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**THE MASSACHUSETTS  
TOXICS USE REDUCTION INSTITUTE**

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**TURA Data Review  
Cable & Wire Industry Sector**

**Methods and Policy Report No. 22**

**April 2002**

**University of Massachusetts Lowell**

**TURA Data Review  
Cable & Wire Industry Sector**

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The Toxics Use Reduction Institute is a multi-disciplinary research, education, and policy center established by the Massachusetts Toxics Use Reduction Act of 1989. The Institute sponsors and conducts research, organizes education and training programs, and provides technical support to promote the reduction in the use of toxic chemicals or the generation of toxic chemical byproducts in industry and commerce. Further information can be obtained by writing the Toxics Use Reduction Institute, University of Massachusetts Lowell, One University Avenue, Lowell, Massachusetts 01854.

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## Introduction

The Toxics Use Reduction Institute (TURI) commissioned this report to evaluate the Toxics Use Reduction Act (TURA) data provided by facilities within the Cable & Wire industry. The TURA data included in this review covers a ten year period from 1990 through 1999, and includes twenty-one facilities in the Cable & Wire industry. The total reported toxic chemical use for these twenty-one facilities in 1999 was 7.5 million pounds. This represents approximately 0.7% of the toxic chemical use reported by all TURA filers in 1999.

The data was evaluated for trends and patterns of current use. The findings are presented in the following four sections:

1. **Industry Wide** – Production ratio, chemical use, byproduct, shipped in product, release, and transfer data is reviewed for the twenty-one facilities on an aggregate basis.
2. **By Chemical** - Chemical use, byproduct, shipped in product, release, and transfer data is reviewed at the individual chemical level.
3. **By Facility** – Chemical use data is reviewed at the individual facility level.
4. **Toxics Use Reduction Technique** – The toxics use reduction techniques reported for the Cable & Wire industry are reviewed for all chemicals in aggregate as well as for lead compounds.

Throughout this report, data is represented as reported quantities and “production adjusted” quantities. Reported quantities appear as reported by TURA filers. “Production adjusted” data is used to eliminate the effects of production changes and to provide more insight as to whether changes in chemical quantities are due to toxics use reduction or varying production levels. The overall production ratio for the Cable & Wire industry was calculated by weighting the reported production ratio for each facility by that facility’s reported use and then taking an average for the entire Cable & Wire industry. In addition, overall production ratios were calculated for individual chemicals and facilities for which use was reported in all years.

One of TURA’s original goals was to reduce the generation of toxic waste byproducts by 50%. This goal takes into account changes in levels of production as reflected in production adjusted data. The Cable & Wire industry progress will be compared with the state-wide goal.

In order to fairly evaluate progress over the ten year period of TURA data reporting, this report includes “core” data only. The “core” data set includes chemicals and industries that have been subject to TURA reporting from 1990 through 1999. The Cable & Wire “core” facilities included in this review are facilities with SIC codes reportable in 1990 and which use chemicals reportable in 1990 and that have not since been delisted. Throughout this evaluation, the results achieved by the Cable & Wire facilities are often compared to the results achieved by the Core Group of TURA filers. This Core Group includes “core” facilities across all Massachusetts industries.

For further information about the methodology for measuring toxics use reduction progress, see *Measuring Progress in Toxics Use Reduction and Pollution Prevention* or contact the Toxics Use Reduction Institute.

# 1. Findings – Industry Wide

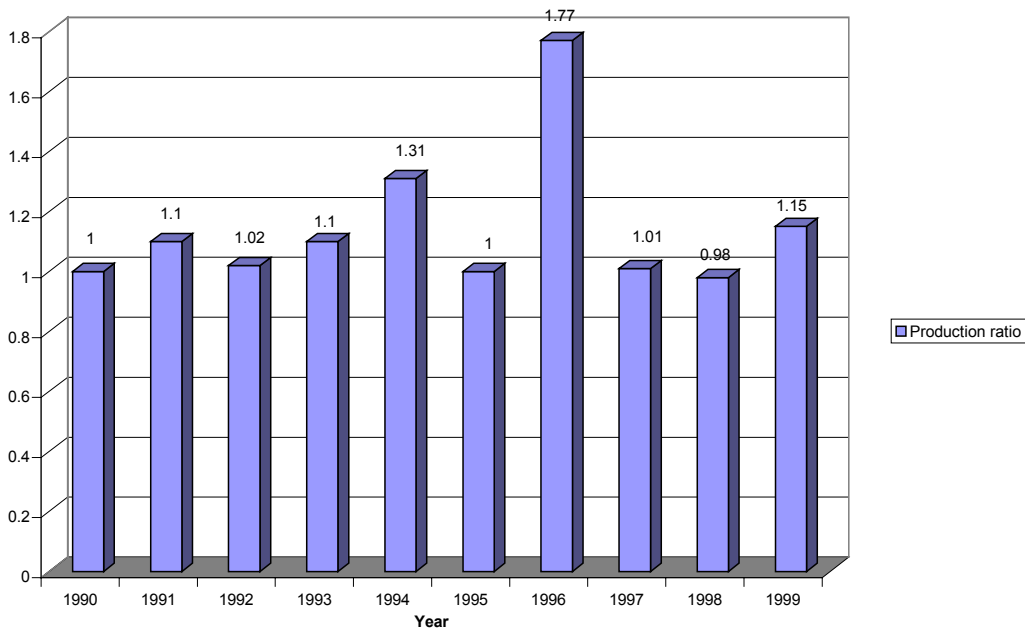
## 1.a. Changes in Production

The annual production ratio calculated for the Cable & Wire industry fluctuated greatly from 1990 through 1999. The overall production ratio calculated for the period 1990 through 1999 was 3.26, indicating that production more than tripled for this period. For this same period, the overall production ratio for TURA Core Group filers was 1.52.

The high production ratio calculated in 1996 was influenced by the 1.5 million pounds of lead compounds reported by American Insulated Wire at a production ratio greater than 3.0. However, this appears to be an isolated high production ratio reported by American Insulated Wire because their overall production ratio for lead compounds from 1990 through 1999 is 1.81.

The following figure illustrates the annual production ratios calculated for the Cable & Wire industry for the period 1990 through 1999.

**Figure 1 - Cable & Wire Industry - Overall Production Ratio**



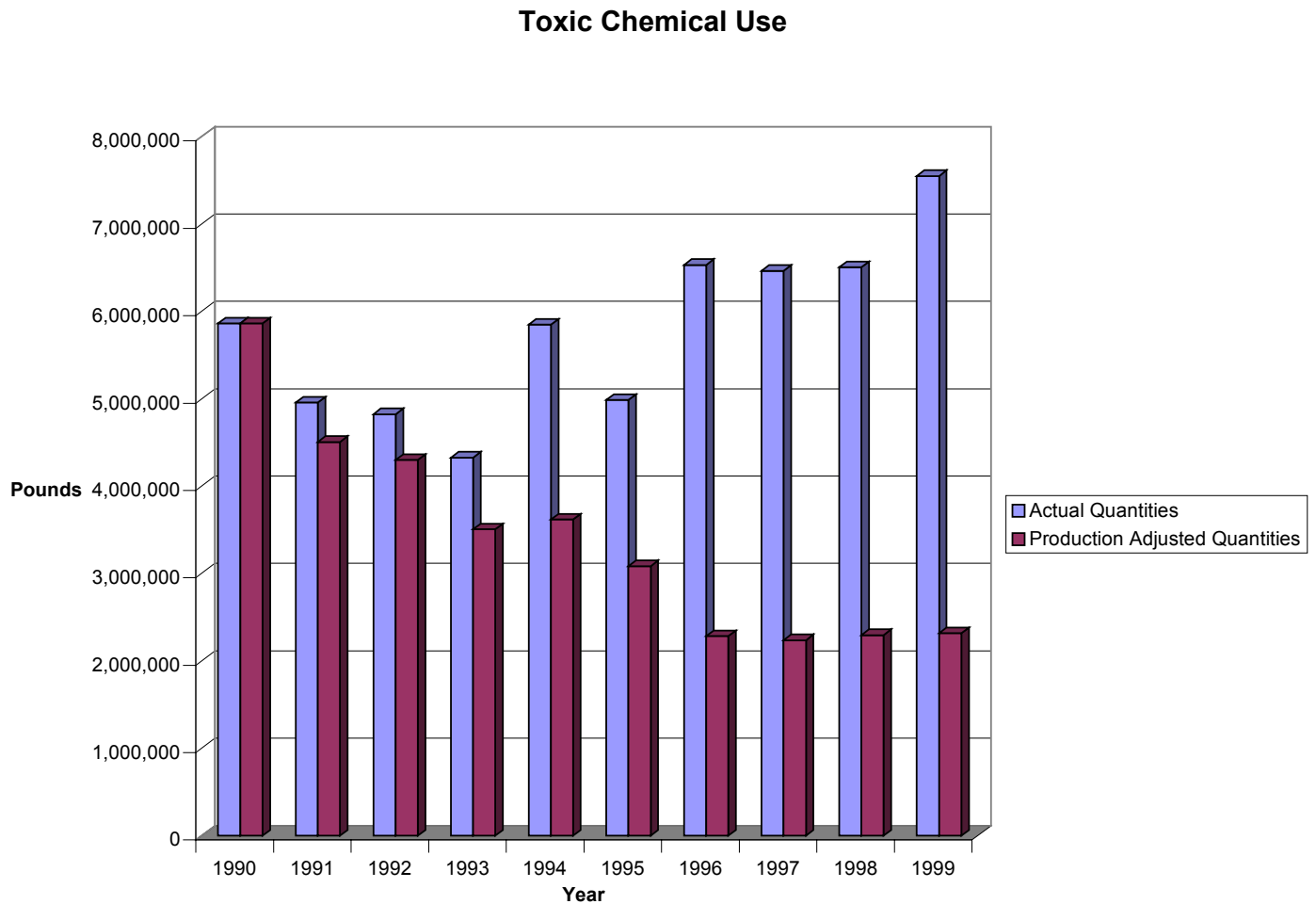
**Overall Production Ratio  
For 1990 – 1999 = 3.26**

### 1.b. Toxic Chemical Use

Toxic chemical use for the Cable & Wire industry was 5.9 million pounds in 1990 and increased to 7.5 million pounds in 1999 for an increase of 29%. Adjusting 1999 toxic chemical use for production results in a 60% reduction compared with 1990 levels.

From 1990 through 1996, the Cable & Wire industry generated a consistent trend downward for toxic chemical use on a production adjusted basis. During this period, the Cable & Wire industry achieved a 61% reduction in toxic chemical use. However, toxic chemical use leveled off for the period 1996 through 1999.

The following chart illustrates the total toxic chemical use for the years 1990 through 1999:



**29 % Increase – Actual Use**  
**60% Decrease – Production Adjusted Use**

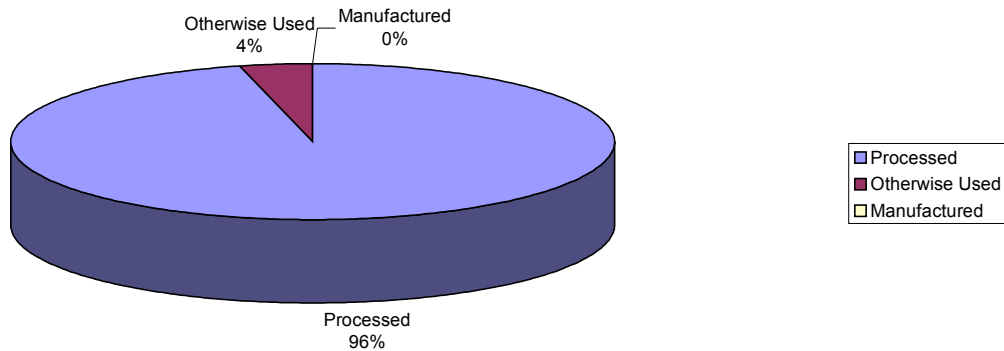
### 1.b. Toxic Chemical Use (continued)

Facilities can report their toxic chemical use under one of the three following TURA categories:

- 1) **Manufactured:** To produce, prepare, import or compound a toxic or hazardous substance.
- 2) **Processed:** The preparation of a toxic or hazardous substance, including without limitation, a toxic substance contained in a mixture or trade name product, after its manufacture, for distribution in commerce.
- 3) **Otherwise used:** Any use of a toxic substance that is not covered by the terms manufacture or processed and includes use of a toxic substance contained in a mixture or trade name product.

In the Cable & Wire industry from 1990 through 1999, toxic chemical use consisted of 96% processed, 4% otherwise used, and 0% manufactured. For 1999 TURA filers in all industries, toxic chemical use consisted of 71% processed, 23% otherwise used, and 6% manufactured. The following figure illustrates the categories of toxic chemical use for the Cable & Wire industry from 1990 through 1999.

**Figure 3 - Categories of Use: 1990 - 1999**



### 1.c. Byproduct

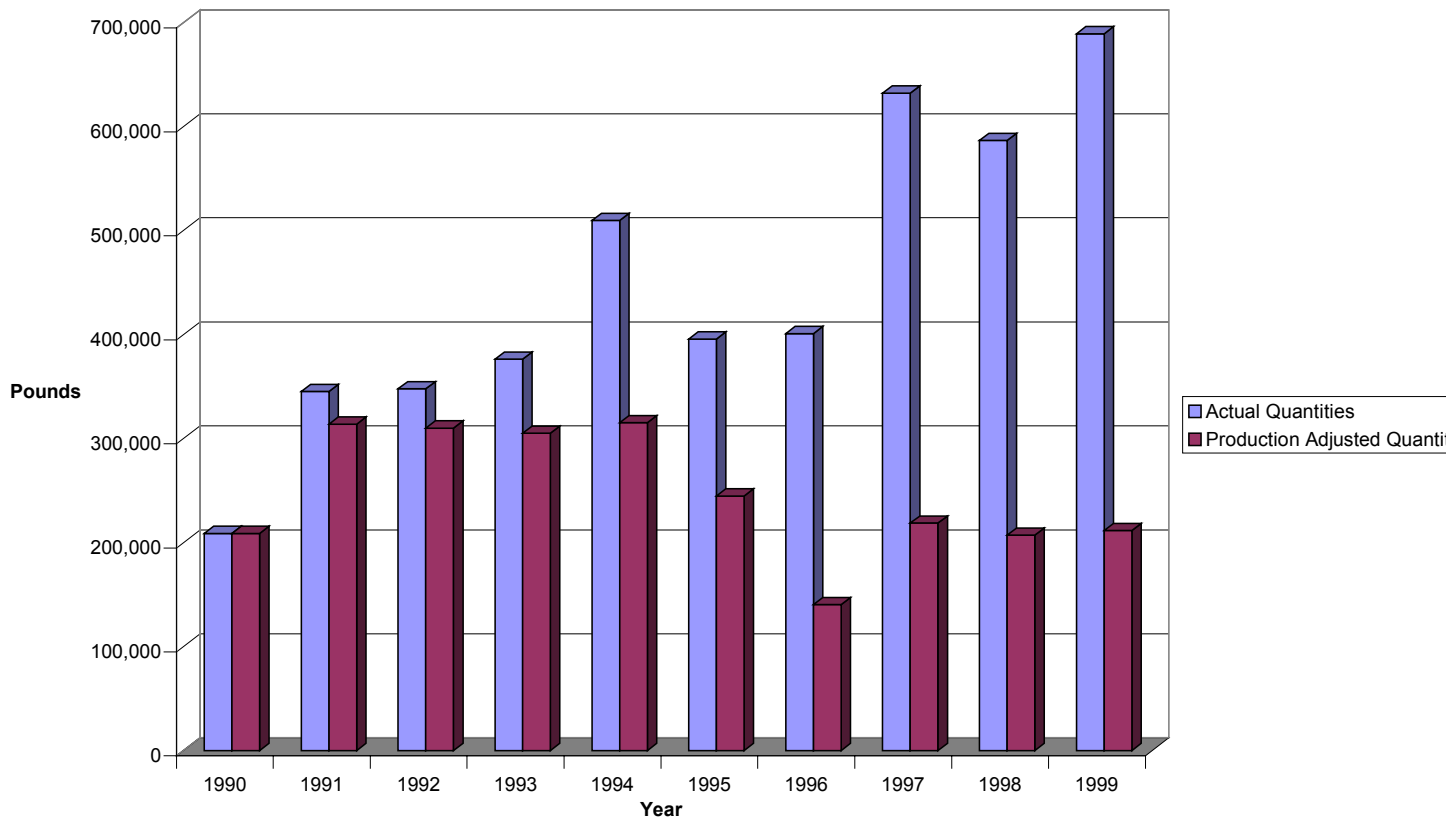
The Cable & Wire industry byproduct generation has increased from 208,714 pounds in 1990 to 689,230 pounds in 1999 resulting in an increase of 230% during that period. Even after adjusting 1999 byproduct generation for production there was still an increase of 1%. This is significantly below both the 57% byproduct reduction achieved by the TURA Core Group filers for all industries, as well as the TURA goal of a 50% reduction in toxic waste generated.

On a production adjusted basis, there was no consistent trend for byproduct generation for the Cable & Wire industry for the period 1990 through 1999. A 33% reduction in byproduct generation was achieved from 1990 through 1996. However, byproduct generation increased 51% for the period 1996 through 1999.

Byproduct as a percentage of total use increased from 4% in 1990 to 9% in 1999 for the Cable & Wire industry. However, for TURA Core Group filers, byproduct as a percentage of total use decreased from 14% in 1990 to 10% in 1999.

The following chart illustrates byproduct generation for the years 1990 through 1999:

**Figure 4 - Byproduct Generation**



**230% Increase – Actual Byproduct**  
**1% Increase – Production Adjusted Byproduct**

### 1.d Shipped in Product

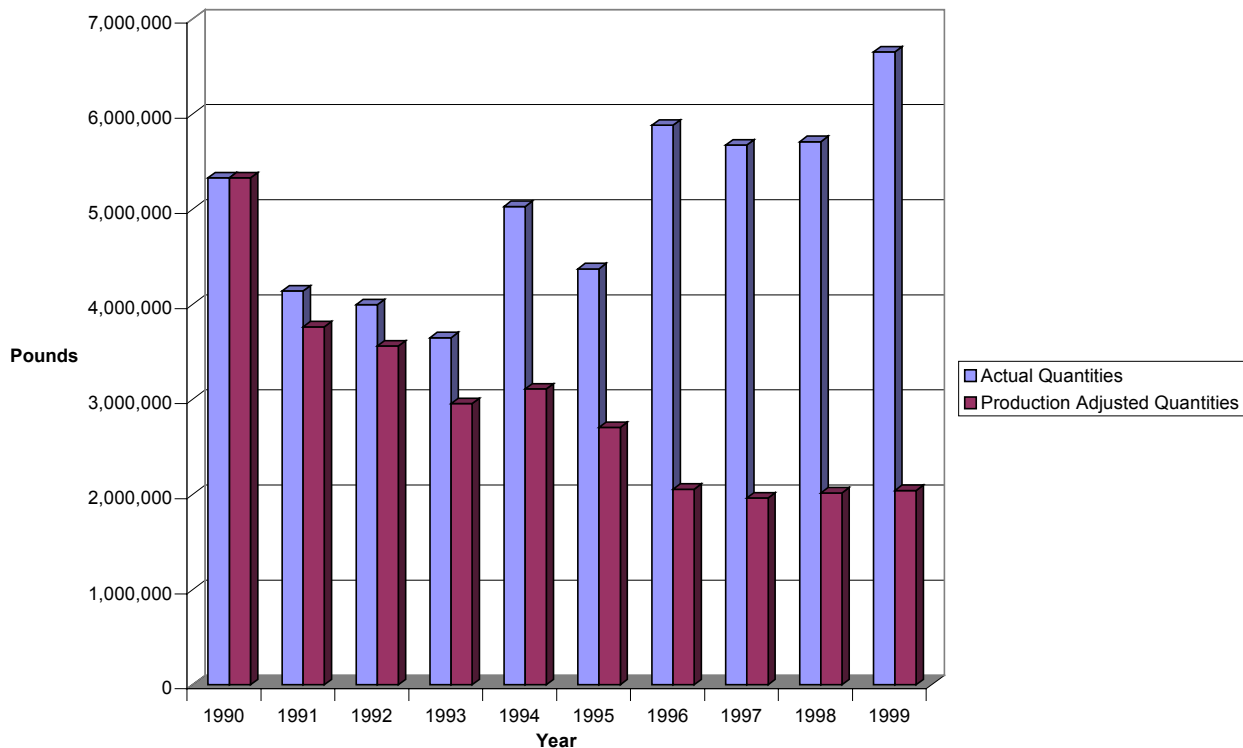
The Cable & Wire industry shipped in product 5.3 million pounds of toxic chemicals in 1990 and 6.7 million pounds in 1999 resulting in an increase of 25%. Adjusting 1999 shipped in product quantities for production results in a 62% reduction compared with 1990 levels.

Shipped in product as a percentage of total use was 88% for the Cable & Wire industry in 1999. However, shipped in product as a percentage of total use was 17% for TURA Core Group filers in 1999. This is not so much a reflection of performance, but rather an indication of the way toxic chemicals are used by this industry. Many toxic chemicals are used as plasticizers, stabilizers, flame retardants, and colorants in the coated wire and cable products.

On a production adjusted basis, the Cable & Wire industry achieved a 61% reduction in chemicals shipped in products from 1990 through 1996. However, chemicals shipped in product leveled off for the period 1996 through 1999.

The following chart illustrates the amount of chemicals shipped in products for the years 1990 through 1999:

**Figure 5 - Shipped in Product**



**25% Increase – Actual Shipped**  
**62% Decrease – Production Adjusted Shipped**

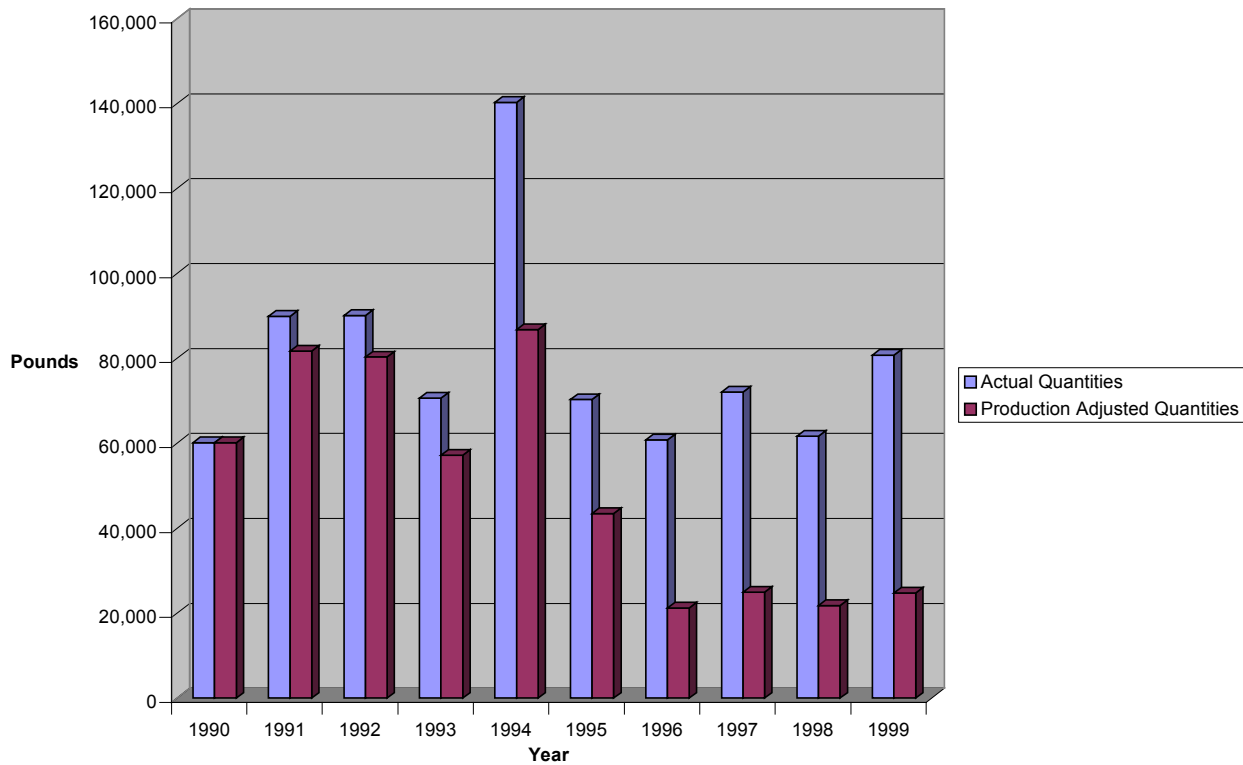
### 1.e. TRI On-site Releases

The Cable & Wire industry had TRI on-site releases to the environment of 60,186 pounds in 1990 and 80,756 pounds in 1999 resulting in an increase of 34%. The 1999 production adjusted value for releases was 59% less than 1990 levels. The TURA Core Group filers achieved an 87% reduction for this same time period. The release level spike in 1994 was primarily comprised of 43,324 pounds of methylethylketone reported by Madison Cable Corp., 33,666 pounds of methylethylketone reported by Rockbestos, and 20,180 pounds of acetone reported by American Insulated Wire.

On a production adjusted basis, there was no consistent trend for releases for the Cable & Wire industry for the period 1990 through 1999. The Cable & Wire industry achieved a 65% reduction in toxic chemical released from 1990 through 1996. However, toxic chemicals released increased 17% for the period 1996 through 1999.

The following chart illustrates the total toxic chemical released for the years 1990 through 1999:

**Figure 6 - TRI On-site Releases**



**34% Increase – Actual Releases**  
**59% Decrease – Production Adjusted Releases**

### 1.f. TRI Total Transfers

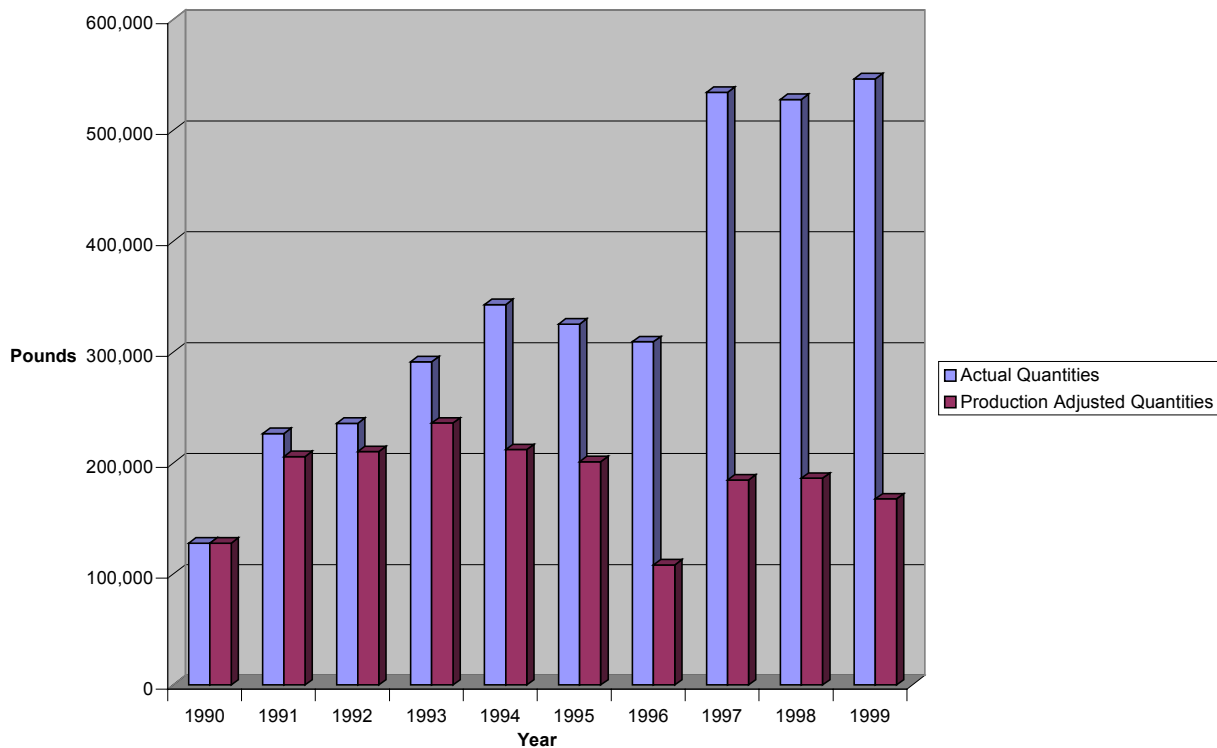
The Cable & Wire industry transferred off-site and to POTWs 127,992 pounds of toxic chemicals in 1990 and 546,555 pounds in 1999 resulting in an increase of 327%. After the 1999 transfer quantities were production adjusted there was an increase of 31% from 1990 levels. This is significantly below the 41% reduction in transfers achieved by the TURA Core Group filers for all industries over the same period.

Transfers as a percentage of total use, increased from 2.2% in 1990 to 7.2% in 1999 for the Cable & Wire industry. Transfers were 2.8% of total use for TURA Core Group filers in 1999.

On a production adjusted basis, the Cable & Wire industry achieved a 16% reduction in toxic chemicals transferred from 1990 through 1996. However, toxic chemicals transferred increased 55% for the period 1996 through 1999.

The following chart illustrates the toxic chemicals transferred for the years 1990 through 1999:

**Figure 7 - TRI Total Transfers**



**327% Increase – Actual Transfers**  
**31% Increase – Production Adjusted Transfers**

## 1.g. Summary

The following table provides a comparison between the toxics use reduction achieved by the Cable & Wire industry and the TURA Core Group filers for all industries. Overall, the Cable & Wire industry and TURA Core Group Filers achieved significant reduction in total use, shipped in product, and TRI on-site releases. However, the Cable & Wire industry performed significantly below the TURA Core Group Filers in byproduct generation and TRI transfer reductions.

**Table 1 - Toxics Use Reduction Results: 1990 through 1999 (Production Adjusted)**

	<b>Total Use</b>	<b>Byproduct Generation</b>	<b>Shipped in Product</b>	<b>TRI On-site Releases</b>	<b>TRI Total Transfers</b>
<b>TURA Core Group Filers</b>	41% Reduction	57% Reduction	55% Reduction	87% Reduction	41% Reduction
<b>Cable &amp; Wire Industry</b>	60% Reduction	1% Increase	62% Reduction	59% Reduction	31% Increase

## 2. Findings - by Chemical

### 2.a. Reporting

For the period 1990 – 1999, twenty-eight different TURA chemicals were reported as used by the Cable & Wire Industry. An overall product ratio was calculated for each chemical reported as used from 1990 through 1999. There were a wide range of overall production ratios calculated, with a low of 0.64 for nitric acid and a high of 6.04 for methylethylketone.

The following table illustrates the years these chemicals were reported, the number of facilities reporting use over the threshold in 1999, as well as the overall production ratio calculated for chemicals that were used from 1990 through 1999.

**Table 2 – Chemical Reporting**

Chemical Name	Years Reported	Number Facilities Reporting 1999	* Overall Production Ratio 1990 - 1999
Acetone	1990, 1994, 1996 - 1999	1	0.66
Antimony	1990 - 1999	1	1.17
Antimony compounds	1990 - 1999	14	2.65
Barium	1996 - 1998	0	n/a
Barium compounds	1990 - 1994, 1999	1	1.70
Cadmium	1998	0	n/a
Cadmium compounds	1990, 1993 - 1994	0	n/a
Carbon tetrachloride	1992	0	n/a
Chromium	1998	0	n/a
Chromium compounds	1990 - 1999	2	1.73
DBCP	1991 - 1992	0	n/a
Decabromodiphenyloxide	1990 - 1999	4	1.69
Diethylhexylphthalate	1990, 1992 - 1994, 1997 - 1999	3	0.79
Diethylphthalate	1990 - 1992	0	n/a
Ethylene thiourea	1991	0	n/a
Hydrochloric acid	1990	0	n/a
Lead	1990 - 1999	1	2.08
Lead compounds	1990 - 1999	13	4.33
Methanol	1990, 1996 - 1999	1	0.76
Methylethylketone	1990 - 1999	3	6.04
Methylisobutylketone	1993 - 1994	0	n/a
Molybdenum trioxide	1997	0	n/a
Nickel compounds	1990 - 1999	1	0.83
Nitric acid	1990 - 1999	1	0.64
Silver	1991 - 1992	0	n/a
Sulfuric acid	1992	0	n/a
Toluene	1991 - 1992, 1997 - 1999	1	n/a
Zinc compounds	1990 - 1999	4	1.72

\* If there were any interim years in which there was no reported use for a chemical, then a production ratio of 1.0 was assumed for those years.

## 2.b. Toxic Chemical Use

The following table illustrates the change in use of toxic chemicals by the Cable & Wire industry during the period of 1990 through 1999 on an actual and production adjusted basis. Of the seventeen chemicals reported in 1990, six chemicals were reported in 1999 as exceeding 1990 use levels on a production adjusted basis: acetone, antimony, decabromodiphenyloxide, methanol, nickel compounds, and nitric acid.

**Table 3 – Toxic Chemical Use 1990 - 1999**

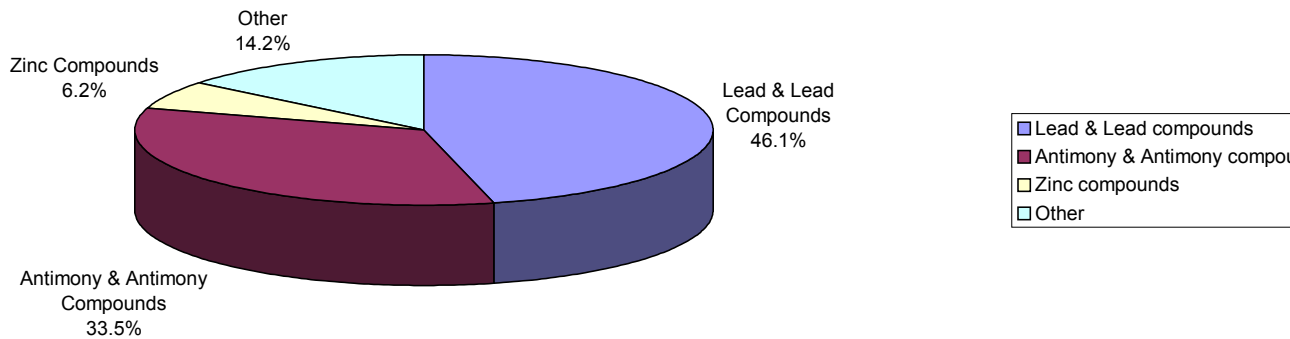
Chemical Name	Total Use 1990	Total Use 1999	% Change Actual Use 1990 - 1999	Overall Production Ratio 1990 - 1999	% Change Use 1990 – 1999 (Prod Adj.)
Acetone	19,900	42,000	111%	0.66	220%
Antimony	54,824	64,490	18%	1.17	1%
Antimony compounds	1,257,307	2,467,641	96%	2.65	-26%
Barium	0	0	n/a	n/a	n/a
Barium compounds	180,000	20,225	-89%	1.70	-93%
Cadmium	0	0	n/a	n/a	n/a
Cadmium compounds	180,000	0	-100%	n/a	-100%
Carbon tetrachloride	0	0	n/a	n/a	n/a
Chromium	0	0	n/a	n/a	n/a
Chromium compounds	726,147	71,250	-90%	1.73	-94%
DBCP	0	0	n/a	n/a	n/a
Decabromodiphenyloxide	120,041	433,919	261%	1.69	114%
Diethylhexylphthalate	561,187	240,240	-57%	0.79	-46%
Diethylphthalate	300,000	0	-100%	n/a	-100%
Ethylene thiourea	0	0	n/a	n/a	n/a
Hydrochloric acid	12,540	0	-100%	n/a	-100%
Lead	59,688	62,313	4%	2.08	-50%
Lead compounds	1,958,782	3,418,187	75%	4.33	-60%
Methanol	11,965	22,000	84%	0.76	142%
Methylethylketone	83,056	80,385	-3%	6.04	-84%
Methylisobutylketone	0	0	n/a	n/a	n/a
Molybdenum trioxide	0	0	n/a	n/a	n/a
Nickel compounds	21,000	74,000	252%	0.83	325%
Nitric acid	29,376	69,350	136%	0.64	269%
Silver	0	0	n/a	n/a	n/a
Sulfuric acid	0	0	n/a	n/a	n/a
Toluene	0	14,726	n/a	1.86	n/a
Zinc compounds	285,732	469,011	64%	1.72	-5%
<b>Totals:</b>	<b>5,861,545</b>	<b>7,549,737</b>			

Note: All quantities in pounds.

**2.b. Toxic Chemical Use (continued)**

The following chemicals accounted for 86% of chemical use in 1999: antimony & antimony compounds, lead & lead compounds, and zinc compounds as illustrated in the figure below. Lead compounds and antimony compounds were the most widely reported chemicals in the industry, with fourteen companies reporting antimony compound use and thirteen companies reporting lead compound use.

**Figure 8 - Chemical Usage - 1999**



Eight chemicals were used by only one company in 1999 within the Cable & Wire industry. One chemical, chromium compounds, was reported by two companies in 1999. The following table lists the chemicals reported by only one company:

**Table 4 – Chemicals With Only One Company Reporting**

<b>Chemical Name</b>	<b>Company Using in 1999</b>
Acetone	American Insulated Wire Company
Antimony	Montrose Products Co.
Barium compounds	Mohawk CDT
Lead	Montrose Products Co.
Methanol	American Insulated Wire Company
Nickel compounds	American Insulated Wire Company
Nitric acid	Supercon Inc.
Toluene	Madison Cable Corp.

## 2.c. More Hazardous Chemical Use

The Toxics Use Reduction Science Advisory Board conducted a study of the chemicals reported under TURA. The purpose of this study was to categorize these chemicals to aid in setting priorities and to serve as guidance for facilities making chemical substitution decisions. The chemicals were categorized based upon eight criteria: carcinogenicity, oral LD50, reference dose, threshold limit value (TLV)/ time weighted average (TWA), aquatic LC50, flash point, pH, and bioconcentration factor.

Based on the above criteria, the chemicals were categorized into one of the following three groups:

- Category 1: more hazardous chemicals
- Category 2: less hazardous chemicals
- Category 3: uncategorized chemicals. This includes chemicals not reported under TURA since 1990 and chemicals reported under TURA but not categorized as more or less hazardous due to insufficient information or because the chemical was deemed to be of medium hazard.

Further information about this study can be obtained in TURI Methods and Policy Report No. 18, “Categorization of the Toxics Use Reduction List of Toxic and Hazardous Substances”.

The following eight chemicals were listed as “Category 1 – More Hazardous” by the Toxics Use Reduction Science Advisory Board and were used by the Cable & Wire industry during the period 1990 through 1999.

- Cadmium
- Cadmium compounds
- Carbon tetrachloride
- DBCP
- Lead
- Lead compounds
- Nickel compounds
- Sulfuric acid

Three of the eight chemicals, lead, lead compounds, and nickel compounds accounted for 47% of total reported chemical use in 1999 for the Cable & Wire industry.

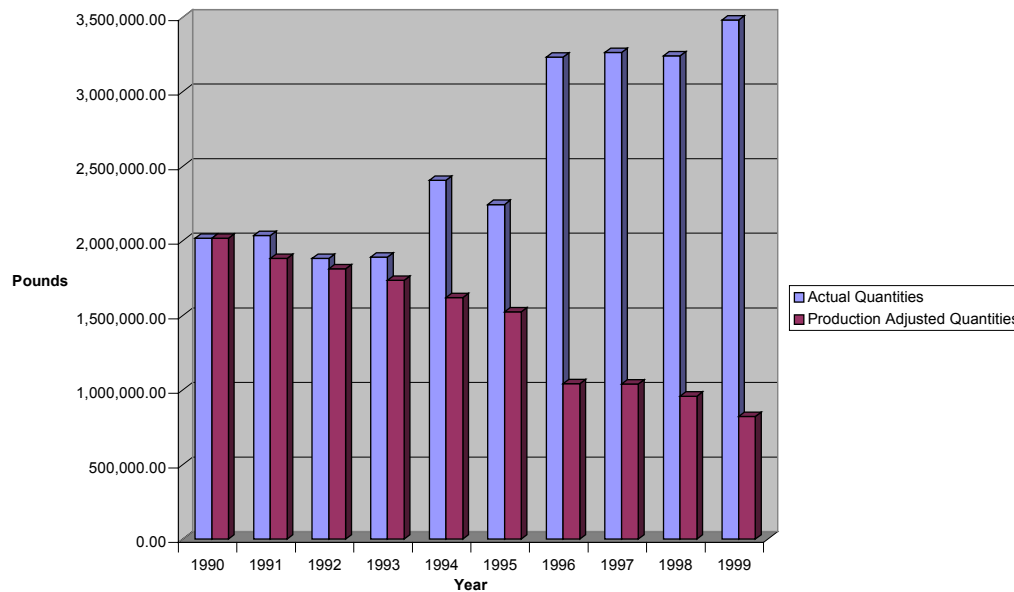
Five of the eight chemicals used in earlier years, cadmium, cadmium compounds, carbon tetrachloride, DBCP, and sulfuric acid were not reported as used by the industry in 1999.

## 2.d. Lead and Lead Compound Use

Lead and lead compounds comprise almost half of the total chemical use by the Cable & Wire industry in 1999 and are listed as “Category 1 – More Hazardous” by the Toxics Use Reduction Science Advisory Board. The use of lead and lead compounds has grown from 2.0 million pounds in 1990 to 3.5 million pounds in 1999 representing an increase of 72%. However, when 1999 use was adjusted for production, there was a 59% reduction from 1990 levels.

The following figure illustrates the total use of lead and lead compounds by the Cable & Wire industry from 1990 through 1999.

**Figure 9 - Lead & Lead Compound Use**



72% Increase - Actual Use  
59% Decrease - Production Adjusted Use

## 2.e. Byproduct Generation

During the period 1990 through 1999, the three highest reported byproduct generation entries were for lead compounds reported by American Insulated Wire in 1997, 1998, and 1999. The fourth through eighth highest reported byproduct entries were for methylethylketone reported by Madison in 1994, 1995, 1997, 1998, and 1999.

Of the sixteen chemicals for which byproduct generation was reported in 1990, thirteen chemicals have not yet met the state-wide TURA goal of 50% production adjusted byproduct reduction by 1999: acetone, antimony, antimony compounds, barium compounds, chromium compounds, decabromodiphenyloxide, diethylhexylphthalate, lead, lead compounds, methanol, nickel compounds, nitric acid, and zinc compounds. The following table illustrates the change in byproduct generation from 1990 through 1999 for each chemical.

**Table 5 - Byproduct Generation 1990 through 1999**

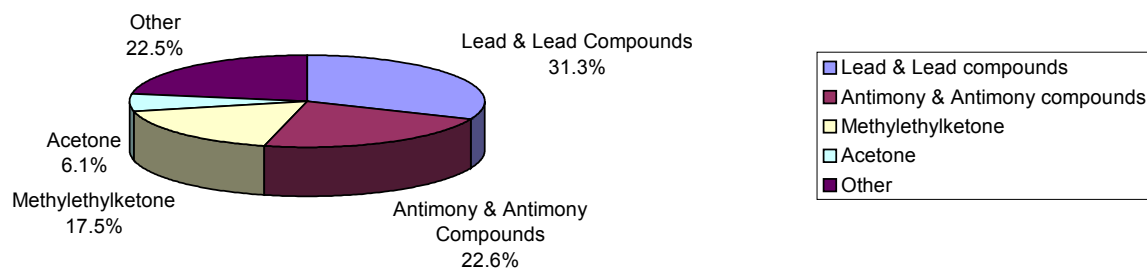
Chemical Name	Byproduct 1990	Byproduct 1999	% Change 1990 - 1999	Overall Production Ratio 1990 - 1999	% Change 1990 - 1999 (Prod Adj)
Acetone	19,900	42,000	111%	0.66	220%
Antimony	555	7,775	1301%	1.17	1097%
Antimony compounds	26,480	148,164	460%	2.65	111%
Barium	0	0	n/a	n/a	n/a
Barium compounds	35	298	751%	1.70	401%
Cadmium	0	0	n/a	n/a	n/a
Cadmium compounds	35	0	-100%	n/a	-100%
Carbon tetrachloride	0	0	n/a	n/a	n/a
Chromium	0	0	n/a	n/a	n/a
Chromium compounds	78	251	222%	1.73	86%
DBCP	0	0	n/a	n/a	n/a
Decabromodiphenyloxide	1,427	22,028	1444%	1.69	813%
Diethylhexylphthalate	499	40,762	8069%	0.79	10240%
Diethylphthalate	18,000	0	-100%	n/a	-100%
Ethylene thiourea	0	0	n/a	n/a	n/a
Hydrochloric acid	12,540	0	-100%	n/a	-100%
Lead	597	7,518	1159%	2.08	505%
Lead compounds	27,082	208,202	669%	4.33	78%
Methanol	11,965	22,000	84%	0.76	142%
Methylethylketone	72,481	120,277	66%	6.04	-73%
Methylisobutylketone	0	0	n/a	n/a	n/a
Molybdenum trioxide	0	0	n/a	n/a	n/a
Nickel compounds	1	780	77900%	0.83	93876%
Nitric acid	10,568	18,349	74%	0.64	171%
Silver	0	0	n/a	n/a	n/a
Sulfuric acid	0	0	n/a	n/a	n/a
Toluene	0	14,726	n/a	1.86	n/a
Zinc compounds	6,471	36,100	458%	1.72	224%
<b>Totals:</b>	<b>208,714</b>	<b>689,230</b>			

Note: All quantities in pounds.

## 2.e. Byproduct (continued)

Lead & lead compounds, antimony & antimony compounds, methylethylketone, and acetone account for 77.5% of the byproduct reported in 1999. The following chart illustrates the actual percentages:

Figure 10 - Byproduct - 1999



## 2.f. Shipped in Product

The following table illustrates the change in toxic chemicals shipped in or as product from 1990 through 1999 for each chemical. Of the twelve chemicals that were shipped in product in 1990, only nickel compounds and decabromodiphenyloxide did not achieve a production adjusted reduction in shipped in product by 1999.

**Table 6 - Shipped in Product 1990 through 1999**

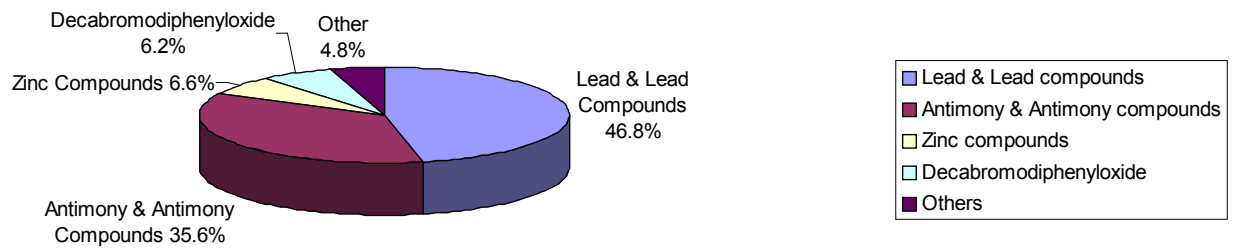
Chemical Name	Shipped in Product 1990	Shipped in Product 1999	% Change 1990 - 1999	Overall Production Ratio 1990 - 1999	% Change 1990 - 1999 (Prod Adj)
Acetone	0	0	n/a	0.66	n/a
Antimony	54,269	56,715	5%	1.17	-11%
Antimony compounds	1,229,783	2,312,136	88%	2.65	-29%
Barium	0	0	n/a	n/a	n/a
Barium compounds	179,965	19,927	-89%	1.70	-93%
Cadmium	0	0	n/a	n/a	n/a
Cadmium compounds	179,965	0	-100%	n/a	-100%
Carbon tetrachloride	0	0	n/a	n/a	n/a
Chromium	0	0	n/a	n/a	n/a
Chromium compounds	644,344	26,842	-96%	1.73	-98%
DBCP	0	0	n/a	n/a	n/a
Decabromodiphenyloxide	118,614	411,891	247%	1.69	105%
Diethylhexylphthalate	560,688	201,468	-64%	0.79	-55%
Diethylphthalate	282,000	0	-100%	n/a	-100%
Ethylene thiourea	0	0	n/a	n/a	n/a
Hydrochloric acid	0	0	n/a	n/a	n/a
Lead	59,091	54,795	-7%	2.08	-55%
Lead compounds	1,734,062	3,062,383	77%	4.33	-59%
Methanol	0	0	n/a	0.76	n/a
Methylethylketone	0	0	n/a	6.04	n/a
Methylisobutylketone	0	0	n/a	n/a	n/a
Molybdenum trioxide	0	0	n/a	n/a	n/a
Nickel compounds	20,999	73,000	248%	0.83	319%
Nitric acid	0	0	n/a	0.64	n/a
Silver	0	0	n/a	n/a	n/a
Sulfuric acid	0	0	n/a	n/a	n/a
Toluene	0	0	n/a	1.86	n/a
Zinc compounds	265,920	435,911	64%	1.72	-5%
<b>Totals:</b>	<b>5,329,700</b>	<b>6,655,068</b>	<b>25%</b>		<b>-53%</b>

Note: All quantities in pounds.

## 2.f. Shipped in Product (continued)

Lead & lead compounds, antimony & antimony compounds, zinc compounds, and decabromodiphenyloxide account for 95.2% of the shipped in product reported in 1999. The following chart illustrates the actual percentages:

**Figure 11 - Shipped in Product - 1999**



## 2.g. TRI On-site Releases

The following table illustrates the change in TRI on-site releases from 1990 through 1999 for each chemical. Methyleneethylketone accounted for nearly 70% of all TRI on-site releases in 1999 for the Cable & Wire industry. Actual use of methyleneethylketone decreased by 3% from 1990 to 1999, however, the actual releases for this chemical nearly doubled for this same period.

**Table 7 – TRI On-site releases 1990 through 1999**

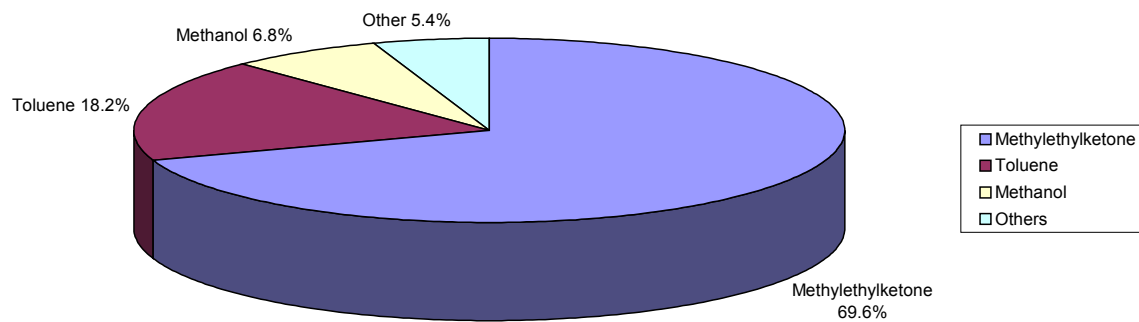
Chemical Name	TRI Releases 1990	TRI Releases 1999	% Change 1990 - 1999	Overall Production Ratio 1990 - 1999	% Change 1990 - 1999 (Prod Adj)
Acetone	17,182	920	-95%	0.66	-92%
Antimony	0	0	n/a	1.17	n/a
Antimony compounds	1,262	556	-56%	2.65	-83%
Barium	0	0	n/a	n/a	n/a
Barium compounds	35	0	-100%	1.70	-100%
Cadmium	0	0	n/a	n/a	n/a
Cadmium compounds	35	0	-100%	n/a	-100%
Carbon tetrachloride	0	0	n/a	n/a	n/a
Chromium	0	0	n/a	n/a	n/a
Chromium compounds	37	0	-100%	1.73	-100%
DBCP	0	0	n/a	n/a	n/a
Decabromodiphenyloxide	100	40	-60%	1.69	-76%
Diethylhexylphthalate	255	330	29%	0.79	64%
Diethylphthalate	0	0	n/a	n/a	n/a
Ethylene thiourea	0	0	n/a	n/a	n/a
Hydrochloric acid	0	0	n/a	n/a	n/a
Lead	0	0	n/a	2.08	n/a
Lead compounds	531	186	-65%	4.33	-92%
Methanol	10,562	5,490	-48%	0.76	-32%
Methyleneethylketone	28,989	56,239	94%	6.04	-68%
Methylisobutylketone	0	0	n/a	n/a	n/a
Molybdenum trioxide	0	0	n/a	n/a	n/a
Nickel compounds	0	17	n/a	0.83	n/a
Nitric acid	510	2,042	300%	0.64	526%
Silver	0	0	n/a	n/a	n/a
Sulfuric acid	0	0	n/a	n/a	n/a
Toluene	0	14,700	n/a	1.86	n/a
Zinc compounds	688	236	-66%	1.72	-80%
<b>Totals:</b>	<b>60,186</b>	<b>80,756</b>			

Note: All quantities in pounds.

## 2.g. TRI On-site Releases (continued)

Methylethylketone, toluene, and methanol account for 94.6% of the releases reported in 1999. The following chart illustrates the actual percentages of chemicals released in 1999:

**Figure 12 - Releases in 1999**



## 2.h. TRI Transfers

The following table illustrates the change in TRI transfers from 1990 through 1999 for each chemical. Of the eleven chemicals for which transfers were reported in 1990, a production adjusted reduction in transfers by 1999 was met by only two: dioctylphthalate and methylethylketone. Transfers for each of the other nine chemicals increased over 100% on a production adjusted basis during the period 1990 through 1999.

**Table 8 - TRI Transfers 1990 through 1999**

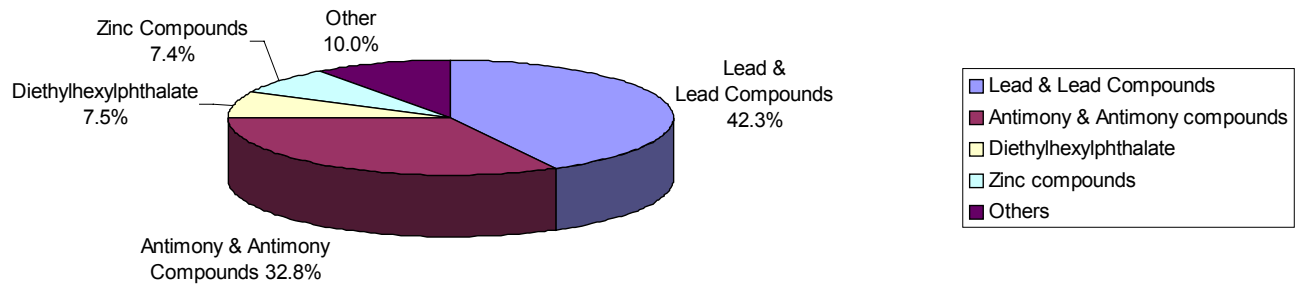
Chemical Name	TRI Transfers 1990	TRI Transfers 1999	% Change 1990 - 1999	Net Production Ratio 1990 - 1999	% Change 1990 - 1999 (Prod. Adj.)
Acetone	2,808	8,000	185%	0.66	332%
Antimony	1,005	7,775	674%	1.17	561%
Antimony compounds	24,299	171,261	605%	2.65	166%
Barium	0	0	n/a	n/a	n/a
Barium compounds	0	1,003	n/a	1.70	n/a
Cadmium	0	0	n/a	n/a	n/a
Cadmium compounds	0	0	n/a	n/a	n/a
Carbon tetrachloride	0	0	n/a	n/a	n/a
Chromium	0	0	n/a	n/a	n/a
Chromium compounds	42	253	502%	1.73	248%
DBCP	0	0	n/a	n/a	n/a
Decabromodiphenyloxide	1,799	17,248	859%	1.69	467%
Diethylhexylphthalate	0	40,962	n/a	0.79	n/a
Dioctylphthalate	18,000	0	-100%	n/a	-100%
Ethylene thiourea	0	0	n/a	n/a	n/a
Hydrochloric acid	0	0	n/a	n/a	n/a
Lead	0	7,518	n/a	2.08	n/a
Lead compounds	23,944	223,383	833%	4.33	115%
Methanol	1,404	3,300	135%	0.76	209%
Methylethylketone	43,498	11,094	-74%	6.04	-96%
Methylisobutylketone	0	0	n/a	n/a	n/a
Molybdenum trioxide	0	0	n/a	n/a	n/a
Nickel compounds	0	768	n/a	0.83	n/a
Nitric acid	8,750	13,543	55%	0.64	142%
Silver	0	0	n/a	n/a	n/a
Sulfuric acid	0	0	n/a	n/a	n/a
Toluene	0	0	n/a	1.86	n/a
Zinc compounds	2,443	40,447	1556%	1.72	863%
<b>Totals:</b>	<b>127,992</b>	<b>546,555</b>			

Note: All quantities in pounds.

## 2.h. TRI Transfers (continued)

Lead and lead compounds, antimony and antimony compounds, diethylhexylphthalate, and zinc compounds account for 90% of the transfers reported in 1999. The following chart illustrates the actual percentages:

Figure 13 - Transfers in 1999



### 3. Findings - by Facility

#### 3.a. Toxic Chemical Use

There were twenty-one facilities reporting toxic chemical use sometime during the years 1990 through 1999. Nine of these facilities reported toxic chemical use for each of the years 1990 through 1999. The production ratio reported by these facilities from 1990 through 1999 was used to calculate an overall production ratio. Production adjusted progress from 1990 to 1999 was calculated using the overall production ratio.

The following table illustrates the years reporting, the overall production ratio, and the toxic chemical use by the facilities within the Cable & Wire industry from 1990 through 1999.

**Table 9 - Use by Facility: 1990 through 1999**

Facility Name	Years Reporting	1990 Use	1999 Use	% Change 1990 - 1999	Overall Production Ratio 1990 - 1999	% Change 1990 - 1999 Prod. Adj.
Alpha Wire	1997 - 1999	0	68,086	n/a	n/a	n/a
American Insulated Wire Corp.	1990 - 1999	2,599,996	2,737,000	5%	1.50	-30%
Astro Wire & Cable Corp.	1990 - 1991	75,819	0	-100%	n/a	-100%
Belden Wire & Cable Intech Div.	1996 - 1998	0	0	n/a	n/a	n/a
Berkshire Elec. Cable	1990, 1992	561,187	0	-100%	n/a	-100%
BICC General	1990	58,187	0	-100%	n/a	-100%
BIW Cable Systems	1990 - 1999	73,445	259,444	253%	9.88	-64%
BSCC Corp.	1991 - 1999	0	235,714	n/a	n/a	n/a
Comtran Corp.	1990 - 1999	239,500	324,200	35%	2.21	-39%
Connectivity Products BSC Division	1997 - 1999	0	157,143	n/a	n/a	n/a
Data Guide Cable Corp.	1994 - 1998	0	0	n/a	n/a	n/a
General Cable	1990 - 1999	852,679	1,135,665	33%	1.55	-14%
Helix Hitemp Cable Inc.	1993 - 1999	0	190,331	n/a	n/a	n/a
Judd Wire Inc.	1990 - 1999	19,732	64,054	225%	3.71	-13%
Madison Cable Corp.	1991 - 1999	0	398,800	n/a	n/a	n/a
Mohawk CDT	1990 - 1999	178,733	407,627	128%	2.03	12%
Montrose Products Co.	1991 - 1999	0	126,803	n/a	n/a	n/a
Quabbin Wire & Cable Co. Inc.	1990 - 1999	65,581	85,758	31%	3.17	-59%
Rockbestos Surprenant & Cable Corp.	1990 - 1999	1,107,310	1,156,307	4%	1.33	-21%
Spectrum Wire Corp.	1991 - 1999	0	133,455	n/a	n/a	n/a
Supercon Inc.	1990 - 1999	29,376	69,350	136%	0.64	269%
<b>Totals:</b>		<b>5,861,545</b>	<b>7,549,737</b>			

Note: All quantities in pounds.

### 3.a. Toxic Chemical Use (continued)

The most highly used toxic chemicals in the Cable & Wire industry are lead & lead compounds, antimony & antimony compounds, and zinc compounds. Use of these chemicals within the Cable & Wire industry is heavily concentrated with American Insulated Wire Corp., General Cable, and Rockbestos Surprenant & Cable Corp. The following table illustrates the reported use by facility in 1999 for these particular toxic chemicals.

**Table 10 – 1999 Total Toxic Chemical Use by Facility for Selected Chemicals**

Facility Name	Antimony & Antimony Compound Use	% of Antimony & Antimony Compound Use	Lead & Lead Compound Use	% of Lead & Lead Compound Use	Zinc Compound Use	% of Zinc Compound Use
Alpha Wire	25,986	1%	42,100	1%	0	0%
American Insulated Wire Corp.	560,000	22%	1,300,000	37%	350,000	75%
Astro Wire & Cable Corp.	0	0%	0	0%	0	0%
Belden Wire & Cable Intech Div.	0	0%	0	0%	0	0%
Berkshire Elec. Cable	0	0%	0	0%	0	0%
BICC General	0	0%	0	0%	0	0%
BIW Cable Systems	22,108	1%	74,396	2%	45,884	10%
BSCC Corp.	56,756	2%	130,814	4%	0	0%
Comtran Corp.	129,100	5%	195,100	6%	0	0%
Connectivity Products BSC Division	37,837	1%	87,210	3%	0	0%
Data Guide Cable Corp.	0	0%	0	0%	0	0%
General Cable	280,390	11%	803,025	23%	0	0%
Helix Hitemp Cable Inc.	62,487	2%	95,290	3%	15,225	3%
Judd Wire Inc.	64,054	3%	0	0%	0	0%
Madison Cable Corp.	177,830	7%	163,188	5%	0	0%
Mohawk CDT	117,926	5%	188,204	5%	57,902	12%
Montrose Products Co.	64,490	3%	62,313	2%	0	0%
Quabbin Wire & Cable Co. Inc.	32,422	1%	53,336	2%	0	0%
Rockbestos Surprenant & Cable Corp.	855,293	34%	197,521	6%	0	0%
Spectrum Wire Corp.	45,452	2%	88,003	3%	0	0%
Supercon Inc.	0	0%	0	0%	0	0%
<b>Totals:</b>	<b>2,532,131</b>	<b>100%</b>	<b>3,480,500</b>	<b>100%</b>	<b>469,011</b>	<b>100%</b>

Note: All quantities in pounds.

### 3.b. Summary

The following table illustrates the toxics use reduction results for the eight facilities within the Cable & Wire industry that have reported toxic chemical use from 1990 through 1999. These results are then compared to the results for the entire Cable & Wire Industry as well as all TURA Core Group filers. The following is a summary of the comparison:

- The Cable & Wire industry and TURA Core Group filers achieved comparable toxic chemical reduction results for total use, shipped in product, and TRI on-site releases.
- The Cable & Wire industry significantly lagged TURA Core Group performance in the areas of byproduct generation and TRI transfer reductions.
- BIW Cable Systems is the only facility listed below that achieved better results than the TURA Core Group Filers for each of the five categories. This is due to their nearly ten-fold reported increase in production, rather than due to actual quantity reduction.
- American Insulated Wire Corp, General Cable, and Supercon Inc. lagged the results achieved by the TURA Core Group filers in each of the five categories.
- The results for the remaining facilities were mixed between exceeding or lagging TURA Core Group performance within the five different categories.

**Table 11 - Results 1990 through 1999 (Production Adjusted)**

	<b>Total Use</b>	<b>Byproduct Generation</b>	<b>Shipped in Product</b>	<b>TRI Releases</b>	<b>TRI Transfers</b>
<b>TURA Core Group Filers</b>	41% Reduction	57% Reduction	55% Reduction	87% Reduction	41% Reduction
<b>Cable &amp; Wire Industry</b>	60% Reduction	1% Increase	62% Reduction	59% Reduction	31% Increase
<b>American Insulated Wire Corp.</b>	30% Reduction	184% Increase	36% Reduction	85% Reduction	368% Increase
<b>BIW Cable Systems</b>	64% Reduction	90% Reduction	63% Reduction	N/A	90% Reduction
<b>Comtran Corp.</b>	39% Reduction	61% Reduction	29% Reduction	100% Reduction	61% Reduction
<b>General Cable</b>	14% Reduction	8% Reduction	0% Reduction	653% Increase	9% Reduction
<b>Judd Wire Inc.</b>	13% Reduction	31% Reduction	12% Reduction	N/A	89% Reduction
<b>Mohawk CDT</b>	12% Increase	77% Reduction	19% Increase	100% Reduction	87% Increase
<b>Quabbin Wire &amp; Cable Co. Inc.</b>	59% Reduction	51% Reduction	6% Reduction	N/A	180% Increase
<b>Rockbestos Surprenant &amp; Cable Co. Inc.</b>	22% Reduction	87% Reduction	19% Reduction	97% Reduction	71% Reduction
<b>Supercon Inc.</b>	269% Increase	171% Increase	N/A	526% Increase	142% Increase

## 4. Findings – Toxics Use Reduction Techniques

### 4.a. Reporting Requirements

As part of the TURA reporting requirements, a facility must report a toxics use reduction technique applied to a production operation that accounted for an increase of five or more points in the byproduct reduction index (BRI) between the base year and reporting year. Eight categories of toxics use reduction techniques are available for TURA reporting:

- 1) **Input Substitution:** Changing the raw materials of product to use non- or less toxic materials.
- 2) **Product Reformulation:** Reformulating or redesigning end products to be non- or less toxic upon use, release, or disposal.
- 3) **Production Unit Redesign or Modification:** Using production units of a different design than those used previously.
- 4) **Production Unit Modernization:** Upgrading or replacing production unit equipment or methods.
- 5) **Improved Operation & Maintenance Of Production Unit Equip. & Methods:** Modifying existing equipment/methods by such steps as improved housekeeping, system adjustments or process/product inspections.
- 6) **Recycling, Reuse, or Extended Use Of Toxics:** Using equipment/methods that are integral to the production unit.
- 7) **Management Technique of Using Byproduct As Product:** Use of byproduct without further treatment when the byproduct would have otherwise been released, treated, or shipped off-site for recycling/reuse.
- 8) **Miscellaneous:** Toxics use reduction techniques that are different than the above categories.

Facilities also indicate at what stage of their production operations lifecycle the toxics use reduction techniques were employed. The three categories available for TURA reporting are materials handling/storage, processing operations, and finished goods handling.

#### 4.b. Techniques Used by the Cable & Wire Industry

Facilities in the Cable & Wire industry employed various toxics use reduction techniques as illustrated in the table below. The predominant technique employed was “Improved Operation & Maintenance of Production Unit Equipment & Methods” which was reported in 45% of the reduction entries. In addition, 80% of the reduction entries occurred during the “Processing Operations” stage of the production operations lifecycle.

**Table 12 - Toxics Use Reduction Techniques 1990 – 1999**

	<b>Materials Handling/ Storage</b>	<b>Processing Operations</b>	<b>Finished Goods Handling</b>	<b><u>Totals:</u></b>
<b>Input Substitution</b>	98	436	0	534
<b>Product Reformulation</b>	0	201	3	204
<b>Production Unit Redesign or Modification</b>	20	42	0	62
<b>Production Unit Modernization</b>	59	288	0	347
<b>Improved Operation &amp; Maintenance Of Production Unit Equip. &amp; Methods</b>	295	1,336	0	1,631
<b>Recycling, Reuse, or Extended Use Of Toxics</b>	43	78	3	124
<b>Management Technique of Using Byproduct As Product</b>	0	0	0	0
<b>Miscellaneous</b>	204	531	0	735
<b><u>Totals:</u></b>	719	2,912	6	

#### 4.c. Techniques Used for Lead Compounds

Lead compounds are the most widely used toxic chemical within the Cable & Wire industry and are also listed as a Category 1 more hazardous substance by the Toxics Use Reduction Science Advisory Board. Companies in the Cable & Wire industry employed various toxics use reduction techniques to address lead compounds as illustrated in the table below.

The predominant techniques employed were “Improved Operation & Maintenance of Production Unit Equipment & Methods”, “Input Substitution”, and “Product Reformulation”. Because lead is an integral part of the end product, a company may report either “Input Substitution” or “Product Reformulation” when substituting a less hazardous substance for lead. In addition, 78% of the reduction entries occurred during the “Processing Operations” segment of the operations lifecycle.

**Table 13 - Toxics Use Reduction Techniques 1990 – 1999 for Lead Compounds**

	<b>Materials Handling/ Storage</b>	<b>Processing Operations</b>	<b>Finished Goods Handling</b>	<b><u>Totals:</u></b>
<b>Input Substitution</b>	0	135	0	135
<b>Product Reformulation</b>	0	98	0	98
<b>Production Unit Redesign or Modification</b>	10	0	0	10
<b>Production Unit Modernization</b>	37	60	0	97
<b>Improved Operation &amp; Maintenance Of Production Unit Equip. &amp; Methods</b>	59	145	0	204
<b>Recycling, Reuse, or Extended Use Of Toxics</b>	0	17	0	17
<b>Management Technique of Using Byproduct As Product</b>	0	0	0	0
<b>Miscellaneous</b>	36	36	0	72
<b><u>Totals:</u></b>	142	491	0	

## Conclusions

This evaluation of the Cable & Wire industry revealed the following:

- According to the TURA reports by facilities in the Cable & Wire industry, there was substantial growth in their production areas in which toxic chemicals were used. On an industry wide level, growth more than tripled in these production areas resulting in an overall production ratio of 3.26.
- The reported quantities of toxic chemicals for the Cable & Wire industry increased from 1990 to 1999 for each category: use, byproduct generation, shipped in product, TRI on-site releases, and TRI transfers. However when these quantities are adjusted for changes in production, there were significant reductions in use, shipped in product, and TRI on-site releases.
- The Cable & Wire industry and TURA Core Group filers across all industries achieved comparable toxic chemical reduction results for total use, shipped in product, and TRI on-site releases. However, the Cable & Wire industry significantly lagged TURA Core Group performance in the areas of byproduct generation and TRI transfer reductions.
- Performance for the different facilities varied significantly within the Cable & Wire industry with respect to achieving toxics use reduction results for each of the following categories: use, byproduct generation, shipped in product, TRI on-site releases, and TRI transfers.
- On a production adjusted basis, the majority of achievements in reducing use, byproduct generation, shipped in product, TRI on-site releases, and TRI transfers occurred during the period of 1990 through 1996. For the period 1996 through 1999, there were limited incremental reductions and often increases in these areas for the Cable & Wire industry.
- Byproduct reductions remain a challenge for the Cable & Wire industry. The TURA goal of 50% byproduct reduction remains to be achieved by the Cable & Wire industry. Also, byproduct as a percentage of total use significantly increased from 1990 to 1999 for the Cable & Wire industry, but decreased during this same period for TURA Core Group filers.
- The fate of the majority of toxic chemical use in the Cable & Wire industry is shipped in product. For shipped in product as a percentage of total toxic chemical use, the Cable & Wire industry is five times higher than TURA Core Group filers. This is a result of the many toxic chemicals used as plasticizers, stabilizers, flame retardants, and colorants in the coated wire and cable products.
- There were twenty-eight toxic chemicals reported sometime during the years 1990 through 1999. However, the amounts reported in 1999 for use, byproduct generation, shipped in product, TRI on-site releases, and TRI transfers were heavily concentrated within three or four chemicals for each category. For example, methylethylketone, toluene, and methanol accounted for 95% of TRI on-site releases in 1999.

The following are some proposed recommendations for consideration by the TURA Program based upon this evaluation of the Cable & Wire industry:

- Contact the companies listed that are the only reported users of a chemical within the Cable & Wire industry to determine if their needs are unique within the industry. If their needs are not unique, then identify toxics use reduction techniques employed by other companies within the Cable & Wire industry to address these toxic chemicals.
- Nine chemicals that were used within the Cable & Wire industry prior to 1995 have not been reported as used since 1996. These include: cadmium compounds, carbon tetrachloride, dbcp, dioctylphythalate, ethylene thiourea, hydrochloric acid, methylisobutylketone, silver, and sulfuric acid. Other Massachusetts industries that still use these chemicals could possibly look to the Cable & Wire industry for details on how they eliminated the use of these chemicals from their production operations.
- Since the majority of toxic chemical use in the Cable & Wire industry ends up shipped in the product, there should be more focus on toxics use reduction efforts with product design personnel at Cable & Wire facilities.
- Conduct an analysis on the toxics use reduction techniques used by the facilities in the Cable & Wire industry that have achieved the greatest success in their toxics use reduction efforts. Share the results of this analysis with facilities that have similar production operations but have not achieved similar success in the area of toxics use reduction. The initial areas of focus should be in byproduct generation and TRI transfer reductions where significant opportunities remain.