**PROCESS WASTE ASSESSMENT:
KODALITH/CONTACT PRINT PROCESSING**

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Final Report

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Technical Communications
Kansas City Division

MASTER
AlliedSignal
AEROSPACE

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Abstract

This process waste assessment was performed to determine quantitatively the chemicals used in the Kodalith/contact printing process, to determine their ultimate destination, and to explore options for reduced usage. It was discovered that, because of increased use of computer graphics, the volume of chemicals used for this process has been greatly diminished; however, limited technology precludes total elimination of the Kodalith process. Of three options explored, only the purchase of a laser printer that would decrease Kodalith requirements by 60% seems presently feasible.

Summary

A photomechanical transfer (PMT) camera is used to expose film (Kodak Ultraline). The resultant negative is then developed through a four-step process which includes a developer (98504600), a stop bath (98600042), a fixer (98504612), and a continuous-flow water rinse. The product is mechanically dried and can be used "as is" to continue the graphics process or be exposed using an arc printer to contact a print (Kodak Transtar) or film positive (Kodak Ultraline). The resultant product from this process is again developed through the same four-step process. The final rinse water, mixed with a minute amount of these chemicals, is then disposed through the industrial wastewater drain. Spent chemicals are disposed to Waste Management. The developer is drained daily. The stop bath and fixer are drained monthly.

The stop bath, developer, and fixer from this process are mixed with PMT activator from another process and then disposed to Waste Management approximately every 1.5 months using a 5-gal. alkaline carboy. A KCD-1722 is attached which states that the mixture contains silver. Waste

Management then processes the mixture according to procedural guidelines.

Three options explored included the purchase of a laser copier that would eliminate about 60% of the Kodalith requirements, substitution of chemicals that would perhaps decrease toxicity, and incorporation of new hardware and software that could eliminate the entire process.

Of these three options, only the purchase of a laser printer that would decrease Kodalith requirements by 60% seems presently feasible.

Discussion

Process Description

A photomechanical transfer (PMT) camera is used in D/554 to expose film (Kodak Ultraline). The resultant negative is then developed through a four-step process which includes developer (98504600), a stop bath (98600042), a fixer (98504612), and a continuous-flow water rinse. The product is mechanically dried and can be used as-is to continue the graphics process or can be exposed using an arc printer to contact a print (Kodak Transtar) or film positive (Kodak Ultraline). The resultant product from this process is again developed through the same four-step process. The process flow diagram is shown in the Appendix.

Process Assessment

A. Methodology

Mass balances were determined by inventory records and personal judgment.

B. Mass Balance

Mass balance worksheets are shown in the Appendix.

C. Waste Stream Summary

The waste stream description worksheets are shown in the Appendix

Option Summary and Analysis

The following three options were researched for this process.

- Purchase of either a Canon Color Laser Copier (approximately \$25,000) or a Textronix Phaser III Color Copier (approximately \$10,000). Either of these copiers would provide an option that would eliminate 60% of Kodalith requirements resulting in reduced chemical usage and material storage.
- Substitution of new products from Eastman Kodak or another supplier could result in lower toxicity and might reduce chemical usage. This option appears to be unlikely at present due to research and development costs that would ultimately be paid by the consumer.
- Incorporation of new hardware and software could eliminate the process entirely; however, the cost could run as high as \$100,000. Software is not currently available that will interface with all the systems currently in use at KCD.

Conclusion

Due to customer requirements, the PMT process must remain. The costs associated with this process are inexpensive (about \$40.00 a year for water and about \$300.00 a year for chemicals and materials). Disposal of water and non-hazardous chemicals to the industrial waste stream is minimal.

Recommendations

Due to the low volume of chemicals and materials, the process should continue to be studied. The laser printer would

eliminate 60% of the chemicals and still
allow Kodalith/ contact printing.

Appendix A

Worksheets

WORKSHEET 1
ISSUE DATE _____
REVISED _____

PROCESS WASTE ASSESSMENT

PWA TEAM

PWA TITLE Kodalith/Contact Print Processing

PWA ID CODE(S) Z951554-GA002

<u>NAME</u>	<u>EMP. #</u>	<u>DEPT.</u>	<u>MAIL CODE</u>	<u>EXT.</u>
*				

* Team Leader

ADDITIONAL RESOURCES:

<u>DEPT.</u>	<u>NAME</u>	<u>EXT.</u>
Environmental Protection		
Environmental Protection		
Environmental Protection		
Emission Factors		
Waste Water Pretreatment		
Fire Protection		
Industrial Hygiene		
Facilities Engineering (Cost Engineering)		
Waste Management		
Safety		
Maintenance (Equipment)		
Analytical Lab Testing		

PROCESS WASTE ASSESSMENT

PROCESS DESCRIPTION

PWA TITLE Kodalith/Contact Print Processing

PWA ID CODE(S) Z951554-GA002

PROCESS LOCATION D/554 OB48

PROCESS DESCRIPTION

The process involves the use of a Photomechanical Transfer (PMT) camera (CE#63841) to expose film (Kodak Ultraline). The resultant negative is then developed through a 4-step process; Developer (98504600), Stop Bath (98600042), Fixer (98504612), and a continuous flow water rinse. The product is then mechanically dried (CE#73486). This product can be used as is to continue the graphics process or can be exposed using an Arc Printer (CE#44258) to contact a print (Kodak Transtar) or film positive (Kodak Ultraline). The resultant product from this process is again developed through the above-mentioned 4-step process.

MAJOR PRODUCTS (Optional):

WASTE STREAM AFFECTED: (Circle One)

PLATING

SOLVENT

POLYMER

MISCELLANEOUS

PROCESS WASTE ASSESSMENT

FACILITY LAYOUT

PWA TITLE or PWA ID CODE(S) Z951554-GA002

PROCESS WASTE ASSESSMENT

PROCESS FLOW DIAGRAM

PWA TITLE or PWA ID CODE(S) Z951554-GA002

(INDICATE THE PWA ID(S) ASSOCIATED WITH THE PROCESS ON THE DIAGRAM.)

PROCESS WASTE ASSESSMENT

MASS BALANCE

PWA TITLE or PWA ID CODE: Z951554-GA002

From 1/1/92
To 12/31/92

From 1/1/92 To 12/31/92		OUTPUT (LBS.)										
Material Standard No. 5098 Support Stores No. 98504612 Name Ultratec Fixer & Replenisher	Component Input Qty. (lbs.) 46 (Component Name and %)	Total Output Matl./Comp. Reaction Prod.	Waste Mgmt. Empty Cont. *3	Waste Mgmt. Liquid *4	Waste Mgmt. Solid *5	Point Source Air *6	Fugitive Air *7	Water (Sanit.) *8	Water (Indust.) *9	Input To Another Process (Proc. ID) *10	Product (Retained on) *11	Other *12
	Water	Water 26.45		25.92			0.53					
%	57.5			98			2					
	Ammonium Thiosulfate	Ammonium Thiosulfate 14.95		14.95								
%	32.5			100								
	Sodium Acetate	Sodium Acetate 0.92		0.92								
%	2.0			100								
TOTAL							0.53					

* These are the process releases as coded in the directions for Worksheet 4.

PROCESS WASTE ASSESSMENT

MASS BALANCE

WORKSHEET 5
 ISSUE DATE _____
 REVISED _____
 Page 2 of 8

PWA TITLE or PWA ID CODE: Z951554-GA002

From 1/1/92
 To 12/31/92

From 1/1/92		To 12/31/92		OUTPUT (LBS.)									
Material Standard No. 5098	Support Stores No. 98504612	Component Input Qty. (lbs.) 46	Total Output Matl./Comp. Reaction Prod.	Waste Mgmt. Empty Cont.	Waste Mgmt. Liquid	Waste Mgmt. Solid	Point Source Air	Fugitive Air	Water (Sanit.)	Water (Indust.)	input To Another Process (Proc. ID)	Product (Retained on)	Other
98504612	Name Ultratec Dev. & Replenisher	(Component Name and %)		*3	*4	*5	*6	*7	*8	*9	*10	*11	*12
		Ammonium Acetate	Ammonium Acetate 0.92		0.92								
%		2.0			100								
		Disodium Citrate	Disodium Citrate 0.92		0.92								
%		2.0			100								
		Ammonium Sulfite	Ammonium Sulfite 0.92		0.92								
%		2.0			100								
TOTAL													

* These are the process releases as coded in the directions for Worksheet 4.

PROCESS WASTE ASSESSMENT

MASS BALANCE

WORKSHEET 5
ISSUE DATE _____
REVISED _____
Page 3 of 8

PWA TITLE or PWA ID CODE: Z951554-GA002

From 1/1/92

To 12/31/92

OUTPUT (LBS.)										
Material Standard No.	Component Input Qty. (lbs.)	Total Output Mat./Comp. Reaction Prod.	Waste Mgmt. Empty Cont.	Waste Mgmt. Liquid	Waste Mgmt. Solid	Point Source Air	Fugitive Air	Water (Sanit.)	Water (Indust.)	Input To Another Process (Proc. ID)
5098 Support Stores No. 98504612 Name Ultratec Dev. & Replenisher	46 (Component Name and %)		*3	*4	*5	*6	*7	*8	*9	*10
	Sodium Metabisulfite	Sodium Metabisulfite 0.92		0.92						*11
%	2.0			100						*12
%										
%										
%										
TOTAL	100	46.00		45.47						

* These are the process releases as coded in the directions for Worksheet 4.

PROCESS WASTE ASSESSMENT

MASS BALANCE

PWA TITLE or PWA ID CODE: Z951554-GA002

From 1/1/92
To 12/31/92

From 1/1/92 To 12/31/92		OUTPUT (LBS.)										
Material Standard No. 5106 Support Stores No. 98504600 Name Ultratec Dev. & Replenisher	Component Input Qty. (lbs.) 63.00 (Component Name and %)	Total Output Mati./Comp. Reaction Prod.	Waste Mgmt. Empty Cont. *3	Waste Mgmt. Liquid *4	Waste Mgmt. Solid *5	Point Source Air *6	Fugitive Air *7	Water (Sanit.) *8	Water (Indust.) *9	Input To Another Process (Proc. ID) *10	Product (Retained on) *11	Other *12
	Water	Water 48.83		47.85			0.98					
%	77.5			98			2					
	Tripotassium Phosphate	Tripotassium Phosphate 4.73		4.73								
%	7.5			100								
	Sodium Sulfite	Sodium Sulfite 4.73		4.73								
%	7.5			100								
TOTAL							0.98					

* These are the process releases as coded in the directions for Worksheet 4.

PROCESS WASTE ASSESSMENT

MASS BALANCE

WORKSHEET 5
ISSUE DATE _____
REVISED _____
Page 5 of 8

PWA TITLE or PWA ID CODE: Z951554-GA002

From 1/1/92
To 12/31/92

From 1/1/92		To 12/31/92		OUTPUT (LBS.)								
Material Standard No. 5106 Support Stores No. 98504600 Name Ultratec Dev. & Replenisher	Component Input Qty. (lbs.) 63.00 (Component Name and %)	Total Output Matl./Comp. Reaction Prod.	Waste Mgmt. Empty Cont. *3	Waste Mgmt. Liquid *4	Waste Mgmt. Solid *5	Point Source Air *6	Fugitive Air *7	Water (Sanit.) *8	Water (Indust.) *9	Input To Another Process (Proc. ID) *10	Product (Retained on) *11	Other *12
	Hydroquinone	Hydroquinone 1.89		1.89								
%	3.0			100								
	Sodium Hydroxide	Sodium Hydroxide 1.26		1.26								
%	2.0			100								
%												
TOTAL	97.5	61.44		60.46								

* These are the process releases as coded in the directions for Worksheet 4.

PROCESS WASTE ASSESSMENT

MASS BALANCE

PWA TITLE or PWA ID CODE: Z951554-GA002

From 1/1/92

To 12/31/92

From 1/1/92		To 12/31/92										
		OUTPUT (LBS.)										
Material Standard No. 5094	Component Input Qty. (lbs.) 0.375	Total Output Matl./Comp. Reaction Prod.	Waste Mgmt. Empty Cont. *3	Waste Mgmt. Liquid *4	Waste Mgmt. Solid *5	Point Source Air *6	Fugitive Air *7	Water (Sanit.) *8	Water (indust.) *9	Input To Another Process (Proc. ID) *10	Product (Retained on) *11	Other *12
Support Stores No. 98600042	(Component Name and %)											
Name												
Stop Bath												
	Acetic Acid	Acetic Acid 0.328		0.328								
%	87.5			100								
	Water	Water 0.047		0.047								
%	12.5			100								
%												
TOTAL	100	0.375		0.375								

* These are the process releases as coded in the directions for Worksheet 4.

PROCESS WASTE ASSESSMENT

MASS BALANCE

PWA TITLE or PWA ID CODE: Z951554-GA002

From 1/1/92

To 12/31/92

From 1/1/52		To 12/31/92		OUTPUT (LBS.)															
Material Standard No. ----- Support Stores No. ----- Name -----	Component Input Qty. (lbs.) ----- (Component Name and %)	Total Output Matl./Comp. Reaction Prod.	Waste Mgmt. Empty Cont. *3	Waste Mgmt. Liquid *4	Waste Mgmt. Solid *5	Point Source Air *6	Fugitive Air *7	Water (Sanit.) *8	Water (Indust.) *9	Input To Another Process (Proc. ID) *10	Product (Retained on) *11	Other *12							
Kodak Ultraline Film 98504602	Kodak Ultraline Film 10	Kodak Ultraline Film 10			2.0					8.0									
%	100				20					80									
Kodak Translar Paper	Kodak Translar Paper 0.5	Kodak Translar Paper 0.5			0.1					0.4									
%	100				20					80									
Cardboard Container	Cardboard Container 2.1	Cardboard Container 2.1	2.1																
%	100		100																
TOTAL					2.1					8.4									

* These are the process releases as coded in the directions for Worksheet 4.

PROCESS WASTE ASSESSMENT
MASS BALANCE

PWA TITLE or PWA ID CODE: Z951554-GA002

From 1/1/92
To 12/31/92

From 1/1/92 To 12/31/92		OUTPUT (LBS.)										
Material Standard No. ----- Support Stores No. ----- Name -----	Component Input Qty. (lbs.) ----- (Component Name and %)	Total Output Matl./Comp. Reaction Prod.	Waste Mgmt. Empty Cont. *3	Waste Mgmt. Liquid *4	Waste Mgmt. Solid *5	Point Source Air *6	Fugitive Air *7	Water (Sanit.) *8	Water (Indust.) *9	Input To Another Process (Proc. ID) *10	Product (Retained on) *11	Other *12
Plastic Container	Plastic Container 0.5	Plastic Container 0.5	0.50									
%	100		100									
Water (Mixed to Form Solution)	Water 138	Water 1138		135.24			2.76					
%	100			98			2					
Rinse Water	Water 27,103.65	Water 27,103.65							Water 27,103.65			
%	100								100			
TOTAL			2.60	241.55			4.27		27,103.65			

* These are the process releases as coded in the directions for Worksheet 4.

PROCESS WASTE ASSESSMENT

WASTE STREAM SUMMARY

(Only required for Multi-Waste Streams with the same Process Release Code.)

PWA TITLE or PWA ID CODE(S): Z951554-GA002

ATTRIBUTE	Process Release Code 4	Process Release Code 5	Process Release Code 10	Process Release Code 7	Process Release Code 9	Process Release Code
WASTE STREAM NAME	Used Chemicals	Scrap Material	Final Product	Evaporation	Rinse Water	
OVERALL OUTPUT FOR EACH PROCESS RELEASE CODE						
ANNUAL GENERATION RATE (lbs.) From 1/1/92 To 12/31/92 <i>Components:</i>	241.55	2.10	8.40	4.27		
Ultratec Fixer & Replenisher	45.47			0.53		
Ultratec Dev. & replenisher	60.46			0.98		
Stop Bath	0.375					
Water (Exclusive of Chemical Composition)	135.24			2.76	27,103.65	
Ultraline Film		2.00	8.00			
Transtar Paper		0.10	0.40			
FINAL DISPOSITION	Waste Management	Waste Management	Customer	Fugitive Air	Industrial Drain

PROCESS WASTE ASSESSMENT

WASTE STREAM SUMMARY

(Only required for Multi-Waste Streams with the same Process Release Code.)

PWA TITLE or PWA ID CODE(S): Z951554-GA002

ATTRIBUTE	Process Release Code 3	Process Release Code	Process Release Code	Process Release Code	Process Release Code	Process Release Code
WASTE STREAM NAME	Empty Container					
OVERALL OUTPUT FOR EACH PROCESS RELEASE CODE						
ANNUAL GENERATION RATE (lbs.) From 1/1/92 To 12/31/92 Components:	2.60					
Cardboard Container	2.10					
Plastic Container	0.50					
FINAL DISPOSITION	Waste Management					

PROCESS WASTE ASSESSMENT

WORKSHEET 7
ISSUE DATE _____
REVISED _____

MATERIAL COST SHEET

PWA TITLE or PWA ID CODE(S) Z951554-GA002

COST OF INPUT MATERIALS:

Material(s)	MS/SS Number	Cost Per Unit _____	Annual Cost
Ultratec Fixer & Replenisher	98504612	\$18.54 per Box	\$37.03
Ultratec Developer & Replenisher	98504600	\$29.87 per Box	\$59.87
Stop Bath	98600042	\$20.20 per Gal*	\$40.40
Ultraline Film	98504602	\$ 1.74 per Sheet	\$48.00
Transtar Paper	-----	\$ 2.28 per Sheet	\$54.72
Water		\$ 6.55 /1000 Cu. Ft.	\$ 2.87

OTHER INFORMATION: * Based on 1985 retail price. Material was transferred to our department sometime in this time period. No records were kept.

COST OF DISPOSAL OF OUTPUT MATERIAL(S):

Material(s)/Waste Streams	MS/SS Number (If applicable)	Cost Per Unit _____	Annual Cost
Ultratec Fixer & Replenisher (Liquid)	98504612	Mixed Mat'l (includes water) \$0.32 per lb.	
Ultratec Dev.& Replenisher (Liquid)	98504600		\$77.30
Stop Bath (Liquid)	98600042		
Ultraline Film (Solid)	98504602	\$0.13 per lb.	\$0.26
Transtar Paper (solid)	-----	\$0.13 per lb.	\$0.13
Packaging Material (solid)	-----	\$0.13 per lb.	\$0.34
Water	-----	\$ 6.29 /1000 Gal..	\$ 20.63

OTHER INFORMATION: _____

PROCESS WASTE ASSESSMENT

WORKSHEET 9
ISSUE DATE _____
REVISED _____
Page 1 of 1

OPTION DESCRIPTION

PWA TITLE or PWA ID CODE(S) Z951554-GA002

OPTION NAME and DESCRIPTION:

(Include input materials or components affected. Optional--Include products affected.)

OPTION 1 : Purchase of either a Canon Color Laser Copier 300 (Approx. \$25,000) or Textronix Phaser III Color Copier (Approx. \$10,000) would provide an option that could eliminate 60% of Kodalith requirements thus resulting in reduced chemical and material usage.

	Consider: Yes X No
Source Reduction <u>X</u>	Recycling/Reuse _____
Procedure Change <u>X</u>	Other _____

OPTION 2 : Substitution of new products from Eastman Kodak or other supplier could result in lower toxicity and might result in reduced chemical usage. This option, at present, appears an unlikely choice until such time that manufacturers are willing to incur the increased costs of research and development. These costs would probably be reflected in higher costs to the consumer.

	Consider: Yes X No
Source Reduction <u>X</u>	Recycling/Reuse _____
Procedure Change <u>X</u>	Other <u>Toxicity</u>

OPTION 3 : Incorporation of new Hardware or software could eliminate the process entirely. Cost estimates could be in excess of \$100,000 (hardware). Software is not currently available that will effectively interface with all of the numerous computer systems currently in use at KCD.

	Consider: Yes X No
Source Reduction <u>X</u>	Recycling/Reuse _____
Procedure Change <u>X</u>	Other _____

OPTION :

	Consider: Yes No
Source Reduction _____	Recycling/Reuse _____
Procedure Change _____	Other _____

PROCESS WASTE ASSESSMENT
OPTIONS SUMMARY

WORKSHEET 11
ISSUE DATE _____
REVISED _____
Page 1 of 3

PWA TITLE or PWA ID CODE(S): Z951554-GA002

Contact(s): D. L. Albers, D. J. Crockett

Waste Stream Affected (Circle One): Plating Solvent Polymer Miscellaneous

CONSIDERED OPTIONS	Option Score or Rank	Qty. Material Used (Lbs.) From 1/1/92 To 12/31/92 (List Material)	Estimated Implementation Cost	Feasibility	Anticipated Reduction Qty. (Lbs.)	Estimated Cost Savings
Purchase new equipment #1	1	Ultratec Developer & Replenisher- 46	\$10-25,000	Good	27.60	0
		Ultratec Fixer & Replenisher- 61.44			36.86	0
		Stop Bath-0.375			0.225	0
		Water (Exclusive of Chem. Comp.)- 138			82.80	0
		Ultraline Film - 10			6.00	0
		Transtar Paper - 0.5			0	0
		Empty Containers - 2.6			0	0
		Rinse Water - 27,103.65			16,262.19	0

PROCESS WASTE ASSESSMENT

OPTIONS SUMMARY

WORKSHEET 11
ISSUE DATE _____
REVISED _____
Page 2 of 3

PWA TITLE or PWA ID CODE(S): Z951554-GA002

Contact(s): D. L. Albers, D. J. Crockett

Waste Stream Affected (Circle One): Plating Solvent Polymer Miscellaneous

CONSIDERED OPTIONS	Option Score or Rank	Qty. Material Used (Lbs.) From 1/1/92 To 12/31/92 (List Material)	Estimated Implementation Cost	Feasibility	Anticipated Reduction Qty. (Lbs.)	Estimated Cost Savings
Replace current chemistry #2	2	Ultratec Developer & Replenisher- 46	\$100.00	Poor	0	0
		Ultratec Fixer & Replenisher- 61.44			0	0
		Stop Bath-0.375			0	0
		Water (Exclusive of Chem. Comp.)- 138			0	0
		Ultraline Film - 10			0	0
		Transtar Paper - 0.5			0	0
		Empty Containers - 2.6			0	0
		Rinse Water - 27,103.65			0	0

PROCESS WASTE ASSESSMENT

OPTIONS SUMMARY

WORKSHEET 11
ISSUE DATE _____
REVISED _____
Page 3 of 3

PWA TITLE or PWA ID CODE(S): Z951554-GA002

Contact(s): D. L. Albers, D. J. Crockett

Waste Stream Affected (Circle One): Plating Solvent Polymer Miscellaneous

CONSIDERED OPTIONS	Option Score or Rank	Qty. Material Used (Lbs.) From 1/1/92 To 12/31/92 (List Material)	Estimated Implementation Cost	Feasibility	Anticipated Reduction Qty. (Lbs.)	Estimated Cost Savings
Purchase new hardware/ software #3	3	Ultratec Developer & Replenisher- 46	\$100,000.00	Poor	46.00	0
		Ultratec Fixer & Replenisher- 61.44			61.44	0
		Stop Bath-0.375			0.375	0
		Water (Exclusive of Chem. Comp.)- 138			138.00	0
		Ultraline Film - 10			10.00	0
		Transtar Paper - 0.5			0.50	0
		Empty Containers - 2.6			2.60	0
		Rinse Water - 27,103.65			27,103.65	0

PROCESS WASTE ASSESSMENT

REGULATORY REPORTING REQUIREMENTS

PWA TITLE or PWA ID CODE(S) Z951554-GA002

MATERIAL NAME	Kodak Ultratec Developer and Replenisher
MS/SS #	98504600
CAS #	
STORAGE LOC. (MFL)	OB48 (300)
PHYSICAL STATE	Liquid
SARA CODES	K (1, 4)
ANNUAL USE CY	63 lbs.
MAX STORED	96.4 lbs.
VERIFIED BY:	Inventory Record/Personnel Judgement

	COMPONENT	COMPONENT	COMPONENT	COMPONENT	COMPONENT
COMPONENT	Water	Tripotassium Phosphate	Sodium Sulfite	Hydroquinone	Sodium Hydroxide
COMPONENT %	77.5	7.5	7.5	3.0	2.0
CAS #	7732-18-5	7778-53-2	7757-83-7	123-31-9	1310-73-2
PHYSICAL STATE	Liquid	Liquid	Liquid	Liquid	Liquid
ANNUAL USAGE	48.83	4.73	4.73	1.89	1.26
MAX STORED	74.71	7.23	7.23	2.89	1.93
FUGITIVE EM	0.98	-----	-----	-----	-----
POINT SOURCE EM	-----	-----	-----	-----	-----
STACK NO.	-----	-----	-----	-----	-----
DEPT. TREATMENT QTY. (RECYCLING)	-----	-----	-----	-----	-----
DEPT. TREATMENT EFFICIENCIES	-----	-----	-----	-----	-----
WASTE MANAGEMENT DISPOSAL QTY. CY	47.85	4.73	4.73	1.89	1.26

PROCESS WASTE ASSESSMENT

REGULATORY REPORTING REQUIREMENTS

PWA TITLE or PWA ID CODE(S) Z951554-GA002

MATERIAL NAME	Kodak Ultratec Fixer and Replenisher
MS/SS #	98504612
CAS #	
STORAGE LOC. (MFL)	OB48 (300)
PHYSICAL STATE	Liquid
SARA CODES	K (1, 4)
ANNUAL USE CY	46 lbs.
MAX STORED	101.6 lbs.
VERIFIED BY:	Inventory Record/Personnel Judgement

	COMPONENT	COMPONENT	COMPONENT	COMPONENT	COMPONENT
COMPONENT	Water	Ammonium Trisulfate	Sodium Acetate	Ammonium Acetate	Sodium Hydroxide
COMPONENT %	57.5	32.5	2.0	2.0	2.0
CAS #	7732-18-5	7783-18-8	127-09-3	631-61-8	144-33-2
PHYSICAL STATE	Liquid	Liquid	Liquid	Liquid	Liquid
ANNUAL USAGE	26.45	14.95	0.92	0.92	0.92
MAX STORED	58.42	33.02	2.03	2.03	2.033
FUGITIVE EM	0.53	-----	-----	-----	-----
POINT SOURCE EM	-----	-----	-----	-----	-----
STACK NO.	-----	-----	-----	-----	-----
DEPT. TREATMENT QTY. (RECYCLING)	-----	-----	-----	-----	-----
DEPT. TREATMENT EFFICIENCIES	-----	-----	-----	-----	-----
WASTE MANAGEMENT DISPOSAL QTY. CY	25.92	14.95	0.92	0.92	0.92

PROCESS WASTE ASSESSMENT

REGULATORY REPORTING REQUIREMENTS

PWA TITLE or PWA ID CODE(S) Z951554-GA002

MATERIAL NAME	Kodak Ultratec Fixer and Replenisher
MS/SS #	98504612
CAS #	
STORAGE LOC. (MFL)	OB48 (300)
PHYSICAL STATE	Liquid
SARA CODES	K (1, 4)
ANNUAL USE CY	46 lbs.
MAX STORED	101.6 lbs.
VERIFIED BY:	Inventory Record/Personnel Judgement

	COMPONENT	COMPONENT	COMPONENT	COMPONENT	COMPONENT
COMPONENT	Ammonium Sulfite	Sodium Metabisulfite			
COMPONENT %	2.0	2.0			
CAS #	10196-04-0	7681-57-4			
PHYSICAL STATE	Liquid	Liquid			
ANNUAL USAGE	0.92	0.92			
MAX STORED	2.03	2.03			
FUGITIVE EM	-----	-----			
POINT SOURCE EM	-----	-----			
STACK NJ.	-----	-----			
DEPT. TREATMENT QTY. (RECYCLING)	-----	-----			
DEPT. TREATMENT EFFICIENCIES	-----	-----			
WASTE MANAGEMENT DISPOSAL QTY. CY	0.92	0.92

WORKSHEET 12
ISSUE DATE _____
REVISED _____
Page 4 of 4

PROCESS WASTE ASSESSMENT
REGULATORY REPORTING REQUIREMENTS

PWA TITLE or PWA ID CODE(S) Z951554-GA002

MATERIAL NAME	Kodak Indicator Stop Bath
MS/SS #	98600042
CAS #	
STORAGE LOC. (MFL)	OB48 (300)
PHYSICAL STATE	Liquid
SARA CODES	K (1, 4)
ANNUAL USE CY	0.375
MAX STORED	9.0
VERIFIED BY:	Inventory Record/Personnel Judgement

	COMPONENT	COMPONENT	COMPONENT	COMPONENT	COMPONENT
COMPONENT	Acetic Acid	Water			
COMPONENT %	87.5	12.5			
CAS #	64-19-7	7732-18-5			
PHYSICAL STATE	Liquid	Liquid			
ANNUAL USAGE	0.328	0.047			
MAX STORED	7.88	1.125			
FUGITIVE EM	-----	-----			
POINT SOURCE EM	-----	-----			
STACK NO.	-----	-----			
DEPT. TREATMENT QTY. (RECYCLING)	-----	-----			
DEPT. TREATMENT EFFICIENCIES	-----	-----			
WASTE MANAGEMENT DISPOSAL QTY. CY	0.328	0.046			

PROCESS WASTE ASSESSMENT

REGULATORY REPORTING REQUIREMENTS (COMPLETE APPLICABLE INFORMATION)

PWA TITLE or PWA ID CODE(S) Z951554-GA002

SURFACE FINISHING OPERATION

MATERIAL NAME	N/A				
MS/SS #					
	COMPONENT	COMPONENT	COMPONENT	COMPONENT	COMPONENT
COMPONENT					
SUBSTRATE					
APPLICATION METHOD					
COATING TYPE					
COATING USE/RATE					
SOLVENT/% OF COATING					
THINNER AND % OF COATING AND THINNER MIXTURE					
STRIPPER AND %					

EMISSION CONTROL EQUIPMENT

TYPE	N/A
CE#	
PROCESS CONTROLLED	
EFFICIENCY	

DEGREASER/SPRAY EQUIPMENT

CE#	N/A
SOLVENT(S)	
CAPACITY	
DEPARTMENT/POST LOCATION	

PROCESS WASTE ASSESSMENT

WASTE MANAGEMENT OPERATIONS REGULATORY REPORTING REQUIREMENTS

PWA TITLE or PWA ID CODE(S) Z951554-GA002

Process Release Code Worksheet 4	Waste Stream Name	* Ind./EPA Hazard Waste No.	Waste Mixed Yes/No	Current Waste Container or Disposal Method
4	Ultratec Dev. & Repl. (Liquid)	N/A	Yes	5 Gallon Carboy
4	Ultratec Fixer & Repl. (Liquid)	N/A	Yes	5 Gallon Carboy
4	Indicator Stop Bath (Liquid)	N/A	Yes	5 Gallon Carboy
5	Empty Containers (Solid)	N/a	Yes	Regular Trash
5	Ultraline film (Solid)	N/a	Yes	Regular Trash
5	Transtar Paper (Solid)	N/A	Yes	Regular Trash

* Consult Waste Management Contact for EPA Hazard Code.

Is recycling performed within the department? Yes X No _____

Method of Recycling: Material is sent to Excess and Reclamation (D/162R) for silver reclamation

Is the reclaimed material returned to the department? Yes _____ No X

Used by others? Yes X No _____

If used by others, in what way? Silver content is reclaimed by Waste Management

**PROCESS WASTE ASSESSMENT
EMPLOYEE EXPOSURE ASSESSMENT INFORMATION
(FOR ALL MATERIALS COVERED BY PWA)**

PWA TITLE Kodalith /Contact Print Processing

PWA ID CODE(S) Z951554-GA002

1. Number of personnel that work directly with this process. 4
2. Are there any KCD known or suspected carcinogens used or produced in this process? Yes No
3. How could employees directly involved with the process be exposed during performance of the process? (Mark more than one if needed.)
 - (a) Inhalation of airborne contaminant
 - (b) Eye/skin absorption by direct contact with substance
 - (c) Ingestion of substance
 - (d) Injection or entry through cuts, scrapes, burns, or other open wounds
 - e. No exposure or not possible
4. Does the process release airborne contaminants (e.g. dusts, mists, fumes) into the work area? (disregard engineering controls)
 - (a) Airborne or high potential to become airborne
 - b. Airborne or moderate potential to become airborne
 - c. Airborne or low potential to become airborne
 - d. Not airborne but may be released by an incident
 - e. Not airborne, or not possible
5. Can employees recognize if they are exposed to the substance in the work area?
 - a. Not perceptible, no warning properties (e.g., no odor)
 - (b) Barely perceptible, poor warning properties
 - c. Perceptible, good warning properties
 - d. Highly perceptible, warning properties at very low levels

6. What types of air contaminants could be released into the work area? (Mark more than one if needed.)

- ☒ a. Gas
- b. Dust
- c. Aerosol
- d. None

Photographic material dipped in trays of chemical

7. What type of administrative or process controls are used in the work area during the process? (Mark more than one if needed.)

- a. Carcinogen Control Program
- b. Mandatory employee rotation or time limit
- c. Written safe work practices or supervision
- ☒ d. Employee information and training
- e. No administrative controls, or not required

8. In the near proximity of the process, how many employees are potentially exposed?

- a. More than 50 employees
- b. 11 to 50 employees
- c. 3 to 10 employees
- ☒ d. 1 to 3 employees
- e. No employees exposed

9. For employees directly involved with the process, how long per day are employees potentially exposed in the work area? (Mark all that apply and indicate number of employees.)

	<u># Exposed</u>
a. Full-shift exposure, more than 5 hours	_____
b. Partial shift exposure, 3 to 5 hours	_____
c. Partial shift exposure, 1 to 3 hours	_____
☒ d. Partial shift exposure, less than 1 hour	1-3
☒ e. Short-term exposure, less than 15 minutes	1-3
☒ f. Incidental, caused by incident or nonroutine	1-3
g. No exposure, or not possible	_____

10. For employees directly involved with the process, how long are employees potentially exposed on a typical monthly basis? (Choose maximum for any employee.)

- a. High (40 hours/month or greater))
- b. Medium (4-39 hours/month)
- ☒ c. Low (less than 4 hours/month)
- d. No exposure, or not possible

11. Is respiratory protective equipment (RPE) worn by employees in the work area during the process?

- a. Mandatory use of RPE (required by GPI or work instructions)
- b. Optional use of RPE (used by employee even though not required)
- ☒ c. No RPE used

12. What type of engineering controls are used during the process?

- a. Dilution ventilation (e.g., general room heating, ventilation and cooling)
- b. Local exhaust on the process
- c. Containment or enclosure w/o exhaust
- d. Containment or enclosure w/exhaust
- ☒ e. No engineering controls

13. What are the primary types of controls used during the process? (Mark more than one if needed.)

- a. Personal protective equipment (PPE)
- b. Respiratory protective equipment (RPE)
- c. Administrative controls (e.g., employee job rotation or certified operators)
- d. Engineering controls (e.g., local exhaust)
- e. Process control (e.g., work instructions)

No controls currently used

14. Concerns/Comments safety glasses/gloves are available, low hazard ratings for chemicals used.

Process Waste Assessment: Supplemental Data

To clarify data used to estimate the volume of water used in the final rinse process for PWA Z951554-GA002, the following judgments and equations were used.

Since this process is a continuous flow rinse, a rate of flow was required. The holding tank was measured in cubic inches and that result was converted to gallons. The tank was then filled with water to the overflow mark and timed. Rate of flow was determined to be 4.35 gallons per minute. This particular process was then determined to be in use an average of 15 minutes per week. The following formula was then used to determine yearly usage in pounds.

$$4.35 \text{ gal/min.} \times 15 \text{ min./wk.} = 65.25 \text{ gal./wk.} \times 50 \text{ wk./yr.} = 3,262.5 \text{ gal./yr.} \times 8.3 \text{ lbs.} = 27,103.65 \text{ lbs./yr.}$$

All subsequent calculations were then based upon this number 27,103.65 lbs./yr.

Paper and film costs and usage were primarily based upon estimates as these materials have been in the department for several years. Since the process is used only sparingly, current supplies are sufficient for near term usage.

END

**DATE
FILMED**

11 / 4 / 93