

Envelopes		Average Over Stroke Widths & Ink Colors	Breakdown by Stroke Width and Ink Color																				
			Thin Stroke Width						Bold Stroke Width														
			Black		Blue		Green		Purple		Red		Black		Blue		Green		Purple		Red		
Color Class	Sample Set		Black	Blue	Green	Purple	Red	Black	Blue	Green	Purple	Red	Black	Blue	Green	Purple	Red	Black	Blue	Green	Purple	Red	
Green	36	54	82	64		67	0	53	48			25	0				0						0
Green	37	14	4	0		46	0	0	0			30	0				0						0
Green	38	0	0	0			0	0	0			0	0				0						0
Green	39	43	83	63		38	0	33	25			17	0				0						0
Green	40	0	0	0		0	0	0	0			0	0				0						0
Red	41	95	96	96	100	100		96	92	91	92												
Red	42	96	96	92	100	100		100	100	83	96												
Red	43	86	83	75	88	96		92	83	96	75												
Blue	44	74	92		42	83	0	96		67	63	0											0
Blue	45	35	79		0	58	0	50	17	0	17	0											0
Blue	46	53	90		0	81	0	100	50	5	50	0											0
Blue	47	81	92		83	83	0	88	63	79	63	4											4
Blue	48	97	100		95	100	28	100	85	100	85	5											5
Blue	49	23	46		32	8	0	17	21	17	21	0											0
Pink	50	97	100	96	100		0	100	96	92		0											0
Orange	51	90	96	96	96	100		95	88	83	71												
White	52	96	100	96	98	98	4	96	100	94	92	0											0

Table 4. Summary of Address Readability Test

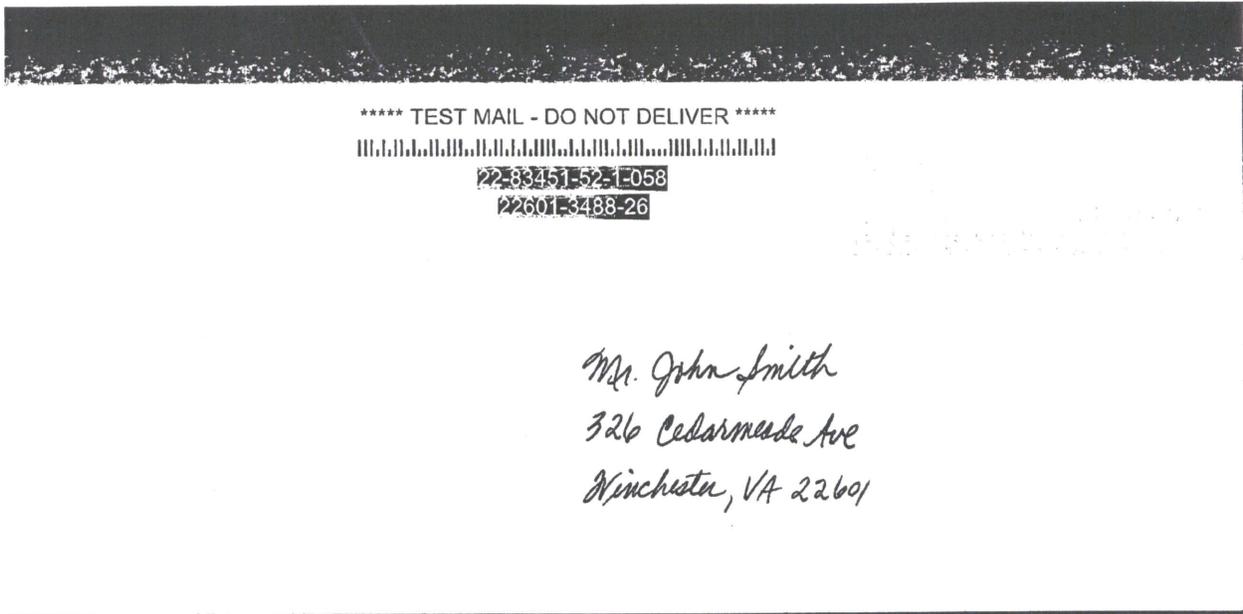


Figure 18. Miscode Example 1 - White/Black ISS Image Correctly Processed

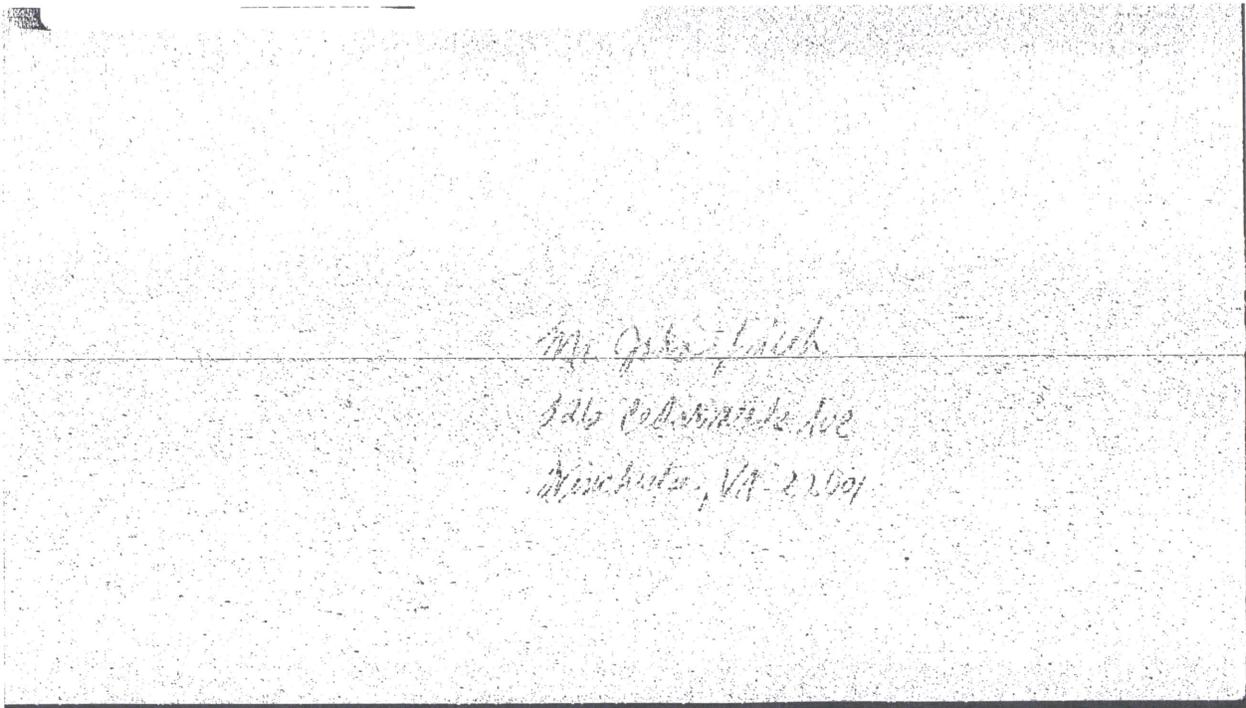


Figure 19. Miscode Example 1 - Green (PMS3278)/Black ISS Image Incorrectly Processed

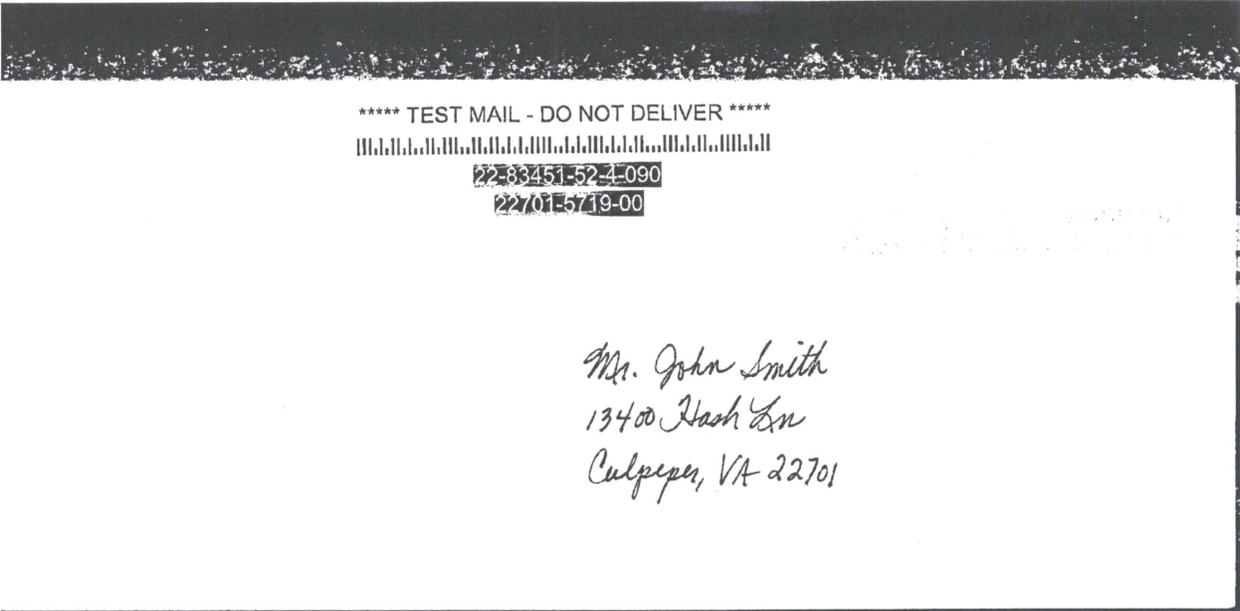


Figure 20. Miscode Example 2 - White/Blue ISS Image Correctly Processed

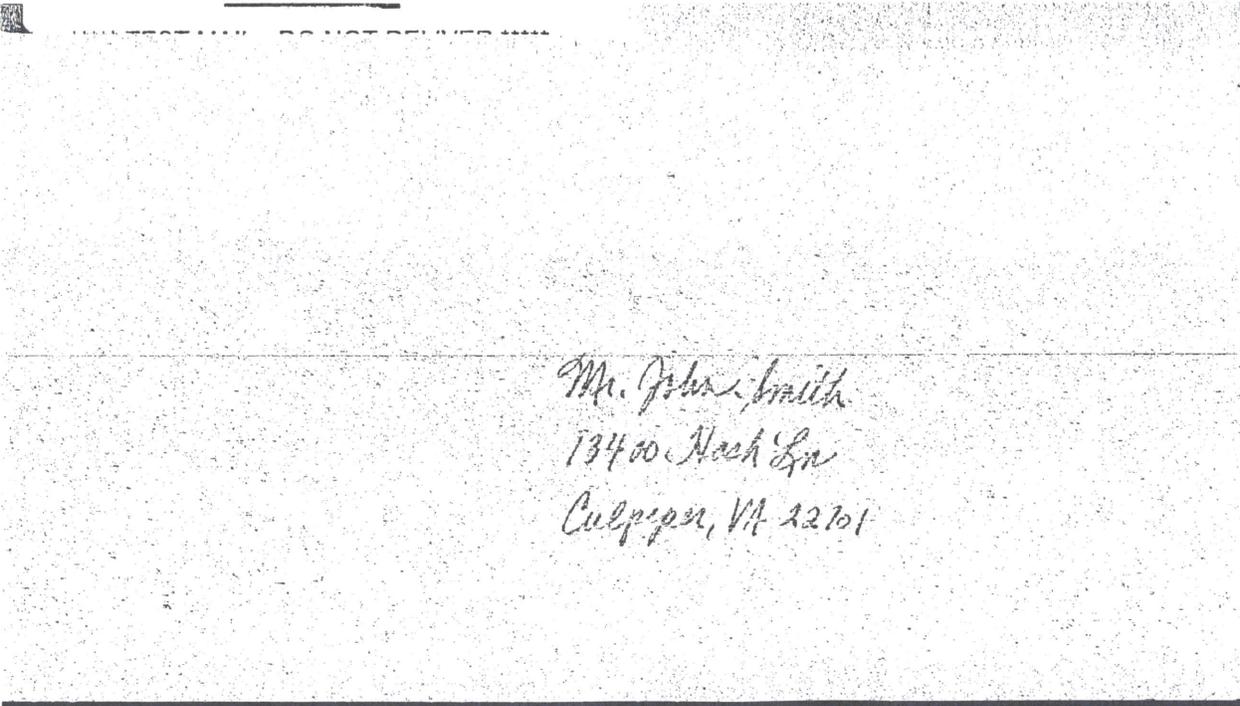


Figure 21. Miscode Example 2 - Green (PMS3278)/Blue ISS Image Incorrectly Processed

Envelope Color		Ink Color				
Color Class	Sample Set	Black	Blue	Green	Purple	Red
Green	36	-29	-16	0	-42	0
Green	37	-4	0	0	-16	0
Green	38	0	0	0	0	0
Green	39	-50	-38	0	-21	0
Green	40	0	0	0	0	0
Red	41	0	-4	-9	-8	0
Red	42	+4	+8	-17	-4	0
Red	43	+9	+8	+8	-21	0
Blue	44	+4	0	+25	-20	0
Blue	45	-29	0	0	-41	0
Blue	46	10	0	+5	-31	0
Blue	47	-4	0	-4	-20	+4
Blue	48	0	0	+5	-15	-23
Blue	49	-29	0	-15	+13	0
Pink	50	0	0	-8	0	0
Orange	51	-1	-8	-13	-29	0
White	52	-4	+4	-4	-6	-4

Table 5. Address Readability Rate Differentials from Increasing Stroke Width

### 6.2.3 ID Tag Readability

Table 6 summarizes the results of the ID tag readability test. For each of the seventeen sample sets, Table 6 shows the readability rate, which is computed as the ratio of readable pieces to the sum of readable and unreadable pieces, and expressed as a percentage. The threshold of acceptability for ID tag readability rate is 97 percent.

ID tag readability was poor on four of the five green sample sets, one of the six blue sample sets, and the orange sample set. In all, ID tag readability was unacceptable for six of the tested envelope colors.

### 6.2.4 POSTNET Code Readability

Table 6 also summarizes the results of the POSTNET Code readability test. For each of the seventeen sample sets, Table 6 shows the readability rate, which is computed as the ratio of readable pieces to the sum of readable and unreadable pieces, and expressed as a percentage. The threshold of acceptability for POSTNET Code readability rate is 98 percent.

POSTNET Code readability was poor on one of the five green sample sets, and on the darkest of the three red sample sets. It could not be measured on two of the green sample sets because address readability on those sample sets was insufficient; i.e., there was no barcode to print.

Envelopes		Readability	
Color Class	Sample Set	Fluorescent ID Tag	POSTNET Code
Green	36	94	99
Green	37	94	83
Green	38	96	
Green	39	89	100
Green	40	100	
Red	41	98	100
Red	42	100	100
Red	43	100	38
Blue	44	100	100
Blue	45	99	100
Blue	46	96	100
Blue	47	100	100
Blue	48	98	100
Blue	49	99	100
Pink	50	99	100
Orange	51	92	99
White	52	100	100

Table 6. Results of ID Tag Readability Test

### 6.3 Cancellation Testing

The color test deck was used for cancellation testing. The threshold of acceptability for cancellation rate is 98 percent.

As Table 7 shows, cancellation performance was unacceptable on all five green sample sets, two of the three red sample sets, and one of the six blue sample sets. Note that most of the darker envelopes failed to achieve an acceptable level of cancellation.

Sample Set	Envelope Size	Aspect Ratio	Legal Size	Legal Ratio	Color	Performance Acceptable	Quantity	Reject Mechanical	Reject Cancellation	Weak Ink	Cancelled	Percent Cancelled
36	5-3/4 X 8-1/4	1.43	YES	YES	Green PMS 3278	NO	251	0	251	0	0	0.00
37	5-3/4 X 8-1/4	1.43	YES	YES	Green PMS 347	NO	278	0	278	0	0	0.00
38	5-3/4 X 8-1/4	1.43	YES	YES	Green PMS 348	NO	261	0	261	0	0	0.00
39	5-1/4 X 7-1/8	1.36	YES	YES	Green PMS 355	NO	261	0	261	0	0	0.00
40	5-3/4 X 8-1/4	1.43	YES	YES	Green PMS 356	NO	245	0	245	0	0	0.00
41	5-3/4 X 8-1/8	1.41	YES	YES	Red PMS 186	NO	259	0	252	0	7	2.70
42	5-1/4 X 7-1/4	1.38	YES	YES	Red PMS 199	YES	301	0	1	0	300	99.67
43	5-1/8 X 7-1/4	1.41	YES	YES	Red PMS 1935	NO	267	0	265	0	2	0.75
44	5-3/4 X 8-1/4	1.43	YES	YES	Blue PMS 278	YES	270	0	0	0	270	100.00
45	5-3/4 X 8-1/4	1.43	YES	YES	Blue PMS 279	YES	265	0	0	0	265	100.00
46	5-1/8 X 7-1/8	1.39	YES	YES	Blue PMS 291	YES	201	0	0	0	201	100.00
47	5-1/4 X 7-1/4	1.38	YES	YES	Blue PMS 306	NO	257	0	254	0	3	1.17
48	5-1/2 X 8-3/4	1.59	YES	YES	Blue PMS 319	YES	200	0	0	0	200	100.00
49	5-1/8 X 7-1/4	1.41	YES	YES	Blue PMS 659	YES	288	0	0	0	288	100.00
50	5-1/4 X 7-1/4	1.38	YES	YES	Purple PMS 680	YES	250	0	0	0	250	100.00
51	5-1/4 X 7-1/4	1.38	YES	YES	Orange PMS 1505	YES	253	0	0	0	253	100.00
52	4-1/8 X 9-1/2	2.30	YES	YES	White	YES	400	0	0	0	400	100.00

Table 7. Cancellation Rates for Color Test Deck

## 7 Conclusions

### 7.1 Results

Address readability was acceptable (>95%) on five of the sixteen color sample sets: 41, 42, 48, 50, and 51. They include the lightest two of the three red sample sets, the lightest of the six blue sample sets, and the pink and orange sample sets.

Ten sample sets -- 40, 41, 42, 43, 44, 45, 47, 48, 49, and 50 -- produced acceptable (> 97%) readability rates on fluorescent ID tags. They include one green sample set, all three red sample sets, five of the six blue sample sets, and the pink sample set.

Twelve sample sets produced acceptable (> 98%) readability rates on POSTNET Codes. Sets 37 and 43 did not; sets 38 and 40 could not be tested for POSTNET readability.

Eight sample sets -- 42, 44, 45, 46, 48, 49, 50, and 51 -- produced acceptable (> 99%) cancellation performance. None of the green sample sets and only one of the red sample sets passed that test.

Three sample sets passed all three readability tests and the cancellation performance test, whose threshold of acceptability was 98%. They are sets 42, 48, and 50. They correspond to PMS colors 199, 319, and 680, respectively.

Table 8 summarizes the results of tests performed using the color test deck. Rates that met or exceeded their respective thresholds of acceptability are shown in bold type.

Envelopes			Test Results				Acceptance Decision
Color Class	Sample Set	PMS Number	Readability Rates			Cancellation Performance	
			Address	ID Tag	POSTNET		
Green	36	3278	54	94	<b>99</b>	0	Fail
Green	37	347	14	94	83	0	Fail
Green	38	348	0	96		0	Fail
Green	39	355	43	89	<b>100</b>	0	Fail
Green	40	356	0	<b>100</b>		0	Fail
Red	41	186	<b>95</b>	<b>98</b>	<b>100</b>	3	Fail
Red	42	199	<b>96</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>Pass</b>
Red	43	1935	86	<b>100</b>	38	1	Fail
Blue	44	278	74	<b>100</b>	<b>100</b>	<b>100</b>	Fail
Blue	45	279	35	<b>99</b>	<b>100</b>	<b>100</b>	Fail
Blue	46	291	53	96	<b>100</b>	<b>100</b>	Fail
Blue	47	306	81	<b>100</b>	<b>100</b>	1	Fail
Blue	48	319	<b>97</b>	<b>98</b>	<b>100</b>	<b>100</b>	<b>Pass</b>
Blue	49	659	23	<b>99</b>	<b>100</b>	<b>100</b>	Fail
Pink	50	680	<b>97</b>	<b>99</b>	<b>100</b>	<b>100</b>	<b>Pass</b>
Orange	51	1505	90	92	99	100	Fail
White	52		<b>96</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>Pass</b>

Table 8. Results of Readability and Cancellation Testing for Color Deck

## 7.2 Recommendations

Based on test results, no changes or exceptions to the current size and aspect ratio requirements for first class automation mail are possible.

A waiver to the currently imposed non-automation compatible surcharge should be granted for letter size mail with a matte finish, meeting all other DMM requirements for automation-compatible, first class mail, and not having red fluorescence in excess of 4 PMU, for mail envelopes in PMS colors 199, and 319, that do not meet the current minimum envelope reflectance requirements of 50% red and 45% green. This waiver should be granted only if ERM-II measured reflectance values are above, or no more than 2% below, the measured values of the samples received from GCA and identified in Table 9 below. Sample set 50 (PMS 680) met the current Domestic Mail Manual (DMM) minimum print reflectance requirements. Therefore, no waiver is necessary for PMS 680.

<b>GCA ID</b>	<b>Red Reflectance</b>	<b>Green Reflectance</b>
PMS 199	69	39
PMS 319	29	42
PMS 680	63	52

Table 9. Color Test Sample Reflectance



Preliminary Test Report

Greeting Card Association (GCA) Samples

Effects of Envelope Size and Color

On the Automated Facer Cancellor System (AFCS)

Image Recognition & Processing  
USPS Engineering

March 22, 2006

***Draft***

<b>Revision History</b>		
<b>Revision # and Date</b>	<b>Person</b>	<b>Description</b>
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## 1 Executive Summary

In the fall of 2005, the Greeting Card Association (GCA) provided a number of empty, unsealed envelopes to the United States Postal Service, Engineering facility in Merrifield, VA for the purpose of ascertaining the automation processability on currently fielded equipment. Most of these samples are currently assessed a postage surcharge based on long-standing requirements related to the physical dimensions and color of the envelopes. Specifically, the goal of the test was to determine if these samples could be processed without additional processing costs and the surcharge eliminated or reduced.

The United States Postal Service (USPS) contracted to have the envelopes prepared to simulate actual greeting card mail to the extent necessary to determine processability. In late fall, USPS received two batches of fully prepared samples. The first batch consisted of various size envelopes stuffed, sealed and stamped as if they contained an actual greeting card prepared by an individual. Many samples in this batch exceeded maximum height, maximum length, aspect ratio or a combination of these requirements and are currently subject to a surcharge based on cost associated with processing these pieces.

The second batch consisted primarily of colored envelopes that do not meet current the Domestic Mail Manual (DMM) print reflectance requirements. These samples were prepared with simulated hand written addresses and had postage applied by a popular Pitney-Bowes postage meter. As a control, addresses and postage were also applied, in an identical manner, on commercial #10 white envelopes.

This report is limited to an evaluation of how the two batches of samples described above would be initially inducted into the mail stream prior to subsequent processing. As greeting cards, the samples were processed as collection mail by the rough cull and Automated Facer Cancellor System (AFCS).

By design, the rough cull and AFCS removes mail pieces with physical characteristics that cannot be processed or are prone to damage by the AFCS or subsequent mail processing equipment. With the exception of three samples very close to the aspect ratio requirements, the equipment could not achieve a satisfactory level of performance outside of the currently stated requirements. Unfortunately, this included the much-desired, square greeting card format.

Additionally, it was noted that most of the darker color samples also were not able to achieve a satisfactory level of performance in the cancellation and facing process. This was unexpected and is still being investigated. Many of these problematic colored samples also had difficulty in subsequent processing tests as well. This will be the subject of an expanded report due later this month. Any new information related to any problems unique to processing the colored samples on the AFCS will be updated at that time.



## 2 Pictorial Narrative of AFCS Testing

This section describes a portion of the AFCS testing performed on a group of three square card samples. This process was typical of the testing and subsequent analysis of results for all other samples.



**Image 1 – Square Samples #22 (5-3/4”), #23 (6”), #24 (6-1/4”)**

Image 1 shows a group of three fully prepared square envelope samples prior to the commencement of this portion of the test. The actual sample quantities and processing results for the aspect ratio samples are provided in Table – 1 at the end of this report.



**Image 2 – Square samples being inducted at the AFCS Rough Cull Input Hopper**

This image shows three different square envelope sample sizes. The samples are intermingled and deposited into the AFCS's Rough Cull Input Hopper in a manner consistent with the standard operating procedure employed at USPS Processing and Distribution Centers (P&DC) for the processing of collection mail.

The actual equipment utilized for this test was located within the USPS Engineering Facility at Merrifield, VA and had been very recently refurbished to field equipment specifications. The ink jet cancellation equipment on this machine is currently deployed at the Northern Virginia P&DC and many other sites across the nation.