a copy paper with 50% or 100% PCC; Rolland, Inc., manufacturers a paper with 60% PCC; and Badger Paper Mills produces a paper with 100% PCC. Table C lists the different manufacturers, the paper brand names, the post-consumer content, and the location(s) of their mill.

None of the mills producing this paper are located in the Southeast. Rolland is located in Canada, Fort James in the Midwest, and Badger Papers on the West Coast. As discussed in detail in Section III.B.3., the distance that paper must be transported from mill to market is a factor that can impact price.

Of the companies surveyed in 1998 by the EPA, only the Fort James Corporation offered a copy

paper with a post-consumer content higher than 30%. EPA tried to reach Badger Paper Mills, Inc., and Rolland, Inc., but was unsuccessful.³⁴

Table D lists distributors that sell the recycled papers in Table C and could offer them to N.C. state government agencies in the sufficient quantity. According to recent purchasing data, state agencies purchase between 13,000-15,000 cases per month of recycled DP paper from state term contract.³⁵ Due to limits on mill production and capacity, the two distributors that sell Rolland's New Life DP can only supply between 2,500-4,000 cases per month.³⁶

Products placed by GPO on its QPL, must meet federal technical specifications and performance requirements (discussed in Section III.A.2.) and be produced or distributed in sufficient quantities to supply federal agencies nationwide. Badger Paper Mills', Envirographic® 100 is the only DP paper listed above that is on the GPO's QPL. According to the OFEE, GSA contracts with various distributors to supply paper from the QPL to federal agencies. Four distributors sell Envirographic® 100 to state agencies through state

term and agency specific contracts. Xpedx is the only distributor under contract with the GSA that offers Envirographic® 100 in North Carolina.³⁷

2. Characteristics and performance of recycled copy paper with greater than 30% post-consumer content

Research conducted by DPPEA on the performance of recycled DP paper with greater than 30% PCC generated little data. The results of the few studies which have been conducted on 10%, 20%, and 30% PCC were discussed in Section III.A.2.

Table A in Section III.A.1. lists the recycled paper tested by the GPO which met its specifications for the QPL. As mentioned in that section, due to the confidential nature of the testing, specific testing protocols and equipment used are unknown. Furthermore, the GPO did not indicate which papers were provided for testing but did not meet its specifications. Of all the brands tested, Badger Paper Mills', Envirographic® 100 is the only recycled DP paper with greater than 30% PCC that is guaranteed to meet all of the specifications listed in Table B.

Although official performance data on high PCC recycled paper is sparse, many state agencies using these papers have not reported any performance or quality problems. The State of Vermont uses Rolland's New Life DP with 60% PCC;³⁸ Pennsylvania tested Fort James, Eureka™ 100 (100% PCC) and rated the paper a four out of five for quality.³⁹

Table E compares the technical specifications for the brands of recycled copy paper discussed in Section III.B.1. to: 1) Weyerhaeuser's technical specifications for its recycled Husky brand DP copy paper available on State Term Contract #645A,⁴⁰ and 2) the technical specifications outlined by P&C for recycled DP paper.⁴¹ All of the recycled DP papers listed are white, 8.5 in. x 11 in., papers comparable in appearance and weight to their virgin counterparts. Each paper is guaranteed by the manufacturer to work in high-speed copiers, office laser printers, ink jet printers, fax machines, and offset presses.

All the high PCC papers currently meet or exceed all of the technical specifications, except caliper,

listed for Weyerhaeuser's recycled Husky brand paper.⁴² Caliper is defined as the thickness of a sheet of paper expressed in units of thousandths of an inch. Each of the high PCC papers is within one or two ten-thousandths of an inch of meeting Weyerhaeuser's specification. Higher caliper paper, being thicker, has increased stiffness, better folding endurance, greater tearing resistance, and more resistance to curling.⁴³ The GPO does not include caliper in its technical specifications.

These high PCC papers also meet all the technical specifications, except caliper and smoothness, established for recycled DP paper by P&C.⁴⁴ Smoothness, as defined in EDF's, *White Paper No. One*, is the degree to which a surface is free of irregularities invisible to the naked eye. Smoothness influences print quality, ink holdout and transport of the paper through the machine. As smoothness decreases, solids and halftones may become sandy in appearance but type is minimally affected.⁴⁵ By contrast, all of the papers above meet the GPO's technical specification for smoothness (Table B), 160±30 Sheffields.

Technical specifications, while ensuring that paper meets the functionality requirements for copy paper, such as adequate strength, runability, and a smooth printing surface, do not dictate performance. As reported by the EDF Paper Task Force, paper performance in office equipment more often is influenced by auto-duplexing, the condition of the equipment, the quality of the paper, and operator errors.⁴⁶

3. The price of recycled copy paper with greater than 30% post-consumer content

As noted above, all of the high PCC recycled DP papers discussed in this report are available through distributors and not directly from manufacturers. The distance a distributor must transport the paper from the mill to its customers can affect the sale price of the paper. Badger Paper Mills, Inc., Envirographic® 100, produced in Wisconsin and delivered directly to Xpedx distributors in North Carolina, proved to be the least expensive paper available. Table F lists distributors' quoted price per case for the high PCC recycled DP papers they carry.

The table compares the quoted prices to the

TABLE F. Quoted per case prices for dual-purpose paper with greater than 30% post-consumer content

Distributor	Brand	PCC	Price per Case	Price Difference B/W Recycled
Xpedx (NY)	Eureka™ 50	50%	\$25.00	\$3.89
BW Wilson Paper	New Life DP	60%	\$27.00	\$5.89
Graphic Paper	New Life DP	60%	\$26.50	\$5.39
Bayer James	Envirographic® 100	100%	\$28.23	\$7.12
MAC Papers	Envirographic® 100	100%	\$24.50	\$3.39
Xpedx (NY)	Eureka™ 100	100%	\$33.00	\$11.89
Xpedx (NY)	Envirographic® 100	100%	\$26.10	\$4.99
Xpedx (NC)	Envirographic® 100	100%	\$22.75	\$1.64
AVERAGE PRICE DIFFERENCE				\$5.53

The prices listed in the table are based on estimated sales of between 13,000-15,000 cases per month distributed statewide. These prices are only a benchmark and maybe greater than or less than the prices quoted in response to an Invitation for Bid. These prices are estimates of current market prices.

previous per case price, \$21.11, for recycled DP paper formerly available from State Term Contract 645A.⁴⁷ The price for a case of high PCC recycled DP paper ranges between \$22.75 and \$33. Envirographic® 100, from Xpedx in Morrisville, North Carolina, is priced \$1.64 higher per case. Actual costs to individual state agencies for the purchase of higher PCC recycled copy paper would be determined by each agency’s supply and delivery requirements.

State agencies facing higher costs for the purchase of high PCC recycled paper could offset the cost increase by source reducing paper through duplex copying or electronic communication.

C. HIGH PCC LETTERHEAD PAPER

1. Availability of high post-consumer content letterhead paper

Dual-purpose copy paper usually comprises the largest proportion of recycled paper purchased by agencies, but many recycled letterhead papers also have a high post-consumer content. Since agencies purchase lower quantities of letterhead paper, smaller, specialized mills could manufacture enough paper to meet state agency demand. Often, more lenient technical specifications for letterhead paper allow less bright or speckled

paper to be purchased.

Letterhead paper can be defined in a number of ways. The EPA defines “bond” and “writing” papers as papers with a cotton fiber content designed for the printing of bonds and legal documents.⁴⁸ The term “bond” now refers to paper used for less demanding applications such as letterhead, business forms, etc. Bond paper, also called “cotton fiber” paper, contains a minimum of 25% cellulose fibers derived from lint cotton or other cotton material. This paper contains a watermark and is primarily used for stationary, currency ledgers, invitations, and specialty applications. For the purposes of this discussion, “bond papers” are defined as letterhead papers with a watermark and which may also contain cotton fiber. The term “writing papers” refers to letterhead papers that contain neither cotton fiber nor a watermark.

The terms “text” and “cover,” as defined by EPA, include various grades of printing papers that are made for the specific use of bookwork.⁴⁹ Text papers are used in making deluxe editions and fancy stationery. These papers resemble writing papers but are produced at various weights, so a lighter weight text paper could be used as a writing paper. Cover papers are heavy weight

papers commonly used for covers, books, brochures, pamphlets, and other similar applications. In this report, lighter weight text paper is defined as writing paper.

In the EPA survey, *Availability of Uncoated Printing and Writing Papers Containing 30% Post-Consumer Fiber*, published in March 1998, five of the six mills contacted indicated their intention to produce a recycled bond paper with 30% PCC. None however, indicated that they would produce a bond paper with greater than 30% PCC. Contact with Badger Paper Mills, Inc., was attempted but without success. The EPA also surveyed 20 manufacturers of text and cover papers. Fourteen indicated that they already produce a 30% PCC writing paper. Out of this group, six companies reported that they also produce a letterhead paper with greater than 30% PCC.⁵⁰

Five of the 25 mills DPPEA contacted for information on high PCC recycled paper manufacture a recycled writing paper with greater than 30% PCC and three manufacture a recycled bond paper with greater than 30% PCC. Tables G and H list the different manufacturers, the paper brand names, the post-consumer content, and the location(s) of their mills. Currently,

North Carolina has a state term contract for bond paper only.

None of the mills producing letterhead paper are located in the Southeast. Compared to the mills manufacturing high PCC recycled DP paper, however, more of these mills are located in the Midwest and eastern states, possibly making distribution of these papers easier and more cost effective.

MAC Papers in Morrisville, North Carolina, distributes Badger Paper Mills, Inc., Ta-non-ka® brand paper, a 20 lb., white, watermarked, non-cotton, bond paper. The manufacturer currently produces this paper with only 30% PCC, but discussed the possibility of producing it with greater than 30% PCC if at least 800 cases were purchased each shipment.⁵¹

Table I lists distributors that sell the recycled letterhead papers in Tables G and H and could offer them to North Carolina state government agencies in sufficient quantity. According to current purchasing data, state agencies purchase about 250 cases per month of recycled bond paper (20% PCC/25% cotton) from state term contract. The distributors indicated their ability to offer

TABLE G. Manufacturers of recycled writing paper (no watermark) with greater than 30% PCC

MANUFACTURER	BRAND	%PCC	MILL LOCATION
Rolland, Inc.	Evolution 100 - Glacier	75	Quebec and Ontario, Canada
Domtar Fine Papers	Sandpiper	100	St. Catherines, Cornwall and Windsor, Canada
Fraser Papers	Genesis	100	Maine, Ohio, Wisconsin
Galleher Paper Corp.	OTD and Directory Plus	100	Ontario, Canada
Mohawk Paper Mills	Options - White Sand	100	Cohoes, New York

TABLE H. Manufacturers of recycled bond paper (with a watermark) with greater than 30% PCC

MANUFACTURER	BRAND	%PCC	MILL LOCATION
Rolland, Inc.	New Life 25% Cotton	50	Quebec and Ontario, Canada
New Leaf Paper	Everest	80	San Francisco, California
Fox River Paper Co.	Quest	100	Vicksburg, Michigan

TABLE I. Distributors of recycled letterhead paper (writing and bond) with greater than 30% PCC

DISTRIBUTOR	CITY, STATE	BRAND	PCC	MANUFACTURER
Bayer James	Greensboro, NC	New Life 25% Cotton	50%	Rolland, Inc.
Bayer James	Greensboro, NC	Evolution 100	60%	Rolland, Inc.
BW Wilson Paper	Burlington, NC	New Life 25% Cotton	60%	Rolland, Inc.
New Leaf Paper	Berkley, CA	Everest	100%	New Leaf
MAC Papers	Morrisville, NC	Quest	100%	Fox River Paper Co.
Nationwide Fine Papers	Charlotte, NC	Sandpiper	100%	Domar Fine Papers
Nationwide Fine Papers	Charlotte, NC	Options	100%	Mohawk Paper Mills
MAC Papers	Morrisville, NC	Genesis	100%	Fraser Papers

and transport that quantity of paper to any state agency. Three of the papers — Genesis, OTD/Directory Plus, Esleek — are not offered by any distributors below.

2. Characteristics and performance of recycled letterhead paper with greater than 30% post-consumer content

Even though high PCC letterhead paper meets all or most of the same technical specifications as virgin letterhead paper, there is still a perception that recycled paper is inferior. As with copy paper, copy machine jams are the most common performance problem cited. However, as mentioned previously, the EDF Paper Task Force determined that paper jams are not caused by recycled paper but most often are a function of auto-duplexing, the speed and condition of the equipment, the quality level of the paper, and operator errors.⁵²

Research conducted by DPPEA on the performance of recycled letterhead papers generated less data than that for recycled DP papers. Few data are available on these papers because they generally purchased in small quantities (less than 1000 cases/month). The GPO does not have a QPL for cotton fiber content, bond, writing, or text

paper. When asked about the performance or quality of their paper, most manufacturers say they offer a full guarantee on any unopened reams of paper.

Table J lists the technical specifications for brands of recycled letterhead (bond and writing) papers discussed in Section III.C.1., as compared to the technical specifications outlined by P&C for recycled letterhead paper.⁵³ Some papers are white with small speckles, some are colored, some contain cotton, and others are comparable to the white recycled bond paper currently available on State Term Contract #645A. Each paper is guaranteed by the manufacturer to work in high-speed copiers, office laser printers, ink jet printers, fax machines and offset presses.

The Division of Purchase and Contract’s current specifications for recycled bond paper include a white cockle finish, 25% cotton, 20-pound weight, and a watermark, but not brightness or degree of speckles allowable. The Division also limits requests for bids to nationally advertised and industry recognized mill brand items. Rolland’s New Life 25% Cotton paper meets each of these technical specifications and contains a high PCC.

3. The price of recycled letterhead

paper with greater than 30% post-consumer content

Due to the smaller amount of letterhead paper used by agencies relative to copy paper, all letterhead paper is purchased through distributors and not directly from the mills. The distance a distributor must transport the paper from the mill to its customers is a factor that can affect the sale price of the paper.

Table K lists the distributors' quoted prices for the high PCC letterhead papers they carry, which range from \$51.35 to \$86.75 per case, and compares them to the price for recycled bond paper, \$43.20 per case, formerly available on State Term Contract 645A.⁵⁴ Rolland's New Life 25% Cotton, distributed by BW Wilson, is the least expensive high PCC letterhead paper available, priced \$8.15 more per case. Actual costs to individual state agencies for the purchase of higher PCC recycled letterhead paper would be determined by each agency's supply and delivery requirements. As previously discussed, source reduction can re-

duce paper purchasing costs.

Currently MAC Papers sells Badger Paper Mills' Ta-non-ka® paper with 30% PCC for \$36.00 per case, which is \$7.00 less per case than the recycled bond paper formerly available on state term contract. Were the distributor able to work out an agreement with the mill to produce the Ta-non-ka® paper with higher than 30% PCC in shipments of at least 800 cases, the per case price might increase but still be more economical than the other high PCC papers listed.⁵⁵

IV. CONCLUSION

Purchasing recycled paper helps to "close the recycling loop" by reducing the amount of waste disposed, increasing the demand for recovered waste paper and stimulating recycling markets. An assessment of recycling markets conducted by

TABLE J. Specifications for recycled letterhead paper (writing and bond) with greater than 30% PCC

	PCC	WATER-MARK	SPECKLES	COLOR	WEIGHT	BRIGHT-NESS	COTTON	
N.C. Division of Purchase and Contract specifications for bond paper	20%	yes	none given	white	20 lb.	none given	25%	
MANUFACTURER	PRODUCT NAME	PCC	WATER-MARK	SPECKLES	COLOR	WEIGHT	BRIGHT-NESS	COTTON
Rolland, Inc.	New Life 25% Cotton	50%	yes	no	white	20 lb.	86	25%
Rolland, Inc.	Evolution 100 - Glacier	75%	no	yes	gray	24 lb.	83	none
Domtar Fine Papers	Sandpiper - Ice	100%	no	no	white	24 lb.	not known	none
Fox River Paper Co.	Quest	100%	yes	yes	white	24 lb.	not known	none
Fraser Papers	Genesis	100%	no	no	white	24 lb.	not known	none
Galleher Paper Corp.	OTD/ Directory Plus	100%	no	no	gray	20 lb.	not known	none
Mohawk Papers	Options - White Sand	100%	no	yes	white	28 lb.	not known	none

TABLE K. Quoted per case prices from distributors of recycled letterhead paper with greater than 30% PCC

DISTRIBUTOR	BRAND	PCC	PRICE PER CASE	PRICE DIFFERENCE B/W RECYCLED
Bayer James	New Life 25% Cotton	50%	\$60.82	\$17.62
BW Wilson Paper	New Life 25% Cotton	50%	\$51.35	\$8.15
New Leaf Paper	Everest	80%	\$86.75	\$43.55
Bayer James	Evolution 100	100%	\$69.56	\$26.36
MAC Papers	Quest	100%	\$54.25	\$11.05
Nationwide Fine Papers	Sandpiper	100%	\$72.75	\$29.55
Nationwide Fine Papers	Options	100%	\$71.75	\$28.55
AVERAGE PRICE DIFFERENCE				\$24.24

The prices listed in the table are based on estimated sales of about 250 cases per month distributed statewide. These prices are only a benchmark and maybe greater than or less than the prices quoted in response to an Invitation for Bid. These prices are estimates of current market prices.

DPPEA in 1998 identified the need to increase procurement of recycled paper by both the public and private sectors in order to increase de-inking capacity and counter depressed prices for virgin pulp in North Carolina and the Southeast. Buying recycled paper helps to conserve resources, energy, and landfill space, reduces waste and pollution, creates jobs and improves competitiveness.

DPPEA researched the availability, performance and cost of recycled DP paper and letterhead paper specifically to determine manufacturers' and distributors' capacity to supply enough paper to meet the demand of state agencies through term and agency specific contracts. We concluded that recycled paper with 30% PCC is widely available through various distributors located throughout the state and is cost competitive with virgin grade DP paper. The decision by P&C to specify only recycled paper (minimum 30% PCC)

in its new state term contract for office paper supports this conclusion.

Even though recycled paper meets or exceeds most of the same technical specifications as virgin paper, there is still a perception among purchasers and end users that it does not perform as well as virgin grades in photocopier machines and printers. Study data reveal that recycled paper of at least 30% PCC performs equally well as virgin papers. The anecdotal experience of other states suggests that higher PCC recycled papers also perform well.

Three manufacturers produce a DP paper with greater than 30% PCC; one brand is only \$1.64 more per case than the 30% PCC paper formerly available on state term contract. Eight mills manufacture letterhead paper with greater than 30% PCC. The price difference between the least expensive recycled bond paper discussed and the 30% PCC bond paper formerly available on state term contract is \$8.15. Another brand of 30% PCC recycled bond paper costs \$7 less per case than the previous contract price for recycled bond, and could potentially be produced with higher PCC less expensively than the other brands.

APPENDIX A. DEFINITIONS

Taken from the Dictionary of Paper Fifth Edition, 1996, the Technical Association of the Pulp and Paper Industry (TAPPI) unless otherwise noted.

ACID-FREE PAPER -

A permanent record paper where the lack of acidity will prevent its premature deterioration. It refers to paper manufactured at pH values of 7.0 or higher with the use of calcium carbonate filler, which buffers at a high pH.

ALKALINE PAPER -

See Acid-Free Paper.

BOND PAPER -

Originally this paper was a cotton-containing writing or printing paper designed for the printing of bonds, legal documents, etc. and is distinguishable by superior strength, performance, and durability. This term is now applied to papers and used or less demanding applications such as letterhead, business forms, etc. Bond paper is now made from cotton and/or chemical woodpulp in basis weights ranging from 13-24 pounds and includes cut-size papers, parent or folio sizes and rolls. Typical properties include, printability, erasability, whiteness, cleanliness, freedom from fuzz, uniform finish, and good formation.

BRIGHTNESS -

The reflectivity of pulp and paper for specified blue light measured under standardized conditions on a particular instrument designed for this purpose.

CALIPER -

The thickness of a sheet of paper measured under certain standard conditions, expressed in units of thousandths of an inch.

COCKLE FINISH -

A ripple-like finish caused by shrinkage during drying under little or no tension. It may be caused deliberately or inadvertently and is frequently desired, in varying degrees in some grades of writing paper.

COPY PAPER -

Paper suitable for copying in xerographic processes. These papers are bond grades made from chemical woodpulp, mechanical pulps, recycled

fiber, cotton, or a combination thereof.

COTTON-FIBER CONTENT PAPER -

Paper that contains at least 25% up to 100% cellulose fibers derived from lint cotton, cotton liners, and cotton or linen cloth cuttings. It is used for stationary, currency, ledgers, invitations, maps, and other specialty applications.

DUAL-PURPOSE -

In NC State Term Contract 645A, dual-purpose is defined as being bond/xerographic and offset duplicator. EDF uses the term synonymously with "reprographic paper" to mean a multi-purpose paper designed for use in copy machines, laser printers, ink-jet printers, and plain paper faxes.

MOISTURE CONTENT -

The percent by weight of water in sawdust, pulp, pulpwood, paper or paperboard.

OPACITY -

The property of a sheet that obstructs the passage of light and limits visibility of objects through the sheet. This property is important for printing papers.

PERMANENCE -

Retention of significant properties particularly folding endurance and color over prolonged periods.

POST-CONSUMER CONTENT PAPER -

Paper, paperboard, and fibrous wastes from retail stores, office buildings, homes and so forth, after they have passed through their end-usage as a consumer item; and all paper, paperboard and fibrous wastes that enter and are collected from municipal solid waste. (EPA, 1997.)

RAG CONTENT PAPER -

See Cotton-Fiber Content Paper.

REPROGRAPHIC PAPER -

Writing paper used for office copying by xerography, spirit, stencil, or offset duplicating. See also Dual-Purpose.

SMOOTHNESS -

The property of a surface determined by the degree to which it is free of irregularities. In printing, smoothness improves as the paper is compressed and is locally deformed under mechanical pressure. It is measured by the rate of flow of air between two or more sheets of paper.

STIFFNESS -

The ability to resist deformation under stress. Resistance to a force causing the specimen to bend is termed bending or flexing stiffness.

TEARING RESISTANCE -

The force required to tear a specimen under standardized conditions.

TEXT PAPER -

A general term applied to various grades of printing papers that are made for the specific use of bookwork. This type of paper is used in making deluxe editions and fancy stationary because it has a fine quality and texture for printing. Text papers are manufactured in white or color, from bleached chemical woodpulp or cotton fiber content, furnished with a deckled or plain edge and are sometimes watermarked. They are made in a variety of finishes, including antique, vellum, smooth, felt-marked, and patterned surfaces, some with laid formation. Common basis weights are 60, 70, 80 pounds or heavier. Many of these papers are manufactured in matching cover weights.

WATERMARK -

A true watermark is a localized modification of the formation and opacity of a sheet of paper while it is still quite wet, so that a pattern, design, or work group can be seen in the dried sheet when held up to the light. Such modifications can be accomplished in several ways.

WRITING PAPER -

Papers suitable for pen, ink, pencil, typewriter, or printing. Made in a wide range of quantities from chemical/mechanical, wood/rag pulp, or mixtures of rag, and chemical/mechanical pulp. Distinctive finishes and colors produce variations in this class of paper, which through long usage have established well-known grades. These include fine or extra-fine writing, azure laid, azure wove, boxed, chemical manila, commercial flat, folded, industrial, laid, machine-dried manila, railroad, superfine, etc. Each comes in a form, finish, color, and weight (13-14 pounds) to meet a particular use, but all are fairly typical of this class of paper. The most significant class properties are good writing and ruling surface. For some uses, good strength and erasability are also necessary.

XEROGRAPHIC PAPER -

See Copy Paper.

APPENDIX B. CONTACT INFORMATION

MANUFACTURERS AND DISTRIBUTORS OF RECYCLED DP PAPER WITH GREATER THAN 30% PCC

MANUFACTURERS	PRODUCT	% PCC	CONTACT NO.	INTERNET ADDRESS
Badger Paper Mills, Inc.	Envirographic® 100	100	715-582-4551	www.badgerpaper.com
Fort James Corp.	Eureka™ 100/50	100/50	800-854-5345	www.eurekarecycled.com
Rolland, Inc.	New Life DP	60	203-878-5895	www.rolland.ca
DISTRIBUTORS	PRODUCT	% PCC	CONTACT NO.	CONTACT NAME
Bayer James	Envirographic® 100	100	800-487-3873	Venus Merritt
BW Wilson Paper	New Life DP	60	800-277-9895	Jennifer Shaw
Graphic Paper	New Life DP	60	516-413-9207	Greg Barber
MAC Papers	Envirographic® 100	100	919-467-6076	Robert Farrel
Xpedx (NY)	Eureka™ 50 & 100	50/100	800-433-0539	Carmel Flanagan
Xpedx (NC)	Envirographic® 100	100	919-467-8141	John Turbeville

MANUFACTURERS AND DISTRIBUTORS OF RECYCLED LETTERHEAD (WRITING AND BOND) PAPER WITH GREATER THAN 30% PCC

MANUFACTURERS	PRODUCT	% PCC	CONTACT NO.	INTERNET ADDRESS
Badger Paper Mills, Inc.	Ta-non-ka®	30	715-582-4551	www.badgerpaper.com
Domtar Fine Papers	Sandpiper	100	800-361-4946	www.domtar.com/papers
Fraser Papers	Genesis	100	800-543-3297	www.norandaforest.com/company/fraser.htm
Fox River Paper Co.	Quest	100	800-558-8327	www.foxriverpaper.com
Galleher Paper Corp.	OTD/Directory Plus	100	800-563-6377	
Mohawk Paper Mills	Options - White Sand	100	800-THE-MILL	www.mohawkpaper.com
New Leaf Paper	Everest	80	888-989-5323	www.newleafpaper.com
Rolland, Inc.	New Life 25% Cotton	50	203-878-5895	www.rolland.ca
DISTRIBUTORS	PRODUCT	% PCC	CONTACT NO.	CONTACT NAME
Bayer James	New Life 25% Cotton	50	800-487-3873	Venus Merritt
BW Wilson Paper	New Life 25% Cotton	50	800-277-9895	Jennifer Shaw
MAC Papers	Ta-non-ka® and Quest	50/100	919-467-6076	Robert Farrel
Nationwide Fine Papers	Sandpiper and Options	100	800-654-6003	Pete Rounds
New Leaf Paper	Everest	80	888-989-5323	Melissa

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