Executive summary

This report to Congress is the last of three in which the Librarian of Congress, Archivist of the United States, and the Public Printer summarize the Federal Government s progress on implementing Public Law 101-423. Much has been accomplished since the law was passed in October 1990, particularly during the period 1994 through 1995. Highlights of these achievements, discussed in detail in the following report, include:

- Joint Committee on Printing (JCP) specifications developed for 4 new permanent papers and 16 new alkaline papers;
- JCP issued *Government Paper Specification Standards (No. 10)*, from which the 20 newly specified papers can be procured;
- National Archives and Records Administration (NARA) issued *NARA Bulletin No. 95-7*, Procurement of Writing, Copying, and Printing Papers for Federal Records, which provides guidance to Federal agencies in the use of alkaline and permanent papers;
- Library of Congress (LC) continues research to identify new and improved methods for the artificial aging of paper;
- Research on the aging of lignin-containing alkaline papers initiated in both the United States (including LC and NARA) and Canada;
- New or revised standards for paper permanence issued by the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), and the International Organization for Standards (ISO);
- Continued increase in U.S. production of alkaline paper; 99.9 percent of book papers procured through bulk purchase by the Government Printing Office (GPO) in 1995 were alkaline; and
- General Services Administration (GSA) provided papers for purchase that match the JCP specifications.

Submission of this report discharges responsibilities assigned to the Librarian of Congress, Archivist of the United States, and the Public Printer, as set forth in Pub. L. 101-423. However, since important work remains to be done, they have agreed to continue monitoring, on an ad hoc basis, progress in the implementation of the Government s permanent paper policy.

Introduction

Public Law 101-423, A Joint Resolution to Establish a National Policy on Permanent Papers (Section 3), states the following:

> The Librarian of Congress, the Archivist of the United States, and the Public Printer shall jointly monitor the Federal Government's progress in implementing the national policy . . . regarding acid free permanent papers and shall report to the Congress regarding such progress on December 31, 1991, December 31, 1993 and December 31, 1995.

The Librarian of Congress, the Archivist of the United States, and the Public Printer (the monitoring agencies) have been working together to monitor implementation of the law since it was signed by the President on October 12, 1990. In addition, the agencies worked jointly to enhance the general level of knowledge in the Federal Government about the national policy on permanent paper, and to ensure that Federal agencies understand the criteria to be used to determine whether documents have enduring (*i.e.*, long-term) value. This report is the last of three reports to Congress required by Pub. L. 101-423.

Progress in Monitoring Pub. L. 101-423

Definition of permanence

Pub. L. 101-423 (Appendix 1) recommends the use of "acid free permanent paper" using the specifications established by the Joint Committee on Printing (JCP). For purposes of clarity, this report adheres to the JCP specifications. Thus, an acid free permanent paper is defined to be a fully bleached sheet with a pH of 7.5 or above, an alkaline reserve of 2 percent or more, a minimum MIT folding endurance in either direction of 30 double folds, and a minimum tearing strength in either direction of 25 grams for a 30 lb paper and proportionately higher tearing strengths for heavier papers. This definition matches most closely the first specification for permanent paper, ANSI Z39.48-1984, developed by National Information Standards Organization, which has strong support in the archival and library communities.

Standards and specifications

Federal. When Public Law 101-423 was passed five years ago, the Government had only one specification for permanent paper: **JCP A270**, uncoated permanent book, white and cream white. With the issuance in July 1994 of the latest version of the *Government Paper Specification Standards (No. 10)*, the number of permanent papers available for Government use increased from one to five. The four new permanent papers are:

JCP G40, Option A, 25 percent bond, white and colored (with 50 percent recovered material);
JCP G60, Option A, 25 percent opacified bond, white and buff (with 50 percent recovered material);
JCP H30, Option A, imitation parchment, laser-finish, white and colored; and
JCP O-60, Option A, plain copier, xerographic, white, natural and colored.

A number of alkaline papers have been added as option A to many existing specifications. The specification standards advise that option A should be specified if the printed product *must* have above average permanence. The alkaline option is available in 16 paper grades (Appendix 2). All of these JCP papers available through the Government Printing Office (GPO) and General Services Administration (GSA) are recyclable within the programs Federal agencies now operate.

The monitoring agencies have been working with the GSA to ensure that some of the same papers available to Federal agencies in the Washington, DC area through the GPO will be available nationwide. GSA now offers three permanent papers and two alkaline papers (Table 1).

Table 2B: Coated Paper in Procured Printing, FY 1994						
Papers	**Acidic**		**Alkaline**		**Totals**	
L11	1	2	44	98	45	100
L12	3	7	39	93	42	100
Subtotal	**49**	**7**	**629**	**93**	**678**	**100**
Total (Tables 2A and 2B)					**1,125**	

Table 3A: Uncoated Paper in Procured Printing, FY 1995						
Papers	**Acidic**		**Alkaline**		**Totals**	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Miscellaneous	41	36	74	64	115	98
A60	32	11	258	89	290	100
A61	0	0	3	100	3	100
A80	2	5	38	95	40	100
D10	8	42	11	58	19	100
H10	5	33	10	67	15	100
H20	4	22	14	78	18	100
K10	19	73	7	27	26	100
L20	5	33	10	67	15	100
Subtotal	**116**	**21**	**425**	**79**	**541**	**100**

Table 3B: Coated Paper in Procured Printing, FY 1995						
Papers	**Acidic**		**Alkaline**		**Totals**	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Miscellaneous	20	22	69	78	89	100
A170	4	12	29	88	33	100
A180	3	2	130	98	133	100
A181	0	0	38	100	38	100
A182	2	3	68	97	70	100
A240	0	0	102	100	102	100
A260	1	1	95	99	96	100
A261	0	0	60	100	60	100
A262	0	0	45	100	45	100
L10	3	4	77	96	80	100
L11	1	3	35	97	36	100
L12	0	0	35	100	35	100
Subtotal	**34**	**4**	**783**	**96**	**817**	**100**
Total (Tables 3A and 3B)					**1,358**	

Table 4: Comparison of Alkaline Paper Purchased* in FY 1994 & FY 1995			
	Percent		Percentage Points
Papers	1994	1995	Difference
Uncoated, overall	***69***	***79***	***10***
A60 offset book	77	89	12
A80 opacified offset book	75	95	20
D10 writing	84	58	-26**
K10 index	23	27	4
L20 vellum-finish cover	53	67	14
Coated, overall	***93***	***96***	***3***
A170 publication-grade, gloss coated text	69	88	19
A180 gloss coated text	94	98	4
L10 litho coated cover	95	96	1
* For stocking in GPO, direct shipments, open market purchases, etc. **This figure is affected by the amount of colored paper purchased per year because many colors can only be produced in an acidic papermaking process.			

Over 75 percent of the uncoated text paper represented by A60, A61, A80 in tables 2A and 3A and over 90 percent of the coated paper in tables 2B and 3B (except the miscellaneous and A170) were alkaline. Both uncoated and coated papers showed an increase in the percentage of alkaline stocks used from FY 1994 to 1995. Selected grades are listed in Table 4.

Bulk purchases. In GPO's bulk purchases, the amount of alkaline paper received was unaffected by EPA requirements that the paper contain recycled fibers (50 percent wastepaper with 20 percent postconsumer (PC) fiber content in FY 1994, or simply 20 percent postconsumer fiber in FY 1995). In all JCP specifications requiring a PC fiber content or that has a minimum of 25 percent cotton fiber content, the specification requires a minimum pH of 6.5. This requirement has not proven to be a problem thus far for any of the suppliers whose paper is being procured in the quarterly bulk purchases. For the GPO's quarterly procurement of **book papers** for stocking in GPO (measured in tons), 87 percent were alkaline in FY 1994 and almost all (99.9 percent) were alkaline in FY1995. Even though GPO did not specify that the paper must be alkaline, nearly all of the book papers received (JCP A25, A55, A60, and A80) were alkaline.

Of the bulk purchase of **office papers**, all of the 25 percent and 50 percent cotton cut-size bond/writing papers (JCP G-series papers) purchased were alkaline in the current year. All the bulk purchased recycled (20 percent PC) copier paper (JCP O-65 paper) were alkaline. Colored JCP O 60 copier paper was about 50 percent alkaline and 50 percent acidic.

There were only a few grades of **acidic paper**. One was a map paper grade (JCP E40, GPO Lot 94) which was specified to be acidic for the purpose of improving the sheet s ink drying characteristics. Often, colored index (JCP K10) and vellum-finish cover (JCP L20) stocks are also acidic so some of the colors desired by the customer can be attained. Alkaline papers are available for index and cover stock, but in fewer colors.

Observations/Relevant Findings

Environmental issues

During the 5-year period covered by Pub. L. 101-423, a number of pertinent events have occurred. First, the trend has continued in the paper industry to convert mills from acid to alkaline papermaking. This conversion can be attributed primarily to EPA regulations 40 CFR 430 - Pulp, Paper, and Paperboard Point Source Category that govern the amount and kinds of effluent that paper mills can discharge.[5] Once conversion was underway, the lower cost of raw materials for alkaline papermaking made the change a profitable one.

A second development within the monitoring period was the issuance of Executive Order 12873, "Federal Acquisition, Recycling, and Waste Prevention." This order followed a number of earlier EPA regulations, the most significant of which was the Guideline for Federal Procurement of Paper and Paper Products Containing Recovered Materials that was published in the *Federal Register* (Vol. 53, No. 120) on June 22, 1988. EO 12873 addresses recycling in general and places some very specific requirements on Government purchasers of paper. Section 504 sets minimum content standards for postconsumer recovered materials in printing and writing papers, with a 20 percent requirement as of December 31, 1994, and 30 percent as of December 31, 1998 (for most of these papers), which have been incorporated as a basic requirement in *Government Paper Specification Standards (No. 10).*

Section 505 directs agencies to revise or eliminate sections of standards or specifications that contain brightness or other specific pulp requirements if these requirements are not needed for a particular grade of paper to be functional. These two requirements appear to conflict with the policy set out in Pub. L. 101-423. However, the Federal Environmental Executive in a July 19, 1994, letter to the Director of the New York Public Library (Appendix 7) stated that all agency environmental executives would be notified that "the requirements for use of recycled paper are not to conflict in any way with the concurrent requirement for permanent paper use." Thus, provided that the requirements for permanent paper are met, any amount of postconsumer recovered material can be incorporated.

The purpose of section 505 is to eliminate unnecessary requirements for paper that result in the production of harmful byproducts such as dioxins. Dioxin is of particular concern because it has been shown to be a byproduct of papermaking when pulp is bleached with elemental chlorine (chlorine gas). For those not versed in industry technology or recent research, section 505 might appear to eliminate the purchase of bleached paper. This interpretation is erroneous for two reasons.

First, in the absence of research that provides other options, fully bleached pulp is a necessary component of permanent paper at this time. Bleaching removes the lignin from the pulp, which is necessary for permanence because lignin-containing papers have been shown to darken with age and light exposure. Librarians, archivists, and records managers are concerned that such discoloration could impede future reformatting procedures. Thus, the requirement that permanent paper be fully bleached cannot be eliminated because it is directly related to its long-term performance.

Second, the paper industry is gradually using more elemental chlorine-free (ECF) bleaching, with the result that the dioxin levels in fish near pulp and paper mills have been dropping.[6] Data show that by the end of 1994 ECF and TCF (totally chlorine-free) bleached pulps comprised about 54 percent of the bleached pulp produced. Of that 54 percent, 85 percent (about 20 million tons) was ECF pulp. However, when pulp is ECF bleached, the process is not totally free of chlorine. Most manufacturers are using chlorine dioxide instead of elemental chlorine. Despite this continued presence of chlorine, the dioxin levels decline. This leads many U.S. producers to question the need

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Proposed improvements to these regulations appear in the Federal Register, V. 58, No. 241 (December 17, 1993), under authority of sections 301, 304, 306-308, and 501 of the Clean Water Act and 33 U.S.C. sections 1311, 1314, 1316, 1317, and 1361. The proposal identifies and describes previous studies and guidance that helped to propel mill conversion.

McDonough, T.J., *Proceedings of the Fourth China Paper Technical Conference,* TAPPI PRESS, Atlanta. 1995.

to go totally chorine-free. Another factor in their reluctance is the cost. Currently, virtually all TCF production is in Europe. The one U.S. producer, Louisiana Pacific at Samoa, California, has met with weak demand for its pulp. For this reason, North American producers believe that the market is unwilling to pay more for TCF pulps.[7]

The effect of recycling on paper performance and longevity was the topic of the September 28, 1994, meeting of the NARA Advisory Committee on Preservation. The meeting included representatives from several Federal agencies as well as standards and testing professional organizations, librarians, paper manufacturers and associations, and other interested organizations. Most representatives agreed that it is possible to produce paper that contains postconsumer waste while satisfying permanent paper specifications; however, it will not be easy or inexpensive. The postconsumer wastepaper supply eventually will contain paper that has been previously recycled perhaps for the third or fourth time. Several participants predicted that after a period of time recycled paper containing postconsumer waste will fail the strength requirements for permanent paper.

Three manufacturing practices contribute to the weakness of recycled paper containing postconsumer waste: (1) repulping paper fibers reduces the length of fibers and thus decreases the strength of paper; (2) drying and rewetting pulp for re-shipment between recyclers and manufacturers reduces bonding strength among fibers; and (3) removing groundwood and lignin exacerbates the reduction of fiber and bonding strength even further. A change of these practices may help manufacturers produce more long lasting paper containing a high proportion of recycled fiber content, but the consumer must tolerate a less bright sheet of paper and a degree of eventual yellowing. As discussed elsewhere in this report, the American Society for Testing and Materials and the paper research institutions of Canada are researching these concerns.

During 1994, a paper made by an alkaline process, but containing a high percentage of groundwood, entered the Federal marketplace. This grayish paper, natural shade recycled plain copier xerographic paper (JCP O-70), was being used widely in copiers and laser printers, and, as a result, it was used to create some permanent records. Concern was first expressed about the paper in a "Meeting on Groundwood Paper in Federal Offices," sponsored by the Office of the Federal Environmental Executive on October 11, 1994.

The meeting discussed primarily how JCP O-70 would recycle when entering the waste stream (a topic outside the scope of this report), but concerns regarding the longevity of this paper were raised. In direct answer to these concerns, the USDA Forest Products Laboratory presented results of research done on this paper. They studied the optical and physical properties of three different paper mixes which they recycled.

The control mix was a fully-bleached paper which contained 50 percent recycled content, of which 10 percent was postconsumer fiber. The second paper was the grayish paper under discussion at the meeting, which had 100 percent recycled content, of which 50 percent was postconsumer fiber. The third was a 50/50 mixture of these two papers. The 50/50 mixture was studied to demonstrate what would happen when the higher percentage postconsumer fiber content became mixed with the white office paper and recycled.

This study showed, as might be expected, that the strength properties of the 50/50 mix paper were midway between those of the two papers from which it was made. However, the optical properties of the mixed paper were much closer to, not midway between, the properties of the 50 percent postconsumer fiber paper. Thus, they concluded that the introduction of a higher percentage postconsumer fiber paper into a recycling mix would "degrade both the physical strength and brightness of the final product."[8] This could be overcome, of course, by adding stronger fiber, and additional bleaching steps, both of which appear counter to the intended purposes of the Executive Order.

Continuing changes in technology

McDonough, T.J., *Tappi Journal*. 78(3), 55(1995).

"A Comparison of Upcycled and Recycled Paper," S. Abubaker and K. Cropsey presented at USDA Forest Products Laboratory, Madison, WI, "Meeting on Groundwood Paper in Federal Offices."