Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations—Background Information for Technology and Residual Risk Review

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Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations—Background Information for Technology and Residual Risk Review

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TABLE OF CONTENTS

Page

List of Tables iv

List of Acronyms and Units of Measure v

Chapter 1 Introduction and Summary 1-1
1.1 Statutory Authority and Mandate 1-1
1.2 NESHAP Source Category 1-2
1.3 References 1-2

Chapter 2 Magnetic Tape Manufacturing 2-1
2.1 Industry Description 2-1
2.1.1 Manufacturing Process Overview 2-1
2.1.2 SIC and NAICS Codes 2-1
2.1.3 Emission Points 2-2
2.1.4 Status of the Industry 2-6
2.2 Baseline Emissions 2-8
2.3 References 2-10

Chapter 3 Existing Regulations 3-1
3.1 Summary of New Source Performance Standards 3-1
3.2 Summary of State Regulations 3-2
3.3 Summary of Promulgated NESHAP 3-3
3.4 References 3-5

Chapter 4 Technology (MACT) Review 4-1
4.1 Status of Industry Technology 4-1
4.2 Identification and Measurement of HAP Used 4-2

Chapter 5 Residual Risk Analysis 5-1
5.1 Data Collection 5-2
5.1.1 Pollutants 5-2
5.1.2 Source Identification 5-3
5.1.3 Source Characterization 5-3
5.2 Risk Analyses 5-4
5.3 References 5-8

Chapter 6 Risk Reduction Options 6-1
6.1 EPA Decision of MACT Adequacy 6-1
6.2 Feasibility of Additional Controls to Reduce Risk 6-2
6.3 EPA Decision of No Rulemaking Action 6-3

LIST OF TABLES

Page

2-1 Magnetic Tape Manufacturing Facilities in the United States 2-7
2-2 Recent HAP Emissions from Magnetic Tape Manufacturing Facilities 2-9
2-3 Summary of Total HAP Emissions 2-10
3-1 Summary of the Magnetic Tape Manufacturing Standard 3-4
5-1 Summary of Residual Risk for Magnetic Tape Manufacturing Facilities 5-5

LIST OF ACRONYMS AND UNITS OF MEASURE

ATSDR	Agency for Toxic Substances and Disease Registry
CAS	Chemical Abstracts Service
CD	compact disc
CEM	continuous emission monitor
CFR	Code of Federal Regulations
CTG	control techniques guideline
dL	deciliter
DVD	digital video disc
EPA	U.S. Environmental Protection Agency
FR	Federal Register
g	gram(s)
gal	gallon(s)
HAP	hazardous air pollutant(s)
HEM	Human Exposure Model
HI	hazard index
IEUBK	Integrated Exposure Uptake Biokinetic Model for Lead in Children
ISCST3	Industrial Source Complex-Short-Term
kg	kilogram(s)
L	liter(s)
lb	pound(s)
m^3	cubic meter(s)
MACT	maximum achievable control technology
MEK	methyl ethyl ketone
Mg	megagram(s)
mg	milligram(s)
MIBK	methyl isobutyl ketone
MIR	maximum individual lifetime risk(s)
MRL	minimum risk level
NAICS	North American Industrial Classification System
NEI	National Emissions Inventory
NESHAP	national emission standards for hazardous air pollutants
NSPS	new source performance standards
PB	persistent and bioaccumulative
PbB	blood lead concentration
ppmv	part(s) per million by volume
RfC	reference concentration
SIC	Standard Industrial Classification
SSR	solid state recording
ton	tons
TRI	Toxics Release Inventory
VOC	volatile organic compound
yr	year(s)
μg	microgram(s)

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Chapter 1
Introduction and Summary

1.1 STATUTORY AUTHORITY AND MANDATE

Under section 112(d) of the Clean Air Act as amended in 1990 (the Act), the U.S. Environmental Protection Agency (EPA) promulgated national emission standards for hazardous air pollutants (NESHAP) for the magnetic tape manufacturing operations source category on December 15, 1994 (59 FR 64596). The final rule was codified as subpart EE to Part 63 of the Code of Federal Regulations (CFR). These national emission standards are technology-based and are also known as maximum achievable control technology (MACT) standards. The standards apply to new and existing sources of hazardous air pollutants (HAP) as listed in section 112(b) of the Act. Section 112(d)(6) of the Act requires EPA to review and revise, as necessary (taking into account developments in practices, processes, and control technologies), emission standards promulgated under this section no less often than every 8 years.

The NESHAP covers sources that are major sources of HAP. Major sources of HAP are those that emit, or have the potential to emit, 9.1 megagrams per year (Mg/yr) (10 tons per year [ton/yr]) or more of any one HAP or 22.7 Mg/yr (25 ton/yr) or more of any combination of HAP. The NESHAP also applies to any magnetic tape manufacturing operations located at a major source of HAP emissions (i.e., co-located emission sources), even if the magnetic tape manufacturing operations, by themselves, are not major sources of HAP emissions.

Section 112(f)(2) of the Act directs EPA to assess the risk remaining (residual risk) after the application of MACT standards developed under section 112(d) . This section of the Act states that:

> ...the Administrator shall, within 8 years after promulgation of standards for each category or subcategory of sources pursuant to subsection (d), promulgate standards for such

category or subcategory if promulgation of such standards is required in order to provide an ample margin of safety to protect public health in accordance with this section (as in effect before the date of enactment of the Clean Air Act Amendments of 1990) or to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect.

1.2 NESHAP SOURCE CATEGORY [1,2]

The magnetic tape manufacturing industry uses a primary coating process in which a mixture of magnetic (metal) particles, resins, and solvents (the coating mix) is applied to either a plastic film (tape) or paper. The HAP that have been used in this industry include methyl ethyl ketone (MEK), methyl isobutyl ketone (MIBK), toluene, toluene diisocyanate, ethylene glycol, methanol, xylenes, chromium, cobalt, ethylbenzene, and acetaldehyde. The most common HAP solvents are MEK and toluene. The non-HAP solvents that have been used in this industry include cyclohexanone, acetone, and isopropyl alcohol. Some of the HAP and non-HAP compounds listed above are no longer used in this industry.

Magnetic media on plastic film are used primarily for audio and video recording (audio- and videotape cassettes) and computer information storage (datatape, diskettes). Other uses of magnetic media on plastic film include magnetic cards, credit cards, bank transfer ribbons, instrumentation tape, and dictation tape. Magnetic coatings on paper are used for toll tickets, airline boarding passes, and security badges.

1.3 REFERENCES

1. U.S. Environmental Protection Agency. Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations – Background Information for Proposed Standards. Research Triangle Park, NC. EPA-453/R-93-059. December 1993.

2. U.S. Environmental Protection Agency. Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations – Background Information for Promulgated Standards. Research Triangle Park, NC. EPA-453/R-94-074b. December 1994.

Chapter 2
Magnetic Tape Manufacturing

2.1 INDUSTRY DESCRIPTION [1,2]

2.1.1 Manufacturing Process Overview

In the magnetic tape manufacturing process, a mixture of magnetic (metal) particles, resins, and solvents (the coating mix) is applied to either a plastic film (tape) or paper. The HAP emissions are predominantly from solvents used in the coating operation and in the cleaning of equipment. The primary HAP currently associated with magnetic tape surface coating are MEK (68 percent of reported emissions) and toluene (29 percent).

The solvent HAP emissions result from the evaporation of solvents from the (1) storage tanks, (2) coating mix preparation area, (3) coating application/flashoff area, (4) drying oven, (5) packaging and labeling operations, (6) waste handling area, (7) cleaning activities, and (8) pipe fittings. The drying oven and the coating mix area are typically the largest solvent HAP emission sources.

The magnetic particles are combinations of iron, chrome, and cobalt. Particulate HAP emissions can result from handling of materials, cleaning of process equipment, and adding dry media to mix tanks during coating mix preparation.

2.1.2 SIC and NAICS Codes

The magnetic tape manufacturing industry is predominantly included in Standard Industrial Classification (SIC) codes 3695, "Magnetic and Optical Recording Media"; 2672, "Coated and Laminated Paper, Not Elsewhere Classified"; and 3861, "Photographic Equipment and Supplies." Those same industry groups are covered under North American Industrial Classification System

(NAICS) codes 334613, "Magnetic and Optical Recording Media Manufacturing"; 322222, "Coated and Laminated Paper Manufacturing"; and 325992, "Photographic Film, Paper, Plate, and Chemical Manufacturing."

2.1.3 Emission Points

In the course of developing the NESHAP for magnetic tape manufacturing, EPA examined for potential control all known HAP emission points associated with the manufacturing process. These emission points are described in the following subsections.

2.1.3.1 Solvent Storage Tanks

Small tanks are generally used to store the solvent HAP, which may be virgin material, spent solvent from cleaning or off-specification mixes, or solvent from any stage of the solvent recovery process. The tanks operate at or slightly above atmospheric pressure. A facility typically has from 1 to 12 storage tanks, with a total capacity ranging from 757 to 75,700 liters (L) (200 to 20,000 gallons [gal]). As discussed in the MACT rule, storage tanks do not refer to tanks that are part of the process (e.g., mix preparation equipment). The HAP emissions from storage tanks occur through working losses during tank loading or through breathing losses due to diurnal temperature changes.

2.1.3.2 Mix Preparation Equipment and Particulate Transfer Operations

Mix preparation usually takes place in a room or rooms separated from the coating line. The components of the mix are first blended and then transferred to a series of mills to disperse the aggregates of magnetic particles without reducing particle size. The mix is circulated and filtered in holding tanks to prevent binders from curing, to prevent metal particles from settling out, and to remove any oversize contaminants. The coating mix is pumped to and from the different pieces of mix preparation equipment through closed lines. The mix preparation equipment controlled by the MACT standards includes all of the equipment used in preparing the coating mix, including mixers, holding tanks, and polishing tanks. Mills are not included as mix

preparation equipment, because they operate under pressure and, therefore, no emissions are expected, nor could they be vented to a control device.

Particulate HAP can be either transferred through closed systems or manually poured through hatches in the covers of the mix preparation equipment. A small amount of particulate HAP is emitted while transferring particulate from the bag or storage bin to the mix tank.

2.1.3.3 Coating Operations

In the coater, the substrate to be used for the magnetic or leader tape passes over a support roll while the coating mix is applied. The thickness and amount of coating applied vary with the product. During the coating application step, some solvent HAP will volatilize. The amount emitted depends on site-specific variables, such as the coating mix composition and the type of coater. Immediately following the coater, the magnetic tape is guided through an orientation field consisting of an electromagnet or permanent magnet, which aligns the individual magnetic particles in the direction of the intended recording. (Leader tape does not go through the orientation process, because magnetic particles are not used.) The magnetic or leader tape is passed through a drying oven, where the remaining solvents in the coating mix evaporate. Any solvents on the coated tape that are going to evaporate are expected to do so by this point in the process; therefore, no solvent evaporation is expected in subsequent steps. After drying, the finished product may be (1) calendered to compact the dry coating and smooth the surface; (2) slit to the desired width; and (3) packaged and labeled, either in parts produced in-house or in prepurchased plastic casings.

2.1.3.4 Cleaning Activities

Cleaning is performed differently at each plant. Some plants may clean equipment between each batch of coating, while others may clean only between product changes. At some plants, virgin solvent is used once and immediately treated as a waste. At other plants, cleaning solvent may be used several times before it is considered "spent." Four basic categories of cleaning activities have been identified for this industry: (1) flushing fixed lines; (2) cleaning tanks; (3) cleaning fixed exterior surfaces; and (4) cleaning miscellaneous removable parts.

The flushing of fixed lines involves flushing solvent through fixed lines not associated with the cleaning of a tank (e.g., the line from the mix preparation equipment to the coater). A fixed line is one that is stationary during normal operation but can be removed from its original location for cleaning. Emissions can occur if the solvent used for cleaning, or collected after cleaning, is exposed to the air.

Tank cleaning may be either an open-top or closed-top process. Open-top tank cleaning is the practice of cleaning a tank that either has no cover or whose cover has been removed. Solvent may be added and drained via buckets or pipes. The interior of the tank may be manually cleaned with brushes while the solvent is in it. Closed-top tank cleaning is the practice of cleaning a tank while using a cover that seals the top of the tank. Solvent is added to and drained from the tank via pipes. An automated brush inside the tank may scrub the sides while the solvent is in the closed tank. Emissions occur when the solvent used in the cleaning process is exposed to the air. In a closed system, equipment leak emissions also occur. Based on test data from industry, emissions from both types of cleaning processes are approximately equal.

Cleaning fixed exterior surfaces involves cleaning the surface area of a fixed piece of equipment with rags or brushes. The solvent on the rag or brush evaporates to the air. The surfaces to be cleaned are typically on the coater. The ventilation system of the enclosure around the coater draws these emissions to the outside air.

Cleaning removable parts involves cleaning parts that have been moved from their normal position to a wash tank or a sink that contains solvent. The solvent is volatile and, thus, evaporates into the air above the wash tank or sink. The sink is usually ventilated; consequently, emissions are discharged to the atmosphere.

Rags used for miscellaneous cleaning activities will contain some residual solvent and will, therefore, contribute to air emissions.

2.1.3.5 Waste Handling Devices

The two waste handling devices most commonly used in the magnetic tape manufacturing industry are pot stills and filter dryers. Both devices recover solvents from waste materials. In a pot still, liquid wastes are pumped through closed piping into the pot still and heated to evaporate the solvent portion of the waste. A filter dryer is used to treat solid wastes, such as filters, rags,

and brushes, which are manually placed in the dryer and heated to evaporate the solvent portion. With both pot stills and filter dryers, the evaporated solvent is condensed, and the recovered liquid is sent to a storage tank. Air emissions may occur through the condenser vent.

2.1.3.6 Wastewater Treatment

At magnetic tape manufacturing facilities, the only significant source of wastewater that contains HAP results from steam desorption of the carbon adsorption system beds used to recover HAP solvent from the air stream. After the steam desorbs the carbon adsorber bed, the solvent/water mixture is condensed and separated by gravity into distinct solvent and water phases.

The solvent phase is distilled to separate it into its individual components. Potential air emissions could result from residual solvents in the water phase if the water phase is not further treated prior to discharge to the publicly owned treatment works. At magnetic tape manufacturing facilities, the water phase is treated through steam stripping to remove residual solvent. The solvent compounds recovered through steam stripping are then purified into the individual solvent components.

2.1.3.7 Condenser Vents in the Solvent Recovery Area

The solvent recovery area is that area in the plant that contains the equipment used to (1) remove HAP solvent from the air stream, (2) recover the solvent, and (3) purify the solvent for reuse in the process. At magnetic tape manufacturing facilities, this equipment would include the control device (a carbon adsorption system or condenser), the wastewater treatment system (in the case of carbon adsorbers), and distillation units. Emissions of HAP to the air occur in the solvent recovery area from atmospheric condenser vents, including condenser vents on the steam stripper distillation columns and condenser vents to condense steam from carbon adsorber regeneration. The vent on a condenser that is used as a primary emission control device is not considered part of this emission point.

2.1.3.8 Equipment Leaks

In magnetic tape manufacturing operations, solvent is pumped through piping and process equipment as it travels to or from storage tanks and from the mix preparation equipment to the coater. Facilities that perform onsite solvent recovery and wastewater treatment will also have process piping and equipment within these areas. Volatile HAP will be emitted through leaks from equipment such as pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, and flanges or any other connecter in volatile organic compound (VOC) service.

2.1.3.9 Packaging and Labeling

The packaging and labeling process occurs after the product has been coated, rewound, and slit into the desired width (or punched into diskettes). Whatever the final form of the product, printed materials such as labels, boxes, and inserts are usually part of the final package. Most facilities purchase these items preprinted. Some facilities use ink jet printers to print product identification codes on boxes. This operation can involve small amounts of HAP solvents (contained in the ink) that volatilize as the ink dries.

2.1.4 Status of the Industry

In March 1994, 25 existing magnetic recording media and magnetic stripe manufacturing facilities were identified in the course of NESHAP development. Those 25 facilities were owned by 21 companies, and 14 of those 25 facilities were estimated to be major sources of HAP and, thus, would have been affected by the regulation. As of July 2005, 6 magnetic tape manufacturing facilities are still in operation in the United States, with 3 of the 6 located in Alabama. Four of the 6 facilities are considered major sources of HAP, based solely on the level of HAP emissions from their magnetic tape manufacturing operations, while the other two facilities can be considered major sources because they are located at major source facilities. Table 2-1 lists the six facilities identified as having magnetic tape manufacturing operations and presents verified information on their location.

Table 2-1. Magnetic Tape Manufacturing Facilities in the United States

Facility name and address	County	Latitude	Longitude	SIC code	NAICS code	Magnetic tape products
Quantegy Inc. 2230 Marvyn Parkway Opelika, AL 36801	Lee	32°37'28"	85°22'24"	3695	334613	audio-, video-, and datatape
JVC Magnetics America Co. #1 JVC Road Tuscaloosa, AL 35405	Tuscaloosa	33°10'29"	87°27'30"	3695	334613	audio- and videotape
Sony Magnetic Products Inc. of America 4275 W. Main Street Dothan, AL 36305	Houston	31°13'56"	85°27'28"	3695	334613	audio-, video-, and datatape
3M Magnetic Tape Manufacturing Division 905 - 915 Adam Street S.E. Hutchinson, MN 55350	McLeod	44°52'49"	94°21'32"	3695; 2672	334613; 322222	audio- and videotape
Eastman Kodak Co. - Kodak Park Plant 1669 Lake Avenue Rochester, NY 14652	Monroe	43°12'10"	77°37'45"	3861	325992	Advantix film
Imation Enterprises Corp. 2700 East Frontage Road Weatherford, OK 73096	Custer	35°32'03"	98°40'25"	3695	334613	diskettes, datatape

The shrinkage of the domestic magnetic tape manufacturing industry, resulting in many of the plants closing in the United States, has been ascribed to competition from foreign producers, which have lower production costs (primarily labor costs) than domestic producers. Industry contacts have also noted that both domestic and foreign competitors have been consolidating their operations. In addition, compact discs (CDs) and digital video discs (DVDs) have replaced most audio- and videotape cassettes in today's market.

Two new technologies may eventually supplant magnetic recording media: optical recording media and solid state recording (SSR) media. Optical recording devices use lasers to record electronically encoded information onto a reflective disk. Currently, optical disks are used to store extremely large amounts of data, much like computer tape and cartridges. Optical recording devices are generally much more expensive than current technologies for recording purposes and, therefore, have not been used extensively. Solid state recording devices eliminate the need for mechanical devices (to move tape or rotate a disk) by using other types of technology (e.g., semiconductor memory). This technology is in the early to intermediate stage of development.

In the mid-1990s, production of magnetic tape products reached its peak. In the late-1990s and early-2000s, magnetic tape products were increasingly replaced by optical recording media, particularly in prerecorded applications (e.g., prerecorded music and movies). Market value for tape products continues to fall as optical media and SSR media penetrate the market.

2.2 BASELINE EMISSIONS[2-9]

In 1994, EPA estimated that the NESHAP for the magnetic tape manufacturing source category would reduce baseline HAP emissions (4,060 Mg/yr [4,470 ton/yr]) from the 14 major source facilities by 2,080 Mg/yr (2,300 ton/yr). The major HAP emitted at that time were MEK and toluene. Emissions of VOC that are both HAP and non-HAP were expected to be controlled in the process of meeting the requirements for HAP removal. However, the quantity of those non-HAP VOC that would be removed was not quantified.

The six major source facilities in operation in 2005 are estimated to have HAP emissions ranging from 3.9 to 214 Mg/yr (4.3 to 236 ton/yr) from their magnetic tape manufacturing operations; these HAP emission estimates were determined using data from the 1999 Review Draft National Emissions Inventory (NEI) Version 3, the 2000 Toxics Release Inventory (TRI), State offices, and the facilities involved. The total HAP emissions for the magnetic tape manufacturing source category are currently estimated to be 468 Mg/yr (516 ton/yr). As in 1994, the major HAP emitted are MEK and toluene. These two solvents currently comprise 97 percent of all air emissions in this source category. Tables 2-2 and 2-3 summarize recently reported HAP emissions from these six facilities.

Table 2-2. Recent HAP Emissions from Magnetic Tape Manufacturing Facilities[a]

Facility name	Pollutant	Emissions Mg/yr	Emissions ton/yr	Notes
Quantegy Inc. Opelika, AL	Cobalt	0.005	0.005	Data from TRI (2000) and NEI (1999)
	MEK	27	30	
	Toluene	17	19	
	HAP subtotal	44	49	
JVC Magnetics America Co. Tuscaloosa, AL	MEK	76	84	Data from TRI (2000)
	Toluene	50	55	
	HAP subtotal	126	139	
3M Magnetic Tape Manufacturing Division Hutchinson, MN	Acrylic acid	2.0	2.2	Data from TRI (2000); estimated emissions by applying 30 percent factor to the total facility emissions for each pollutant
	Antimony	0.003	0.003	
	Ethylbenzene	0.04	0.05	
	Ethylene glycol	0.006	0.007	
	n-Hexane	2.4	2.6	
	Lead compounds	0.003	0.004	
	MEK	35	39	
	Methanol	11	12	
	MIBK	0.1	0.2	
	Toluene	24	26	
	Xylenes	0.2	0.2	
	HAP subtotal	74	82	
Eastman Kodak Co. Kodak Park Rochester, NY	Cobalt	< 0.001	< 0.001	Data from Eastman Kodak (2001); estimated MEK and toluene emissions by applying ratio of emissions from TRI (2000) to total organic emissions from Eastman Kodak
	Hydrogen chloride	0.03	0.04	
	MEK	1.1	1.2	
	Toluene	2.8	3	
	HAP subtotal	3.9	4.3	
Imation Enterprises Corp. Weatherford, OK	Acrylonitrile	0.004	0.004	Data from NEI (1999)
	MEK	4.9	5.4	
	Methanol	0.02	0.02	
	Toluene	0.4	0.4	
	HAP subtotal	5.3	5.8	
Sony Magnetic Products Inc. of America Dothan, AL	Cobalt	0.3	0.3	Data from TRI (2000) and Sony (2000)
	Cobalt compounds	0.003	0.004	
	MEK	172	190	
	Toluene	42	46	
	HAP subtotal	214	236	

[a] Data were from 1999, 2000, or 2001, depending on the facility.

Table 2-3. Summary of Total HAP Emissions[a]

Pollutant	Emissions		Percent of total
	Mg/yr	ton/yr	
Acrylic acid	2.0	2.2	0.4
Acrylonitrile	0.004	0.004	< 0.01
Antimony	0.003	0.003	< 0.01
Cobalt	0.3	0.3	0.06
Cobalt compounds	0.003	0.004	< 0.01
Ethylbenzene	0.04	0.05	< 0.01
Ethylene glycol	0.006	0.007	< 0.01
n-Hexane	2.4	2.6	0.5
Hydrogen chloride	0.03	0.04	< 0.01
Lead compounds	0.003	0.004	< 0.01
MEK	317	349	68
Methanol	11	12	2.3
MIBK	0.1	0.2	0.03
Toluene	136	150	29
Xylenes	0.2	0.2	0.03
Total	468	516	100

[a] Summed across facilities using recent emission data presented in Table 2-2.

2.3 REFERENCES

1. U.S. Environmental Protection Agency. Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations – Background Information for Proposed Standards. Research Triangle Park, NC. EPA-453/R-93-059. December 1993.

2. U.S. Environmental Protection Agency. Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations – Background Information for Promulgated Standards. Research Triangle Park, NC. EPA-453/R-94-074b. December 1994.

3. Memorandum from Holloway, T., RTI, to the project files. January 3, 2003. Toxics Release Inventory data for magnetic tape manufacturing facilities.

4. Memorandum from Holloway, T., RTI, to the project files. December 21, 2004. Additional Toxics Release Inventory data for one magnetic tape manufacturing facility.

5. Telecon. Hellwig, V., EPA/CCPG, with Sidig, K., 3M Corp. June 19, 2002. Hutchinson mag tape HAP emissions.

6. E-mail and attachment from Holloway, T., RTI, to Dail, H., EPA/CCPG. June 17, 2003. Mag tape NEI data.

7. E-mail and attachment from Palma, T., EPA/REAG, to Dail, H., EPA/CCPG. June 17, 2003. NEI data.

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9. E-mail and attachment from Farmer, M., Sony Magnetic Products Inc. of America, to Reeves, D., RTI. November 20, 2003. Re: Word vs. Word Perfect.

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Chapter 3
Existing Regulations

3.1 SUMMARY OF NEW SOURCE PERFORMANCE STANDARDS[1]

Magnetic tape manufacturing operations have previously been regulated by the EPA. The new source performance standards (NSPS) for the magnetic tape manufacturing industry were promulgated on October 3, 1988 (53 FR 38914). The NSPS are national standards that limit VOC emissions from the coating operation and the mix preparation steps at new magnetic tape manufacturing facilities.

The NSPS include control requirements for new coating operations using greater than or equal to 38 cubic meters (m^3) (10,000 gal) of solvent per year and for modified or reconstructed coating operations using greater than or equal to 370 m^3 (98,000 gal) of solvent per year. Coating operations that fall below these solvent usages are subject only to reporting and recordkeeping requirements.

The NSPS require new coating operations to recover or destroy 93 percent of the VOC content of the solvent applied at the coater. This same requirement applies to any modified or reconstructed coating operation that was achieving less than 90 percent control when it was modified or reconstructed. However, an existing coating operation that demonstrates an overall VOC control efficiency greater than or equal to 90 percent before modification or reconstruction is not required to add additional controls but must maintain an overall control level greater than or equal to the previously demonstrated control level (up to an overall VOC control efficiency of 93 percent).

The NSPS also require new mix preparation equipment to be covered and vented to a 95 percent-efficient control device, if the equipment is constructed concurrently with any control

device other than a condenser. For other cases, at a minimum, mix preparation equipment has to be equipped with a cover meeting particular specifications.

Under the NSPS, sources can also comply with the rule by using coatings that contain less than 0.2 kilograms per liter (kg/L) (1.67 pounds per gallon [lb/gal]) of coating solids as calculated on a weighted-average basis for each nominal 1-month period. As of the date of proposal of the NSPS (January 22, 1986), any new, modified, or reconstructed lines in any State were subject to the NSPS.

3.2 SUMMARY OF STATE REGULATIONS [1]

In addition to the NSPS, several State regulations that apply to the magnetic tape manufacturing industry have been developed. Twenty-eight States limit VOC emissions by requiring that the coatings used contain less than 347 grams per liter (g/L) (2.9 lb/gal) of coating applied, excluding water. This requirement originally applied to 12 operating facilities and was recommended by a 1977 Federal control techniques guideline (CTG) for existing stationary sources ("Control of Volatile Organic Emissions from Existing Stationary Sources—Volume II: Surface Coatings of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks," Document No. EPA-450/2-77-008). Based on the average VOC content of the coatings used by the magnetic tape manufacturing industry, this requirement was equal to approximately 83 percent control. Two States limited VOC emissions by requiring that the coatings used contain less than 359 g/L (3.0 lb/gal) of VOC. One magnetic tape manufacturing facility was located in one of those States and was, therefore, subject to this requirement. Five facilities in California were subject to rules that limit the VOC content of their coatings to either 120 or 264 g/L (1.0 or 2.2 lb/gal) of VOC, depending upon local district regulations. All of the aforementioned coating limits could also be met through the use of add-on controls, which is the method all known magnetic tape manufacturing facilities have chosen for compliance.

There has also been some regulation of VOC emissions from cleaning activities in the magnetic tape manufacturing industry. In California, the Bay Area Air Quality Management District requires that owners or operators either maintain a minimum freeboard ratio in their wash sinks or vent wash sink emissions to a control device. Four facilities were located in the California Bay Area. Illinois requires facilities with VOC emissions greater than 90.7 Mg/yr

(100 ton/yr) that are located in ozone nonattainment areas to cover vessels during cleaning. However, there have been no known magnetic tape manufacturing sources with VOC emissions above this level located in Illinois.

3.3 SUMMARY OF PROMULGATED NESHAP [2,3]

The NESHAP for the magnetic tape manufacturing operations source category was promulgated on December 15, 1994 (59 FR 64596) and amended on April 9, 1999 (64 FR 17464). The Magnetic Tape Manufacturing NESHAP defines MACT and limits emissions of HAP from surface coatings used at new and existing major sources in the manufacture of magnetic and optical recording media used in audio, video, computer, and magnetic stripe tape and disks. In general, an overall HAP control efficiency of at least 95 percent is required for emissions from each solvent storage tank, piece of mix preparation equipment, coating operation, waste handling device, or condenser vent in solvent recovery. Most facilities were expected to meet this requirement with solvent recovery devices, such as carbon adsorbers or condensers. Some were expected to use incinerators. If a facility uses an incinerator to control these emission points, it could choose to meet an outlet HAP concentration of no greater than 20 parts per million by volume (ppmv) by compound rather than achieve 95 percent control, as long as the efficiency of the capture system is 100 percent. The standards provide procedures for establishing an alternate concentration limit for the control device when the coating operations are not running. If a facility uses a coating with a HAP content no greater than 0.18 kg/L (1.5 lb/gal) of coatings solids, that facility's coating operation does not require further control.

The final NESHAP applies to major sources performing magnetic tape manufacturing operations, which is the affected source subject to these standards. The standards do not apply to research or laboratory facilities, or to owners or operators whose magnetic tape production on a coating line is 1 percent or less of total production from that coating line (in terms of square footage coated) in any 12-month period. Table 3-1 summarizes the standards for magnetic tape manufacturing operations in the final NESHAP.

Table 3-1. Summary of the Magnetic Tape Manufacturing Standard

Emission point	Standards	
Each solvent storage tank	§ 63.703(c)(1):	Overall (i.e., capture × control device efficiency) HAP control efficiency of ≥95 percent; or
	§ 63.703(c)(2):	For incinerators, an alternate outlet HAP concentration of ≤20 ppmv; or
	§ 63.704(c)(4):	Do not control solvent storage tanks, but control coating operations at higher efficiencies specified in rule; or
	§ 63.703(i):	Establish an alternate maximum HAP outlet concentration monitored with a continuous emission monitor (CEM) to demonstrate compliance during periods when coaters are not operating.
Each piece of mix preparation equipment	§ 63.703(c)(1):	Overall HAP control efficiency of ≥95 percent; or
	§ 63.703(c)(2):	For incinerators, an alternate outlet HAP concentration of ≤20 ppmv; or
	§ 63.703(i):	Establish an alternate maximum HAP outlet concentration monitored with a CEM to demonstrate compliance during periods when coaters are not operating.
Each coating operation	§ 63.703(c)(1):	Overall HAP control efficiency of ≥95 percent; or
	§ 63.703(c)(2):	For incinerators, an outlet HAP concentration of ≤20 ppmv; or
	§ 63.703(c)(4):	Control all coating operations at specified higher efficiencies instead of controlling solvent storage tanks; or
	§ 63.703(c)(5):	Use coating with HAP content no greater than 0.18 kg/L (1.5 lb/gal) of coating solids.
Each waste handling device	§ 63.703(c)(1):	Overall HAP control efficiency of ≥95 percent; or
	§ 63.703(c)(2):	For incinerators, an alternate outlet HAP concentration of ≤20 ppmv; or
	§ 63.703(i):	Establish an alternate maximum HAP outlet concentration to demonstrate compliance during periods when coaters are not operating.
Each condenser vent in solvent recovery	§ 63.703(c)(1):	Overall HAP control efficiency of ≥95 percent; or
	§ 63.703(c)(2):	For incinerators, an alternate outlet HAP concentration of ≤20 ppmv; or
	§ 63.703(i):	Establish an alternate maximum HAP outlet concentration to demonstrate compliance during periods when coaters are not operating.
Each particulate transfer operation	§ 63.703(d)(1):	Use enclosed transfer; or
	§ 63.703(d)(2):	Vent to baghouse/fabric filter that exhibits no visible emissions while controlling particulate HAP transfer.

(continues)

Table 3-1. (continued)

Emission point	Standards	
Each wash sink for cleaning removable parts	§ 63.703(e)(1)(i): § 63.703(e)(1)(ii): § 63.703(i):	Overall HAP control efficiency of ≥88 percent; or Minimum freeboard ratio of 75 percent; or Establish an alternate maximum HAP outlet concentration to demonstrate compliance during periods when coaters are not operating.
Each piece of equipment for flushing fixed lines	§ 63.703(f)(1)(i): § 63.703(f)(i)(ii): § 63.703(i):	Overall HAP control efficiency of ≥95 percent; or Use closed system; or Establish an alternate maximum HAP outlet concentration to demonstrate compliance during periods when coaters are not operating.
Each wastewater treatment operation	§ 63.703(g):	Treat to remove HAP by the fraction removed that is specified in Table 9 of 40 CFR part 63, subpart G; Treat to remove HAP so that total volatile organic HAP concentration at exit is <50 parts per million by weight.

3.4 REFERENCES

1. U.S. Environmental Protection Agency. National Emission Standards for Hazardous Air Pollutants; Proposed Standards for Hazardous Air Pollutant Emissions From Magnetic Tape Manufacturing Operations; Proposed Rule. 59 FR 11662. Washington, DC. U.S. Government Printing Office. March 11, 1994.

2. U.S. Environmental Protection Agency. National Emission Standards for Hazardous Air Pollutants; Final Standards for Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations; Final Rule. 59 FR 64596. Washington, DC. U.S. Government Printing Office. December 15, 1994.

3. U.S. Environmental Protection Agency. National Emission Standards for Hazardous Air Pollutants for Source Categories; Amendments for Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations; Direct Final Rule. 64 FR 17464. Washington, DC. U.S. Government Printing Office. April 9, 1999.

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Chapter 4
Technology (MACT) Review

4.1 STATUS OF INDUSTRY TECHNOLOGY

Section 112 (d)(6) of the Act requires EPA to review and revise, as necessary (taking into account developments in practices, processes, and control technologies), emission standards promulgated under section 112 no less often than every 8 years. The Magnetic Tape Manufacturing NESHAP was promulgated on December 15, 1994.

In 2002, as part of the data gathering effort for the residual risk analysis required under section 112(f)(2), EPA reviewed available information about the industry, talked with industry representatives, and contacted several facilities in the industry to discuss emission control technologies available to the industry. The EPA did not identify any additional control technologies beyond those that are already in widespread use within the source category (e.g., carbon adsorbers, condensers). The only developments identified involve improvements in the performance of existing technologies or increased frequency of inspections and testing, which would achieve only small incremental emission reductions that are often already being achieved because facilities over-control to maintain a safe level of continuous compliance with the NESHAP. The only major technical advances have been in the development of optical recording media and SSR media, which may eventually supplant magnetic tape. However, optical recording media and SSR media are not considered magnetic tape and would not be covered under the Magnetic Tape Manufacturing NESHAP. Therefore, the investigation did not identify any significant developments in practices, processes, or control technologies in the magnetic tape manufacturing industry since promulgation of the original standard in 1994. Because the existing

NESHAP continues to represent the best controls that can be implemented nationally, EPA believes that no further revisions to this standard are needed under section 112(d)(6).

4.2 IDENTIFICATION AND MEASUREMENT OF HAP USED

As noted in the introductory discussion of the NESHAP source category in Chapter 1, the HAP that have been used in the magnetic tape manufacturing industry include MEK, MIBK, methanol, toluene, toluene diisocyanate, ethylene glycol, xylenes, chromium, cobalt, ethylbenzene, and acetaldehyde. The non-HAP solvents that have been used in this industry include cyclohexanone, acetone, and isopropyl alcohol. Some of the HAP and non-HAP compounds listed above are no longer used in this industry.

Based on recent emission data reported by those U.S. facilities still manufacturing magnetic tape products, the primary HAP currently associated with magnetic tape surface coating operations are MEK (68 percent of reported emissions) and toluene (29 percent). A significant reduction has been noted in the amount of chromium used in the manufacturing operations compared to the 1994 data. Most facilities either have eliminated all chromium from their processes or are working on ways to substitute alternative metals in their coating formulations.

In a Federal Register notice published on May 30, 2003 (68 FR 32606), EPA proposed to amend the list of HAP contained in section 112(b)(1) of the Act by removing MEK (Chemical Abstracts Service [CAS] No. 78-93-3). This action was taken in response to a petition to delete MEK from the HAP list submitted by the Ketones Panel of the American Chemistry Council on behalf of MEK producers and consumers. Petitions to remove a substance from the HAP list are permitted under section 112(b)(3) of the Act.

To delete a substance from the HAP list, section 112(b)(3) provides that the Administrator must determine that "...there is adequate data on the health and environmental effects of the substance to determine that emissions, ambient concentrations, bioaccumulation or deposition of the substance may not reasonably be anticipated to cause any adverse effects to the human health or adverse environmental effects." The proposed delisting notice is open to public comment and public hearing, and EPA will evaluate all substantive information prior to taking any final action related to the proposal.

If MEK were successfully delisted, it would have minimal impact on the regulation of magnetic tape manufacturing facilities. As noted in the following chapters, there is not a significant health risk associated with any of the facilities currently manufacturing magnetic tape in the United States. The delisting of MEK will not change that conclusion.

As part of the petition evaluation, EPA considered the fact that MEK is one of the top compounds by volume reported in TRI. Under the proposed delisting notice, MEK would no longer be regulated as a HAP, but it would continue to be reported in TRI and regulated under EPA's criteria pollutant (ozone) program.

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Chapter 5
Residual Risk Analysis

Section 112(f)(2) of the Act directs EPA to assess the risk remaining (residual risk) after the application of MACT standards under section 112(d). This section states that:

> ...the Administrator shall, within 8 years after promulgation of standards for each category or subcategory of sources pursuant to subsection (d), promulgate standards for such category or subcategory if promulgation of such standards is required in order to provide an ample margin of safety to protect public health in accordance with this section (as in effect before the date of enactment of the Clean Air Act Amendments of 1990) or to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect.

The EPA's policy for defining and providing "an ample margin of safety" can be found in the "National Emission Standards for Hazardous Air Pollutants (NESHAP): Benzene Emissions from Maleic Anhydride Plants, Ethylbenzene/Styrene Plants, Benzene Storage Vessels, Benzene Equipment Leaks, and Coke By-Product Recovery Plants," 54 FR 38044, September 14, 1989, where EPA stated that:

> [I]n protecting the public health with an ample margin of safety under section 112, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1 in 1 million and (2) limiting to no higher than approximately 1 in 10 thousand the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years. Implementation of these goals is by means of a two-step, standard-setting approach, with an analytical first step to determine an "acceptable risk" that considers all health information, including risk estimation uncertainty, and includes a presumptive limit on maximum individual lifetime risk (MIR) of approximately 1 in 10 thousand. A second step follows in which the actual standard is set at a level that provides "an ample margin of safety" in consideration of all health information, including the number of persons at risk levels higher than approximately 1 in 1 million, as well as other relevant factors

including costs and economic impacts, technological feasibility, and other factors relevant to each particular decision.

54 FR 38044-45. See also, 55 FR 8292 (March 7, 1990).

5.1 DATA COLLECTION [1,2]

To evaluate the residual risk from the magnetic tape manufacturing source category after implementation of the Magnetic Tape Manufacturing NESHAP, it was necessary to identify those facilities that are subject to the control requirements of the standard and also to accurately describe their site locations, operations, and emissions. During the development of the Magnetic Tape Manufacturing NESHAP, information was gathered from a variety of sources to describe and characterize the industry, the HAP emitted, the emission sources, the control measures that were in use or available, and the projected emission reductions and costs of implementing the standards. Much of the information gathered during the development of the technology standards was useful in understanding the source category's emissions and controls as well as determining the identify and location of affected sources and some of the site-specific information necessary to do a risk analysis. The following sections describe the data gathering activities conducted for this residual risk study.

5.1.1 Pollutants [3]

The primary HAP emitted from magnetic tape manufacturing are MEK and toluene. These organic compounds comprise 97 percent of the HAP emitted from magnetic tape surface coating. The single biggest pollutant is MEK, which accounts for 68 percent of the total source category HAP emissions reported. Toluene accounts for 29 percent of total source category emissions. Three facilities reported metallic cobalt emissions ranging from less than 0.001 to 0.3 Mg/yr (0.001 to 0.3 ton/yr). One facility reported cobalt compound emissions of 0.1 Mg/yr (0.1 ton/yr), with cobalt comprising 3 weight-percent of the mix. (See Tables 2-2 and 2-3.) Some metals, such as iron and chromium compounds, are also found in trace amounts in many magnetic tape coatings.

5.1.2 Source Identification[4]

The list of sources subject to the Magnetic Tape Manufacturing NESHAP was compiled by investigating the 1999 NEI and the 2000 TRI, and by contacting and collecting information from State offices and from the facilities involved. Table 2-1 lists each of the six facilities reportedly manufacturing magnetic tape products. As noted in Chapter 2, several of the facilities identified in 1994 are no longer in business or are no longer manufacturing magnetic tape products.

5.1.3 Source Characterization[5]

To assess the risk posed by HAP emissions from the magnetic tape manufacturing source category, detailed site-specific information was needed. Modeling inputs, such as latitude and longitude, HAP emission rates, stack parameters (for stack emission points), building volume (for fugitive emission points), and operating hours, were used to perform the risk modeling.

The primary sources of site-specific modeling data used for this risk analysis were the 1999 NEI, 2000 TRI, State offices, and the facilities involved. The NEI provided data for each of the six facilities on the list of sources subject to the Magnetic Tape Manufacturing NESHAP. Although the NEI was used as the site-specific data source for the six facilities, there were deficiencies in the inventory that EPA had to address.

First, not all of the data fields in the NEI were populated with actual data. For missing key parameters (e.g., stack height, stack diameter, stack gas temperature and velocity), the NEI used default entries based on industry average values. Rather than use these default entries, EPA obtained actual parameter data from most of the facilities involved, including data on stack parameters (for stack emission points) and building volume (for fugitive emission points).

Second, in most cases, the HAP emission data in the NEI were somewhat out-of-date and did not reflect recent emission reductions achieved in the industry. Consequently, EPA supplemented the NEI with emission data obtained from the more recent 2000 TRI and from contacts with State offices and the facilities involved. Where possible, stakeholders provided updated information on the facilities' HAP emissions and on the percentage of HAP emissions that could be attributed to magnetic tape manufacturing operations.

At three of the six facilities (Quantegy, JVC Magnetics America, and Sony Magnetic Products), it was possible to attribute all of the facilities' TRI emissions to their magnetic tape manufacturing operations because they manufacture only magnetic tape. At the remaining three facilities (3M Magnetic Tape, Eastman Kodak, and Imation Enterprises), only a small fraction of these facilities' emissions can be attributed to their magnetic tape manufacturing operations because they manufacture more than just magnetic tape. At one of these facilities (Eastman Kodak), EPA was able to obtain emission data from the facility that were specific to the facility's magnetic tape manufacturing operation. At the second facility (Imation Enterprises), the SIC codes provided in the NEI made it possible to segregate the NEI emissions attributable to the magnetic tape manufacturing operation at the facility from the NEI emissions attributable to co-located sources that are part of another source category at the facility. At the third facility (3M Magnetic Tape), EPA obtained information from the facility indicating that up to 30 percent of the facility's total HAP emissions from the TRI could be attributed to the magnetic tape manufacturing operation.

It was not possible to determine exactly which pollutants from the TRI were emitted from 3M's magnetic tape manufacturing operation and which were emitted from co-located sources that are part of other source categories at the facility. However, some assumptions can be made based on the list of HAP typically used in the magnetic tape manufacturing industry. Using these assumptions, seven pollutants from the TRI (ethylbenzene, ethylene glycol, MEK, methanol, MIBK, toluene, and xylenes) are the most likely pollutants emitted from 3M's magnetic tape manufacturing operation, and four pollutants from the TRI (acrylic acid, antimony, n-hexane, and lead compounds) are most likely emitted from co-located sources that are part of another source category at the 3M facility.

5.2 RISK ANALYSES[6]

As discussed previously in more detail, site-specific emissions and source characteristic data were obtained directly from the NEI or from the TRI, or gathered from contacts with State offices or with the facilities involved. Using this information, EPA modeled exposure concentrations surrounding the six facilities in the magnetic tape manufacturing source category, calculated the risk of possible chronic cancer and noncancer health effects, evaluated whether

acute exposures might exceed relevant health thresholds, and investigated human health multipathway and ecological risks.

The EPA Human Exposure Model (HEM-Screen, 2003 Version) was used for the assessment of chronic exposures. HEM-Screen contains an atmospheric dispersion model with meteorological data and year 2000 population data at the census block level from the U.S. Bureau of Census. For this assessment, EPA used HEM-Screen to estimate the average annual ambient concentration at census block centroid locations for each facility. This concentration was then used as a surrogate for exposure to estimate the maximum lifetime individual cancer risk (MIR) and chronic noncancer hazard index (HI) for that facility. The MIR and HI estimates represent upper-bound risks for individuals who actually live in the most impacted areas. The MIR and HI results for the most exposed census blocks for each facility are summarized in Table 5-1. The total HAP emission rates used in the risk analysis are also provided in Table 5-1 for reference.

Table 5-1. Summary of Residual Risk for Magnetic Tape Manufacturing Facilities

Facility	Emissions		MIR[a]	Chronic HI
	Mg/yr	ton/yr		
Quantegy	44	49	NA	0.008
JVC Magnetics America	126	139	NA	0.02
3M Magnetic Tape	74	82	NA	0.3
Eastman Kodak	3.9	4.3	NA	0.0002
Imation Enterprises	5.3	5.8	1×10^{-8}	0.0002
Sony Magnetic Products	214	236	NA	0.2

[a] NA = not applicable.

The results show that out of the six facilities modeled, none pose cancer risks that are predicted to exceed 1 in 1 million, and none pose chronic noncancer risks that are predicted to exceed an HI of 1. One of the six facilities in the magnetic tape manufacturing source category (Imation Enterprises) was quantitatively assessed for potential cancer risks due to acrylonitrile emissions from this facility. Acrylonitrile is classified as a probable human carcinogen by EPA. The other five facilities did not emit any amount of known, probable, or possible carcinogens. The estimated MIR associated with this facility was 1 in 100 million, or 0.01 excess cancer case in

a population of 1 million. This is significantly less than the statutory limit of 1 excess cancer case in a population of 1 million in section 112(f)(2) of the Act. Furthermore, because of the health-protective assumptions used in the assessment, EPA believes that worst-case cancer risks from the magnetic tape facilities are actually lower.

The maximum chronic noncancer HIs for all six of the modeled facilities were well below 1. This means that the total lifetime exposures to the HAP emitted by these sources did not exceed the noncancer reference concentration (RfC) for any of the sources. For one of the facilities with the highest HI (0.2), the primary noncancer risk driver was cobalt, responsible for 99 percent of the estimated risk. Chronic inhalation exposure to cobalt has been associated with a variety of noncancer health effects in humans, including respiratory irritation, wheezing, asthma, pneumonia, fibrosis, cardiac effects, congestion of the liver and kidneys, and immunological effects. However, since all predicted cobalt exposures were well below the RfC, EPA does not believe that chronic exposures from these facilities pose a public health concern.

The EPA SCREEN3 air dispersion model was used for the assessment of acute exposures. SCREEN3 is a screening-level model that can be used to predict worst-case, 1-hour concentrations for a source of air toxics. With one exception, all maximum 1-hour exposure concentrations were below available acute dose-response values. The predicted maximum 1-hour concentration of toluene at one facility (JVC Magnetics America) slightly exceeded the acute minimum risk level (MRL) developed by the Agency for Toxic Substances and Disease Registry (ATSDR). Acute inhalation exposure to toluene has been associated with a variety of adverse health effects in humans, including dysfunction of the central nervous system and narcosis. Because ATSDR MRLs for acute exposures are derived assuming 1- to 14-day exposure durations, they may not be appropriate for comparison to maximum 1-hour HAP concentrations. A more suitable toluene MRL derived specifically for a 1-hour exposure period would likely be higher than the MRL associated with a 1- to 14-day exposure duration and above the maximum 1-hour toluene exposure. Since no 1-hour acute dose-response values for toluene were exceeded at any facility, EPA does not believe that acute exposures from these facilities pose a public health concern. Overall, results of the acute exposure analysis indicate that significant acute effects associated with HAP emissions from the six magnetic tape facilities are not expected.

Some persistent and bioaccumulative (PB) HAP may pose human health risks via exposure pathways other than inhalation and can also pose ecological risks by entering the wildlife food chain. Based on emissions data obtained for the magnetic tape manufacturing source category, lead is the only PB HAP reported as emitted by magnetic tape sources. Therefore, lead was investigated for potential human health impacts via non-inhalation pathways (e.g., ingestion).

Lead was reported as emitted by one facility (3M Magnetic Tape) in the magnetic tape manufacturing source category. Although lead is not typically emitted from magnetic tape manufacturing processes, EPA nonetheless included those emissions in its analysis in an attempt to capture the worst-case impacts for the facility. The lead may have been emitted from other co-located processes at the facility. As noted in the previous section, up to 30 percent of the facility's total HAP emissions can be attributed to the magnetic tape manufacturing process, with the rest attributed to other co-located processes. To estimate the facility's magnetic tape emissions, EPA applied the 30 percent to the facility's emissions for each HAP, including lead. The facility's emissions were extracted from its 2000 TRI results.

The Industrial Source Complex-Short-Term (ISCST3) model was used to model the deposition of lead into soil, and the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) was used to predict blood lead concentrations (PbBs) for children exposed to predicted concentrations of lead in soil as a result of emissions from this facility. The maximum annual average air concentration of lead associated with this facility was estimated at 0.00032 microgram per cubic meter ($\mu g/m^3$). The maximum soil concentration of lead due to deposition over a 30-year time period at a census block centroid was estimated at 4.6 milligrams per gram (mg/g). The PbBs for children 7 years old and younger were calculated using an assumed soil lead concentration of 204.6 mg/g, which represents the IEUBK default of 200 mg/g plus the maximum calculated soil lead concentration of 4.6 mg/g associated with this facility. All of the PbBs associated with this facility were estimated at concentrations ranging from 2.5 to 4.2 micrograms per deciliter ($\mu g/dL$) for the various age groups evaluated. The reference value which represents a level of concern for children as specified by EPA and the Centers for Disease Control and Prevention is 10 $\mu g/dL$. Thus, no significant human health multipathway are expected.

The EPA is also required to consider adverse impacts to the environment (e.g., ecological risks) as a part of a residual risk assessment. Consequently, lead was also investigated for potential ecological risks. Regarding the inhalation exposure pathway for terrestrial mammals, EPA contends that human toxicity values for the inhalation pathway are generally protective of terrestrial mammals. Because the maximum cancer and non-cancer hazards to humans from inhalation exposure are relatively low, EPA expects there to be no significant or widespread adverse effects to terrestrial mammals from inhalation exposure to HAP emitted from facilities in this source category. To ensure that the potential for adverse effects to wildlife (including birds) resulting from lead exposure is low, EPA carried out a screening-level assessment of ecological effects. The predicted soil lead concentrations from the 3M facility are low compared to the screening value for lead in soil and would not be expected to cause unacceptable risks to ecological receptors.

Acrylic acid was also reported as emitted by the 3M facility. Although acrylic acid is not typically emitted from magnetic tape manufacturing processes, EPA nonetheless included those emissions in its analysis in an attempt to capture the worst-case impacts for the facility. The acrylic acid may have been emitted from other co-located processes at the facility. When acrylic acid was included in the residual risk assessment for this facility, cancer risks and acute noncancer risks were unchanged, and the chronic noncancer HI rose to 0.3. Because this value is below 1, EPA remains unconcerned about potential noncancer health risks.

Based on the results presented in this section, the potential for unacceptable chronic or acute human health effects and ecological effects appears to be low for this source category. While this analysis is not exhaustive and is not intended to be, EPA has used (1) the best emissions data currently available, (2) reasonable dispersion models, and (3) exposure locations where receptor populations currently reside. The EPA has also made several health-protective assumptions, meaning that the predicted risk estimates are likely higher than would be expected to actually occur in the exposed population. On balance, based on EPA's scientific judgment and risk assessment experience, EPA believes the results are protective.

5.3 REFERENCES

1. U.S. Environmental Protection Agency. Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations – Background Information for Proposed Standards. Research Triangle Park, NC. EPA-453/R-93-059. December 1993.

2. U.S. Environmental Protection Agency. Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations – Background Information for Promulgated Standards. Research Triangle Park, NC. EPA-453/R-94-074b. December 1994.

3. E-mail and attachment from Holloway, T., RTI, to Pimentel, M., EPA/REAG. November 25, 2003. Updated inputs for Sony.

4. Memorandum from Holloway, T., RTI, to the project files. March 28, 2005. Documentation of magnetic tape manufacturing facility inventory.

5. E-mail and attachment from Holloway, T., RTI, to Dail, H., EPA/CCPG. June 17, 2003. Mag tape NEI data.

6. Memorandum from Pimentel, M., EPA/REAG to Guinnup, D., EPA/REAG. October 15, 2004. Residual risk assessment for the magnetic tape manufacturing source category (dated October 15, 2004); addendum (dated July 20, 2005); EPA internal peer review (dated July 20, 2005).

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Chapter 6
Risk Reduction Options

6.1 EPA DECISION OF MACT ADEQUACY

The results of the residual risk analyses indicate that the development and promulgation of additional standards for the magnetic tape manufacturing source category is not justified for a number of reasons. Provided below is a discussion of those reasons, which draws from the analyses and discussion presented previously.

The EPA used a two-step, standard-setting approach to determine if residual risk standards were warranted. The first step was to determine an "acceptable risk" that considered all health information, including risk estimation uncertainty, and included a presumptive limit on MIR of approximately 100 in 1 million. The EPA modeled each of the six facilities with magnetic tape manufacturing source category emission sources and found no facilities with a cancer MIR at or above 100 in 1 million. The EPA also found the maximum noncancer HI from these facilities to be well below 1 (see Table 5-1). The EPA believes that these six facilities constitute all of the emissions from this source category and that the assessment is likely to overestimate rather than underestimate risks. Therefore, EPA has determined that this source category currently presents an acceptable level of cancer and noncancer risks.

The results of the residual risk analyses show that there is not a significant health risk associated with any of the facilities currently manufacturing magnetic tape in the United States. The major source facilities are complying with the MACT requirements, and overall HAP emissions have been reduced on both an industry-wide and a facility-level basis. Therefore, EPA believes that the existing MACT requirements for the magnetic tape manufacturing source category are adequate and no additional changes or updates are needed.

6.2 FEASIBILITY OF ADDITIONAL CONTROLS TO REDUCE RISK

The second step of the standard-setting approach was to set a standard at a level that provided "an ample margin of safety" in consideration of all health information, including the number of persons at risk levels higher than approximately 1 in 1 million, as well as other relevant factors, including costs and economic impacts, technological feasibility, and other factors relevant to each particular decision.

Facilities in the magnetic tape manufacturing source category typically emit HAP from some combination of storage tanks, mixing operations, coating operations, and equipment leaks. The EPA considered the technological feasibility of applying additional control measures to reduce the emissions and risk at these facilities. In evaluating potential additional controls for magnetic tape manufacturing facilities, EPA considered several recent MACT standards, including the standards for Surface Coating of Plastic Parts and Products (subpart PPPP), Paper and Other Web Coatings (subpart JJJJ), Organic Liquids Distribution (subpart EEEE), and Generic MACT for Storage Vessels (subpart WW). These MACT standards generally require the same types of controls found in most surface coating sectors, as well as the NSPS for storage tanks (subpart Kb), except that the descriptions of the controls are more specific in the newer rules. Emission reductions may have already been realized because some of the standards discussed above require controls for surface coating operations and storage tanks that are new or have been modified or reconstructed since 1984.

As discussed previously, EPA has not identified any additional control technologies beyond those that are already in widespread use within the source category (e.g., carbon adsorbers, condensers). The only additional control measures identified involve improvements in the performance of existing technologies or increased frequency of inspections and testing, which would not significantly reduce emissions (and, therefore, residual risk) within this source category. The incremental emission reductions that could be achieved by the application of these additional control measures would be small and are often already being achieved because facilities over-control to maintain a safe level of continuous compliance with the NESHAP. Therefore, EPA believes that any additional control requirements would achieve minimal risk reduction at a very high cost. As a result, EPA has concluded that no additional control should be required

because an ample margin of safety (considering cost, technical feasibility, and other factors) has been achieved by the NESHAP.

6.3 EPA DECISION OF NO RULEMAKING ACTION

The residual risk analyses show that sufficient data are available to justify removing the magnetic tape manufacturing source category from consideration for a residual risk rule. A residual risk rule is not necessary, because the identifiable risk to the surrounding populations living in neighborhoods close to the magnetic tape manufacturing facilities is below a lifetime excess cancer risk of 1 in 1 million or a noncancer HI of 1.

Although EPA believes no further action is needed on this source category to reduce risk, the residual risk from facilities that have emission sources covered by multiple, co-located source categories will continue to be evaluated by EPA as each source category is reviewed. The Printing and Publishing (subpart KK) and Paper and Other Web Coatings (subpart JJJJ) industries are examples of sectors where the same facility may manufacture other products along with magnetic tape and will be covered by a future residual risk standard for that source category. Total HAP emissions and the associated risks from these facilities will be reduced as controls are implemented to comply with the requirements of the future MACT standards, which will include MACT review and residual risk analyses. The Plastic Parts Surface Coating NESHAP, promulgated in September 2003, will also result in emission reductions from a couple of the same facilities analyzed under the magnetic tape manufacturing source category. Furthermore, EPA will also consider options to allow other co-located emission sources to increase control of magnetic tape manufacturing emission sources in lieu of possible additional controls required under a risk reduction strategy for the other source category (e.g., if risk reductions are necessary for facilities regulated by the Paper and Other Web Coatings NESHAP).

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TECHNICAL REPORT DATA

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

National emission standards for hazardous air pollutants (NESHAP) were promulgated in 1994 for magnetic tape manufacturing operations under the authority of Section 112(d) of the Clean Air Act as amended in 1990. Section 112(d)(6) of the Act requires EPA to review and revise, as necessary (taking into account developments in practices, processes, and control technologies), emission standards promulgated no less often than every 8 years. Section 112(f)(2) directs EPA to assess the risk remaining (residual risk) within 8 years after promulgation of standards and develop standards, if necessary, to provide an ample margin of safety to protect public health or to prevent (taking into consideration costs, energy, safety, and other relevant factors) an adverse environmental effect. This document contains background information considered in EPA's decision to make no changes or updates to the NESHAP based on the results of its technology review and residual risk assessment.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Coating operation Cobalt Methyl ethyl ketone Mix equipment Toluene	Air pollution control Hazardous air pollutants MACT Magnetic tape manufacturing NESHAP Residual risk Technology review	

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