IV. CHEMICAL RELEASE AND TRANSFER PROFILE

This section is designed to provide background information on the pollutant releases that are reported by this industry. The best source of comparative pollutant release information is the Toxic Release Inventory System (TRI). Pursuant to the Emergency Planning and Community Right-to-Know Act, TRI includes self-reported facility release and transfer data for over 600 toxic chemicals. Facilities within SIC Codes 20-39 (manufacturing industries) that have more than 10 employees, and that are above weight-based reporting thresholds are required to report TRI on-site releases and off-site transfers. The information presented within the sector notebooks is derived from the most recently available (1993) TRI reporting year (which then included 316 chemicals), and focuses primarily on the on-site releases reported by each sector. Because TRI requires consistent reporting regardless of sector, it is an excellent tool for drawing comparisons across industries.

Although this sector notebook does not present historical information regarding TRI chemical releases over time, please note that in general, toxic chemical releases have been declining. In fact, according to the 1993 Toxic Release Inventory Data Book, reported releases dropped by 42.7% between 1988 and 1993. Although on-site releases have decreased, the total amount of reported toxic waste has not declined because the amount of toxic chemicals transferred off-site has increased. Transfers have increased from 3.7 billion pounds in 1991 to 4.7 billion pounds in 1993. Better management practices have led to increases in off-site transfers of toxic chemicals for recycling. More detailed information can be obtained from EPA's annual Toxics Release Inventory Public Data Release book (which is available through the EPCRA Hotline at 1-800-535-0202), or directly from the Toxic Release Inventory System database (for user support call 202-260-1531).

Wherever possible, the sector notebooks present TRI data as the primary indicator of chemical release within each industrial category. TRI data provide the type, amount, and media receptor of each chemical released or transferred. When other sources of pollutant release data have been obtained, these data have been included to augment the TRI information.

TRI Data Limitations

The reader should keep in mind the following limitations regarding TRI data. Within some sectors, the majority of facilities are not subject to TRI reporting because they are not considered manufacturing industries, or because they are below TRI reporting thresholds. Examples are the mining, dry cleaning, printing, and transportation equipment cleaning sectors. For these sectors, release information from other sources has been included.

The reader should also be aware that TRI "pounds released" data presented within the notebooks is not equivalent to a "risk" ranking for each industry. Weighting each pound of release equally does not factor in the relative toxicity of each chemical that is released. The Agency is in the process of developing an approach to assign toxicological weightings to each chemical released so that one can differentiate between pollutants with significant differences in toxicity. As a preliminary indicator of the environmental impact of the industry's most commonly released chemicals, the notebook briefly summarizes the toxicological properties of the top five chemicals (by weight) reported by each industry.

Definitions Associated With Section IV Data Tables

General Definitions

SIC Code -- the Standard Industrial Classification (SIC) is a statistical classification standard used for all establishment-based Federal economic statistics. The SIC codes facilitate comparisons between facility and industry data.

TRI Facilities -- are manufacturing facilities that have 10 or more full-time employees and are above established chemical throughput thresholds. Manufacturing facilities are defined as facilities in Standard Industrial Classification primary codes 20-39. Facilities must submit estimates for all chemicals that are on the EPA's defined list and are above throughput thresholds.

Data Table Column Heading Definitions

The following definitions are based upon standard definitions developed by EPAÕs Toxic Release Inventory Program. The categories below represent the possible pollutant destinations that can be reported.

RELEASES -- are an on-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, as well as contained disposal into underground injection wells.

Releases to Air (Point and Fugitive Air Emissions) -- Include all air emissions from industry activity. Point emissions occur through confined air streams as found in stacks, ducts, or pipes. Fugitive emissions include losses from equipment leaks, or evaporative losses from impoundments, spills, or leaks.

Releases to Water (Surface Water Discharges) - encompass any releases going directly to streams, rivers, lakes, oceans, or other bodies of water. Any estimates for stormwater runoff and non-point losses must also be included.

Releases to Land -- includes disposal of waste to on-site landfills, waste that is land treated or incorporated into soil, surface impoundments, spills, leaks, or waste piles. These activities must occur within the facility's boundaries for inclusion in this category.

Underground Injection -- is a contained release of a fluid into a subsurface well for the purpose of waste disposal.

TRANSFERS -- is a transfer of toxic chemicals in wastes to a facility that is geographically or physically separate from the facility reporting under TRI. The quantities reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers for disposal, these quantities do not necessarily represent entry of the chemical into the environment.

Transfers to POTWs -- are wastewaters transferred through pipes or sewers to a publicly owned treatments works (POTW). Treatment and chemical removal depend on the chemical's nature and treatment methods used. Chemicals not treated or destroyed by the POTW are generally released to surface waters or landfilled within the sludge.

Transfers to Recycling -- are sent off-site for the purposes of regenerating or recovering still valuable materials. Once these chemicals have been recycled, they may be returned to the originating facility or sold commercially.

Transfers to Energy Recovery -- are wastes combusted off-site in industrial furnaces for energy recovery. Treatment of a chemical by incineration is not considered to be energy recovery.

Transfers to Treatment -- are wastes moved off-site for either neutralization, incineration, biological destruction, or physical separation. In some cases, the chemicals are not destroyed but prepared for further waste management.

Transfers to Disposal -- are wastes taken to another facility for disposal generally as a release to land or as an injection underground.

IV.A. EPA Toxic Release Inventory for the Motor Vehicles and Motor Vehicle Equipment Industry

Exhibits 17-21 illustrate the TRI releases and transfers for the motor vehicles and motor vehicle equipment industry (SIC 37). Exhibit 18 shows the top TRI releasing transportation equipment facilities. As shown in Exhibit 19, the majority of TRI reporting facilities are located in Michigan, Ohio, Indiana, Illinois, and Tennessee. As mentioned earlier, these States, with the exception of Tennessee, have historically been the focal point of automobile manufacturing.

For the industry as a whole, solvents such as toluene, xylene, methyl ethyl ketone, and acetone, comprise the largest number of TRI releases. The large of quantity of solvent release, both fugitive and point source can be attributed to the solvent-intensive finishing processes employed by the industry. In addition to being used to clean equipment and metal parts, solvents are a component found in many of the coating and finishes applied to automobile during the assembly and painting/finishing operations.

The TRI database contains a detailed compilation of self-reported, facility-specific chemical releases. The top reporting facilities for this sector are listed below. Facilities that have reported only the SIC codes covered under this notebook appear in Exhibit 17. Exhibit 18 contains additional facilities that have reported the SIC code covered within this report, and one or more SIC codes that are not within the scope of this notebook. Therefore, Exhibit 18 includes facilities that conduct multiple operations Ñ some that are under the scope of this notebook, and some that are not. Currently, the facility-level data do not allow pollutant releases to be broken apart by industrial process.

Exhibit 17
Top 10 TRI Releasing Auto and Auto Parts Facilities (SIC 37)

Rank	Total TRI Releases in Pounds	Facility Name	City	State
1	2,689,968	Ford Motor Co., Kansas City Assembly Plant	Claycomo	MO
2	2,519,315	Nissan Motor Mfg. Corp., USA Corp.	Smyrna	TN
3	1,820,840	Ford Motor Co., St. Louis Assembly Plant	Hazelwood	MO
4	1,733,637	Ford Motor Co., Michigan Truck Plant	Wayne	MI
5	1,693,900	GMC NATP Moraine Assembly Plant	Moraine	OH
6	1,669,603	Ford Electronics & Refrigeration Corp.	Connersville	IN
7	1,633,125	Cadillac Luxury Car Div., Detroit Hantranck Assembly	Detroit	MI
8	1,602,429	Ford Motor Co., Louisville Assembly Plant	Louisville	KY
9	1,523,625	North American Truck Platform, Pontiac E Assembly	Pontiac	MI
10	1,490,075	Purolator Prods, Inc.	Fayetteville	NC

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 18
Top 10 TRI Releasing Transportation Equipment Facilities (SIC 37)

SIC Codes	Total TRI Releases in Pounds	Facility Name	City	State
3711, 3751	3,438,305	Honda of America Mfg., Inc.	Marysville	OH
3711, 3713	2,689,968	Ford Motor Co., Kansas City Assembly Plant	Claycono	ND
3711	2,519,315	Nissan Motor Mfg. Corp., USA Corp.	Smyrna	TN
3711	1,820,840	Ford Motor Co., St. Louis Assembly Plant	Hazelwood	MO
3711	1,733,637	Ford Motor Co., Michigan Truck Plant	Wayne	MI
3714, 3231	1,727,400	Harman Automotive, Inc.,	Bolivar	TN
3713	1,693,900	GMC NATP Moraine Assembly Plant	Moraine	OH
3714	1,669,603	Ford Electronics & Refrigeration Corp.	Commersville	IN
3711	1,633,125	Cadillac Luxury Car Div., Detroit Hantranck Assembly	Detroit	MI
3711	1,602,429	Ford Motor Co., Louisville Assembly Plant	Louisville	KY

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Note: Being included on these lists does not mean that the release is associated with non-compliance with environmental laws.

Exhibit 19
TRI Reporting Auto and Auto Parts Facilities (SIC 37) by State

State	Number of Facilities	State	Number of Facilities
AL	11	NC	28
AR	10	ND	1
AZ	3	NE	5
CA	21	NH	1
CO	1	NJ	5
CT	4	NV	1
DE	2	NY	15
FL	6	OH	76
GA	14	OK	5
IA	12	OR	3
IL	31	PA	20
IN	63	PR	1
KS	9	RI	1
KY	24	SC	12
LA	1	SD	1
MA	2	TN	33
MD	4	TX	12
ME	1	UT	5
MI	101	VA	12
MN	7	WA	6
MO	22	WI	11
MS	6		

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 20
Releases for Auto and Auto Parts Facilities (SIC 37) in TRI, by Number of Facilities
(Releases reported in pounds/year)

Chemical Name	# Facilities Reporting Chemical	Fugitive Air	Point Air	Water Discharges	Under-ground Inject-ion	Land Disposal	Total Releases	Average Release s per Facility
Toluene	154	1165126	5507143	13416	0	3978	6689663	43439
Sulfuric Acid	152	12783	46013	13000	0	0	71796	472
Xylene (Mixed Isomers)	150	1416695	21584687	23	0	0	23001405	153343
Copper	142	3423	9331	1261	0	4056	18071	127
Methyl Ethyl Ketone	125	1111122	3619253	13400	0	0	4743775	37950
Acetone	107	1149162	3422729	0	0	0	4571891	42728
Glycol Ethers	105	689599	6957693	7682	0	250	7655224	72907
Chromium	99	16632	9124	777	0	10	26543	268
Methanol	96	316128	2297245	0	0	0	2613373	27223
Ethylene Glycol	95	33573	163221	1052	0	415	198261	2087
Nickel	95	7746	2718	495	0	2233	13192	139
Zinc Compounds	95	31398	5906	3564	0	19528	60396	636
Manganese	85	4680	4710	614	0	0	10004	118

Phosphoric Acid	85	4826	13413	0	0	0	18239	215

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 20 (cont'd)
Releases for Auto and Auto Parts Facilities (SIC 37) in TRI, by Number of Facilities
(Releases reported in pounds/year)

Chemical Name	# Facilities Reporting Chemical	Fugitive Air	Point Air	Water Discharges	Under-ground Inject-ion	Land Disposal	Total Releases	Average Releases per Facility
Hydrochloric Acid	83	6480	911854	0	0	0	918334	11064
N-Butyl Alcohol	78	247976	4852404	0	0	0	5100380	65389
Methyl Isobutyl Ketone	73	657257	5664383	0	0	0	6321640	86598
Barium Compounds	71	16614	16858	602	0	1252720	1286794	18124
1,1,1-Trichloroethane	67	1688511	1451218	0	0	0	3139729	46862
Dichlorodifluoromethane	56	206893	5012	0	0	0	211905	3784
Ethylbenzene	56	195835	2332692	0	0	0	2528527	45152
Lead	53	712	4107	559	0	0	5378	101
Benzene	49	15678	10293	0	0	0	25971	530
Methylenebis (Phenylisocyanate)	48	7384	2816	0	0	0	10200	213
Nickel Compounds	48	760	2515	510	0	190	3975	83
Nitric Acid	48	3857	4147	0	0	0	8004	167
Manganese Compounds	45	1541	2106	1320	0	1800	6767	150
1,2,4-Trimethylbenzene	43	84346	1206168	5	0	0	1290519	30012
Chromium Compounds	37	877	3295	1046	0	0	5218	141
Lead Compounds	34	1034	1455	752	0	0	3241	95
Styrene	33	669058	787529	0	0	0	1456587	44139
Ammonia	32	6788	139153	30	0	0	145971	4562
Copper Compounds	29	1255	2487	284	0	0	4026	139
Trichloroethylene	29	935372	1834267	0	0	0	2769639	95505
Dichloromethane	24	402279	410601	0	0	0	812880	33870
Asbestos (Friable)	17	71	2144	0	0	0	2215	130
Diethanolamine	16	505	4405	0	0	0	4910	307
Phenol	16	25785	268220	0	0	50906	344911	21557
Di(2-Ethylhexyl) Phthalate	14	250	41665	0	0	0	41915	2994
Formaldehyde	14	12515	177775	0	0	15115	205405	14672
Tetrachloroethylene	13	69959	293383	0	0	0	363342	27949
Freon 113	12	160695	73286	0	0	0	233981	19498
Aluminum (Fume Or Dust)	10	6130	800971	0	0	0	807101	80710
Cyclohexane	10	1110	1321	0	0	0	2431	243
Cobalt	9	512	269	250	0	0	1031	115
Methyl Tert-Butyl Ether	9	6627	4860	0	0	0	11487	1276
Cumene	7	5841	67234	0	0	0	73075	10439
Chlorine	6	13816	278	0	0	0	14094	2349
Zinc (Fume Or Dust)	6	979	182	43	0	0	1204	201
Antimony Compounds	4	0	0	0	0	0	0	0
Butyl Benzyl Phthalate	4	0	10792	0	0	0	10792	2698
Cyanide Compounds	4	5	279	3	0	0	287	72
Hydrogen Fluoride	4	6	345	0	0	0	351	88
Propylene	4	350	110	0	0	0	460	115
Sec-Butyl Alcohol	4	15305	42250	764	0	0	58319	14580
Toluene-2,4-Diisocyanate	4	1652	5105	0	0	0	6757	1689
Toluene-2,6-Diisocyanate	4	490	1502	0	0	0	1992	498
Bis(2-Ethylhexyl) Adipate	3	0	90052	0	0	0	90052	30017

Naphthalene	3	702	2926	0	0	0	3628	1209
Phosphorus (Yellow Or White)	3	15	0	0	0	0	15	5
Trichlorofluoromethane	3	500	250	0	0	0	750	250

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 20 (cont'd)
Releases for Auto and Auto Parts Facilities (SIC 37) in TRI, by Number of Facilities
(Releases reported in pounds/year)

Chemical Name	# Facilities Reporting Chemical	Fugitive Air	Point Air	Water Discharges	Under-ground Injection	Land Disposal	Total Releases	Average Releases per Facility
2-Ethoxyethanol	3	3920	24300	0	0	0	28220	9407
4,4'-Isopropylidenediphenol	3	0	5	0	0	0	5	2
Chlorobenzene	2	12911	3230	0	0	0	16141	8071
Cobalt Compounds	2	250	250	0	0	0	500	250
Toluenediisocyanate (Mixed Isomers)	2	255	5	0	0	0	260	130
1,4-Dioxane	2	4000	250	0	0	0	4250	2125
Aluminum Oxide (Fibrous Form)	1	0	0	0	0	0	0	0
Antimony	1	0	0	0	0	0	0	0
Butyl Acrylate	1	880	9400	0	0	0	10280	10280
Carbon Tetrachloride	1	275509	826526	0	0	0	1102035	1102035
Cumene Hydroperoxide	1	250	5484	0	0	0	5734	5734
Dibutyl Phthalate	1	2	0	0	0	0	2	2
Diethyl Phthalate	1	750	60000	0	0	250	61000	61000
Ethylene Oxide	1	0	0	0	0	0	0	0
Isopropyl Alcohol (Manufacturing)	1	750	0	0	0	0	750	750
M-Xylene	1	0	8998	0	0	0	8998	8998
O-Xylene	1	0	0	0	0	0	0	0
Quinone	1	0	0	0	0	0	0	0
Total	**----**	**11,736,697**	**66,116,598**	**61,452**	**0**	**1,351,451**	**79,266,198**	**----**

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 21
Transfers for Auto and Auto Parts Facilities (SIC 37) in TRI, by Number of Facilities
(Transfers reported in pounds/year)

Chemical Name	# Facilities Reporting Chemical	POTW Discharges	Disposal	Recycling	Treatment	Energy Recovery	Total Transfers	Average Transfers per Facility
Toluene	154	954	21709	2540713	83965	1739857	4387448	28490
Sulfuric Acid	152	22	710	4800000	1067714	0	5868446	38608
Xylene (Mixed Isomers)	150	1801	192692	14495581	183599	4256914	19130587	127537
Copper	142	2729	260467	23058138	26472	267	23348073	164423
Methyl Ethyl Ketone	125	1899	15933	4839058	92419	1153386	6102695	48822
Acetone	107	17402	10415	4237359	76693	1534387	5876256	54918
Glycol Ethers	105	2652452	45884	943328	228100	498232	4367996	41600
Chromium	99	3915	446383	7966830	46368	36	8463532	85490
Methanol	96	6312	31276	334497	41293	285819	699197	7283
Ethylene Glycol	95	169438	17890	210618	391126	306410	1095482	11531
Nickel	95	4313	133121	3730134	6971	5	3874544	40785

Zinc Compounds	95	35127	750093	2502350	272103	24930	3584603	37733

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 21 (cont'd)
Transfers for Auto and Auto Parts Facilities (SIC 37) in TRI, by Number of Facilities
(Transfers reported in pounds/year)

Chemical Name	# Facilities Reporting Chemical	POTW Discharges	Disposal	Recycling	Treatment	Energy Recovery	Total Transfers	Average Transfers per Facility
Manganese	85	4167	232071	4698891	1689	2	4936820	58080
Phosphoric Acid	85	37205	84330	275	75444	0	197254	2321
Hydrochloric Acid	83	13855	20710	0	30375	0	64940	782
N-Butyl Alcohol	78	1885	43422	1017184	318581	372643	1753715	22484
Methyl Isobutyl Ketone	73	28787	5675	8971374	67282	1124723	10197841	139696
Barium Compounds	71	10860	3202950	55850	288758	2646	3561064	50156
1,1,1-Trichloroethane	67	867	7610	1113333	24921	65309	1212040	18090
Dichlorodifluoro-methane	56	0	225	45932	132	0	46289	827
Ethylbenzene	56	796	3491	2153976	5362	687526	2851151	50913
Lead	53	857	62803	2586617	59112	284	2709673	51126
Benzene	49	500	22	4215	578	5423	10738	219
Methylenebis (Phenylisocyanate)	48	5	36295	105801	15356	29161	186618	3888
Nickel Compounds	48	18060	162808	402186	82076	8	665138	13857
Nitric Acid	48	5	710	0	26895	0	27610	575
Manganese Compounds	45	17892	154918	2660652	35886	250	2869598	63769
1,2,4-Trimethylbenzene	43	26	40	323150	6012	182922	512150	11910
Chromium Compounds	37	4349	409788	637987	33227	1651	1087002	29378
Lead Compounds	34	7068	90442	824896	52401	675	975482	28691
Styrene	33	0	364260	1574	15750	41199	422783	12812
Ammonia	32	19330	0	0	210	258	19798	619
Copper Compounds	29	2913	183868	18303568	37197	630	18528176	638903
Trichloroethylene	29	565	5400	372186	71991	77401	587543	20260
Dichloromethane	24	9	0	128604	80182	261284	470079	19587
Asbestos (Friable)	17	0	1871982	0	250	0	1872232	110131
Diethanolamine	16	103572	555	105993	139	36200	246459	15404
Phenol	16	3366	187182	0	4132	7911	202591	12662
Di(2-Ethylhexyl) Phthalate	14	0	8120	0	2500	10925	21545	1539
Formaldehyde	14	937	15353	3602	301	3076	23269	1662
Tetrachloroethylene	13	1	2772	166884	32861	15000	217518	16732
Freon 113	12	0	0	155501	14524	25111	195136	16261
Aluminum (Fume Or Dust)	10	0	44377	731959	0	0	776336	77634
Cyclohexane	10	0		850	250	1550	2650	265
Cobalt	9	5	3865	231524	0	0	235394	26155
Methyl Tert-Butyl Ether	9	0	0	0	67	5849	5916	657
Cumene	7	0	0	2871	2	24829	27702	3957
Chlorine	6	21313	0	250			21563	3594
Zinc (Fume Or Dust)	6	48	99338	531602	51858	250	683096	113849
Antimony Compounds	4	1	3412	2400	513	0	6326	1582
Butyl Benzyl Phthalate	4	0	2894	0	1477	0	4371	1093
Cyanide Compounds	4	62	0	3400	38	0	3500	875
Hydrogen Fluoride	4	0	0	0	149	0	149	37

Propylene	4	0	0	0	0	0	0	0

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 21 (cont'd)
Transfers for Auto and Auto Parts Facilities (SIC 37) in TRI, by Number of Facilities
(Transfers reported in pounds/year)

Chemical Name	# Facilities Reporting Chemical	POTW Discharges	Disposal	Recycling	Treatment	Energy Recovery	Total Transfers	Average Transfers per Facility
Sec-Butyl Alcohol	4	0	5627	0	745	7	6379	1595
Toluene-2,4-Diisocyanate	4	0	3900	32300	0	0	36200	9050
Toluene-2,6-Diisocyanate	4	0	980	8100	0	0	9080	2270
Bis(2-Ethylhexyl) Adipate	3	0	1540	0	0	0	1540	513
Naphthalene	3	0	0	0	0	653	653	218
Phosphorus (Yellow Or White)	3	0	250	80800	0	0	81050	27017
Trichlorofluoromethane	3	0	2702	0	1587	0	4289	1430
2-Ethoxyethanol	3	0	0	0	0	7200	7200	2400
4,4'-Isopropylidenedi-phenol	3	0	20401	0	0	0	20401	6800
Chlorobenzene	2	0	0	0	0	75	75	38
Cobalt Compounds	2	5	250	5570	5	0	5830	2915
Toluenediisocyanate (Mixed Isomers)	2	0	0	0	0	0	0	0
1,4-Dioxane	2	0	0	8140	0	1225	9365	4683
Aluminum Oxide (Fibrous Form)	1	0	19002	0	0	0	19002	19002
Antimony	1	0	5	56600	5	0	56610	56610
Butyl Acrylate	1	0	0	11	3	602	616	616
Carbon Tetrachloride	1	0	0	0	0	0	0	0
Cumene Hydroperoxide	1	0	0	0	0	516	516	516
Dibutyl Phthalate	1	0	0	0	0	173	173	173
Diethyl Phthalate	1	0	0	0	2375	0	2375	2375
Ethylene Oxide	1	0	1600		300	0	1900	1900
Isopropyl Alcohol (Manufacturing)	1	0	250	0	0	0	250	250
M-Xylene	1	0	0	0	0	2236	2236	2236
O-Xylene	1	0	0	0	0	9575	9575	9575
Quinone	1	0	0	0	0	0	0	0
Total	**----**	**3,195,675**	**9,294,768**	**116,195,214**	**3,960,321**	**12,807,201**	**145,513,429**	**----**

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

IV.B. Summary of Selected Chemicals Released

The following is a synopsis of current scientific toxicity and fate information for the top chemicals (by weight) that facilities within this sector self-reported as released to the environment based upon 1993 TRI data. Because this section is based upon self-reported release data, it does not attempt to provide information on management practices employed by the sector to reduce the release of these chemicals. Information regarding pollutant release reductions over time may be available from EPA's TRI and 33/50 programs, or directly from the industrial trade associations that are listed in Section IX of this document. Since these descriptions are cursory, please consult the sources referenced below for a more detailed description of both the chemicals described in this section, and the chemicals that appear on the full list of TRI chemicals appearing in Section IV.A.

The brief descriptions provided below were taken from the 1993 Toxics Release Inventory Public Data Release (EPA, 1994), and the Hazardous Substances Data Bank (HSDB), accessed via TOXNET. The brief descriptions provided below were taken from the *1993 Toxics Release Inventory Public Data Release* (EPA, 1994), the Hazardous Substances Data Bank (HSDB), and the Integrated Risk Information System (IRIS), both accessed via TOXNET[1]. The information contained below is based upon exposure assumptions that have been conducted using standard scientific procedures. The effects listed below must be taken in context of these exposure assumptions that are more fully explained within the full chemical profiles in HSDB.

The top TRI release for the motor vehicles and motor vehicle equipment industry (SIC 37) as a whole are as follows: toluene, xylene, methyl ethyl ketone, acetone, glycol ethers, 1,1,1,-trichloroethane, styrene, trichloroethylene, dichloromethane, and methanol. Summaries for several of these chemicals are provided below.

Acetone

Toxicity**.** Acetone is irritating to the eyes, nose, and throat. Symptoms of exposure to large quantities of acetone may include headache, unsteadiness, confusion, lassitude, drowsiness, vomiting, and respiratory depression.

Reactions of acetone (see environmental fate) in the lower atmosphere contribute to the formation of ground-level ozone. Ozone (a major component of urban smog) can affect the respiratory system, especially in sensitive individuals such as asthmatics or allergy sufferers.

Carcinogenicity**.** There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate**.** If released into water, acetone will be degraded by microorganisms or will evaporate into the atmosphere. Degradation by microorganisms will be the primary removal mechanism.

Acetone is highly volatile, and once it reaches the troposphere (lower atmosphere), it will react with other gases, contributing to the formation of ground-level ozone and other air pollutants. EPA is reevaluating acetone's reactivity in the lower atmosphere to determine whether this contribution is significant.

Physical Properties. Acetone is a volatile and flammable organic chemical.

Note: Acetone was removed from the list of TRI chemicals on June 16, 1995 (60 FR 31643) and will not be reported for 1994 or subsequent years.

Glycol Ethers

Due to data limitations, data on diethylene glycol (glycol ether) are used to represent all glycol ethers.

Toxicity. Diethylene glycol is only a hazard to human health if concentrated vapors are generated through heating or vigorous agitation or if appreciable skin contact or ingestion occurs over an extended period of time. Under normal occupational and ambient exposures, diethylene glycol is low in oral toxicity, is not irritating to the eyes or skin, is not readily absorbed through the skin, and has a low vapor pressure so that toxic concentrations of the vapor can not occur in the air at room temperatures.

At high levels of exposure, diethylene glycol causes central nervous depression and liver and kidney damage. Symptoms of moderate diethylene glycol poisoning include nausea, vomiting, headache, diarrhea, abdominal pain, and damage to the pulmonary and cardiovascular systems. Sulfanilamide in diethylene glycol was once used therapeutically against bacterial infection; it was withdrawn from the market after causing over 100 deaths from acute kidney failure.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. Diethylene glycol is a water-soluble, volatile organic chemical. It may enter the environment in liquid form via petrochemical plant effluents or as an unburned gas from combustion sources. Diethylene glycol typically does not occur in sufficient concentrations to pose a hazard to human health.

Methanol

Toxicity. Methanol is readily absorbed from the gastrointestinal tract and the respiratory tract, and is toxic to humans in moderate to high doses. In the body, methanol is converted into formaldehyde and formic acid. Methanol is excreted as formic acid. Observed toxic effects at high dose levels generally include central nervous system damage and blindness. Long-term exposure to high levels of methanol via inhalation cause liver and blood damage in animals.

Ecologically, methanol is expected to have low toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to exceed 1 mg methanol per liter water. Methanol is not likely to persist in water or to bioaccumulate in aquatic organisms.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. Liquid methanol is likely to evaporate when left exposed. Methanol reacts in air to produce formaldehyde which contributes to the formation of air pollutants. In the atmosphere it can react with other atmospheric chemicals or be washed out by rain. Methanol is readily degraded by microorganisms in soils and surface waters.

Physical Properties. Methanol is highly flammable.

Methylene Chloride (Dichloromethane)

Toxicity. Short-term exposure to dichloromethane (DCM) is associated with central nervous system effects, including headache, giddiness, stupor, irritability, and numbness and tingling in the limbs. More severe neurological effects are reported from longer-term exposure, apparently due to increased carbon monoxide in the blood from the break down of DCM. Contact with DCM causes irritation of the eyes, skin, and respiratory tract.

Occupational exposure to DCM has also been linked to increased incidence of spontaneous abortions in women. Acute damage to the eyes and upper respiratory tract, unconsciousness, and death were reported in workers exposed to high concentrations of DCM. Phosgene (a degradation product of DCM) poisoning has been reported to occur in several cases where DCM was used in the presence of an open fire.

Populations at special risk from exposure to DCM include obese people (due to accumulation of DCM in fat), and people with impaired cardiovascular systems.

Carcinogenicity. DCM is a probable human carcinogen via both oral and inhalation exposure, based on inadequate human data and sufficient evidence in animals.

Environmental Fate. When spilled on land, DCM is rapidly lost from the soil surface through volatilization. The remainder leaches through the subsoil into the groundwater.

Biodegradation is possible in natural waters but will probably be very slow compared with evaporation. Little is known about bioconcentration in aquatic organisms or adsorption to sediments but these are not likely to be significant processes. Hydrolysis is not an important process under normal environmental conditions.

DCM released into the atmosphere degrades via contact with other gases with a half-life of several months. A small fraction of the chemical diffuses to the stratosphere where it rapidly degrades through exposure to ultraviolet radiation and contact with chlorine ions. Being a moderately soluble chemical, DCM is expected to partially return to earth in rain.

Methyl Ethyl Ketone

Toxicity. Breathing moderate amounts of methyl ethyl ketone (MEK) for short periods of time can cause adverse effects on the nervous system ranging from headaches, dizziness, nausea, and numbness in the fingers and toes to unconsciousness. Its vapors are irritating to the skin, eyes, nose, and throat and can damage the eyes. Repeated exposure to moderate to high amounts may cause liver and kidney effects.

Carcinogenicity. No agreement exists over the carcinogenicity of MEK. One source believes MEK is a possible carcinogen in humans based on limited animal evidence. Other sources believe that there is insufficient evidence to make any statements about possible carcinogenicity.

Environmental Fate. Most of the MEK released to the environment will end up in the atmosphere. MEK can contribute to the formation of air pollutants in the lower atmosphere. It can be degraded by microorganisms living in water and soil.

Physical Properties. Methyl ethyl ketone is a flammable liquid.

Toluene

Toxicity. Inhalation or ingestion of toluene can cause headaches, confusion, weakness, and memory loss. Toluene may also affect the way the kidneys and liver function.

Reactions of toluene (see environmental fate) in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Some studies have shown that unborn animals were harmed when high levels of toluene were inhaled by their mothers, although the same effects were not seen when the mothers were fed large quantities of toluene. Note that these results may reflect similar difficulties in humans.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. The majority of releases of toluene to land and water will evaporate. Toluene may also be degraded by microorganisms. Once volatized, toluene in the lower atmosphere will react with other atmospheric components contributing to the formation of ground-level ozone and other air pollutants.

Physical Properties. Toluene is a volatile organic chemical.

1,1,1-Trichloroethane

Toxicity. Repeated contact of 1,1,1-trichloroethane (TCE) with skin may cause serious skin cracking and infection. Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations.

Exposure to high concentrations of TCE causes reversible mild liver and kidney dysfunction, central nervous system depression, gait disturbances, stupor, coma, respiratory depression, and even death. Exposure to lower concentrations of TCE leads to light-headedness, throat irritation, headache, disequilibrium, impaired coordination, drowsiness, convulsions and mild changes in perception.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. Releases of TCE to surface water or land will almost entirely volatilize. Releases to air may be transported long distances and may partially return to earth in rain. In the lower atmosphere, TCE degrades very slowly by photooxidation and slowly diffuses to the upper atmosphere where photodegradation is rapid.

Any TCE that does not evaporate from soils leaches to groundwater. Degradation in soils and water is slow. TCE does not hydrolyze in water, nor does it significantly bioconcentrate in aquatic organisms.

Trichloroethylene

Toxicity. Trichloroethylene was once used as an anesthetic, though its use caused several fatalities due to liver failure. Short term inhalation exposure to high levels of trichloroethylene may cause rapid coma followed by eventual death from liver, kidney, or heart failure. Short-term exposure to lower concentrations of trichloroethylene causes eye, skin, and respiratory tract irritation. Ingestion causes a burning sensation in the mouth, nausea, vomiting and abdominal pain. Delayed effects from short-term trichloroethylene poisoning include liver and kidney lesions, reversible nerve degeneration, and psychic disturbances. Long-term exposure can produce headache, dizziness, weight loss, nerve damage, heart damage, nausea, fatigue, insomnia, visual impairment, mood perturbation, sexual problems, dermatitis, and rarely jaundice. Degradation products of trichloroethylene (particularly phosgene) may cause rapid death due to respiratory collapse.

Carcinogenicity. Trichloroethylene is a probable human carcinogen via both oral and inhalation exposure, based on limited human evidence and sufficient animal evidence.

Environmental Fate. Trichloroethylene breaks down slowly in water in the presence of sunlight and bioconcentrates moderately in aquatic organisms. The main removal of trichloroethylene from water is via rapid evaporation.

Trichloroethylene does not photodegrade in the atmosphere, though it breaks down quickly under smog conditions, forming other pollutants such as phosgene, dichloroacetyl chloride, and formyl chloride. In addition, trichloroethylene vapors may be decomposed to toxic levels of phosgene in the presence of an intense heat source such as an open arc welder.

When spilled on the land, trichloroethylene rapidly volatilizes from surface soils. The remaining chemical leaches through the soil to groundwater.

Xylene (Mixed Isomers)

Toxicity. Xylenes are rapidly absorbed into the body after inhalation, ingestion, or skin contact. Short-term exposure of humans to high levels of xylenes can cause irritation of the skin, eyes, nose, and throat, difficulty in breathing, impaired lung function, impaired memory, and possible changes in the liver and kidneys. Both short- and long-term exposure to high concentrations can cause effects such as headaches, dizziness, confusion, and lack of muscle coordination. Reactions of xylenes (see environmental fate) in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. The majority of releases to land and water will quickly evaporate, although some degradation by microorganisms will occur.

Xylenes are moderately mobile in soils and may leach into groundwater, where they may persist for several years.

Xylenes are volatile organic chemicals. As such, xylenes in the lower atmosphere will react with other atmospheric components, contributing to the formation of ground-level ozone and other air pollutants.

IV.C. Other Data Sources

The Aerometric Information Retrieval System (AIRS) contains a wide range of information related to stationary sources of air pollution, including the emissions of a number of air pollutants which may be of concern within a particular industry. With the exception of volatile organic compounds (VOCs), there is little overlap with the TRI chemicals reported above. Exhibit 22 summarizes annual releases of carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter of 10 microns or less (PM10), total particulates (PT), sulfur dioxide (SO_2), and volatile organic compounds (VOCs).

Exhibit 22
Pollutant Releases (Short Tons/Years)

Industry	CO	NO_2	PM_{10}	PT	SO_2	VOC
U.S. Total	97,208,000	23,402,000	45,489,000	7,836,000	21,888,000	23,312,000
Metal Mining	5,391	28,583	39,359	140,052	84,222	1,283
Nonmetal Mining	4,525	28,804	59,305	167,948	24,129	1,736
Lumber and Wood Products	123,756	42,658	14,135	63,761	9,149	41,423
Wood Furniture and Fixtures	2,069	2,981	2,165	3,178	1,606	59,426
Pulp and Paper	624,291	394,448	35,579	113,571	341,002	96,875
Printing	8,463	4,915	399	1,031	1,728	101,537
Inorganic Chemicals	166,147	108,575	4,107	39,082	182,189	52,091
Organic Chemicals	146,947	236,826	26,493	44,860	132,459	201,888
Petroleum Refining	419,311	380,641	18,787	36,877	648,153	309,058
Rubber and Misc. Plastic Products	2,090	11,914	2,407	5,355	29,364	140,741
Stone, Clay, Glass, and Concrete	58,043	338,482	74,623	171,853	339,216	30,262
Iron and Steel	1,518,642	138,985	42,368	83,017	238,268	82,292
Nonferrous Metals	448,758	55,658	20,074	22,490	373,007	27,375
Fabricated Metals	3,851	16,424	1,185	3,136	4,019	102,186
Electronics	367	1,129	207	293	453	4,854
Motor Vehicles, Bodies, Parts, and Accessories	**35,303**	**23,725**	**2,406**	**12,853**	**25,462**	**101,275**
Dry Cleaning	101	179	3	28	152	7,310

Source U.S. EPA Office of Air and Radiation, AIRS Database, May 1995.

IV.D. Comparison of Toxic Release Inventory Between Selected Industries

The following information is presented as a comparison of pollutant release and transfer data across industrial categories. It is provided to give a general sense as to the relative scale of releases and transfers within each sector profiled under this project. Please note that the following table does not contain releases and transfers for industrial categories that are not included in this project, and thus cannot be used to draw conclusions regarding the total release and transfer amounts that are reported to TRI. Similar information is available within the annual TRI Public Data Release book.

Exhibit 23 is a graphical representation of a summary of the 1993 TRI data for the motor vehicles assembly industry and the other sectors profiled in separate notebooks. The bar graph presents the total TRI releases and total transfers on the left axis and the triangle points show the average releases per facility on the right axis. Industry sectors are presented in the order of increasing total TRI releases. The graph is based on the data shown in Exhibit 24 and is meant to facilitate comparisons between the relative amounts of releases, transfers, and releases per facility both within and between these sectors. The reader should note, however, that differences in the proportion of facilities captured by TRI exist between industry sectors. This can be a factor of poor SIC matching and relative differences in the number of facilities reporting to TRI from the various sectors. In the case of the motor vehicles assembly industry, the 1993 TRI data presented here covers 609 facilities. These facilities listed SIC 37 (Motor Vehicles Assembly Industry) as a primary SIC code.

Exhibit 23 - bar graph
Summary of 1993 TRI Data: Releases and Transfers by Industry

Exhibit 24 Summary
Toxic Release Inventory Data for Selected Industries

Industry Sector	SIC Range	# TRI Facilities	Releases: Total Releases (10^6 pounds)	Releases: Average Releases per Facility (pounds)	Transfers: 1993 Total (10^6 pounds)	Transfers: Average Transfers per Facility (pounds)	Total Releases + Transfers (10^6 pounds)	Average Release+ Transfers per Facility (pounds)
Stone, Clay, and Concrete	32	634	26.6	41,895	2.2	3,500	28.2	46,000
Lumber and Wood Products	24	491	8.4	17,036	3.5	7,228	11.9	24,000
Furniture and Fixtures	25	313	42.2	134,883	4.2	13,455	46.4	148,000
Printing	2711-2789	318	36.5	115,000	10.2	732,000	46.7	147,000
Electronics/Computers	36	406	6.7	16,520	47.1	115,917	53.7	133,000
Rubber and Misc. Plastics	30	1,579	118.4	74,986	45.0	28,537	163.4	104,000
Motor Vehicle, Bodies, Parts and Accessories	371	609	79.3	130,158	145.5	238,938	224.8	369,000
Pulp and paper	2611-2631	309	169.7	549,000	48.4	157,080	218.1	706,000
Inorganic Chem. Mfg.	2812-2819	555	179.6	324,000	70.0	126,000	249.7	450,000
Petroleum Refining	2911	156	64.3	412,000	417.5	2,676,000	481.9	3,088,000
Fabricated Metals	34	2,363	72.0	30,476	195.7	82,802	267.7	123,000
Iron and Steel	3312-3313 3321-3325	381	85.8	225,000	609.5	1,600,000	695.3	1,825,000
Nonferrous Metals	333, 334	208	182.5	877,269	98.2	472,335	280.7	1,349,000
Organic Chemical Mfg.	2861-2869	417	151.6	364,000	286.7	688,000	438.4	1,052,000
Metal Mining	10	Industry sector not subject to TRI reporting						
Nonmetal Mining	14	Industry sector not subject to TRI reporting						
Dry Cleaning	7215, 7216, 7218	Industry sector not subject to TRI reporting						

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

V. POLLUTION PREVENTION OPPORTUNITIES

The best way to reduce pollution is to prevent it in the first place. Some companies have creatively implemented pollution prevention techniques that improve efficiency and increase profits while at the same time minimizing environmental impacts. This can be done in many ways such as reducing material inputs, re-engineering processes to reuse by-products, improving management practices, and employing substitution of toxic chemicals. Some smaller facilities are able to actually get below regulatory thresholds just by reducing pollutant releases through aggressive pollution prevention policies.

In order to encourage these approaches, this section provides both general and company-specific descriptions of some pollution prevention advances that have been implemented within the Motor Vehicles and Motor Vehicle Equipment industry. While the list is not exhaustive, it does provide core information that can be used as the starting point for facilities interested in beginning their own pollution prevention projects. When possible, this section provides information from real activities that can, or are being implemented by this sector -- including a discussion of associated costs, time frames, and expected rates of return. This section provides summary information from activities that may be, or are being implemented by this sector. When possible, information is provided that gives the context in which the techniques can be effectively used. Please note that the activities described in this section do not necessarily apply to all facilities that fall within this sector. Facility-specific conditions must be carefully considered when pollution prevention options are evaluated, and the full impacts of the change must examine how each option affects, air, land, and water pollutant releases.

Much of the automotive industry is involved in exploring pollution prevention opportunities. The discussion which follows highlights some of the current pollution prevention activities undertaken by manufacturers involved in all stages of the automotive manufacturing process. This is just a sampling of the numerous pollution prevention/waste minimization efforts currently underway.

V.A. Motor Vehicle Equipment Manufacturing

Non-Production Material Screening

As part of its Non-Production Material approval system, Chrysler Corporation implemented pollution prevention practices to eliminate, substitute, or reduce, to the extent possible, regulated substances from both products supplied to Chrysler as well as those resulting from their manufacturing process. First implemented in April 1993, the environmental strategy focuses on avoiding the use of regulated substances and materials of concern whenever possible as part of an effort to eliminate Òend-of-pipeÓ controls. One example of how this screening approach has been utilized was the refusal to approve a transmission fluid for ChryslerÕs new TE Van which contained 10 to 30 percent butyl benzyl phthalate. This was accomplished by working with suppliers and design teams to identify a substitute material. As part of the initiative, suppliers are being requested to certify their parts regarding the presence of ChryslerÕs identified materials of concern.

Other similar Chrysler successes include:

¥ Elimination of hexavalent chromium from all materials and processes;

¥ Reformulating paints and solvents to exclude the majority of listed toxic solvents;

¥ Reformulating new coatings to reduce odor; and

¥ Elimination of lead from all paints except electrocoat primer.

Used Oil Recycling

In an effort to reduce the waste oil produced at Chrysler stamping, machining, and engine plants, the automobile manufacturer has developed comprehensive recycling programs with outside suppliers. More than 800 million gallons of used oil is recycled annually. Other company efforts designed to reduce waste oil include:

¥ Recovering and remanufacturing waste oil on-site for return to the process;

¥ Reducing the amount used by replacing petroleum-based metal working fluids with longer lasting semi-synthetic materials; and

¥ Developing purchasing programs to promote the use of recycled oils.

Trichloroethylene Reduction

Trichloroethylene (TCE) is traditionally employed by the automotive industry as a degreaser to clean oil from very thin aluminum parts. Although vapor collection systems are used during the degreasing process to collect and recycle TCE, some

TCE inevitably remains on the high-surface-area parts. The remaining TCE then evaporates. In order to reduce emissions of TCE, Ford Motor Company developed a detergent and aqueous solution which was comparable to TCE. The new water wash did not etch or damage aluminum parts and met brazing process requirements. With assistance from a supplier, Ford also designed an enclosed water spray system for the new degreasing operations. According to AAMA, after a 1992 pilot evaluation proved successful, Ford began to convert production processes using heat exchangers (e.g., radiators) to one relying on aqueous cleaning instead of TCE degreasing. As a result, TCE releases at one plant dropped by 250,000 pounds annually. Ford expects comparable further reductions worldwide as the remaining plants implement this process change.

Elimination of Chromium From Radiator Paint

In past years, radiators were spray painted with a coating containing chromium for protection purposes. This process resulted in overspray paint waste (sludge) that contained hazardous constituents. Wastes were collected and shipped to an approved hazardous waste disposal facility. In order to minimize the risk associated with the material constituents and resultant waste associated with coating containing chromium, ChryslerÕs Dayton Thermal Products Plant explored the use of new products which would meet performance specifications for the required surface coating. The result is a water-based material which is chromium as well as lead-free. The use of this new water-based material will eliminate approximately 18,000 gallons of paint waste per year that was previously landfilled, as well as reduce substantially VOC emissions.

Lead-Free Black Ceramic Paint

Ceramic black glaze paint (ink), used for aesthetic purposes as well as an ultraviolet (UV) light shield for the adhesive (adhesive is sensitive to UV light), is applied to glass where the interior trim abuts the window. Application of the ink, which contains lead, to the glass involves a silk-screening process. In an attempt to minimize both solid and liquid waste, McGraw Glass (supplier for Chrysler assembly plants), launched a program to develop, test, and approve a lead-free black ceramic glass paint. A suitable substitute, which was approved and in use by 1994, would eliminate approximately 700 drums of hazardous waste per year.

Recovering Lead From Wastewater

One of the waste streams associated with battery-making operations is wastewater which contains lead. Although in the past it was possible to remove lead from the wastewater, it had not been possible to recycle the lead. In 1990, Delco Remy, a GM supplier, developed a method which allows the lead to be recycled. The process involves a series of steps and the use of a proprietary chemical (identified through a cooperative effort between the plant personnel and a chemical vendor) which allows lead to settle to the bottom when tank contents are neutralized. After the lead has settled, wastewater is decanted and filtered through a sand filter to remove remaining lead. The remaining water and lead are agitated with air to put lead back into suspension before the mixture is pumped into a filter press where water is removed leaving behind the lead. The dried, lead-containing mixture is then sent to a secondary smelter. As a result of this lead removing process, approximately 125,000 pounds of lead are reclaimed and recycled each year.

PCB Elimination Program

Polychlorinated biphenyls (PCBs), which are utilized as a coolant and flame retardant fluid in closed system high voltage electrical equipment, are one of the most persistent toxics used in the automotive industry. In order to eliminate the use of PCBs in its facilities, Chrysler initiated a program that would eliminate the use of PCB containing equipment at its facilities by 1998. The program also plans to minimize the risk of Superfund liability through alternate disposal practices. Similar programs are in place at GM and Ford.

Solvent-Free Spray Adhesive For Interior Trim

General Motors Inland Fisher Guide plant in Livonia, MI produces soft trim for the interior of automobiles. In order to produce car door panels that offer a variety of colors, textures, and materials, an assembly process which glues together small pieces is used. In the past, the adhesive used to bind these parts together contained four percent methylene chloride; 30 percent methyl ethyl ketone; 30 percent hexane, and 14 percent toluene. The combination of VOCs resulted in approximately 20 tons of emissions a year. In order to eliminate the emissions associated with this adhesive, a water-based adhesive was identified. The new adhesive, which was implemented in the beginning of 1993, converted the waste stream from hazardous to non-hazardous.

Reducing Chlorofluorocarbon Use

Chlorofluorocarbons (CFCs) and 1,1,1-trichlorethane are chemical substances that deplete the ozone layer. Depletion of the ozone layer causes skin cancer, cataracts and has other human and environmental effects. Under the Montreal Protocol on Substances that Deplete the Ozone Layer and the Clean Air Act, production of these chemicals will be halted by January 1996. The automobile industry used CFC-12 as a refrigerant in air conditioning systems, CFC-11 as foam blowing agent for flexible seating foams, and CFC-113 and 1,1,1-trichloroethane (methyl chloroform) as a solvent in electronics manufacturing and metal cleaning. The automobile industry undertook voluntary and cooperative projects with EPAÕs Stratopheric Protection Division to reduce and eliminate each of these uses. As a result of these efforts, recycling was implemented and most uses were halted well before regulations took effect (Stratopheric Protection Division 1995). For example, in order to reduce the use of CFCs, GM's Lansing Automotive Division (LAD) Facilities Division decided to remove CFCs wherever possible from its operating procedures. The first step was to identify CFC containing materials that were approved for purchase and which departments were authorized to use them. Departments were then sent a letter asking whether a non-CFC material could be substituted. Results from the inquiries led to identification of acceptable and cost-effective alternatives. Since mid-1992, no CFC-containing products have been purchased by LAD plants. In addition, LAD found a substitute for a degreaser it had been using that has only about 12 percent of ozone-depletion potential of the Freons it replaced. According to the Stratopheric Protection Division, another example of technology and engineering excellence is that Ford joined with other companies under the auspices of the International Cooperative for Ozone Layer Protection (ICOLP) to develop inert gas wave and Òno cleanÓ soldering which replaces CFC-cleaning of printed wiring boards, (PWBs). Electronics are the key to meeting vehicle emissions safety and security. The new process was designed for environmental reasons, but Ford found it also improved the quality of the PWBs.

V.B. Motor Vehicle Assembly

Plants Switch To Clean-Burning Gas

In an effort to reduce air emissions from manufacturing facilities, Ford has converted from coal-fired boilers to natural gas. An estimated $500,000 to $600,000 is saved each year in operating costs for each plant that converts from coal to natural gas. The environmental benefits of the conversion include: a reduction in carbon monoxide emissions by one half; a reduction in sulfur dioxide emissions by approximately 3,000 tons per year system wide; and a reduction in nitrogen oxide emissions of approximately 1,100 tons per year. The switch has also reduced particulate emissions by over 500 tons a year for Ford system-wide, and by as much as 95 percent at some facilities. In addition, 8,000 tons of ash a year, from coal burning, and 4,100 tons of ash collected by emission collectors will no longer have to be disposed of in a landfill.

Solid Waste Recycling

As part of an effort to reduce the amount of waste generated from assembly operations, Chrysler is using durable returnable containers. By using these containers, the company has successfully eliminated 55 percent of its expendable packaging wastes and diverted significant volumes of paper, cardboard, plastic and wood from landfills. Chrysler has designed new product programs which plan to eliminate 95 percent of packaging waste. In addition, each year the company salvages 700,000 tons of scrap metal and recycles thousands of tons of wooden pallets and cardboard from its plants. Chrysler has also instituted one of the largest paper recycling programs in the U.S., recycling more than 800 tons of paper per year.

Ford also has a program to reduce solid waste. At Ford Casting and Forging, steel drums are recycled in the foundryÕs melting process. FordÕs North American assembly plants are recycling 380 million pounds of waste each year. European and North American suppliers have been asked to ship components in reusable and returnable containers. FordÕs Romeo Engine Plant receives over 90 percent of its parts in returnable containers. Also, Ford uses recycled plastic shrink wrap from its own manufacturing operations to make plastic seat covers to protect seats during car shipment to dealers.

V.C. Motor Vehicle Painting/Finishing

Facility Emission Controls

During the past 10 years, automobile companies have reduced the amount of emissions resulting from vehicle painting operations through more efficient paint application techniques, use of lower solvent content paints, and incineration of process emissions. In an attempt to lower emissions without jeopardizing quality, a paint development pilot plant has been established at the Ford Wixom, Michigan Assembly Plant.

Rescheduling Paint Booth Cleaning Reduces Solvent Use And VOC Emissions

One of the major factors in customer satisfaction is the quality of a carÕs paint job. To insure that each vehicle of a given color has a uniform and consistent coating, paint spraying equipment must be cleaned properly each time a color is changed. It is also important that the paint booth be cleaned properly to prevent stray drops or flakes of old paint from dropping onto subsequent paint jobs. The solvent used in these cleaning operations is generally referred to as Òpurge solvent.Ó One of the disadvantages of using purge solvent is that it readily evaporates causing VOC emissions. In March 1993 the GM Fairfax Assembly Plant initiated a new booth-cleaning schedule which reduced the number of required cleanings. In addition to changing cleaning frequency, the company also monitored the amount of purge solvent used in production and cleaning operations. Information from these monitoring activities helped to identify the most efficient cleaning techniques. Implementation of these practices is expected to greatly lower emissions from purge solvent.

Surface Coating Toxics Reduction Program

Painting operations account for the majority of total releases attributed to automobile assembly. This is because painting and finishing operations result in VOC emissions from solvents used as carriers to apply solids to the vehicle. In order to reduce the amount of toxics generated during the painting/finishing process as well as eliminate future regulatory burden, the following projects are either underway or being planned at Chrysler:

¥ Evaluation of the feasibility of using coatings which eliminate or reduce VOCs/toxics; the goal is a 75 percent reduction in toxics by 1996. Various process changes and material reformulation will be required.

¥ Elimination of lead from surface coatings - lead has already been eliminated from all Chrysler color coats (basecoats). Further reductions in lead are being pursued for the electrodeposition primer (E-coat), with a goal of total removal by 1995. A lead-free E-coat is currently being tested.

¥ Elimination of hexavalent chromium phosphate pre-treatment - hexavalent chromium has already been eliminated from phosphate pre-treatment. Trivalent chromium remains in the final rinse that seals the phosphate at all but one of ChryslerÕs assembly plants; elimination of trivalent chromium is slated for 1995.

V.D. Motor Vehicle Dismantling/Shredding

Management Standards For Used Antifreeze

An article in the September/October 1994 edition of *Automotive Recycling* stated that The Coalition on Antifreeze and the Environment, in conjunction with Automotive Recyclers Association (ARA), has developed voluntary management standards for antifreeze. Management standards were developed, in part, to encourage the Federal and State governments to consider less restrictive regulations on recycling and disposal of antifreeze. Recent data show that antifreeze can become hazardous when handled and stored improperly. The voluntary management standards address the following:

¥ **Handling** - procedures for good housekeeping and proper handling of antifreeze

¥ **Storage** - guidelines for proper storage, such as the use of dedicated and well-labeled collection equipment

¥ **Education** - methods for educating employees on the importance of keeping collected, used antifreeze free from exposure to chemicals such as petroleum products, cleaning solvents, and other solvent-containing materials. Employees should also be taught not to use chlorinated solvents to clean antifreeze collection equipment.

V.E. Pollution Prevention Case Studies

Pollution Prevention at General Motors Corporation

General Motor's internal pollution prevention initiative - Waste Elimination and Cost Awareness Reward Everyone (WE CARE) - was piloted in 1990 at selected GM facilities. The initiative was then expanded to GMÕs operations throughout the U.S. and Canada in 1991 and was introduced to Mexican facilities in 1992. The foundation for this program is provided in the mission statement:

> *To minimize the impact of our operations, we will reduce emissions to air, water, and land by putting priority on waste prevention at the source, elimination or reduction of wasteful practices, and the utilization of recycling opportunities whenever available. The responsibility for achievement of this goal is primarily dependent on both managementÕs support and actions of every employee to modify existing methods, procedures, and processes and to incorporate waste prevention into all new endeavors.*

WE CARE provides guidance to individual facilities for setting up a multi-discipline committee to direct pollution prevention efforts. These committee include representatives from the following departments: maintenance, quality control, materials management, production, engineering, purchasing, environmental affairs, as well as from the local union. In bringing together representatives from all aspects of the company, GM is making pollution prevention part of everyoneÕs job. In 1992, GM encouraged employees to suggest ways to reduce the use of raw materials (especially toxics), reduce waste generation, and simple ways to benefit the environment.

GM has undertaken two broad-based initiatives to implement this philosophy; chemicals management and packaging reduction and recycling. Each is discussed below.

Chemicals Management

The automotive industry is a large consumer of chemicals including cleaners, machining fluids, hydraulic fluids, quenching fluids, water treatment chemicals, and solvents. These chemicals are known as indirect chemicals because they are not directly incorporated into the final product. Direct chemicals, which are incorporated into the final product, include automotive paints, vehicle lubricants, and fluids. GM aims to reduce chemical waste and save money by: (1) leveraging resources and expertise from other sources; and (2) reshaping the relation between the supplier and the customer. By developing and implementing an effective chemical management system, GM has reduced the amount of chemicals used at the source and reduced waste treatment and disposal costs.

Under the new chemical management program, GM no longer simply purchases chemicals from suppliers. Instead, they purchase a chemical service. The goal was to have one supplier for all of the indirect chemicals used at a facility. Since no one supplier can supply every chemical, the primary supplier is responsible for getting chemicals from secondary suppliers. Under the program, the primary supplier ultimately becomes a part of the production team by providing GM with chemical management, analysis, inventory control, and information management services. The benefits of this initiative include:

¥ Cost savings through the reduced number of suppliers, types and volumes of chemicals, and chemical inventories

¥ Better environmental control (waste treatment and disposal)

¥ Improved information management

¥ Improved chemical technology application

¥ Reduced purchase order processing

¥ Reduced freight.

The first assembly plant to implement this program went from having 35 different suppliers providing 348 chemicals, to 12 suppliers supplying 200 chemicals. This equates to a 66 percent reduction in the number of suppliers and a 43 percent reduction in the number of chemicals. Total savings were well over $750,000 per year.

Packaging Reduction and Recycling

One of the major waste streams associated with automotive assembly is solid waste. Solid waste is primarily the result of parts packaging from suppliers. The goal of GMÕs packaging reduction and recycling initiative was to reduce the amount of packaging coming into the plant and to ensure that packaging was easily recycled or returned.

Because GM has many different divisions and business units, one packaging strategy was not feasible. Therefore, each division was responsible for setting its own goals and strategies. Packaging guidelines and requirements were developed and communicated to suppliers. The guidelines, which were used throughout GM include:

¥ Eliminate packaging altogether, where possible

¥ Minimize the amount of material used in packaging

¥ Use packages that are returnable or refillable/reusable, where practical

¥ Use packaging that is recyclable and uses recycled material.

Requirements pertaining to expendable packaging (packaging which is used once and not recycled) were established for suppliers. These requirements pertained to package construction (easy to disassemble), the use of recycled material (use recyclable packaging), the use of lead and cadmium (do not use), and other provisions which reduce the amount of waste generated and facilitate recycling.

The GM Midsize Car Division has been able to reduce the amount of packaging waste going to landfill per vehicle manufactured by 75 percent in just two years as part of its "zero packaging-to-landfillÓ goal. As of September 1993, one GM assembly plant has been able to reduce the amount of waste to less than one pound of packaging per vehicle.

FordÕs Manufacturing Environmental Leadership Strategy includes the objective and practice of increasing the use of returnable containers and recycling expendable packaging. FordÕs North American assembly plants now use returnable packaging for over 87 percent of all parts shipped to the plants. These plants alone recycle more than 380 million pounds of waste each year. Many parts are shipped in returnable containers and packaging plastic is made into protective seat covers for use during car shipment.

VI. SUMMARY OF FEDERAL STATUTES AND REGULATIONS

This section discusses the Federal statutes and regulations that may apply to this sector. The purpose of this section is to highlight, and briefly describe the applicable Federal requirements, and to provide citations for more detailed information. The three following sections are included.

- ¥ Section IV.A contains a general overview of major statutes
- ¥ Section IV.B contains a list of regulations specific to this industry
- ¥ Section IV.C contains a list of pending and proposed regulations

The descriptions within Section IV are intended solely for general information. Depending upon the nature or scope of the activities at a particular facility, these summaries may or may not necessarily describe all applicable environmental requirements. Moreover, they do not constitute formal interpretations or clarifications of the statutes and regulations. For further information, readers should consult the Code of Federal Regulations and other state or local regulatory agencies. EPA Hotline contacts are also provided for each major statute.

VI.A. General Description of Major Statutes

Resource Conservation And Recovery Act

The Resource Conservation And Recovery Act (RCRA) of 1976 which amended the Solid Waste Disposal Act, addresses solid (Subtitle D) and hazardous (Subtitle C) waste management activities. The Hazardous and Solid Waste Amendments (HSWA) of 1984 strengthened RCRAÕs waste management provisions and added Subtitle I, which governs underground storage tanks (USTs).

Regulations promulgated pursuant to Subtitle C of RCRA (40 CFR Parts 260-299) establish a Òcradle-to-graveÓ system governing hazardous waste from the point of generation to disposal. RCRA hazardous wastes include the specific materials listed in the regulations (commercial chemical products, designated with the code "P" or "U"; hazardous wastes from specific industries/sources, designated with the code "K"; or hazardous wastes from non-specific sources, designated with the code "F") or materials which exhibit a hazardous waste characteristic (ignitibility, corrosivity, reactivity, or toxicity and designated with the code "D").

Regulated entities that generate hazardous waste are subject to waste accumulation, manifesting, and recordkeeping standards. Facilities that treat, store, or dispose of hazardous waste must obtain a permit, either from EPA or from a State agency which EPA has authorized to implement the permitting program. Subtitle C permits contain general facility standards such as contingency plans, emergency procedures, recordkeeping and reporting requirements, financial assurance mechanisms, and unit-specific standards. RCRA also contains provisions (40 CFR Part 264 Subpart S and ¤264.10) for conducting corrective actions which govern the cleanup of releases of hazardous waste or constituents from solid waste management units at RCRA-regulated facilities.

Although RCRA is a Federal statute, many States implement the RCRA program. Currently, EPA has delegated its authority to implement various provisions of RCRA to 46 of the 50 States.

Most RCRA requirements are not industry specific but apply to any company that transports, treats, stores, or disposes of hazardous waste. Here are some important RCRA regulatory requirements:

¥ **Identification of Solid and Hazardous Wastes** (40 CFR Part 261) lays out the procedure every generator should follow to determine whether the material created is considered a hazardous waste, solid waste, or is exempted from regulation.

¥ **Standards for Generators of Hazardous Waste** (40 CFR Part 262) establishes the responsibilities of hazardous waste generators including obtaining an ID number, preparing a manifest, ensuring proper packaging and labeling, meeting standards for waste accumulation units, and recordkeeping and reporting requirements. Generators can accumulate hazardous waste for up to 90 days (or 180 days depending on the amount of waste generated) without obtaining a permit.

¥ **Land Disposal Restrictions** (LDRs) are regulations prohibiting the disposal of hazardous waste on land without prior treatment. Under the LDRs (40 CFR 268), materials must meet land disposal restriction (LDR) treatment standards prior to placement in a RCRA land disposal unit (landfill, land treatment unit, waste pile, or surface impoundment). Wastes subject to the LDRs include solvents, electroplating wastes, heavy metals, and acids. Generators of waste subject to the LDRs must provide notification of such to the designated TSD facility to ensure proper treatment prior to disposal.

¥ **Used Oil Management Standards** (40 CFR Part 279) impose management requirements affecting the storage, transportation, burning, processing, and re-refining of the used oil. For parties that merely generate used oil, regulations establish storage standards. For a party considered a used oil marketer (one who generates and sells off-specification used oil directly to a used oil burner), additional tracking and paperwork requirements must be satisfied.

¥ **Tanks and Containers** used to store hazardous waste with a high volatile organic concentration must meet emission standards under RCRA. Regulations (40 CFR Part 264-265, Subpart CC) require generators to test the waste to determine the concentration of the waste, to satisfy tank and container emissions standards, and to inspect and monitor regulated units. These regulations apply to all facilities who store such waste, including generators operating under the 90-day accumulation rule.

¥ **Underground Storage Tanks** (USTs) containing petroleum and hazardous substance are regulated under Subtitle I of RCRA. Subtitle I regulations (40 CFR Part 280) contain tank design and release detection requirements, as well as financial responsibility and corrective action standards for USTs. The UST program also establishes increasingly stringent standards, including upgrade requirements for existing tanks, that must be met by 1998.

¥ **Boilers and Industrial Furnaces** (BIFs) that use or burn fuel containing hazardous waste must comply with strict design and operating standards. BIF regulations (40 CFR Part 266, Subpart H) address unit design, provide performance standards, require emissions monitoring, and restrict the type of waste that may be burned.

EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, responds to questions and distributes guidance regarding all RCRA regulations. The RCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., EST, excluding Federal holidays.

Comprehensive Environmental Response, Compensation, And Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a 1980 law commonly known as Superfund, authorizes EPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. CERCLA also enables EPA to force parties responsible for environmental contamination to clean it up or to reimburse the Superfund for response costs incurred by EPA. The Superfund Amendments and Reauthorization Act (SARA) of 1986 revised various sections of CERCLA, extended the taxing authority for the Superfund, and created a free-standing law, SARA Title III, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

The CERCLA **hazardous substance release reporting regulations** (40 CFR Part 302) direct the person in charge of a facility to report to the National Response Center (NRC) any environmental release of a hazardous substance which exceeds a reportable quantity. Reportable quantities are defined and listed in 40 CFR ¤ 302.4. A release report may trigger a response by EPA, or by one or more Federal or State emergency response authorities.

EPA implements **hazardous substance responses** according to procedures outlined in the National Oil and Hazardous Substances Pollution Contingency Plan

(NCP) (40 CFR Part 300). The NCP includes provisions for permanent cleanups, known as remedial actions, and other cleanups referred to as "removals." EPA generally takes remedial actions only at sites on the National Priorities List (NPL), which currently includes approximately 1300 sites. Both EPA and states can act at other sites; however, EPA provides responsible parties the opportunity to conduct removal and remedial actions and encourages community involvement throughout the Superfund response process.

EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, answers questions and references guidance pertaining to the Superfund program. The CERCLA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., EST, excluding Federal holidays.

Emergency Planning And Community Right-To-Know Act

The Superfund Amendments and Reauthorization Act (SARA) of 1986 created the Emergency Planning and Community Right-to-Know Act (EPCRA, also known as SARA Title III), a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by State and local governments. EPCRA required the establishment of State emergency response commissions (SERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees (LEPCs).

EPCRA and the EPCRA regulations (40 CFR Parts 350-372) establish four types of reporting obligations for facilities which store or manage specified chemicals:

¥ **EPCRA ¤302** requires facilities to notify the SERC and LEPC of the presence of any "extremely hazardous substance" (the list of such substances is in 40 CFR Part 355, Appendices A and B) if it has such substance in excess of the substance's threshold planning quantity, and directs the facility to appoint an emergency response coordinator.

¥ **EPCRA ¤304** requires the facility to notify the SERC and the LEPC in the event of a release exceeding the reportable quantity of a CERCLA hazardous substance or an EPCRA extremely hazardous substance.

¥ **EPCRA ¤¤311 and 312** require a facility at which a hazardous chemical, as defined by the Occupational Safety and Health Act, is present in an amount exceeding a specified threshold to submit to the SERC, LEPC, and local fire department material safety data sheets (MSDSs) or lists of MSDSs and hazardous chemical inventory forms (also known as Tier I and II forms). This information helps the local government respond in the event of a spill or release of the chemical.

¥ **EPCRA ¤313** requires manufacturing facilities included in SIC codes 20 through 39, which have ten or more employees, and which manufacture, process, or use specified chemicals in amounts greater than threshold quantities, to submit an annual toxic chemical release report. This report, commonly known as the Form R, covers releases and transfers of toxic chemicals to various facilities and environmental media, and allows EPA to compile the national Toxic Release Inventory (TRI) database.

All information submitted pursuant to EPCRA regulations is publicly accessible, unless protected by a trade secret claim.

EPA's EPCRA Hotline, at (800) 535-0202, answers questions and distributes guidance regarding the emergency planning and community right-to-know regulations. The EPCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., EST, excluding Federal holidays.

Clean Water Act

The primary objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's surface waters. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants; "conventional" pollutants, such as biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, oil and grease, and pH; and "non-conventional" pollutants, including any pollutant not identified as either conventional or priority.

The CWA regulates both direct and indirect discharges. The **National Pollutant Discharge Elimination System (NPDES)** program (CWA ¤402) controls direct discharges into navigable waters. Direct discharges or "point source" discharges are from sources such as pipes and sewers. NPDES permits, issued by either EPA or an authorized State (EPA has presently authorized forty States to administer the NPDES program), contain industry-specific, technology-based and/or water quality-based limits, and establish pollutant monitoring and reporting requirements. A facility that intends to discharge into the nation's waters must obtain a permit prior to initiating its discharge. A permit applicant must provide quantitative analytical data identifying the types of pollutants present in the facility's effluent. The permit will then set forth the conditions and effluent limitations under which a facility may make a discharge.

A NPDES permit may also include discharge limits based on Federal or State water quality criteria or standards, that were designed to protect designated uses of surface waters, such as supporting aquatic life or recreation. These standards, unlike the technological standards, generally do not take into account technological feasibility or costs. Water quality criteria and standards vary from State to State, and site to site, depending on the use classification of the receiving body of water. Most States follow EPA guidelines which propose aquatic life and human health criteria for many of the 126 priority pollutants.

Storm Water Discharges

In 1987 the CWA was amended to require EPA to establish a program to address **storm water discharges**. In response, EPA promulgated the NPDES storm water permit application regulations. Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant (40 CFR 122.26(b)(14)). These regulations require that facilities with the following storm water discharges apply for a NPDES permit: (1) a discharge associated with industrial activity; (2) a discharge from a large or medium municipal storm sewer system; or (3) a discharge which EPA or the State determines to contribute to a violation of a water quality standard or is a significant contributor of pollutants to waters of the

United States.
The term "storm water discharge associated with industrial activity" means a storm water discharge from one of 11 categories of industrial activity defined at 40 CFR 122.26. Six of the categories are defined by SIC codes while the other five are identified through narrative descriptions of the regulated industrial activity. If the primary SIC code of the facility is one of those identified in the regulations, the facility is subject to the storm water permit application requirements. If any activity at a facility is covered by one of the five narrative categories, storm water discharges from those areas where the activities occur are subject to storm water discharge permit application requirements.

Those facilities/activities that are subject to storm water discharge permit application requirements are identified below. To determine whether a particular facility falls within one of these categories, the regulation should be consulted.

Category i: Facilities subject to storm water effluent guidelines, new source performance standards, or toxic pollutant effluent standards.

Category ii: Facilities classified as SIC 24-lumber and wood products (except wood kitchen cabinets); SIC 26-paper and allied products (except paperboard containers and products); SIC 28-chemicals and allied products (except drugs and paints); SIC 29-petroleum refining; and SIC 311-leather tanning and finishing.

Category iii: Facilities classified as SIC 10-metal mining; SIC 12-coal mining; SIC 13-oil and gas extraction; and SIC 14-nonmetallic mineral mining.

Category iv: Hazardous waste treatment, storage, or disposal facilities.

Category v: Landfills, land application sites, and open dumps that receive or have received industrial wastes.

Category vi: Facilities classified as SIC 5015-used motor vehicle parts; and SIC 5093-automotive scrap and waste material recycling facilities.

Category vii: Steam electric power generating facilities.

Category viii: Facilities classified as SIC 40-railroad transportation; SIC 41-local passenger transportation; SIC 42-trucking and warehousing (except public warehousing and storage); SIC 43-U.S. Postal Service; SIC 44-water transportation; SIC 45-transportation by air; and SIC 5171-petroleum bulk storage stations and terminals.

Category ix: Sewage treatment works.

Category x: Construction activities except operations that result in the disturbance of less than five acres of total land area.

Category xi: Facilities classified as SIC 20-food and kindred products; SIC 21-tobacco products; SIC 22-textile mill products; SIC 23-apparel related products; SIC 2434-wood kitchen cabinets manufacturing; SIC 25-furniture and fixtures; SIC 265-paperboard containers and boxes; SIC 267-converted paper and paperboard products; SIC 27-printing, publishing, and allied industries; SIC 283-drugs; SIC 285-paints, varnishes, lacquer, enamels, and allied products; SIC 30-rubber and plastics; SIC 31-leather and leather products (except leather and tanning and finishing); SIC 323-glass products; SIC 34-fabricated metal products (except fabricated structural metal); SIC 35-industrial and commercial machinery and computer equipment; SIC 36-electronic and other electrical equipment and components; SIC 37-transportation equipment (except ship and boat building and repairing); SIC 38-measuring, analyzing, and controlling instruments; SIC 39-miscellaneous manufacturing industries; and SIC 4221-4225-public warehousing and storage.

Pretreatment Program

Another type of discharge that is regulated by the CWA is one that goes to a publicly-owned treatment works (POTWs). The national **pretreatment program** (CWA ¤307(b)) controls the indirect discharge of pollutants to POTWs by "industrial users." Facilities regulated under ¤307(b) must meet certain pretreatment standards. The goal of the pretreatment program is to protect municipal wastewater treatment plants from damage that may occur when hazardous, toxic, or other wastes are discharged into a sewer system and to protect the quality of sludge generated by these plants. Discharges to a POTW are regulated primarily by the POTW itself, rather than the State or EPA.

EPA has developed technology-based standards for industrial users of POTWs. Different standards apply to existing and new sources within each category. "Categorical" pretreatment standards applicable to an industry on a nationwide basis are developed by EPA. In addition, another kind of pretreatment standard, "local limits," are developed by the POTW in order to assist the POTW in achieving the effluent limitations in its NPDES permit.

Regardless of whether a State is authorized to implement either the NPDES or the pretreatment program, if it develops its own program, it may enforce requirements more stringent than Federal standards.

EPAÕs Office of Water, at (202) 260-5700, will direct callers with questions about the CWA to the appropriate EPA office. EPA also maintains a bibliographic database of Office of Water publications which can be accessed through the Ground Water and Drinking Water resource center, at (202) 260-7786.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) mandates that EPA establish regulations to protect human health from contaminants in drinking water. The law authorizes EPA to develop national drinking water standards and to create a joint Federal-State system to ensure compliance with these standards. The SDWA also directs EPA to protect underground sources of drinking water through the control of underground injection of liquid wastes.

EPA has developed primary and secondary drinking water standards under its SDWA authority. EPA and authorized States enforce the primary drinking water standards, which are, contaminant-specific concentration limits that apply to certain public drinking water supplies. Primary drinking water standards consist of maximum contaminant level goals (MCLGs), which are non-enforceable health-based goals, and maximum contaminant levels (MCLs), which are enforceable limits set as close to MCLGs as possible, considering cost and feasibility of attainment.

The SDWA **Underground Injection Control (UIC)** program (40 CFR Parts 144-148) is a permit program which protects underground sources of drinking water by regulating five classes of injection wells. UIC permits include design, operating, inspection, and monitoring requirements. Wells used to inject hazardous wastes must also comply with RCRA corrective action standards in order to be granted a RCRA permit, and must meet applicable RCRA land disposal restrictions standards. The UIC permit program is primarily State-enforced, since EPA has authorized all but a few States to administer the program.

The SDWA also provides for a Federally-implemented Sole Source Aquifer program, which prohibits Federal funds from being expended on projects that may contaminate the sole or principal source of drinking water for a given area, and for a State-implemented Wellhead Protection program, designed to protect drinking water wells and drinking water recharge areas.

EPAÕs Safe Drinking Water Hotline, at (800) 426-4791, answers questions and distributes guidance pertaining to SDWA standards. The Hotline operates from 9:00 a.m. through 5:30 p.m., EST, excluding Federal holidays.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) granted EPA authority to create a regulatory framework to collect data on chemicals in order to evaluate, assess, mitigate, and control risks which may be posed by their manufacture, processing, and use. TSCA provides a variety of control methods to prevent chemicals from posing unreasonable risk.

TSCA standards may apply at any point during a chemicalÕs life cycle. Under TSCA ¤5, EPA has established an inventory of chemical substances. If a chemical is not already on the inventory, and has not been excluded by TSCA, a premanufacture notice (PMN) must be submitted to EPA prior to manufacture or import. The PMN must identify the chemical and provide available information on health and environmental effects. If available data are not sufficient to evaluate the chemical's effects, EPA can impose restrictions pending the development of information on its health and environmental effects. EPA can also restrict significant new uses of chemicals based upon factors such as the projected volume and use of the chemical.

Under TSCA ¤6, EPA can ban the manufacture or distribution in commerce, limit the use, require labeling, or place other restrictions on chemicals that pose unreasonable risks. Among the chemicals EPA regulates under ¤6 authority are asbestos, chlorofluorocarbons (CFCs), and polychlorinated biphenyls (PCBs).

EPAÕs TSCA Assistance Information Service, at (202) 554-1404, answers questions and distributes guidance pertaining to Toxic Substances Control Act standards. The Service operates from 8:30 a.m. through 4:30 p.m., EST, excluding Federal holidays.

Clean Air Act

The Clean Air Act (CAA) and its amendments, including the Clean Air Act Amendments (CAAA) of 1990, are designed to Òprotect and enhance the nation's air resources so as to promote the public health and welfare and the productive capacity of the population.Ó The CAA consists of six sections, known as Titles, which direct EPA to establish national standards for ambient air quality and for EPA and the States to implement, maintain, and enforce these standards through a variety of mechanisms. Under the CAAA, many facilities will be required to obtain operating permits for the first time. State and local governments oversee, manage, and enforce many of the requirements of the CAAA. CAA regulations appear at 40 CFR Parts 50-99.

Pursuant to Title I of the CAA, EPA has established national ambient air quality standards (NAAQSs) to limit levels of "criteria pollutants," including carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide. Geographic areas that meet NAAQSs for a given pollutant are classified as attainment areas; those that do not meet NAAQSs are classified as non-attainment areas. Under ¤110 of the CAA, each State must develop a State Implementation Plan (SIP) to identify sources of air pollution and to determine what reductions are required to meet Federal air quality standards.

Title I also authorizes EPA to establish New Source Performance Standards (NSPSs), which are nationally uniform emission standards for new stationary sources falling within particular industrial categories. NSPSs are based on the pollution control technology available to that category of industrial source but allow the affected industries the flexibility to devise a cost-effective means of reducing emissions.

Under Title I, EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants (NESHAPs), nationally uniform standards oriented towards controlling particular hazardous air pollutants (HAPs). Title III of the CAAA further directed EPA to develop a list of sources that emit any of 189 HAPs, and to develop regulations for these categories of sources. To date EPA has listed 174 categories and developed a schedule for the establishment of emission standards. The emission standards will be developed for both new and existing sources based on "maximum achievable control technology" (MACT). The MACT is defined as the control technology achieving the maximum degree of reduction in the emission of the HAPs, taking into account cost and other factors.

Title II of the CAA pertains to mobile sources, such as cars, trucks, buses, and planes. Reformulated gasoline, automobile pollution control devices, and vapor recovery nozzles on gas pumps are a few of the mechanisms EPA uses to regulate mobile air emission sources.

Title IV establishes a sulfur dioxide emissions program designed to reduce the formation of acid rain. Reduction of sulfur dioxide releases will be obtained by granting to certain sources limited emissions allowances, which, beginning in 1995, will be set below previous levels of sulfur dioxide releases.

Title V of the CAAA of 1990 created an operating permit program for all "major sources" (and certain other sources) regulated under the CAA. One purpose of the operating permit is to include in a single document all air emissions requirements that apply to a given facility. States are developing the permit programs in accordance with guidance and regulations from EPA. Once a State program is approved by EPA, permits will be issued and monitored by that State.

Title VI is intended to protect stratospheric ozone by phasing out the manufacture of ozone-depleting chemicals and restrict their use and distribution. Production of Class I substances, including 15 kinds of chlorofluorocarbons (CFCs), will be phased out entirely by the year 2000, while certain hydrochlorofluorocarbons (HCFCs) will be phased out by 2030.

EPA's Control Technology Center, at (919) 541-0800, provides general assistance and information on CAA standards. The Stratospheric Ozone Information Hotline, at (800) 296-1996, provides general information about regulations promulgated under Title VI of the CAA, and EPA's EPCRA Hotline, at (800) 535-0202, answers questions about accidental release prevention under CAA ¤112(r). In addition, the Technology Transfer Network Bulletin Board System (modem access (919) 541-5742)) includes recent CAA rules, EPA guidance documents, and updates of EPA activities.

VI.B. Industry Specific Regulations

Though production processes associated with the industries listed under SIC 37 have few specific regulatory requirements, the diverse and complex nature of the industry makes it one of the most heavily regulated industries in the manufacturing sector.

The large number of facilities engaged in activities covered by SIC 37, as well as the diversity of processes and products involved, make it difficult to provide a precise regulatory framework; the statutes and regulations governing a producer of a specific part which uses a specific manufacturing process will differ significantly from those affecting an integrated manufacturing plant performing foundry, metal finishing, and painting operations. Thus, the discussion which follows identifies those regulations that are of concern to the industry at large.

VI.B.1. Clean Water Act (CWA)

The Clean Water Act regulates the amount of chemicals/toxics released by industries via direct and indirect wastewater/effluent discharges. Regulations developed to implement this Act establish effluent guidelines and standards for different industries. These standards usually set concentration-based limits on the discharge of a given chemical by any one facility. If a facility is discharging directly into a body of water, it must obtain a National Pollution Discharge Elimination System (NPDES) permit. However, if a facility is discharging to a publicly owned treatment works (POTW), it must adhere to the specified pretreatment standards. (Information provided by Chrysler indicates that all of the company's manufacturing facilities discharge process wastewater to POTWs. Much of their water is treated at an on-site industrial wastewater treatment plant prior to discharge to the POTW.)

The following regulations are potentially applicable to various stages in the auto and auto parts manufacturing and assembly processes. Because so many regulations are potentially applicable to segments of the industry, we have divided the regulations into the following categories: foundry/metal forming operations; metal finishing operations; and painting operations.

Foundry/Metal Forming Operations

The following effluent guidelines and standards are applicable to the activities performed during the foundry/metal forming operations.

¥ Iron and Steel Manufacturing (40 CFR Part 420)
¥ Metal Molding and Casting (40 CFR Part 464)
¥ Aluminum Forming (40 CFR Part 467)
¥ Copper Forming (40 CFR Part 468)
¥ Nonferrous Forming (40 CFR Part 471)
¥ Lead-Tin-Bismuth Forming Category (40 CFR Part 471 Subpart A)
¥ Zinc Forming Subcategory (40 CFR Part 471, SubpartÊH).

Metal Finishing Operations

The following effluent guidelines and standards are applicable to metal finishing activities:

- ¥ Electroplating (40 CFR Part 413)
- ¥ Metal Finishing (40 CFR Part 433)
- ¥ Coil Coating (40 CFR Part 465).

The standards applicable to metal finishing regulate discharges resulting from numerous activities performed by manufacturers of autos and auto parts. The metal finishing and electroplating guidelines address discharges from the following six activities: (1) electroplating; (2) electroless plating; (3) anodizing; (4) coating; (5) chemical etching and milling; and (6) printed circuit board manufacturing. If one of these operations is performed, the metal finishing guidelines provide effluent standards for 40 additional operations, including machining; grinding; polishing; welding; soldering; and solvent degreasing.

VI.B.2. Clean Air Act (CAA)

Several existing regulations promulgated under the CAA are applicable to various stages in the automobile production process. These are discussed below.

The Standards of Performance for Automobile and Light Duty Truck Surface Coating Operations (40 CFR Part 60, subpart MM) are applicable to assembly plant operations where prime coats, guide coats, and topcoats are applied. These standards prohibit assembly plants that begin construction, modification, or reconstruction after October 5, 1979 from discharging VOC emissions in excess of:

- ¥ 0.16 kg of VOC per liter of applied coating solids from each prime coat,

- ¥ 1.40 kg of VOC per liter of applied coating solids from each guide coat operation, and/or

- ¥ 1.47 kg of VOC per liter of applied coating solids from each top coat.

The Standards of Performance for Metal Coil Surface Coating (40 CFR Part 60, subpart TT) may be relevant to some facilities in the automotive industry. This standard regulates the discharge of VOCs.

The Standards of Performance for Fossil-Fired Steam Generators for Which Construction Commenced after August 17, 1971 (40 CFR Part 60, subpart D) are applicable to motor vehicle plants which have fossil-fuel-fired steam generating units of more that 73 megawatts (MW) heat input rate and fossil-fuel and woodresidue-fired steam generating units capable of firing fossil fuel at a rate of more that 73 MW (though these standards do not apply to electric utility steam generating units).

The regulations set emissions standards for sulfur dioxide, particulate matter, and nitrogen oxides, and contain compliance, performance, emissions testing, and recordkeeping requirements.

The Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR Part 60 subpart Dc) apply to motor vehicle and motor vehicle equipment plants which have steam generating units for which construction, modification, or reconstruction is commenced after June 9, 1989 and that have a maximum design capacity of 29 MW input capacity or less, but greater than or equal to 2.9 MW.

These regulations set emissions standards for sulfur dioxide and particulate matter and require certain compliance, performance, emissions testing, and recordkeeping requirements.

National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers (40 CFR Part 63, subpart Q) apply to motor vehicle and motor vehicle equipment plants that have industrial process cooling towers (IPCTs) that are operated with chromium-based water treatment chemicals and are either major sources or are integral parts of facilities that are major sources. Major sources are those sources that emit or have the potential to emit 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants.

The standards prohibit the use of chromium-based water treatment chemicals in:

- Existing IPCTs on or after March 8, 1996, and/or
- New IPCTs (IPCTs for which construction or reconstruction commenced after August 12, 1993) on or after September 8, 1994.

Chromium Electroplating

Human health studies suggest that various adverse effects result from acute, intermediate, and chronic exposure to chromium. As a result, in January 1995, EPA established National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating And Chromium Anodizing Tanks (40 CFR Part 9 and 63, Subpart N) The regulation is an MACT-based performance standard that sets limits on chromium and chromium compounds emissions based upon concentrations in the waste stream (e.g., mg of chromium/m^3 of air).

EPA holds that these performance standards allow a degree of flexibility since facilities may choose their own technology as long as the emissions limits (established by the MACT) are achieved. The standards differ according to the sources (e.g., old sources of chromium emissions will have different standards than new ones), further reducing the standards' rigidity.

VI.B.3. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA has had a much greater impact on the Big Three with facilities built before RCRAÕs enactment than it has had on the so-called transplant companies which have newer plants.

VI.B.4. Resource Conservation and Recovery Act (RCRA)

RCRA was passed in 1976, as an amendment to the Solid Waste Disposal Act, to ensure that solid wastes are managed in an environmentally sound manner. A material is classified under RCRA as a hazardous waste if the material meets the definition of solid waste (40 CFR 261.2), and that solid waste material exhibits one of the characteristics of a hazardous waste (40 CFR 261.20-24) or is specifically listed as a hazardous waste (40 CFR 261.31-33). A material defined as a hazardous waste is then subject to Subtitle C generator (40 CFR 262), transporter (40 CFR 263), treatment, storage, and disposal facility (40 CFR 254 and 265) and land disposal requirements (40 CFR 268). The motor vehicle and motor vehicle equipment manufacturing industry must be concerned with the regulations addressing all these. Most automobile and light truck assembly and component manufacturing facilities are not considered hazardous waste treatment, storage or disposal facilities requiring RCRA permits, although they may generate hazardous waste subject to RCRA management requirements.

The greatest quantities of RCRA listed waste and characteristically hazardous waste are identified in Exhibit 25. For more information on RCRA hazardous waste, refer to 40 CFR Part 261.

Exhibit 25
Hazardous Wastes Relevant to the Automotive Industry

EPA Hazardous Waste No.	Hazardous Waste
D001	Wastes which are hazardous due to the characterization of ignitibility
D002	Wastes which are hazardous due to the characteristic of corrosivity
D006 (cadmium) D007 (chromium) D008 (lead) D009 (mercury) D010 (selenium) D011 (silver) D035 (methyl ethyl ketone) D039 (tetrachloro-ethylene) D040 (trichloro-ethylene)	Wastes which are hazardous due to the characteristic of toxicity for each of the constituents.
F001	Halogenated solvents used in degreasing: tetrachloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of 10% or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F002	Spent halogenated solvents; tetrachloroethylene, methylene chloride, trichlorethylene, 1,1,1-trichloroethane chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, one or more of the above halogenated solvents or those listed in F001, F004, F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F003	Spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of 10% or more (by volume) of one of those solvents listed in F001, F002, F004, F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.
F004	Spent non-halogenated solvents: cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of 10% or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

Exhibit 25 (cont'd)
Hazardous Wastes Relevant to the Automotive Industry

EPA Hazardous Waste No.	Hazardous Waste
F005	Spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of 10% or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvents mixtures.
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.
F007	Spent cyanide plating bath solutions from electroplating operations.
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.

Source: Sustainable Industry: Promoting Strategic Environmental Protection in the Industrial Sector, Phase 1 Report, EPA, OERR, June 1994.

VI.C. Pending and Proposed Regulatory Requirements

Numerous regulatory requirements which might affect the automotive industry are under consideration. Summaries of some of these potential future regulations are discussed below.

VI.C.1. Motor Vehicle Parts Manufacturing

Clean Water Act (CWA)

Although Congress did not reauthorize the Clean Water Act in 1994, future legislative requirements and/or reform may impact the motor vehicle manufacturer. Several of the regulations currently under consideration or development will have a significant impact on the automotive industry. The effluent guidelines and standards for Electroplaters (40 CFR Part 413) and Metal Finishers (40 CFR Part 433) are currently under review. EPA is also currently developing effluent guidelines and standards for the metal products and machinery industry (Phase II, 40 CFR Part 438), which are Scheduled to be finalized by December 1999. It is likely that EPA will integrate new regulatory options for metal finishing industry processes into this guideline.

The Effluent Guidelines and Standards for the Metal Products and Machinery Category, Phase II, will propose effluent limitation guidelines for facilities that generate wastewater while processing metal parts, metal products and machinery, including: manufacture, assembly, rebuilding, repair, and maintenance. The Phase II regulation will cover eight major industrial groups, including: motor vehicles, buses and trucks, household equipment, business equipment, instruments, precious and nonprecious metals, shipbuilding, and railroads. The court-ordered deadline is December 31, 1997.

Clean Air Act (CAA)

In addition to the CAA requirements discussed above, EPA is currently working on several regulations that will directly affect the metal finishing portion of the motor vehicle manufacturing industry. Many proposed standards will limit the air emissions from various industries by proposing Maximum Achievable Control Technology (MACT) based performance standards that will set limits on emissions based upon concentrations of pollutants in the waste stream. Various potential standards are described below.

Organic Solvent Degreasing/Cleaning

EPA has also proposed a NESHAP (58 FR 62566, November 19, 1993) for the source category of halogenated solvent degreasing/cleaning that will directly affect the metal finishing industry. This will apply to new and existing organic halogenated solvent emissions to a MACT-equivalent level, and will apply to new and existing organic halogenated solvent cleaners (degreasers) using any of the HAPs listed in the CAA Amendments. EPA is specifically targeting vapor degreasers that use the following HAPs: methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, and chloroform.

This NESHAP proposes to implement a MACT-based equipment and work practice compliance standard. This would require that a facility use a designated type of pollution prevention technology along with proper operating procedures. EPA has also provided an alternative compliance standard. Existing operations, which utilize performance-based standards, can continue if they reach the same limit as the equipment and work practice compliance standard.

Steel Pickling, HCl

Hydrochloric acid (HCl) and chlorine are among the pollutants listed as hazardous air pollutants in Section 112 of the Clean Air Act Amendments of 1990. Steel pickling processes that use HCl solution and HCl regeneration processes have been identified by the EPA as potentially significant sources of HCl and chlorine air emissions and, as such, a source category for which national emission standards may be warranted. EPA is required to promulgate national emission standards for 50 percent of the source categories listed in Section 112(e) by November 15, 1997. EPA plans to promulgate this standard by September 30, 1996.

VI.C.2. Motor Vehicle Painting/Finishing

Clean Air Act (CAA)

The 1990 CAAA identified a number of ozone non-attainment areas throughout the U.S. and gave those States most affected by high VOC emissions until November 1993 to develop implementation plans to combat the problem. The legislation further required that States reduce VOCs by 15 percent by 1996 and that States with extreme problems reduce emission an additional three percent each year following. Although State VOC limits have been established, national limits have not. A national rule on VOC limits is likely to come next year.

VOCs are one of the primary emissions from the automotive painting/finishing process and come from common paint solvents. Though no standards are currently proposed, industry officials are making their thoughts known. According to Ron Hilovsky, manager of regulatory affairs for PPG Fleet Finishes, as stated in an August 1994 article in Heavy Duty Trucking entitled ÒYou Can Breath Easier, Ò national limits will effectively eliminate lacquer products and systems.

According to Heavy Duty Trucking, limits for paints and finishes are likely to be based on the pounds of VOCs released per gallon. Most topcoats have VOC levels of 5.5 lbs/gallon or more. New limits on VOCs are likely to be as follows:

¥ Pretreat/wash primer - 6.5 lbs./gallon

¥ Primer/primer surfacer - 4.6 lbs./gallon

¥ Primer sealer - 4.6 lbs./gallon

¥ Topcoats (including single-stage solids and metallics and basecoat/clearcoat) - 5.0 lbs./gallon

¥ Tri and quad coat basecoat/clearcoat - 5.2 lbs./gallon

¥ Specialty coatings - 7.0 lbs./gallon.

VI.C.3. Motor Vehicle Dismantling/Shredding

According to AAMA, future U.S. regulatory activity affecting the vehicle recycling process, if it occurs at all, is likely to aim at improving the efficiency of the existing and already successful market infrastructure. For example, it may promote:

- Common definitions and terms
- Market incentives for the use of recycled materials, and
- Common standards for operating dismantling and shredding facilities