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4-57 PB, 7-79

AVRD 0002022202

ETHYLENE DICHLORIDE/VINYL CHLORIDE MONOMER

EDC/VCM

A. GENERAL INFORMATION

Ethylene dichloride and vinyl chloride monomer are intimately linked in the chemical industry. In any given year, 80 to 90 percent of ethylene dichloride production goes to make vinyl chloride monomer.

Ethylene dichloride is a colorless liquid that boils at 83°C. It is also known as 1,2-dichloroethane or glycol dichloride. In the chemical industry, it is abbreviated as EDC.

Vinyl chloride is a gas at room temperature. It is also known as chloroethylene and ethylene chloride. In the chemical industry, it is known as VCM for vinyl chloride monomer.

It is interesting that although they are linked by the large usage of EDC to make VCM, these two chemicals can exhibit different growth demands on a year-to-year basis. Apparently, when VCM production is down due to lower demand, certain producers continue to make EDC as a convenient way to store chlorine or future VCM. In the following year, although VCM use is increasing, EDC production does not keep pace due to the use of inventoried product.

B. CHEMISTRY

EDC is prepared by the direct chlorination of ethylene and by the oxychlorination of ethylene. It is common practice to link these two processes with the production of VCM. The three reactions together make up the so-called "balanced oxychlorination process." Vista Chemical Company uses this process at its facility in Lake Charles, Louisiana.

The first step in the process is the direct chlorination of ethylene with chlorine gas to produce EDC.

$$CH_2{=}CH_2 + Cl_2 \longrightarrow \underset{\text{ethylene dichloride}}{Cl{-}CH_2{-}CH_2{-}Cl}$$

The reaction is catalyzed by $FeCl_3$ and is run in the liquid state at ~70°C. The reaction produces heat. Temperatures up to 135°C have been reported.

The second step is the pyrolysis of EDC to produce VCM and by-product HCl.

$$Cl{-}CH_2{-}CH_2{-}Cl \xrightarrow[\text{catalyst}]{\text{heat}} \underset{\text{vinyl chloride}}{CH_2{=}CH{-}Cl} + HCl$$

EDC is passed through a tube containing a catalyst at 450°-500°C. The catalyst is usually pumice or charcoal. The EDC is cracked and splits out hydrogen chloride to produce VCM. Although the selectivity approaches 95 percent, a 50 to 60 percent conversion is usually realized. The three products then are separated. EDC is recycled back to cracking, vinyl chloride is sent to storage, and the hydrogen chloride is sent to the third step in the process.

The third step is the oxychlorination of ethylene. Ethylene, oxygen, and hydrogen chloride (from EDC cracking) are reacted in a reactor over a special catalyst to produce EDC.

$$2\,CH_2{=}CH_2 + 4\,HCl + O_2 \longrightarrow 2\,Cl{-}CH_2{-}CH_2{-}Cl + 2\,H_2O$$

The reaction is run at 350°-450°C and can be run in a fluidized or fixed bed reactor. Although oxygen could be supplied by air, it is general practice to use pure oxygen. This step is the heart of the whole process. It allows the producer to use all of the chlorines available and not lose one of them as hydrogen chloride. Vista's process now uses oxygen.

The overall reaction of the "balanced oxychlorination process" is:

$$4\,CH_2{=}CH_2 + 2\,Cl_2 + O_2 \longrightarrow 4\,CH_2{=}CH{-}Cl + 2\,H_2O$$

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C. PROCESS

The process is diagrammed below. The EDC/VCM process can be run to maximize yields of any of the three products: VCM, EDC, or HCl. EDC is prepared in reactors by direct chlorination and oxychlorination. It is purified by washing with acid and then base. The EDC is drawn off and sent to a light ends column where a light ends distillate is removed. These light ends have commercial value and have been sold in the past to Vulcan Chemical. The bottoms from the light ends column are distilled to give EDC. The tar bottoms have been sold to PPG.

The purified EDC is sent to furnaces to be cracked. Quench columns cool the products and remove tarry products .

The products are refrigerated and hydrogen chloride is removed by distillation. The hydrogen chloride is either sent back to the oxychlorination unit or used at the Lake Charles Chemical Plant to produce methyl chloride from methanol. In general, about 10 percent of the hydrogen chloride is sent to the methyl chloride unit. After HCl removal, VCM is distilled from the remaining mixture. The VCM product is sent to storage while the unreacted EDC is sent back for recracking.

D. PRODUCT SAFETY

1. Ethylene Dichloride

EDC exposure may produce irritation to eyes, nose, and throat. Overexposure can result in headache, mental confusion, fatigue, loss of appetite, and possible bodily damage to kidneys, lungs, and digestive and nervous systems. EDC is an experimental animal carcinogen and mutagen.

The 1984-85 ACGIH TLV recommended exposure limits for EDC are 15 ppm as an eight-hour time-weighted average and 15 ppm time-weighted average for 15 minutes.

EDC should be handled in a closed system and only in well-ventilated areas. Local exhaust is recommended.

EDC reacts slowly with water, producing a corrosive action. It will react violently with ammonia and NHx-containing compounds.

2. Vinyl Chloride

Vinyl chloride is a gaseous, flammable material which can form an explosive mixture with air. It should be kept away from ignition sources, and all equipment should be grounded to avoid static electricity.

Vinyl chloride should not be transferred or stored in vessels or fittings containing copper, aluminum, or their alloys.

Vinyl chloride has been found to be carcinogenic. Its use is strictly regulated by an OSHA standard which sets permissible exposure limits of 1 ppm averaged for 8 hours with a ceiling of 5 ppm for any 15-minute period.

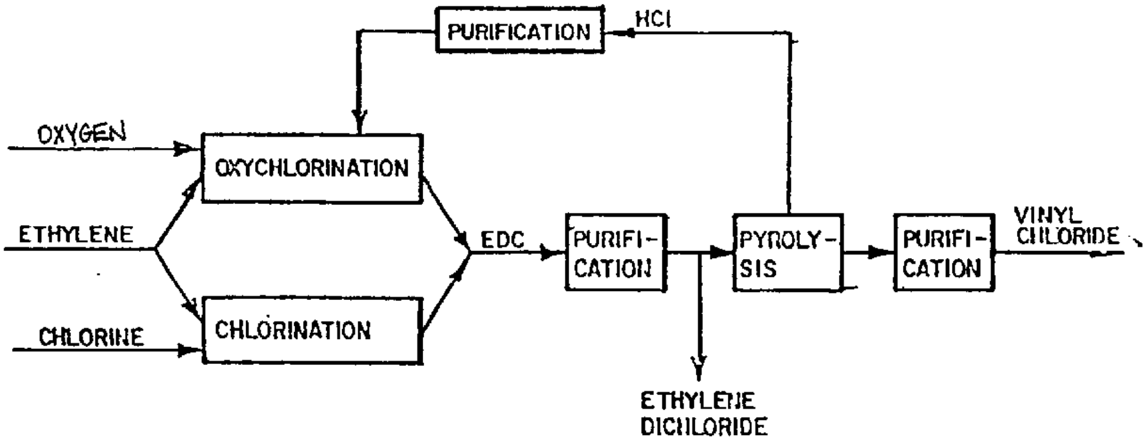
E. THE VCM INDUSTRY

1. Background

Tracking and anticipating the growth of PVC, the largest VCM end use, the U.S. VCM industry saw a strong increase in both demand and capacity during the 1970's. U.S. VCM production rose from 4.0 billion pounds in 1970 to 7.5 billion pounds by 1979, an average of 7 percent annually. Capacity increased by 7.5 percent annually, from 4.3 to 8.2 billion pounds, over the same period.

Selling prices increased along with raw material prices. Since prices in Europe and the Far East rose more rapidly than domestic prices, U.S. VCM exports gained importance over the period. They went from 600 million pounds to 1.2 billion pounds and varied between 10 to 15 percent of total U.S. production.

VCM - EDC PROCESS SCHEME



Two and one-half years of recession in the United States, from 1980 to 1982, led to decreased demand for PVC building products and, consequently, vinyl chloride monomer. Because of lowered domestic prices due to over-capacity and lowered U.S. demand, VCM exports remained competitive and ran at levels between 800 to 900 MM pounds.

With an upturn in the U.S. economy in 1983 and 1984, both PVC and VCM domestic demand have increased some 10 to 12 percent over low 1982 levels. There are signs, however, that U.S. exports of VCM are on the downturn due to higher U.S. prices and increasing competition from Canada, Europe, and the Middle East in traditional U.S. Far East markets. Some minor permanent shutdown of older, inefficient VCM capacity (5 percent) occurred in 1982/83, along with a 700-MM-pound-per-year Shell plant at Norco, Louisiana.

2. Industry Conditions

U.S. production of VCM hit a record 7.54 billion pounds in 1979, but was followed by a 14 percent decrease to 6.46 billion pounds in 1980, where it remained over the 1980-1982 recessionary period. By 1983, VCM production had recovered to 6.95 billion pounds, a 7.5 percent increase over 1982 but still 8 percent under the 1979 banner year.

The production of PVC resins continues to be the major end use market for vinyl chloride monomer. It accounts for 85 to 90 percent of all U.S.-produced VCM. Exports have fluctuated between 800 to 920 million pounds over the past three years, for another 8 to 10 percent of the market. Chlorinated products involve a minor 2 to 3 percent of the marketplace and are growing only with the economy.

PVC growth is concentrated in the building products area, with pipe and fittings accounting for over 40 percent of all PVC pounds sold. Siding, window profiles, and food grade packaging and bottles are other areas of strong PVC growth.

3. Outlook

VCM/PVC has enjoyed a long growth period, but there are signs that U.S. growth rates are slowing in the 1980's due to some maturing of markets and worldwide overcapacity and competition. Imports of VCM/PVC are also being targeted toward the U.S., especially from North American neighbors such as Canada.

From 1950 to 1974, growth averaged 12 percent per year. Over the 1970's when large volumes of U.S. and foreign capacity were added, U.S. VCM/PVC demand still grew at a healthy 7 to 8 percent per year. During the 1980's, U.S. growth in demand for VCM/PVC is expected to average under 4 percent annually. However, this is from a 5-to-6-billion-pound-per-year base. Thus the United States will continue to be the largest domestic market for VCM/PVC in the world.

Building and construction end use markets for PVC will continue to drive U.S. demand for VCM/PVC. PVC pipe and fittings, a 2.0-billion-pound-per-year market, will continue to grow at rates above GNP. PVC siding, window profiles, and other building extrusions are relatively young markets which will show strong growth over the decade, reaching 1.0 billion pounds by 1987. PVC rigid and flexible packaging and bottles, especially food grade, will increase in usage from the mid-to-late 1980's. The potential exists for development of better PVC extrusion and molding products and the use of blended and alloyed PVC to penetrate new market areas.

The significant rise in the cost of crude oil over the 1970's, especially in 1979, has led to a worldwide search for cheaper feedstocks. The start up and expansion of VCM/PVC capacity in areas of inexpensive feedstocks such as Canada, Mexico and the Middle East will mean increased worldwide competition for markets.

World overcapacity and slowly rising demand, dependent as it is on the increasing health of world economies, may have a dampening effect on prices short term. However, other than Saudi Arabian and some minor Middle Eastern and Far Eastern projects, no large new volumes are expected over the rest of the decade. This should lead to a gradually improving world VCM/PVC supply and demand situation.

In the United States, 1981 saw the last year for large increases in VCM capacity. A Georgia-Pacific grassroots plant (1.0 MMM lb) and a PPG expansion (500 MM lb) brought U.S. capacity to 10.7 billion pounds per year.

In 1982/83, shutdowns of older, inefficient plants occurred as producers either exited the business (Stauffer-175 MM; Ethyl-300 MM) or streamlined (Dow-200 MM). Shell temporarily shutdown a 700-MM-pound plant at Norco, Louisiana, in May 1983 to bring present U.S. VCM capacity to 9.0 billion pounds. This plant could be restarted over the next year or two.

Other than a Formosa Plastics grassroots plant which started up in late 1982 (530 MM pound), no new U.S. capacity is planned.

4. Manufacturers

a. Ethylene Dichloride

PRODUCERS—ETHYLENE DICHLORIDE—1984

Producer	MM lb Capacity
Dow	4,800
B. F. Goodrich	3,380
PPG	2,700
Georgia-Pacific	1,595
Shell[1]	1,400
Formosa Plastics	1,390
Vista	1,185
Borden	510
Arco	450
Vulcan	350
Union Carbide	300
Total	18,060

[1]One plant only; Norco plant on temporary shutdown since May 1983.

b. Vinyl Chloride

PRODUCERS—VINYL CHLORIDE—1984

Producer	MM lb Capacity
B. F. Goodrich	2,600
Dow	2,100
Georgia-Pacific	1,000
PPG	840
Shell[1]	840
Formosa Plastics	830
Vista	700
Borden	600
Total	9,510[2]

[1]One plant only; Norco plant on temporary shutdown since May 1983.

[2]This amount of VCM consumes roughly 16 MMM pounds of EDC in its manufacture.

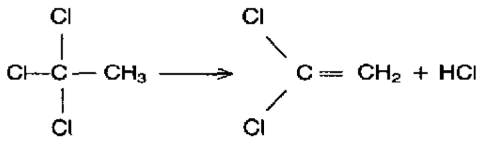
F. DEMAND—END USES

1. Ethylene Dichloride

The largest end use for EDC is the production of VCM. In recent years, from 80 to 90 percent of EDC production has been used for this purpose. VCM will be discussed in a following section.

The second largest end use for EDC is as a chemical intermediate for chlorinated organics such as 1,1,1-trichloroethane, trichloroethylene, and perchloroethylene.

1,1,1-trichloroethane is used to prepare vinylidene dichloride (VDC). VDC accounts for 3 percent of EDC demand. VDC is used as a monomer or comonomer in halogenated polymers.



vinylidene dichloride

Many of the chlorinated solvent uses for EDC and its derivatives have been curtailed due to health effects and pollution controls.

EDC finds widespread use as a solvent in the textile industry. It also has application as a solvent for metal cleaning and in adhesives. It can also be used as a fumigant in grain, upholstery, and carpets. Grain fumigants in the United States generally contain 20 percent EDC and 80 percent carbon tetrachloride.

Ethylenediamine is prepared by reacting ethylene dichloride with ammonia.

$$Cl-CH_2-CH_2-Cl + 2\ NH_3 \longrightarrow H_2N-CH_2CH_2-NH_2 + 2\ HCl$$

It is used to produce chelating agents and carbamate fungicide. Ethylenediamine accounts for 3 percent of EDC demand.

EDC has been used as a lead scavenger in gasoline, but its use here has declined as the use of unleaded gasoline has increased. Only a negligible amount of EDC is now used for this purpose. The attached figure depicts EDC end uses graphically.

1983 ESTIMATE OF EDC END USES

Derivative	Percent
Vinyl Chloride	83
Poly-Chlorinated C2's	9
Ethylenediamine	3
Lead Scavenger	nil
Export	5
Miscellaneous	Nil

2. Vinyl Chloride Monomer (VCM)

Vinyl chloride monomer is used almost exclusively to produce polyvinyl chloride resins (PVC). These can be homopolymers or copolymers. VCM is compatible with a variety of vinyl monomers such as vinyl acetate, ethylene, propylene, vinylidene chloride, or acrylates in making the manufacture of copolymers. Polymer processes are so refined that variables such as molecular weight, particle size, and surface characteristics can be controlled to produce a particular resin with specific physical and chemical properties.

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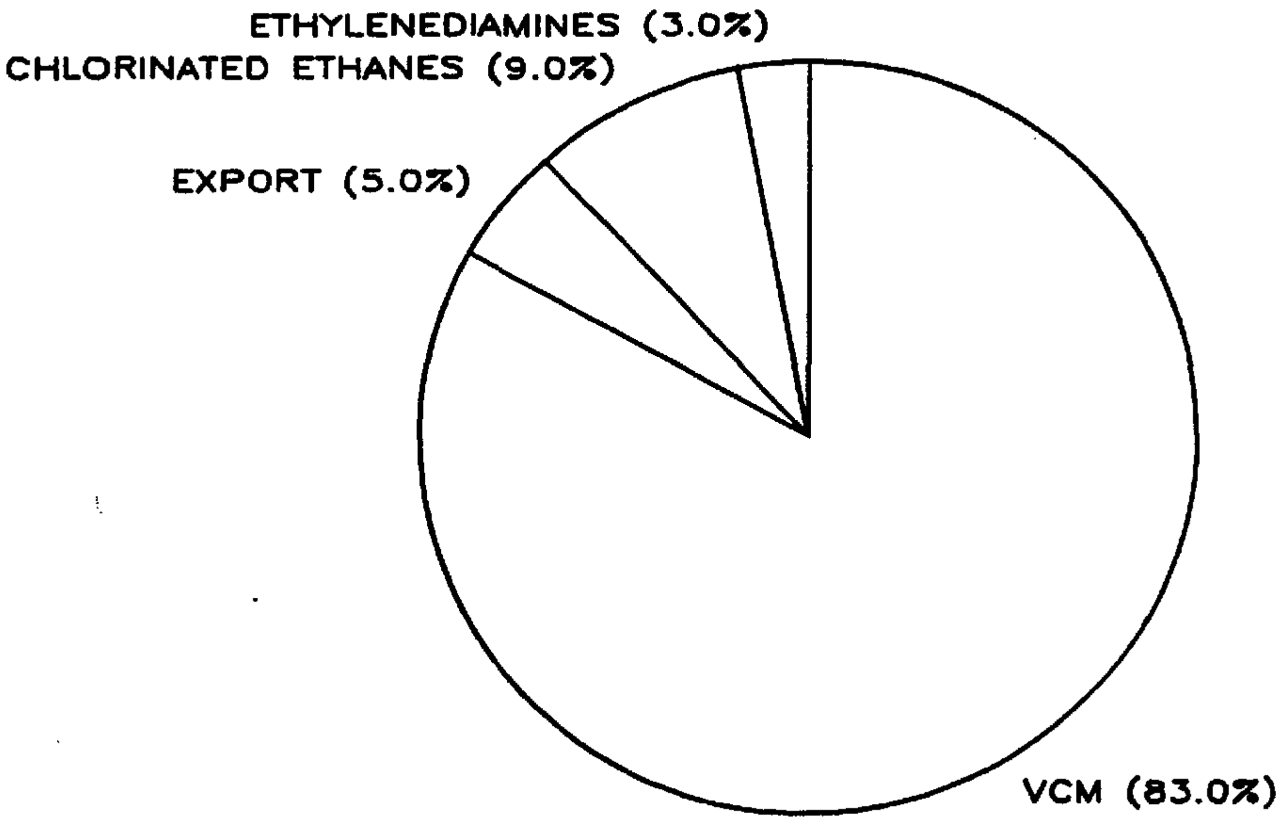
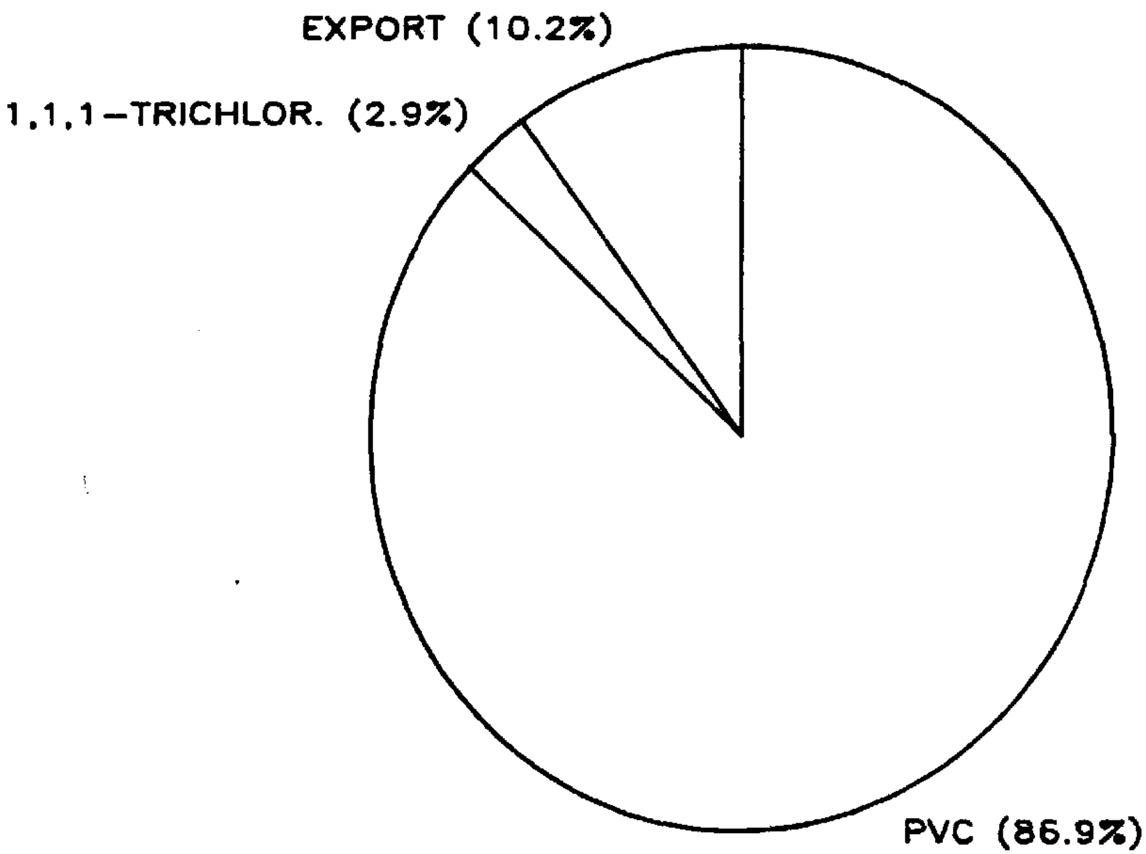
1983 EDC END USES



1984 VCM END USES



PVC resins are particularly compatible with a wide range of plasticizers and modifiers. All proportions of plasticizers, from low (5 to 10 percent) to high (near 100 percent) can be used, and this gives finished products a wide range of properties. PVC can be made hard and stiff or soft and flexible with varying degrees of each. Additionally, with expertise in the area, PVC resins can develop good resistance to weather, water, and chemicals.

The ease of working with PVC resins has also helped its growth. It can be used in all types of normal plastics processes.

PVC can be extruded to produce rigid forms such as pipe or siding or flexible forms such as garden hose or wire insulation. PVC resins are calendered to produce film and sheet products which can be rigid or flexible. These can be laminated to give wall coverings. Blow molding produces a wide range of containers, while injection molding produces automotive parts, toys, machine covers, and pipe fittings.

The PVC end use pattern, which shows percentages of PVC used in construction, electrical/electronics, consumer products, home furnishings, packaging, transportation, and in exports and miscellaneous, is shown in the following figure.

G. VISTA POSITION

1. History

in 1966, Conoco entered into an agreement with the Stauffer Chemical Company concerning use of Stauffer-developed VCM technology. Conoco and Stauffer were to enter into a 50/50 joint venture to construct a 600-MM-pound-per-year plant in Lake Charles, Louisiana. The plant was to be engineered and operated by Stauffer. Plant construction began in late 1966.

A court ruling in 1966 stated that the agreement was in violation of federal antitrust laws, and the court ordered Stauffer to divest itself of its interest in the Lake Charles plant to Conoco. Conoco was required to sell its PVC interests in Massachusetts. Conoco was allowed to continue operating the PVC facility at Aberdeen, Mississippi.

The plant was officially Conoco's when start-up began in early 1968. At its start-up, it was the largest VCM plant in the world.

This VCM plant was the first to use large reactor technology developed by Conoco. Several design flaws had to be remedied before it finally operated at design capacity in 1971.

Minor debottlenecking and operational improvements have brought the plant to its present capacity of 670 MM pounds per year. A VCM plant turnaround in the spring of 1983 was combined with the conversion from air to oxygen technology at Lake Charles. This conversion brings Vista into compliance with Louisiana EPA regulations and provides potential production efficiencies from the more modern process.

2. Business Strategy

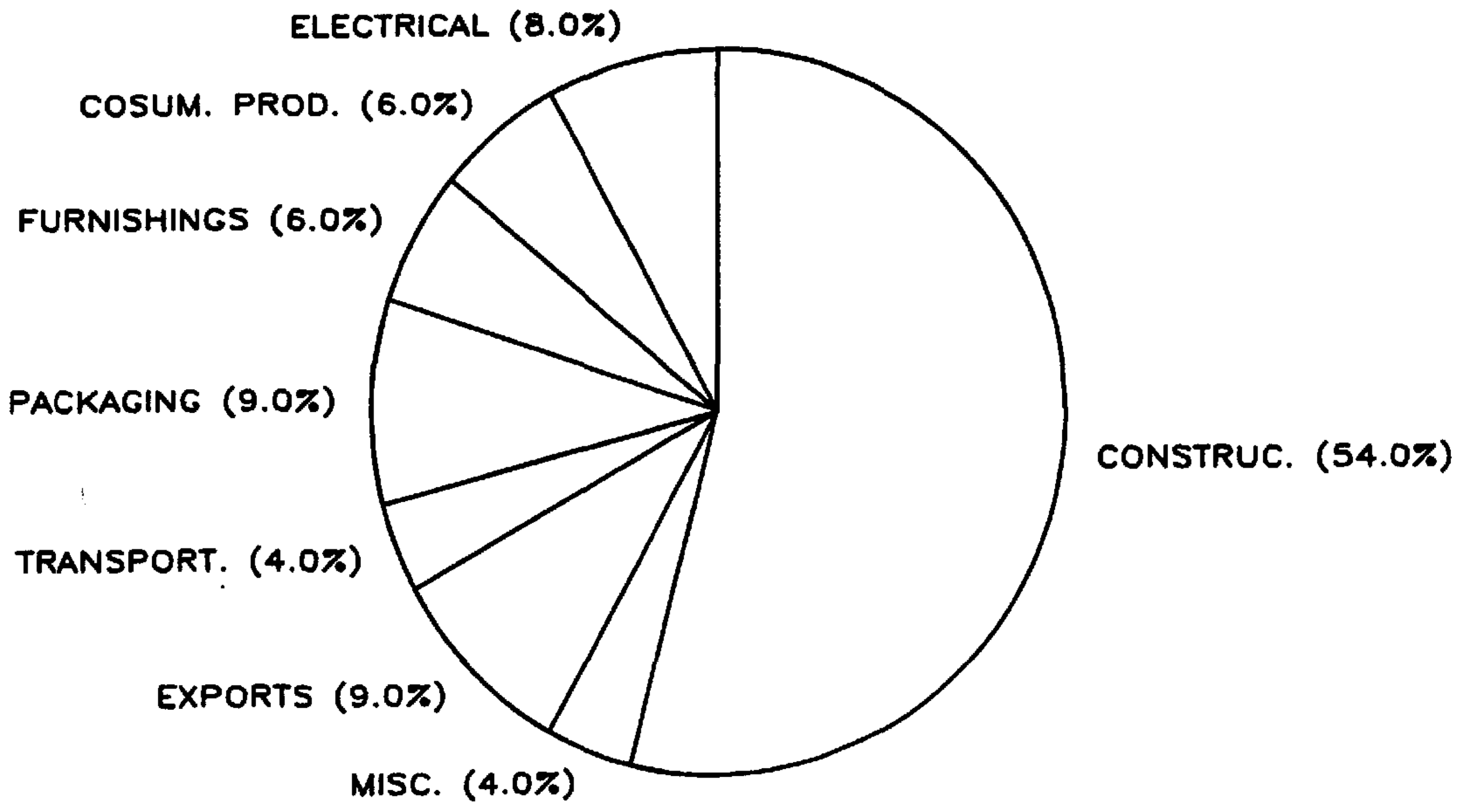
Vista's basic strategy is to combine the best available manufacturing technology with high-capacity utilization to achieve above average earnings in the VCM industry. Our VCM output is directed primarily at the Vista Polymers PVC plants with the goal being to supply all of their requirements in a reliable and economic fashion. Purchases and sales of VCM are utilized to fine tune our supply/demand balance and optimize profits.

3. Strength and Weaknesses

a. Vista has a well-integrated feedstock position. Current ethylene requirements can be supplied out of its Lake Charles ethylene plant, which has excellent reliability and production economics. A major part of the chlorine requirements will be supplied by pipeline from PPG.

b. Our manufacturing facility is very reliable and efficient and has had a better operating history than our competitors.

1983 PVC END USES



c. A large, and still increasing, captive requirement provides a strong baseload to our business, leading to higher capacity utilization.

d. Our very well-developed international network for VCM logistics and marketing provides flexibility and enables Vista to react to changes in market conditions.

e. Our 100 percent dependability on chlorine is a weakness under market conditions as prevailing in 1980, 1981, and 1982 (chlorine/caustic imbalance). Chlorine-driven competition (approximately 50 percent of U.S. nameplate capacity) can be aggressive in their pricing based on lower value of chlorine while we can take little advantage of such low-priced chlorine values. Additional flexibility will be considered in future contracts.

4. Product Volume

The VCM plant is scheduled to operate at capacity in 1984 with one scheduled turnaround and should produce 670 MM pounds. Domestic supplies will be supplemented with total purchases of 100 MM pounds from PPG and B.F. Goodrich. 690 MM pounds of the VCM will be shipped to Conoco PVC plants, 50 MM pounds will be sold domestically, and 50 MM pounds will be exported, primarily to Brazil and the Far East.

5. Feedstocks

The production of 670 MM pounds of VCM requires 320 MM pounds of ethylene (50 percent of the Lake Charles ethylene unit's production) and 216 M tons of chlorine. This amount of ethylene is readily supplied by Lake Charles producing the required ethylene, while the chlorine supply is covered by contracts with two major suppliers, PPG and Diamond Shamrock. All chlorine arrives at Vista via the PPG pipeline. Additional chlorine for incremental EDC production can come from spot purchases. Spot purchases of EDC may also be used to supplement EDC production.

6. Pricing Strategy

In the domestic VCM market, Vista does not have a strong enough position to be a price setter. Our strategy is to keep aware of market trends and increase our prices where possible. Vista must constantly be aware of the effects of irresponsible VCM pricing upon PVC prices; our stake in the latter is much greater.

7. Marketing Strategy

Since Vista's capacity to consume VCM in our PVC plants exceeds capacity to produce VCM, our position in the merchant market is limited. Because of cycles in Vista's production and consumption of VCM, we maintain both purchase and sales contracts to balance the swings in our system. For example, we purchase more VCM when our production is down or sell more VCM when internal demand is depressed.

Merchant sales are divided between the export and domestic markets. The export market operates primarily on a spot basis and is thus well suited to handle swings in our supply/demand balance. In the domestic market, we direct our sales efforts to those accounts where we can complement rather than compete with our PVC marketing program.

8. Manufacturing Strategy

We are now forecasting only one turnaround in 1984 (February/March) depending on our experience with the new oxygen-based oxy technology and a new catalyst. Besides turnarounds, we are projecting to run at full operating rates in the three years ahead.

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9. Customers

In 1984, Vista will toll process about 100 MM pounds of VCM through PPG and B. F. Goodrich.

Major Vista customers and approximate volumes are:

Customer	MM Pounds
Aberdeen PVC Plant	425
Oklahoma City PVC Plant	265
CertainTeed	25
Diversitech	15
Uniroyal	10
Export	50

Major Changes Could Confront Basic Petrochemicals This Year

As new foreign producers' lower-cost output rises, U.S. industry faces changes in product lines, plant capacities, and operating methods

Bruce F. Greek, C&EN Houston

This could be the year in which long-forecast major changes begin to affect the basic U.S. petrochemical industry. Most industry sources expect only modest, if any, gains in production in 1985. But, after this year, small declines in output could begin as a result of loss of export markets for most petrochemical derivatives. And increased competition in U.S. markets will develop from imports of derivatives made in other countries with lower-cost feedstock and fuel costs.

This leveling-off of production growth of basic petrochemicals will lead to many changes in product lines, plant capacities, and operating methods. Some of the changes could be more severe than the present situation warrants, say some industry sources. For example, the well-known shift by producers of commodity chemicals to specialties may be overdone, with the profitability of the shifts now in question in many cases. Another example is in current growth in grades and product specifications aimed at providing a product obtainable only from a single source. This may be a worthwhile marketing technique, but it does boost inventory costs.

Key Chemicals

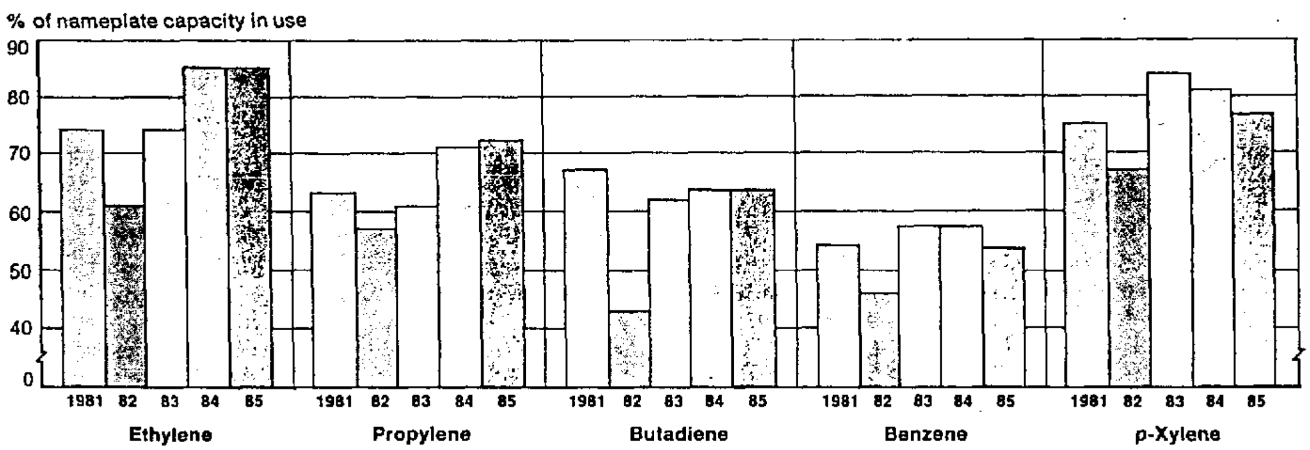
Capacity to make basic petrochemicals certainly will decline for some time under price pressure as it affects profitability. For some products, the shutdown could be huge—as large as the already-completed shutdowns of butadiene capacity. Some 2.5 billion lb of dehydrogenation capacity to make butadiene was shut down from 1974 to 1984, with as much as 80% apparently being scrapped. Much of this capacity was replaced by coproduct butadiene from the rapid expansion of steam cracker capacity during the second half of the 1970s.

A large amount of steam cracker capacity fits into the category of potential shutdown. And any shift toward the heavier feedstocks for steam crackers could increase the effective capacities of important coproducts such as propylene, butadiene, and the aromatics.

A secondary effect on petrochemical capacity could result from the perceived impact of petrochemical products from the new plants in the Middle East. The seriousness of this effect will become clearer in a year or so after most of the Middle Eastern units are operating.

For more on the outlook for basic petrochemicals, see the following pages.

Plant-use rates will level off or drop this year



Sources: U.S. Trade Commission, C&EN estimates

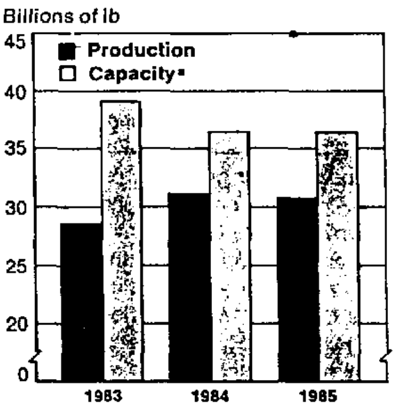
Key Chemicals

$CH_2{=}CH_2$

Ethylene

- ***Production holding***
- ***Capacity may rise***
- ***Prices down***

PRODUCTION/CAPACITY



a First quarter; includes shutdown capacity not expected to restart.

MAJOR PRODUCERS

Arco Chemical, Dow Chemical, Exxon Chemical, Shell Chemical, Union Carbide

HOW MADE

Thermal (steam) and catalytic cracking of hydrocarbons ranging from ethane to heavy gas oil

MAJOR DERIVATIVES (U.S.)

Polymers 50%, ethylene oxide 20%, vinyl chloride 15%, styrene 5%

MAJOR END USES (U.S.)

Fabricated plastics 70%, antifreeze 10%, fibers 5%, solvents 5%

FOREIGN TRADE

Exports and imports negligible

PRICES

About 16 cents a lb for most merchant sales (about 30% of production)

U.S. ethylene production last year, at about 31.2 billion lb, may not be surpassed until late in the 1980s. That's about when domestic demand finally will have made up for losses in exports of ethylene derivatives being supplied instead by new foreign competitors.

Production of ethylene in 1985 likely will match last year's. That output level will depend on the current economic trends continuing into the summer, and it also takes into account increasing exports of ethylene derivatives by newcomer producers in the Middle East and elsewhere. It might be a different story, of course, if the U.S. economy improves and if exports of derivatives from other parts of the world decline just modestly, perhaps 10% on the average. In that case, 1985 production could surpass last year's by about 500 million lb. If, on the other hand, the U.S. economy falters in the second half of 1985, and if foreign producers of ethylene derivatives take away a larger part of U.S. exports, then ethylene production could decline—as much as 1 billion lb, or about 3%, by some estimates, to 30 billion lb.

Currently, more than 36 billion lb of nameplate capacity is available for ethylene production. Not all of this capacity is operating, because of low profitability or no profitability to producers at today's prices. It's widely estimated about 2 billion lb of capacity currently is idle but could be operating. These figures mean that operations at an annualized rate of about 31 billion lb are at almost 90% of the on-stream capacity and at 85% of available nameplate capacity.

Some small additional capacity likely will be returned to operable nameplate capacity within a year. For example, by early 1986, an ethylene unit, now owned by Occidental Chemical but built by Cities Service near Lake Charles, La., will be modernized and restarted, adding about 500 million lb to the total U.S. capacity. That will be the only addition to capacity other than debottlenecking programs, which are expected to add minor amounts to the capacity total during 1985.

However, some of the very old capacity, built more than 15 years ago, could be taken permanently out of potential operability during the next year. This old capacity accounts for between 10 and 15% of the nameplate total. If a fifth of it is scrapped in 1985, the loss would be about equal to expected additions. The shutdown and scrapping of all the old capacity will come along in bits and pieces, probably over five years.

Scrapping of old capacity depends on many factors, most important of which is profitability. Even though depreciated, such capacity is inefficient to operate. To raise the efficiency of some units might cost as much as to rebuild completely, and could possibly cost more than would additions to a more modern unit. Moreover, an old unit might require more costly feedstocks than are available, as a result of changes in demand for various hydrocarbons from petroleum and natural gas.

A decision to buy ethylene rather than to make it also could cut into old capacity. And a large decline in exports of ethylene derivatives also could speed decisions to discontinue ethylene operations at marginal production units. Although a producer might now have little export business in derivatives, competition still could increase because other producers need to find a place for derivatives that they can't export profitably.

Even with some probable loss in exports of ethylene derivatives, with strong competition for sales, and with some shifting around in operating capacity, the overall use pattern for ethylene will not change much in 1985. Polymers will continue their slow gain in the share of total consumption at the expense of some of the smaller uses such as chlorinated derivatives used as solvents.

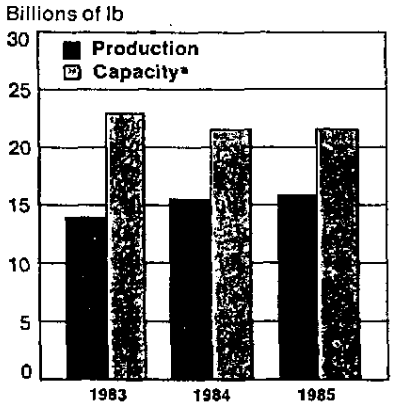
Key Chemicals

$CH_2{=}CH{-}CH_3$

Propylene

- ***Production up a bit***
- ***Capacity flat***
- ***Prices down***

PRODUCTION/CAPACITY



Note: All grades. * First quarter.

MAJOR PRODUCERS

Amoco Chemical, Arco Chemical, Dow Chemical, Exxon Chemical, Shell Chemical

HOW MADE

Recovered from cracked gas streams from steam crackers and refinery catalytic cracking units

MAJOR DERIVATIVES (U.S.)

Polymers 35%, acrylonitrile 20%, propylene oxide 10%, cumene 10%

MAJOR END USES (U.S.)

Fabricated plastics 50%, fibers 15%, solvents 15%

FOREIGN TRADE

Exports—negligible, imports—holding at about 500 million lb for 1985

PRICES

Chemical grade 16 cents per lb, polymer grade 17 cents per lb

The outlook for propylene has at least one similarity to that for ethylene—a nearly complete halt in production growth during 1985 after a major recovery in 1984. Production of all grades of propylene in 1985 will be up slightly to about 15.7 billion lb from about 15.2 billion lb last year. This covers all uses of propylene for making chemicals and polymers, but excludes refinery uses for making gasoline components such as alkylate. The production gain of slightly more than 1% compares with a nearly 11% gain in 1984, the slowdown resulting from more severe competition in many export markets for U.S. propylene derivatives.

Most polypropylene derivatives are made from chemical and polymer grades of propylene. A few exceptions use "refinery grade," whose propylene content may range from 35 to 90%. Gasoline components also use refinery-grade propylene, thereby acting as competition for chemical uses. These uses also are in competition with the upgrading of the refinery-grade propylene stream for use in making derivatives.

Roughly two thirds of propylene is produced in refineries, mainly in fluid catalytic cracking units; the other third is produced as a coproduct of ethylene in steam crackers. Practically all of the propylene made in steam crackers is used to make chemical and polymer derivatives and an important part of refinery propylene also is used for derivatives. Except for the relatively small quantity of derivatives made directly from refinery-grade propylene, most refinery-grade propylene used for derivatives must first be purified at a significant cost. The purification cost also makes the economics of derivative manufacture favor use of coproduct propylene wherever possible.

Sufficient propylene capacity exists to meet demand if that available from refinery operations is included. But propylene must be priced high enough to justify its being drawn away from the fuel uses. This capacity could be expanded, if returns on investment are sufficient, because cracking units in refineries produce more propylene than now is purified or used directly in making derivatives. However, there is a limit to the quantity of propylene available at any time because the refinery cracking units are operated to make gasoline and other fuel components, and not to make propylene.

Shifts in operation of steam crackers and of refineries have led some derivatives producers to sound an alarm about a possible shortage of the chemical and polymer grades of propylene. This alarm has caused higher prices of propylene relative to ethylene. Ten years ago, a rough rule of thumb was that the price of propylene was 70% that of ethylene. Now propylene prices are the same as ethylene prices or slightly higher, reflecting the apparently less plentiful supply.

The causes of the current rough parity in prices for ethylene and propylene come from the economic squeeze of the early 1980s. The economic recession led steam cracker operators to adapt to the lowest-cost feedstocks, largely ethane, to make ethylene at lowest possible cost. At the same time, refinery operations were cut back, because of lower demand for fuel products. More recently, imports of fuel products have further reduced refinery operations.

However, no real long-term shortage of propylene is expected by industry sources. Even without steam cracker operators changing to heavier feedstocks to raise propylene yields to meet demands, more propylene could be taken from refinery fuel uses, if prices were to rise.

The conditions of propylene prices and supply aren't expected to have any major impact on manufacture of derivatives. As is the case with ethylene polymers, polypropylene will grow faster than will most other propylene derivatives and will take a slowly growing share of propylene consumption.

Key Chemicals

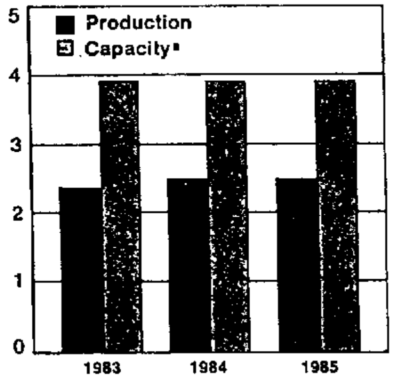
$CH_2{=}CH{-}CH{=}CH_2$

Butadiene

- ***Production limited***
- ***Capacity large***
- ***Prices holding***

PRODUCTION/CAPACITY

Billions of lb



a First quarter; extraction capacity; includes shutdown capacity not expected to restart.

MAJOR PRODUCERS

Amoco Chemical, El Paso Products, Exxon Chemical, Shell Chemical, Texas Petrochemicals

HOW MADE

Recovered from steam cracker product streams; dehydrogenation of butylenes from refinery catalytic cracking

MAJOR DERIVATIVES (U.S.)

Styrene-butadiene rubber 40%, polybutadiene rubber 25%,

MAJOR END USES (U.S.)

Fabricated rubber products 75%, fibers 10%

FOREIGN TRADE

Exports—holding at about 150 million lb in 1985, imports—may fall to about 600 million lb in 1985

PRICES

About 30 cents per lb

U.S. butadiene producers will be pushing plants hard in 1985, including some recently restarted units. Nevertheless, they probably will be capable of supplying less than 80% of the butadiene expected to be consumed domestically this year. Imports, growing ever more difficult to obtain, will have to make up the difference.

Production of butadiene from all sources in the U.S. will be about the same as in 1984, a little more than 2.5 billion lb. But final output will depend on a number of factors, including demand (largely for various elastomers), feedstocks sent to steam crackers, and the strength of the dollar.

Plenty of capacity exists to make butadiene, either as a coproduct of making ethylene in steam crackers or by dehydrogenation of butylenes made in refineries. This capacity is a measure of the ability of producers to extract butadiene from streams of C_4 hydrocarbons produced in the U.S. or imported. During the past two years, it has been reduced as significant quantities of capacity have been scrapped. Some of the capacity now counted in the total probably will be scrapped without ever being run again, but the "on-standby" designation hasn't yet been changed.

Except for a small amount of butadiene produced by dehydrogenation of butylenes, all butadiene consumed in the U.S. is a coproduct of ethylene manufacture. Critical to butadiene production is the feedstock used in steam crackers to make ethylene. If ethane is the feedstock, butadiene production is minimal. As feedstock to a steam cracker is shifted toward heavier hydrocarbons, the butadiene yield rises rapidly. On the average in 1984, the yield of butadiene in steam crackers was less than 8% of the ethylene yield, an output of two thirds or less of the yield of butadiene relative to ethylene in Europe where naphtha still continues to be the major steam cracker feedstock.

In Europe, the source of most butadiene imported into the U.S., the situation is changing. Ethylene units are being shut down and their feedstock composition is changing toward lighter hydrocarbons. All this is being done in anticipation of imports of ethylene derivatives from lower-cost feedstock sources in the Middle East. At the same time, these changes are reducing the amount of coproduct butadiene available for internal use and for export to North America and Japan.

Therefore, the current question among consumers of butadiene is whether imports will be available to meet the expected deficit in U.S. production. Countries other than in Europe have or appear to have little capability to supply much butadiene. Except for the strength of the dollar, competition could reduce this potential supply. As long as the dollar remains strong, the incentive to sell to the U.S. will remain in preference to sales to countries such as Mexico where currency is being devalued.

Prices of butadiene nevertheless might firm slightly during 1985 if demand should increase again this year following the increase in demand of more than 9% in 1984. If prices firm by a small amount as the result of perceived stronger demand in the U.S., then both imports and production could rise.

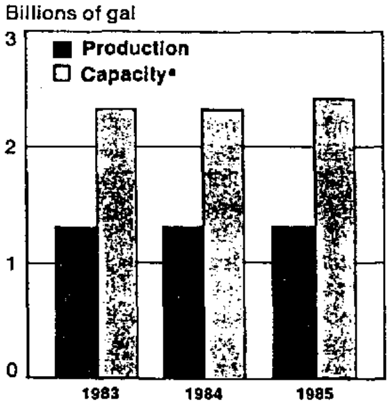
Some increase in butadiene prices has not reduced consumption gains much from what had been anticipated with the economic recovery. In 1985, some of the smaller uses such as acrylonitrile-butadiene-styrene resins may grow faster than will the major elastomer uses. This growth, slowing after a large gain in 1984, will not be large enough to change the end use pattern much. In spite of some development work with this unusual diolefin, no new uses will appear to take significant quantities of butadiene.

At current and expected prices for butadiene for 1985, production will just about hold steady or inch up slightly. Consumption will hold about even.

Benzene

- ***Production flat***
- ***Capacity holding***
- ***Prices firming***

PRODUCTION/CAPACITY



* First quarter.

MAJOR PRODUCERS

Amoco Oil, Arco Chemical, Coastal Corp., Exxon Chemical, Gulf Oil Products, Shell Oil, Sun Oil

HOW MADE

Separated from aromatic streams from refineries, olefin plants, coke ovens; dealkylation of toluene

MAJOR DERIVATIVES (U.S.)

Ethylbenzene 50%, cumene 20%, cyclohexane 15%, aniline 5%

MAJOR END USES (U.S.)

Styrenic plastics 35%, phenolic resins 20%, nylons 15%

FOREIGN TRADE

Exports—small, remaining at about 20 million gal in 1985; imports—slipping to 150 to 160 million gal in 1985

PRICES

List price $1.17 per gal

The best news to come to benzene producers this year is a slight firming of prices. Beyond that, it's a pretty ho-hum outlook for benzene: Production probably will not grow appreciably, nor will capacity rise further following the addition of a new Sohio plant at the end of 1984.

The price firming, however, may not do enough for benzene producers. Spot prices for benzene, reflecting only a part of total sales, increased in small increments beginning in January. By early March, they were above the list price, which had dropped significantly in 1984.

These spot prices reflect mainly demand factors and feedstock conditions beyond those in the chemical industry. The spot price rise went along with firming of gasoline prices, and was related to the value benzene has in gasoline, both as a volume component and as an octane contributor to the total pool octane value. Some minor effect was felt from the drawdown of benzene inventories in 1984 and from anticipated improved demand for some end products of benzene.

During 1984, benzene prices fell more than 30 cents a gal, or nearly 20%, because of stagnant demand, lower prices for some derivatives, large inventories, and declines in crude oil prices. Spot prices ranged slightly below list prices during the second half of the year, further hurting profits from recovery and selling of benzene.

That situation changed during the first quarter of 1985. Now, questions are developing as to whether these price increases, small as they are, will hold for the rest of the year. Benzene demand in the second quarter probably will be as good as in the first quarter. Later on, demand may weaken, pulling down production as inventories build.

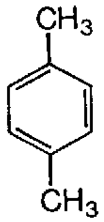
Benzene production for all of 1985, therefore, likely will end up about the same as in 1984, at 1.3 billion gal. This hold on production could mean that a slight decline will occur in the operating rate for total nameplate capacity, but it essentially will remain at about the same 55% rate that it has been the past two years.

Nameplate capacity, much of which is in or closely attached to refineries, long has been considered to be well overstated. If sufficient aromatics streams could be obtained, then the nameplate capacity might nearly be reached. But even so, capacity still could be overstated because of units, long shut down at steel mills and small refineries, which are not expected ever to be run again. In addition, several relatively large benzene units currently are shut down, with questions about future operation concerning some of them.

Some small amounts of capacity have been scrapped, but during the fourth quarter of 1984, Sohio Chemical started up its new unit with a nameplate capacity of 115 million gal a year. The actual net gain in capacity for 1985 operation is hard to pin down, but probably at least two thirds of Sohio's new unit capacity should be added to the total.

Part of benzene capacity is attached to steam crackers where benzene is separated from the pyrolysis gasoline fraction of the product stream. Typically, benzene produced in steam crackers has accounted for about 25% of production, or a bit more. The other part of benzene supply—imports—could decline a bit in 1985 unless domestic prices rise. As U.S. selling prices decline during 1984, imports also decline because of little or no profit to traders in benzene. This year, imports could supply at least 10% of U.S. benzene demand, but certainly not more than 15%.

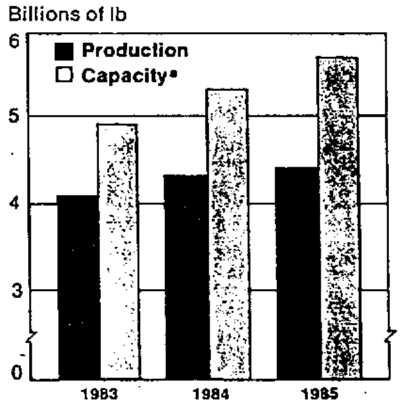
None of the major uses of benzene will show much gain in demand during 1985. One—styrene—because of imports of polymers, could decline slightly. The result, then, for benzene will be a year of minor change in production and a struggle to squeeze a bit of profit from a slight price firming.



p-Xylene

- ***Production may slow***
- ***Capacity up a bit***
- ***Prices could firm***

PRODUCTION/CAPACITY



a First quarter.

MAJOR PRODUCERS

Amoco Chemical, Arco Chemical, Chevron Chemical, Exxon Chemical, Koch, Phillips Chemical

HOW MADE

Separated from mixed xylene streams made in oil refineries and steam cracking olefins plants

MAJOR DERIVATIVES (U.S.)

Dimethyl terephthalate 55%, terephthalic acid 45%

MAJOR END USES (U.S.)

Polyester fibers 80%, blow-molded items (mostly bottles) 10%, films 5%

FOREIGN TRADE

Exports—may exceed 1 billion lb in 1985, imports—may be greater than 100 million lb in 1985

PRICES

List price 22 cents per lb delivered

Capacity to make *p*-xylene continues to expand. It grew again in 1984. But, although that doesn't help prices or profitability for producers, it does bring a small increase to production, if for no other reason than that it increases inventories necessary to meet expected sales volumes.

Because of a net capacity increase during 1984 of about 400 million lb, output during 1985 likely will rise slightly, perhaps about 100 million lb, to 4.4 billion lb. The final figure will depend on availability to producers of mixed xylenes, on the export markets for *p*-xylene (as well as for *o*-xylene), and on the size of imports of apparel made using polyester fibers.

A production total of 4.4 billion lb of *p*-xylene in 1985, however, will not raise the plant operating rate. Nameplate capacity for this year will reach 5.7 billion lb, with all of it expected to operate to supply sales demand and inventory building as needed during the year. The actual operating rate will be about 77% on the average, down slightly from the estimated average rate of 81% in 1984.

The various factors that influence production probably will change only slightly during 1985 when growth in output will be quite close to, but probably slightly below, growth in gross national product. But these factors also could strongly influence *p*-xylene production. For example, mixed xylenes could become more expensive because of the more rapid shift toward unleaded gasoline, which results from lowered limits on use of lead alkyls, more stringent controls against misfueling of catalytic-muffler-equipped cars, and a higher percentage of cars requiring premium unleaded fuels. If demand for *p*-xylene does not remain strong enough to pay the competitive price for it to be removed from the mixed xylenes streams, then actual production could decline.

At the same time, the export demand also could change. Based on recent experience, exports for 1985 are estimated to top 1 billion lb of *p*-xylene. This estimate depends upon a growing demand for the isomer for polyester fibers and for some fabricated items in the Pacific Rim countries. It also depends upon continued production difficulties at plants in developing countries that require *p*-xylene either for their own fiber production or to fill commitments for exports made before the plants were completed.

If fiber demand in some of these countries rises steeply, partly spurred by exports of apparel to the U.S., and if operational problems get worse, export demand for *p*-xylene could soar by an additional 100 million to 200 million lb in 1985. Of course, this rise in export demand would not translate back into an equally large increase in production. Most of the additional exports of *p*-xylene would return to the U.S. as apparel, offsetting consumption of polyester fibers for apparel made in the U.S. and reducing total demand for *p*-xylene by nearly an equal amount.

With almost 80% of *p*-xylene eventually ending up in fibers made in the U.S., the outlook for fibers and apparel demand continues to be critical to total *p*-xylene consumption. In general, polyester fiber demand in the U.S. is expected to do no better than hold even. A slight decline is more likely.

But demand for *p*-xylene in making polyester bottle resins, both the polyethylene and the polybutene terephthalates, probably will increase an amount about equal to the decline in demand for use in fibers.

The result of a lower demand for *p*-xylene for making polyester fibers and a higher demand for making bottle resins could make *p*-xylene one of the few major-volume petrochemicals to show a change in its use pattern in 1985. If a change to 75% or less of U.S. consumption for fibers and to more than 15% for bottle resins doesn't occur in 1985, it certainly will in 1986.

VCM
Vinyl Chloride
Monomer

Description:
Vista vinyl chloride monomer (VCM) is a high purity, clear, colorless, sweet smelling gas at ambient temperature and pressures. It polymerizes readily in the presence of air, sunlight, oxidizing agents, and free-radical catalysts, to form a hard, white resin-polyvinyl chloride (PVC).

Applications:
Vista vinyl chloride monomer is used in the manufacture of polyvinyl chloride for use in pipe and pipe fittings, siding, window profiles, and food grade packaging and bottles. It is also compatible with a variety of vinyl monomers such as vinyl acetate, ethylene, propylene, vinylidene chloride, and acrylates in the manufacture of copolymers. Vista vinyl chloride monomer is suitable for use as an intermediate in the manufacture of 1,1,1-trichloroethane for use as a solvent or degreaser.

Properties	**Specification**	**Typical**
Vinyl Chloride, Wt. %*	99.98 min	99.98
Water, ppm	100 max	<50
Methyl Chloride, ppm	70 max	<50
Acetylene, ppm	2 max	<1
1,3-Butadiene, ppm	12 max	<10
Total C_4 Unsaturates	40 max	<20
Acetaldehyde, ppm	1.0 max	<0.5
Non-Volatiles, ppm	25 max	nil
Iron (non-filterable), ppm	0.15 max	<0.1
Acidity (as HCl), ppm	1 max	nil
Oxygen in Vapor Space, ppm, vol.		
before loading	1,000 max	<350
after loading	500 max	-
Freezing Point, °C		-153.7
Boiling Point, °C		-13.8
Flash Point (COC), °C		-78
Specific Gravity, Liquid (20°C/20°C)		0.9121
Density, (20°C), Lb./Gal.		7.6
Solubility (H_2O in VCM), Wt. %		0.11
Explosive Limits (Volume in Air), Vol. %		
Upper Limit		22.0
Lower Limit		4.0

*excludes water, oxygen and non-volatiles.

NOTE: For export shipment up to 5 ppm of hydroquinone inhibitor will be added.

Safety and Handling:
When inhaled at high concentrations, vinyl chloride monomer acts as an anesthetic. Prolonged exposure to excessive amounts of VCM may cause cancer. Vinyl chloride is a highly flammable gas and can easily ignite at most normal atmospheric conditions. The handling, use and exposure to VCM in the workplace is strictly regulated by OSHA. Refer to 29 CFR, Part 1910.1017 for specific requirements.

THE DATA CONTAINED HEREIN ARE FOR GENERAL INFORMATIONAL PURPOSES ONLY. PLEASE REFER TO THE VISTA CHEMICAL COMPANY MATERIAL SAFETY DATA SHEET FOR SPECIFIC, COMPLETE INFORMATION REGARDING THIS PRODUCT.

Storage and Transfer:
Store Vista vinyl chloride in steel tanks, either under refrigeration or under pressure at atmospheric temperatures. Do not use vessels or fittings made of copper or aluminum or their alloys. Blanket storage tanks with inert gas, and never allow air to enter the tanks. In the presence of water, VCM accelerates the corrosion of iron or steel.

Availability:
Uninhibited or inhibited grades of Vista vinyl chloride are shipped as a liquid in pressurized tank cars from Westlake, Louisiana. Product can be made available in bulk vessels, for barge or vessel liftings. Contact Vista Chemical Company for information regarding water shipment.

VISTA

1502B-M1114-11/84-1M

VCM SAFETY

HEALTH

Carcinogenic

1 ppm 8 hour TLV

5 ppm 15 min TLV

PHYSICAL

Flammable

Reacts with Cu and Al

A VRD 00022024896

CHEMICAL MANUFACTURERS ASSOCIATION

June 10, 1992

TO EXECUTIVE CONTACTS OF CMA MEMBER COMPANIES

Dear Executive Contact:

As part of its increasing use of economic arguments in its advocacy, CMA has developed leaflets and brochures that have made an impact in recent debates on "toxic use reduction" bills and other issues. Depending on the topic covered, some of these "handouts" may be useful to you in communicating with various audiences, for example: customers, suppliers, current and retired employees, plant visitors, local community groups and officials, federal and state legislators, and potential employees contacted during college recruitment visits.

Samples of the currently available materials are enclosed. The leaflet "The U.S. Chemical Industry: Keystone of U.S. Manufacturing" can be oriented to any of 24 individual states by inserting that state's "Industry Fact Sheet." An example state fact sheet--all the state fact sheets are similar in format--is included in the enclosed sample materials.

Color 35 mm slides are also available for the "U.S. Chemical Industry" and "Protecting the Environment" leaflets, should you want to present these materials in oral briefings. Each of the leaflets was transmitted to our printer in computerized, electronic form. Should you wish to do your own printing of any of the leaflets, substituting your logo for CMA's logo, we can make our electronic version available to you.

We intend to develop similar materials on other topics of interest to the industry. The items currently available have been priced to encourage mass distribution. A price list and ordering information is attached.

Sincerely,

Robert A. Roland
President

cc: CMA Key Contacts

2501 M Street, NW, Washington DC 20037 202-887-1100 Panafax 202-887-1237 Telex 89617 (CMA WSH)

PRICE LIST FOR NEW ADVOCACY ITEMS

Description	Price
The U.S. Chemical Industry	$7.00 /100
State Industry Inserts for Above:	
Alabama	$2.00 /100
California	"
Connecticut	"
Delaware	"
Florida	"
Georgia	"
Illinois	"
Indiana	"
Kentucky	"
Louisiana	"
Maryland	"
Massachusetts	"
Michigan	"
Minnesota	"
Missouri	"
New Jersey	"
New York	"
North Carolina	"
Ohio	"
Pennsylvania	"
South Carolina	"
Tennessee	"
Virginia	"
West Virginia	"
U.S. Chemical Industry 35mm Slide set	$75.00 Ea
Chemicals, Manufacturing and Cars	$8.00 /100
Protecting the Environment	$7.00 /100
35 mm Slide Set	$75.00 Ea
Facts About Toxic Use Reduction (TUR) Legislation	3.00 Ea

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~~① FJ~~
② VM
③ File -27.10

Facts About Toxic Use Reduction (TUR) Legislation

H.R. 2880
H.R. 3865
S. 2123
S.1081
S. 761
S. 976

CMA

Chemical Manufacturers Association
Washington, D.C.
June, 1992

VRD-0002024899

Table of Contents

Facts About Toxic Use Reduction Legislation

Toxic Use Reduction (TUR): What's It All About?

- Current legislative proposals would mandate detailed reporting on the use in manufacturing and chemical processing of over 1,000 chemicals characterized as toxic and the elimination or reduction in use of these chemicals.

- The more than 1,000 chemicals affected would range from unprocessed elements of the earth and basic building block organic chemicals to highly specialized chemicals created by many stages of chemical processing.

- These more than 1,000 chemicals have been characterized as "toxic" without systematic reference to risks on the basis of exposure, concentration, dosage, or other relevant criteria.

- It is *not* possible to reduce the production and use of over 1,000 key chemicals by using benign, non-toxic substitutes.

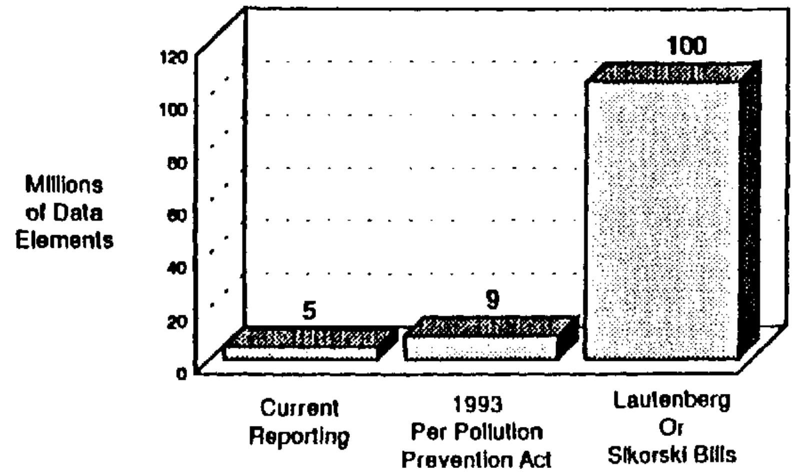
- A mandate to reduce the use of over 1,000 key chemicals would be a mandate to reduce the production of U.S. chemicals and the output of all U.S. manufacturing.

- Detailed reporting on the use of over 1,000 chemicals in individual processes would also markedly increase consumer costs and divert resources from more productive uses -- both economic and environmental.

- In addition, toxic use reporting would give foreign competitors vital intelligence on how U.S. high-tech chemical products that are vital ingredients for other U.S. manufacturers are made.

Toxic Chemical Data Elements

(Current and Proposed)



- Under existing toxic release inventory requirements, EPA currently collects and manages about 5 million data elements.

- That number will rise to 8-9 million by 1993 under the terms of the Pollution Prevention Act of 1990.

- New legislation would require huge increases in reporting by individual facilities. New reports on chemical <u>uses</u> and <u>throughputs</u> -- not just emissions -- would be required at the production unit level. Some facilities have tens or hundreds of production units and processes. A significant diversion of resources from more productive uses to recording and reporting would be required.

- Requiring 225,000 facilities to report on 1000 chemicals and creating a huge -- possibly unmanageable -- data base would at best be an incredibly expensive way to approach a perceived but ill-defined problem. Most likely, it would be counterproductive.

- EPA estimates that the Lautenberg and Sikorski Bills (S. 2123 and H.R. 2880) would raise the pieces of information collected each year to 100 million, a twenty-fold increase from current levels, adding billions of dollars to industry's costs.

- The costs of expensive mishandling of perceived problems -- including the costs of detailed data collection -- in the end are borne not by businesses, but by individuals. These costs are a regressive tax on every person in the U.S. economy.

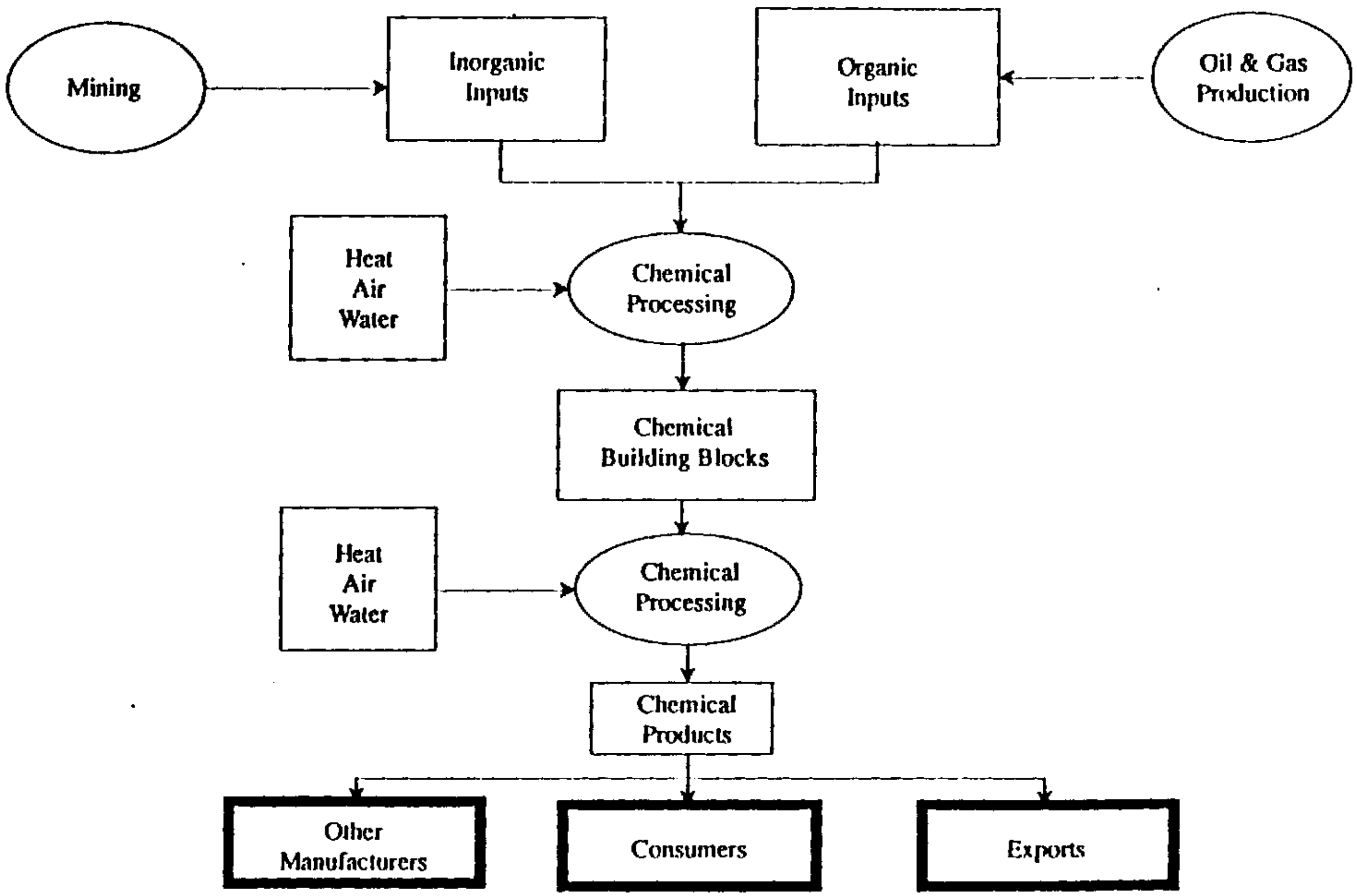
- Every person in the U.S. economy has a stake in intelligent, cost-effective decisions on toxic chemicals.

The Impact of TUR On Chemical Manufacturing

- Toxic use reduction legislation would require the reduction in the manufacture and use and/or the detailed reporting on the use in chemical and other manufacturing processes of over 1,000 chemicals characterized as "toxic" by the legislation.

- The pages that follow illustrate the potential effects of the legislation on the chemical industry and U.S. manufacturing by showing the role in chemical processing and manufacturing of only about 60 of the more than 1,000 chemicals that would be affected by the legislation.

What Is Chemistry?

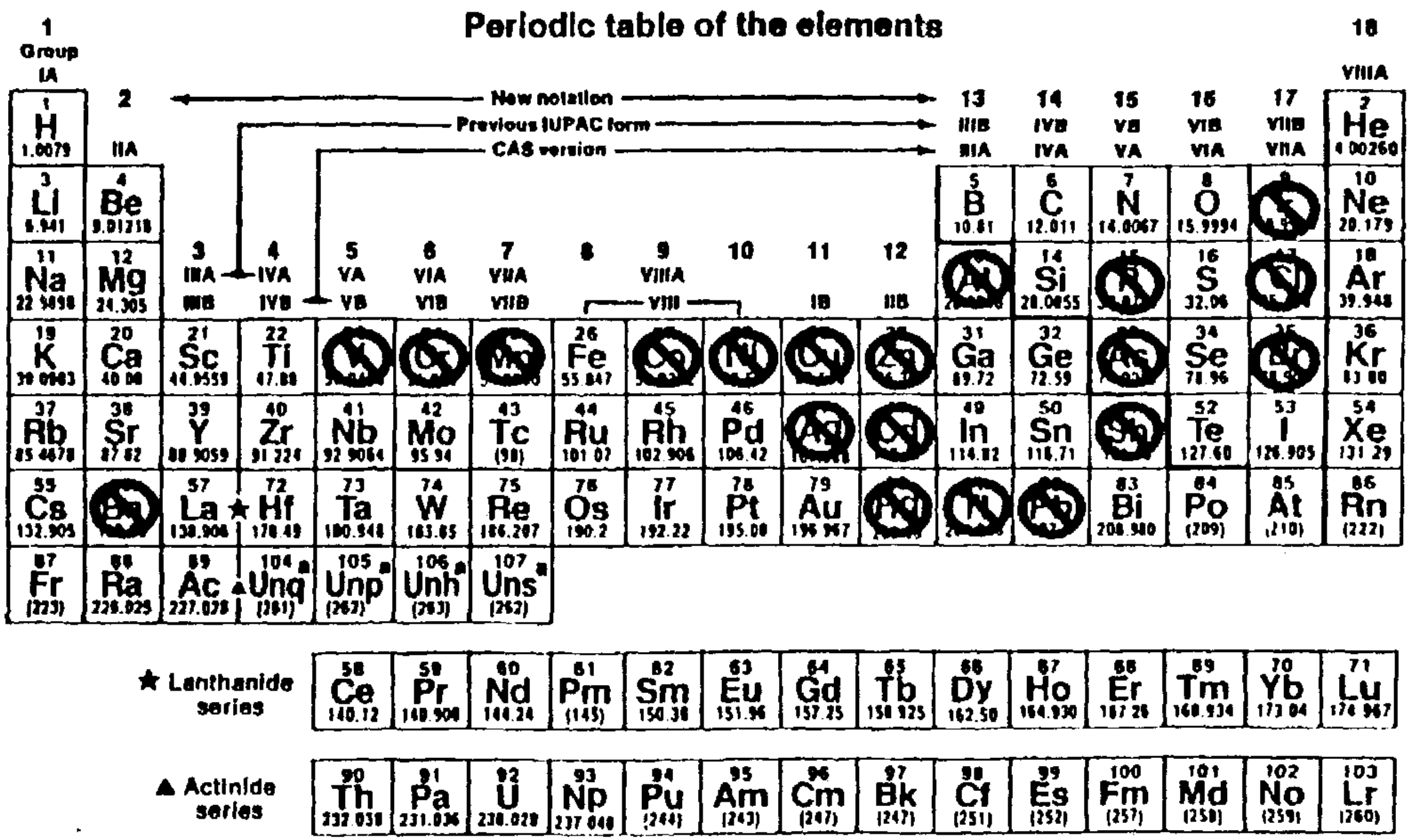


- ❑ Chemistry combines organic and inorganic materials from the earth with heat, air, and water to make products useful in modern civilization.

- ❑ Organic chemicals begin with raw materials containing hydrocarbons such as oil, natural gas, and coal.

- ❑ Inorganic chemicals do not contain carbon but are made from ores. They are listed in the "Periodic Table of Elements".

Foundations of Inorganic Chemistry



Elements Regulated Because of Toxicity:				
Aluminum	Bromine	Cobalt	Manganese	Silver
Antimony	Cadmium	Copper	Mercury	Thallium
Arsenic	Chlorine	Fluorine	Nickel	Vanadium
Barium	Chromium	Lead	Phosphorus	Zinc

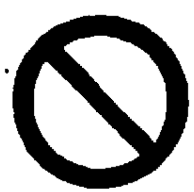
- The "Periodic Table" lists the 107 elements that are the basic building blocks of the earth. These elements include the elements that are the foundation of inorganic chemistry.
- Nearly 20% of the earth's elements are characterized as "toxic" in current bills before Congress. These elements are indicated by a "🚫" symbol.
- There are NO substitutes for elements. NO new elements will be discovered in large quantities.
- The 20 toxic elements illustrate that the popular notion that "natural" is better than "synthetic" is not necessarily tru

Organic Chemicals

- Organic Chemicals are about three-fourths of total U.S. chemical production.

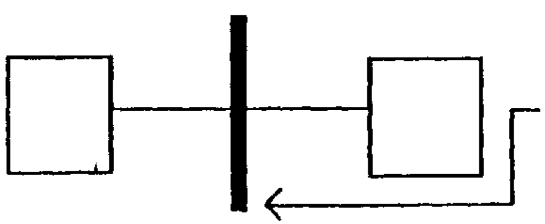
- The following charts illustrate the widespread --and essential-- production and use of "toxic" chemicals at critical stages in processing chains.

- In interpreting these diagrams:



= termed "toxic" by proposed legislation.

And



vertical lines in bold face indicate "breaks" in the chemical processing chains that would be caused by toxic use reduction.

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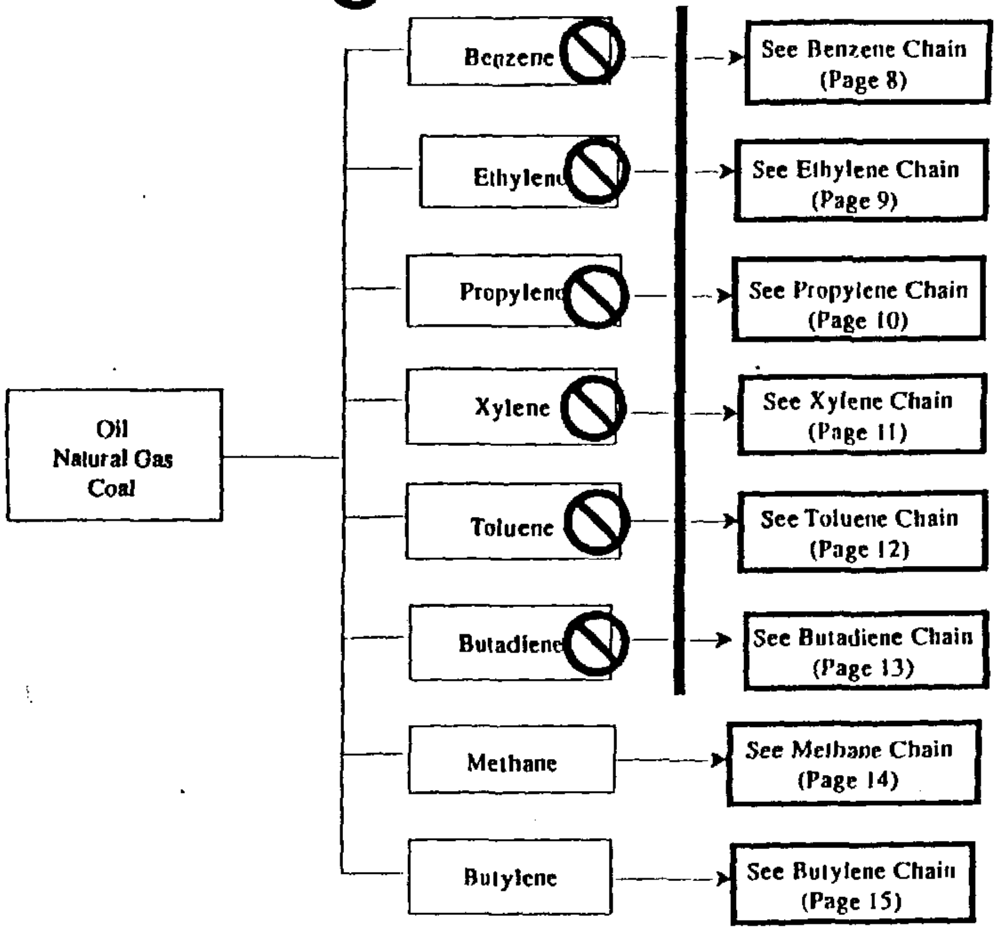
Organic Chemical Chain



- The initial chemical processing of organic inputs -- oil, natural gas, and coal -- creates eight major basic "building block" chemicals. These eight major chemicals are essential inputs to creation of all the downstream products in the organic chemical chain.

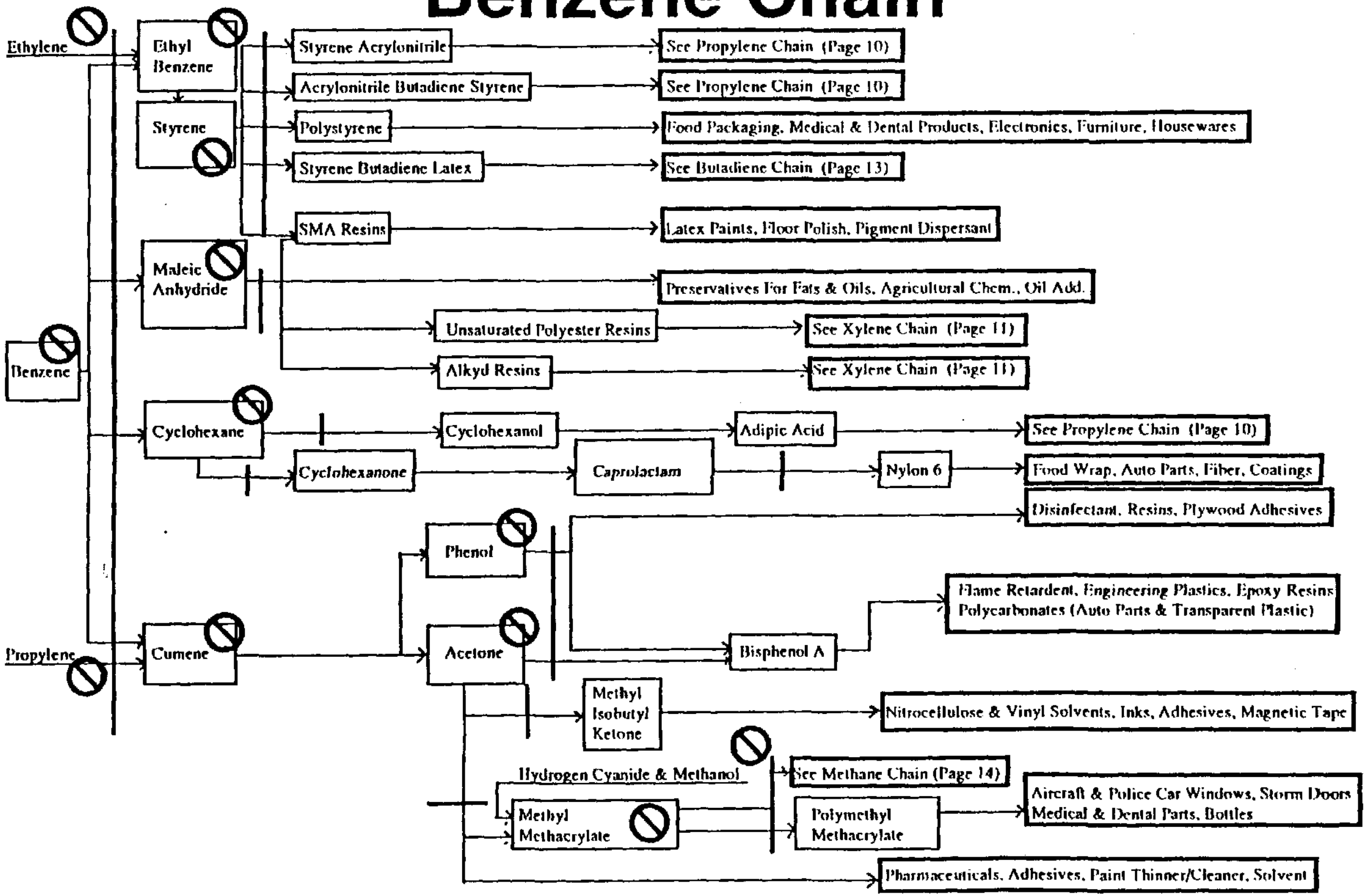
- Six of these eight major organic chemical building blocks are characterized as "toxic" in current legislative proposals.

- These six "toxic" building blocks account for 80% of U.S. sales of all organic chemical building blocks.

- Chemistry -- creating new materials -- depends on the reactions of inputs with one another. Often, properties that make a chemical reactive also make it toxic.

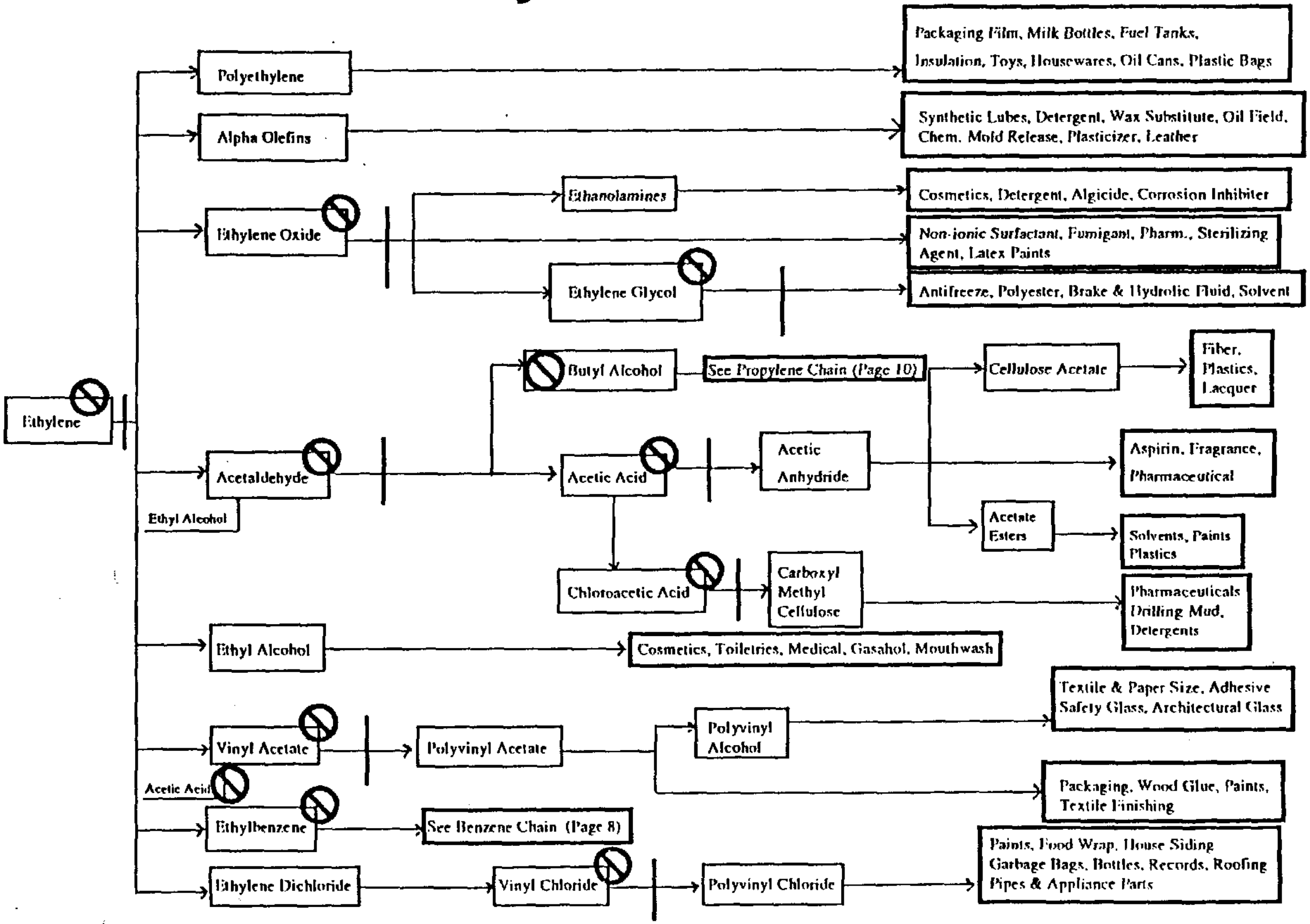
- Benign substitutes will not be found for 6 of the 8 basic building t s of organic chemistry.

Benzene Chain



- Although benzene and its derivatives are "toxic", downstream -- end-use -- products are typically not toxic.

Ethylene Chain



- Several key derivatives processed from ethylene are also characterized as "toxic" by the proposed legislation.

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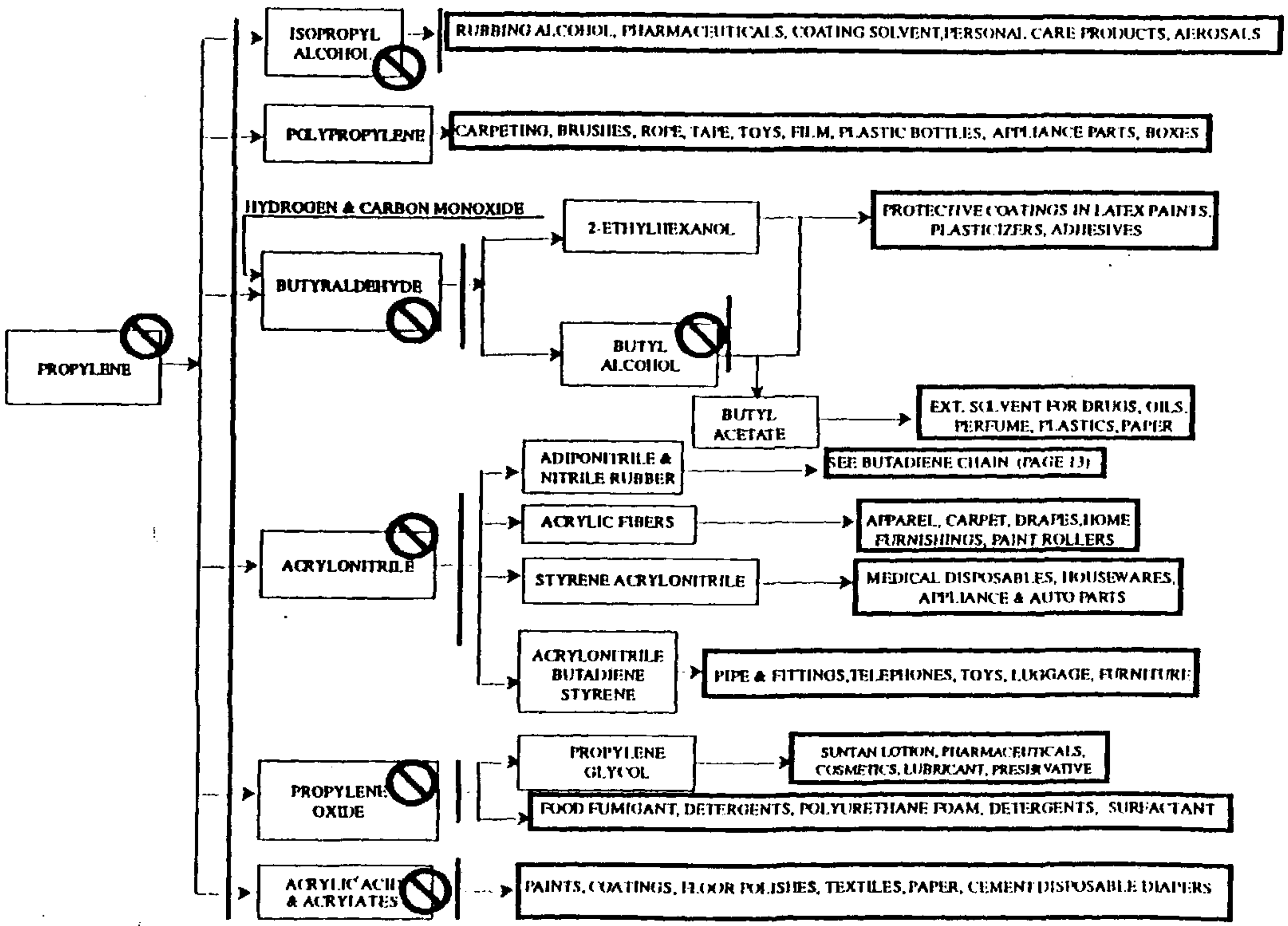
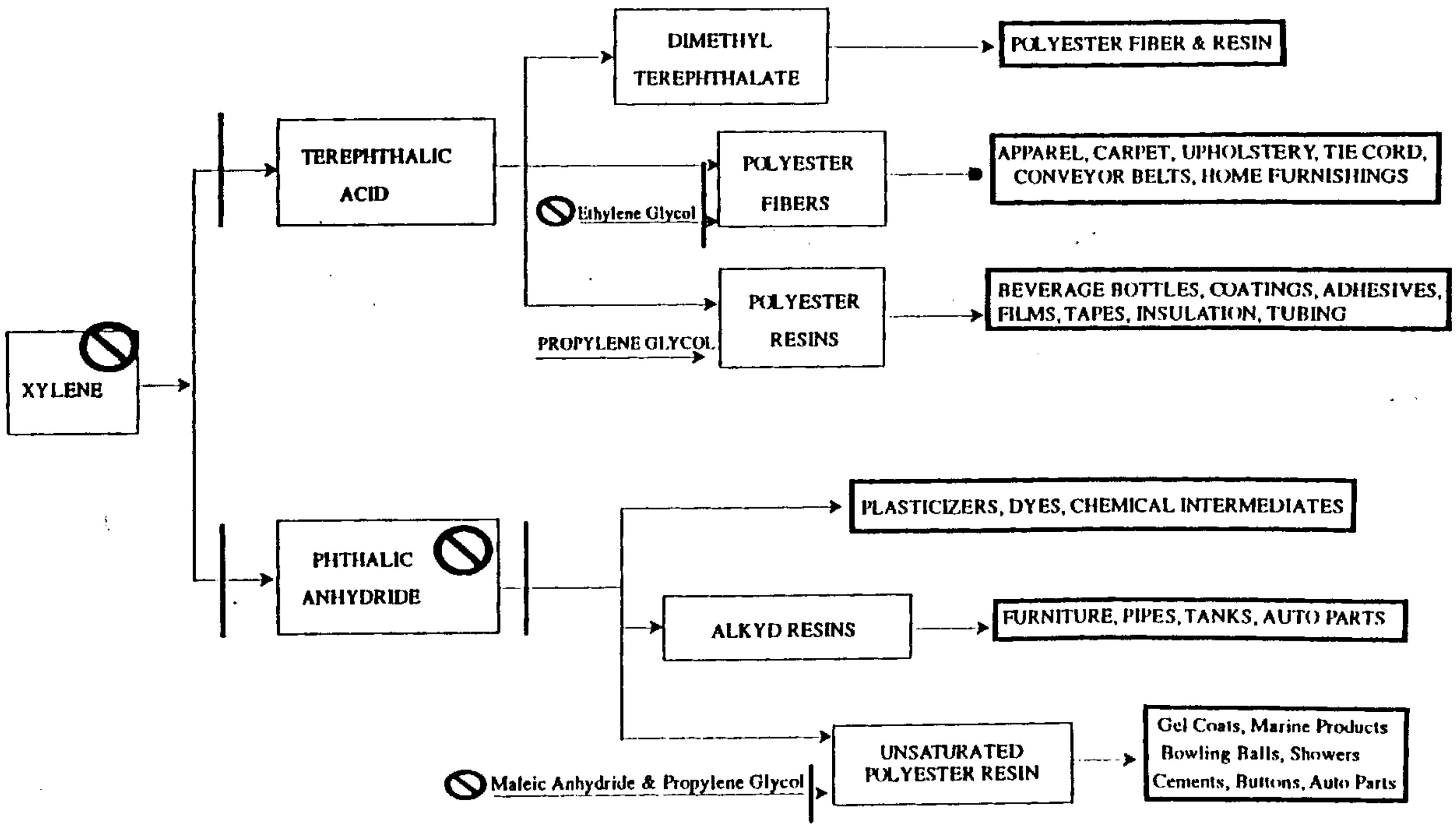
Propylene Chain



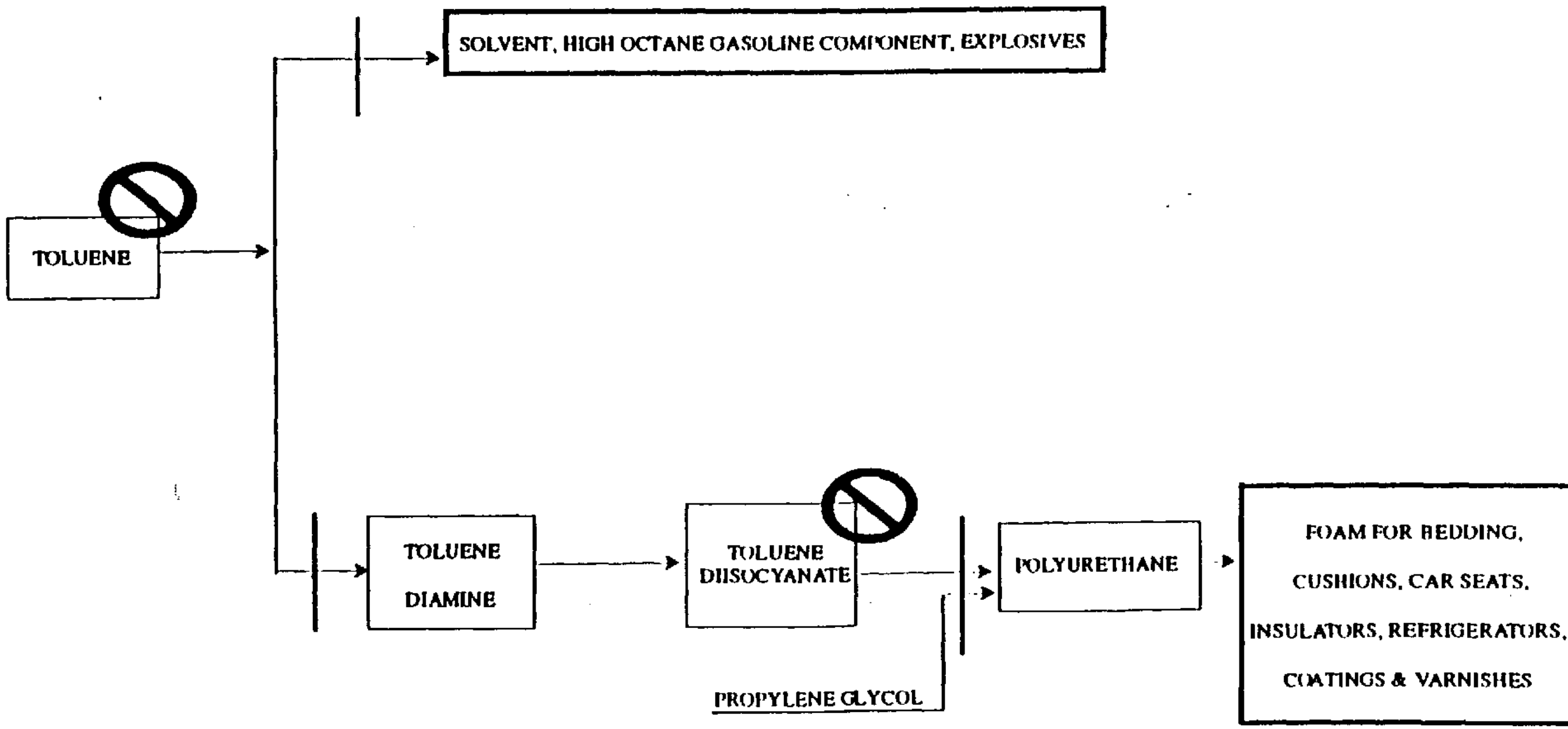
❑ Similarly, several of the key derivatives of propylene are characterized as "toxic".

Xylene Chain

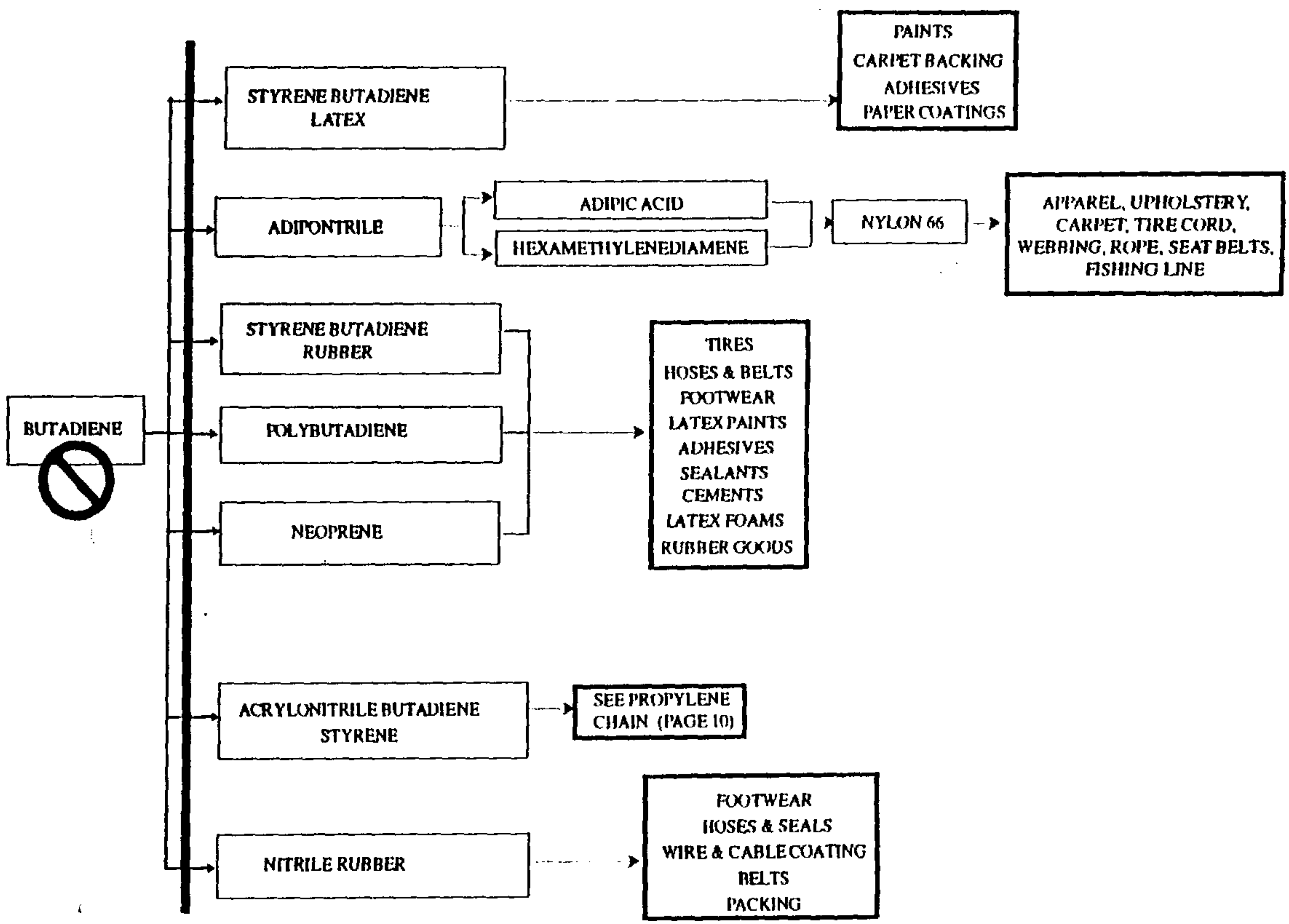


VRD 00020249 11

Toluene Chain



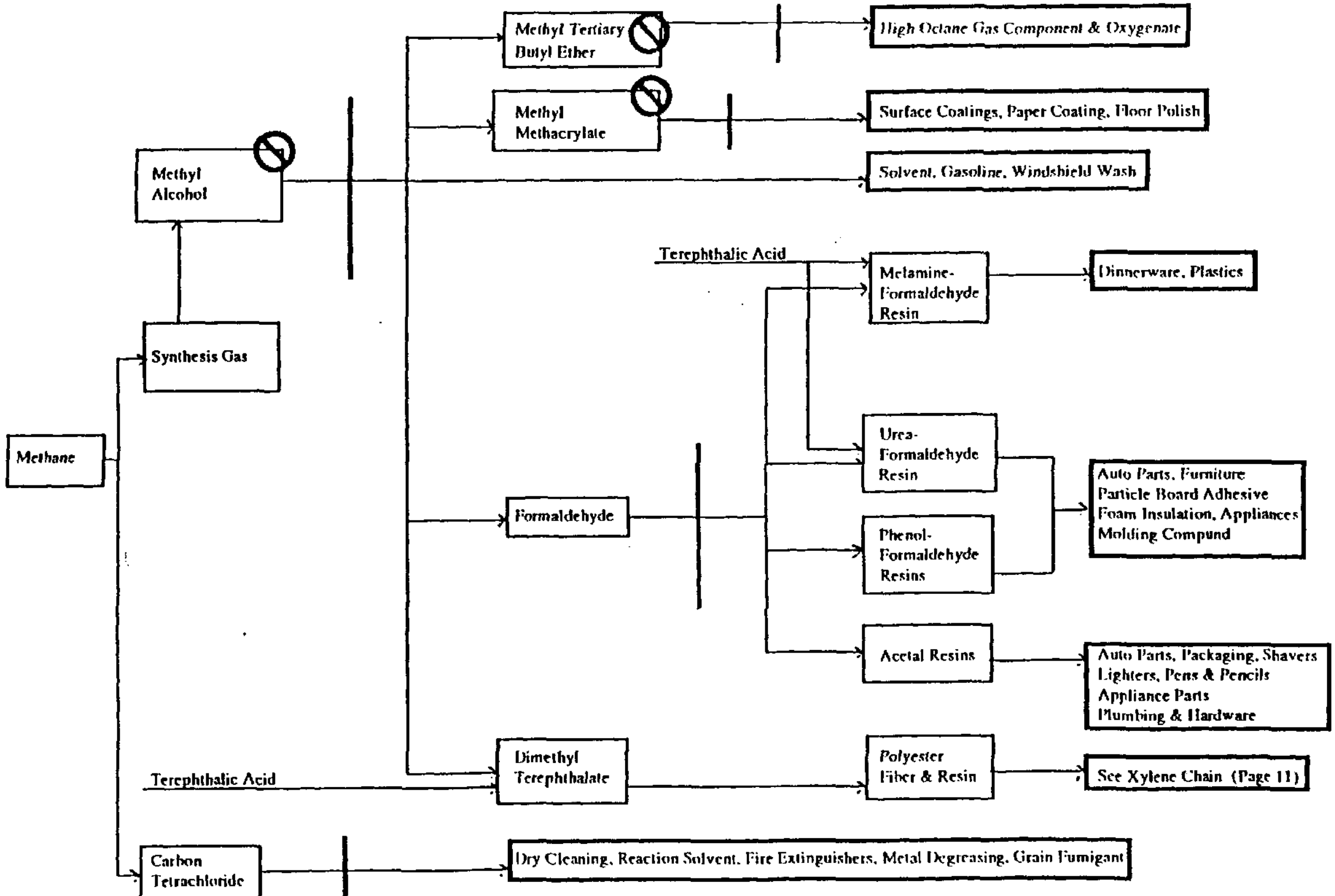
Butadiene Chain



- The synthetic rubbers constructed from butadiene, a "toxic" chemical, are not toxic.

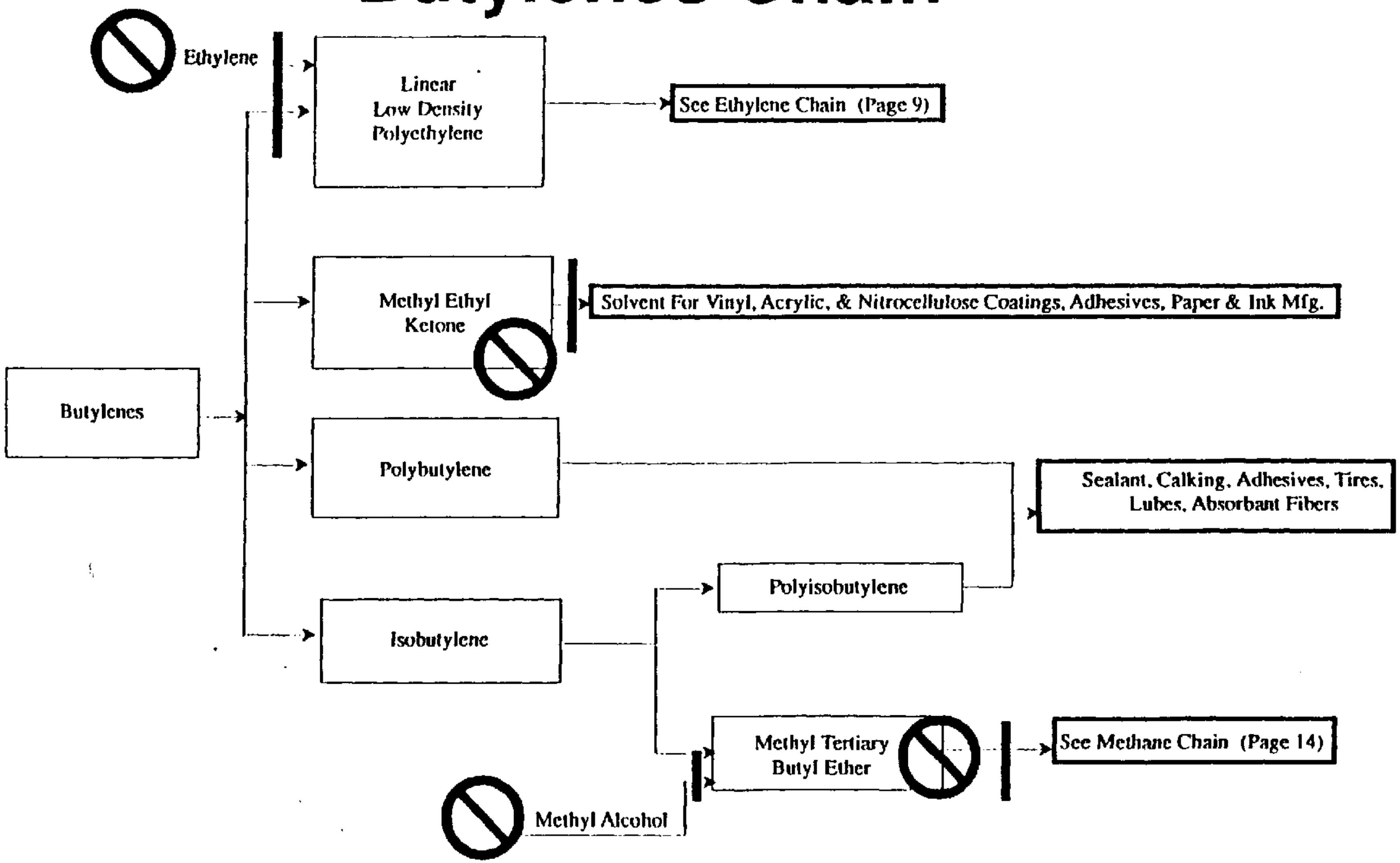
VRD 00020249I3

Methane Chain



- Methane is one of the two major organic building block chemicals not designated as "toxic".
- However, its two major derivatives -- methyl alcohol and carbon tetrachloride -- are considered "toxic" in proposed legislation.

Butylenes Chain



- Butylene is the second of the eight basic organic building blocks that is not considered "toxic".
- However, it is produced as a coproduct from refinery gas, along with many "toxic" chemicals.

Uses of "Toxic" Chemicals

- ❑ Chemicals are essential in modern manufacturing.

- ❑ There is some chemical content in virtually every manufactured product.

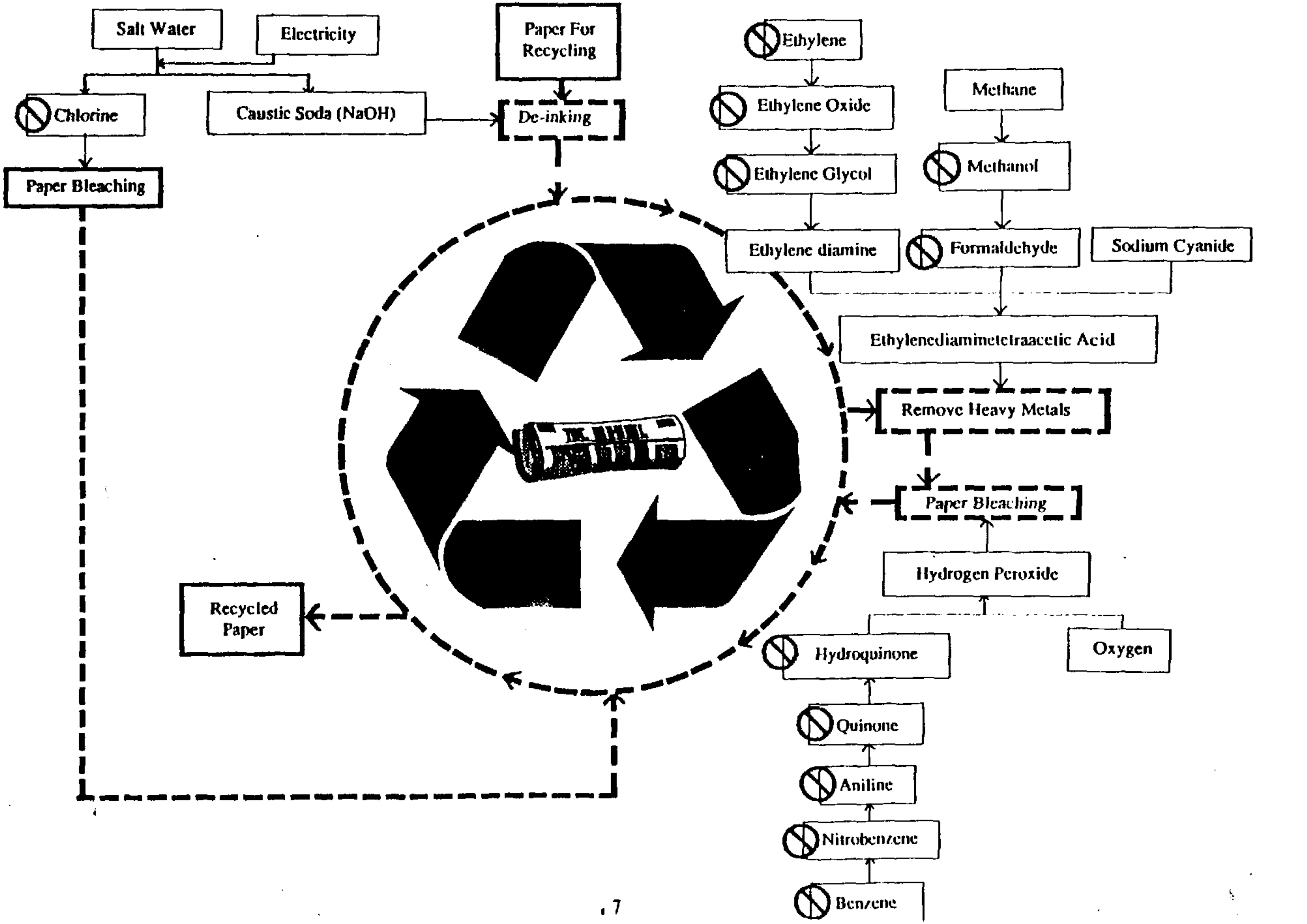
- ❑ Chemicals characterized as "toxic" in proposed legislation include many that are at or near the beginning of chemical processing chains. Many form the building blocks of -- or are used in the production of -- most manufactured goods.

- ❑ The charts that follow show that "toxic" chemicals are often not simply used in the manufacturing process but are the raw materials, or building blocks, for the product. Substitution of raw materials is often much more difficult than substitution of a processing ingredient.

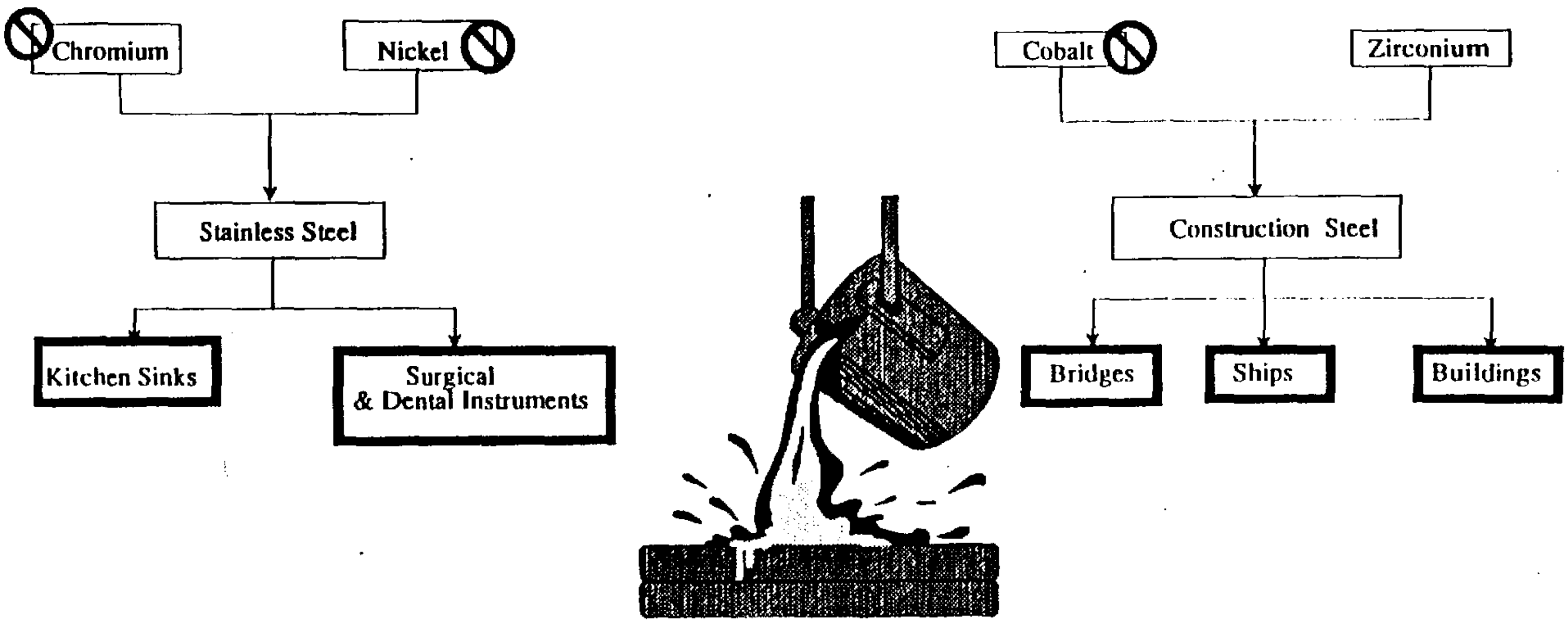
- ❑ Few manufactured products are created without the use of a "toxic" chemical somewhere in the production cycle.

- ❑ The resulting products used by the consumer are, however, typically non-toxic.

"Toxic" Chemicals In Paper Recycling

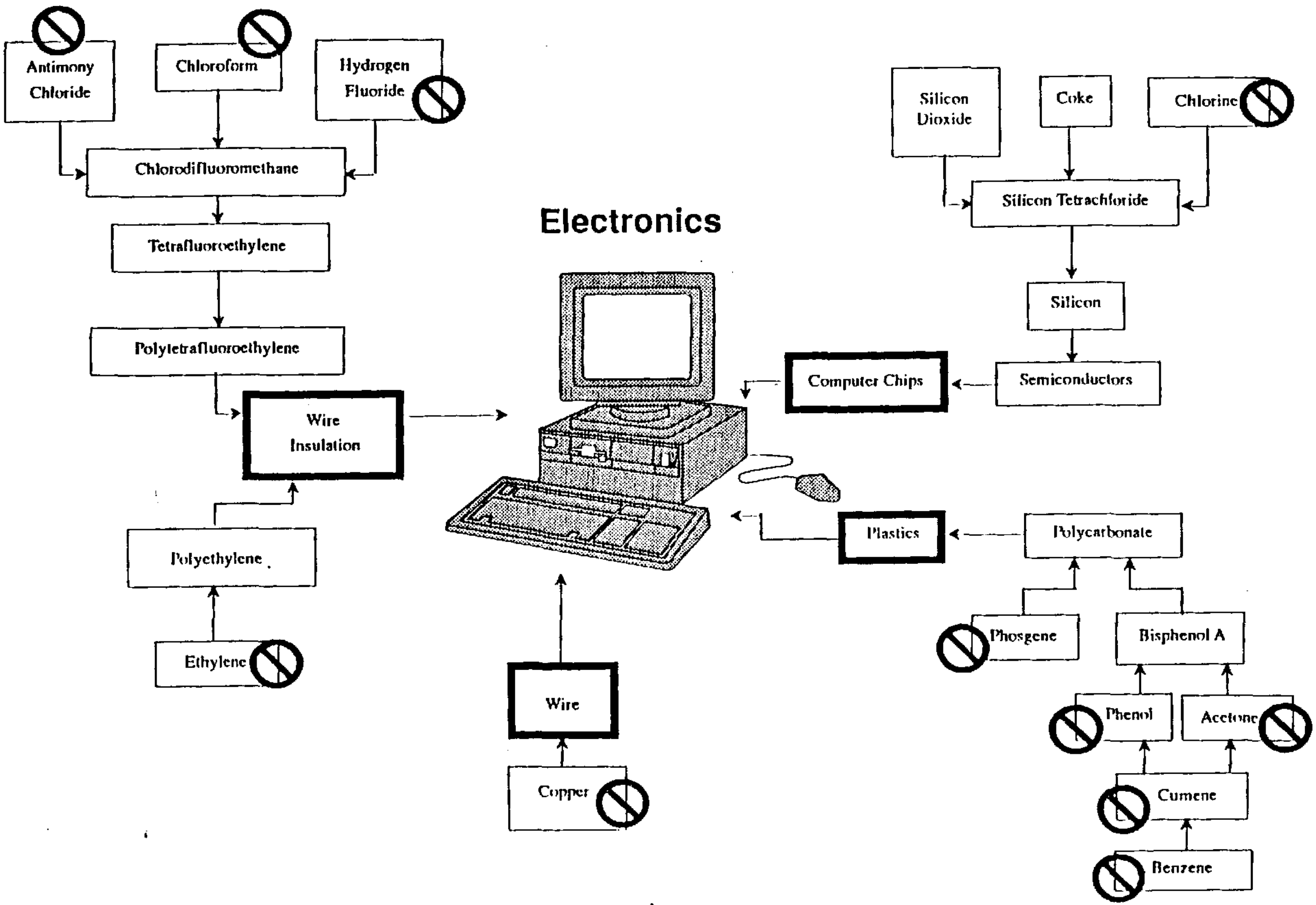


"Toxic" Chemicals In Steel Production

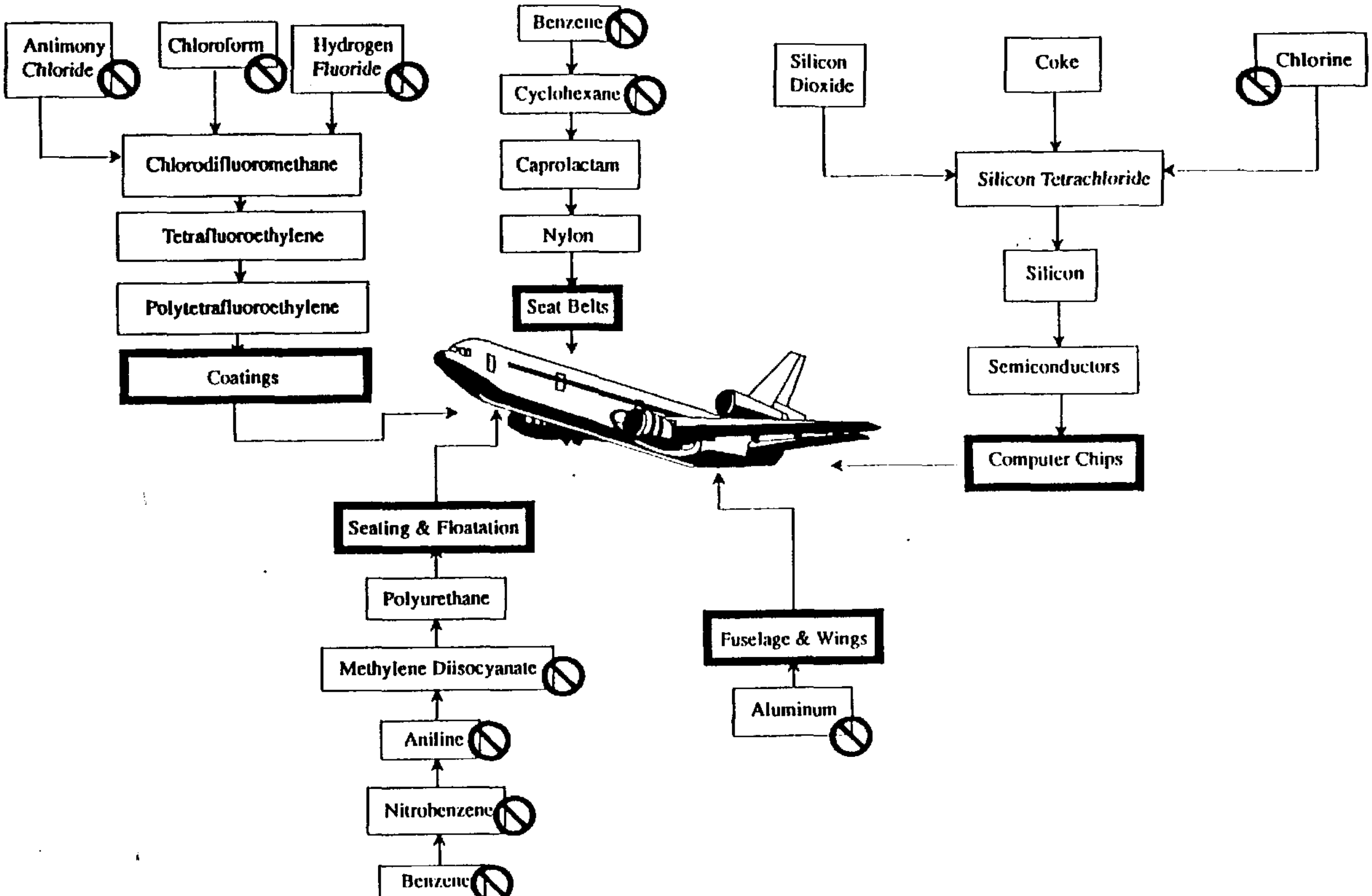


VRD 0002024918

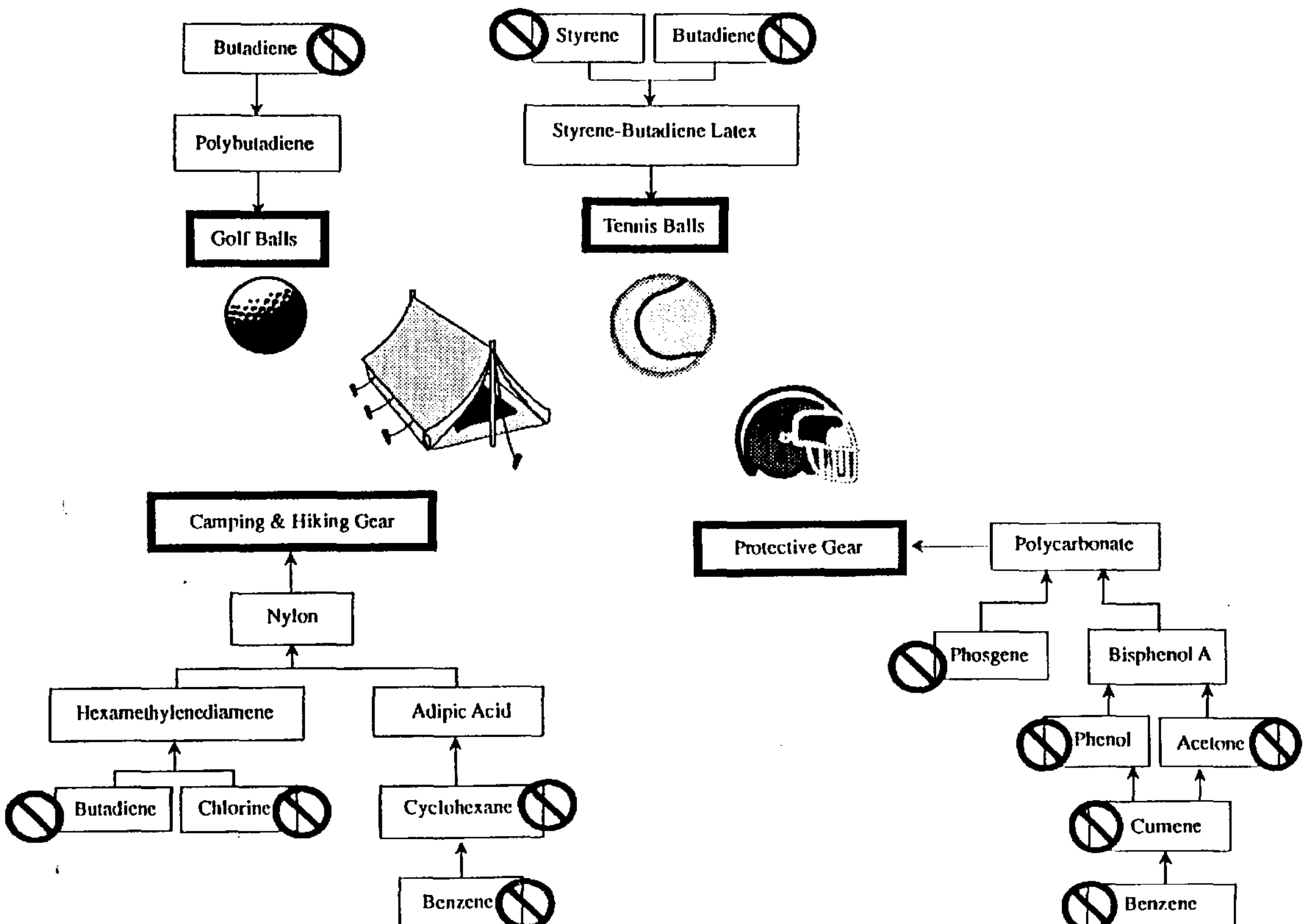
"Toxic" Chemicals In Electronics



"Toxic" Chemicals In Aerospace

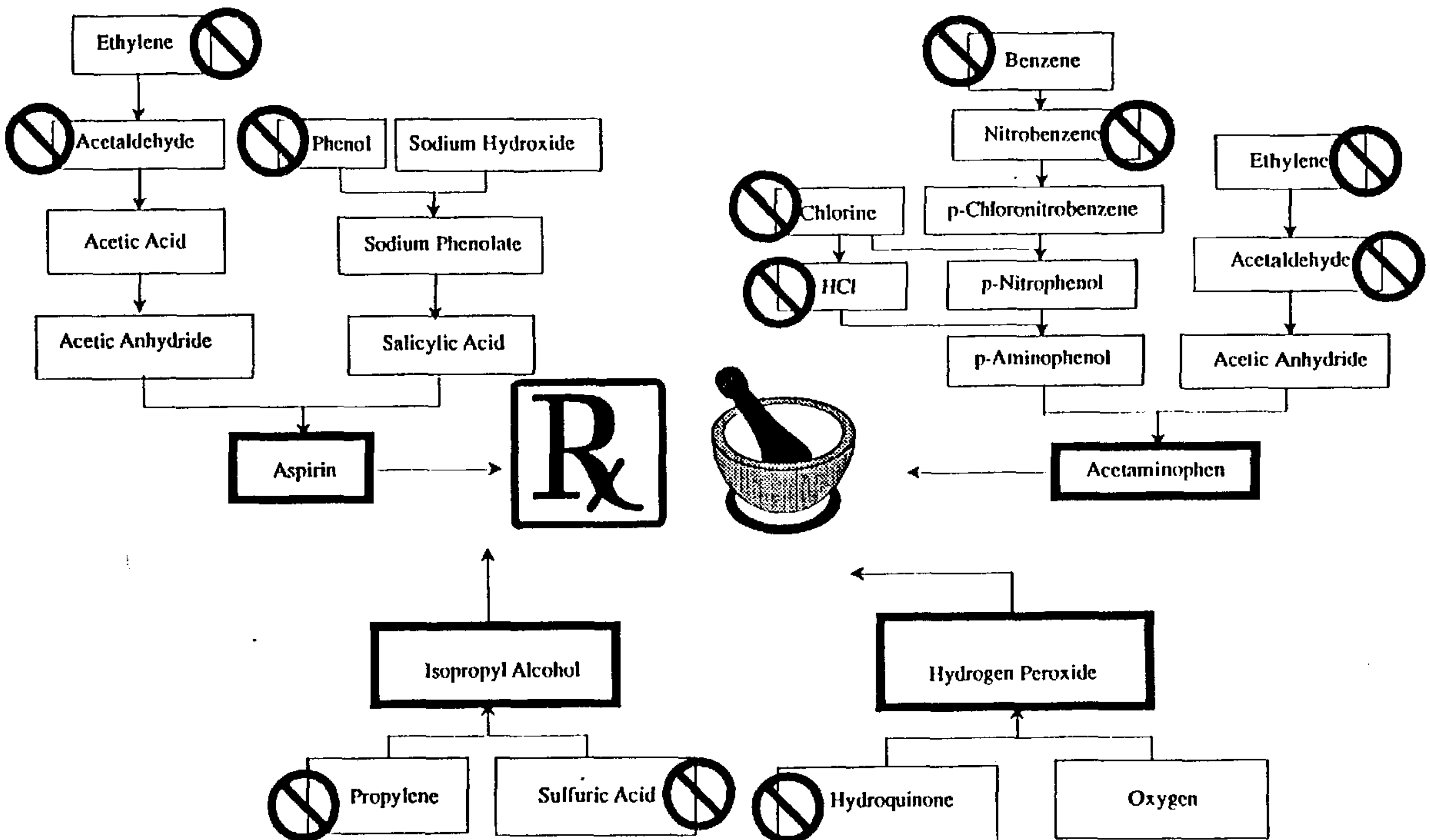


" Toxic" Chemicals In Recreation

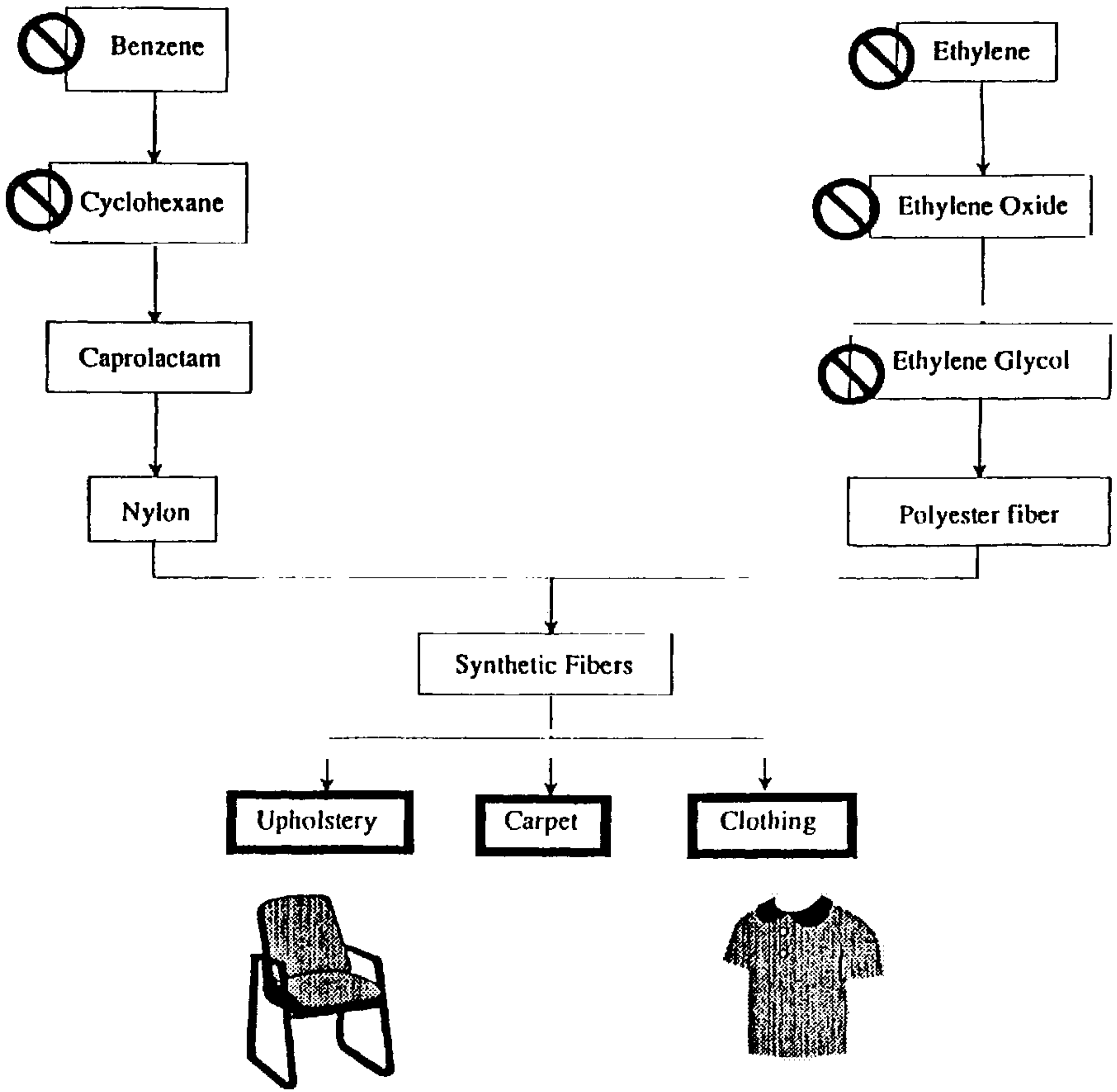


VRD 0002024921

"Toxic" Chemicals In Pharmaceuticals

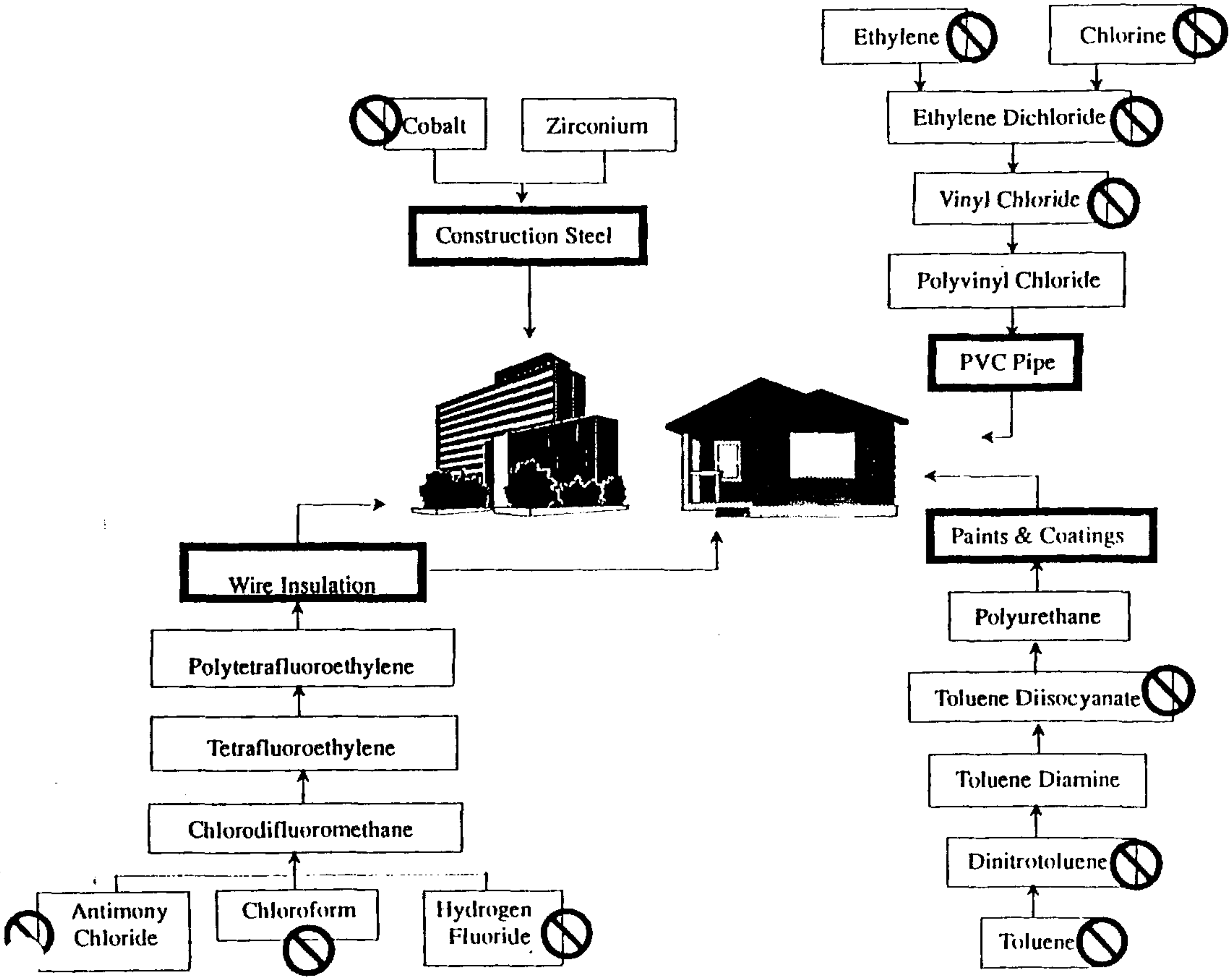


"Toxic" Chemical Use In Textile Production



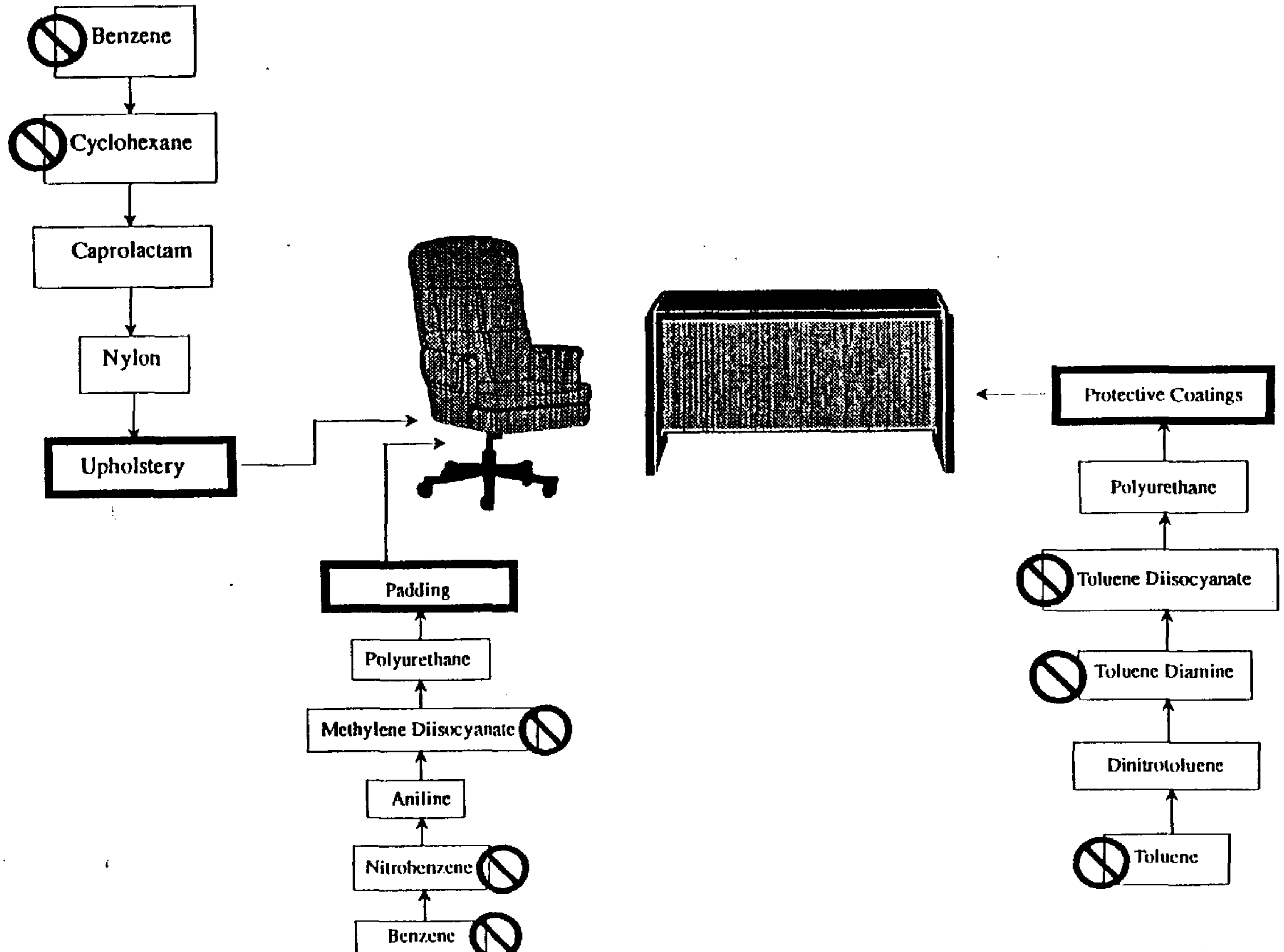
VRD 0002024923

"Toxic" Chemicals In Construction

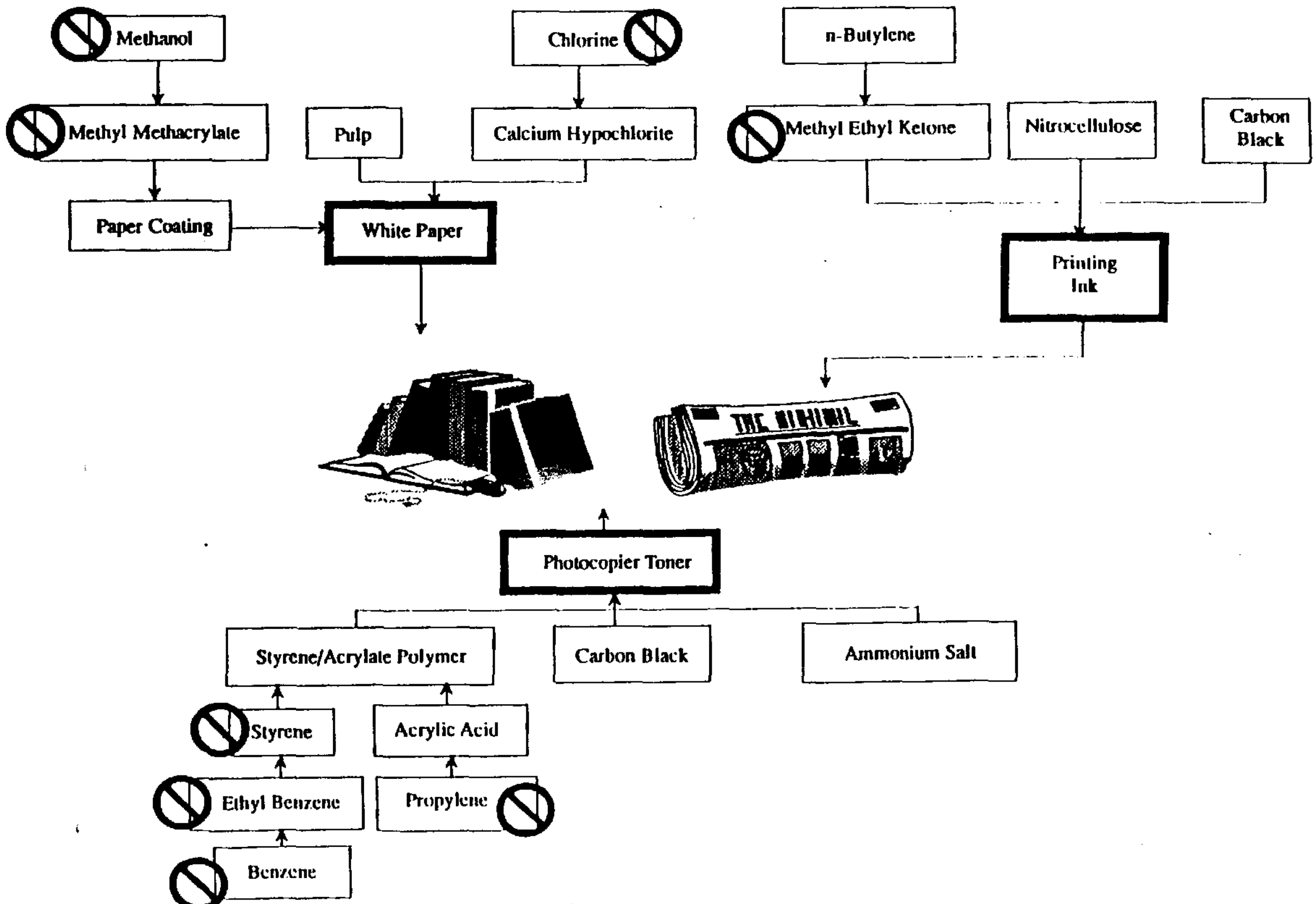


VRD 0002024924

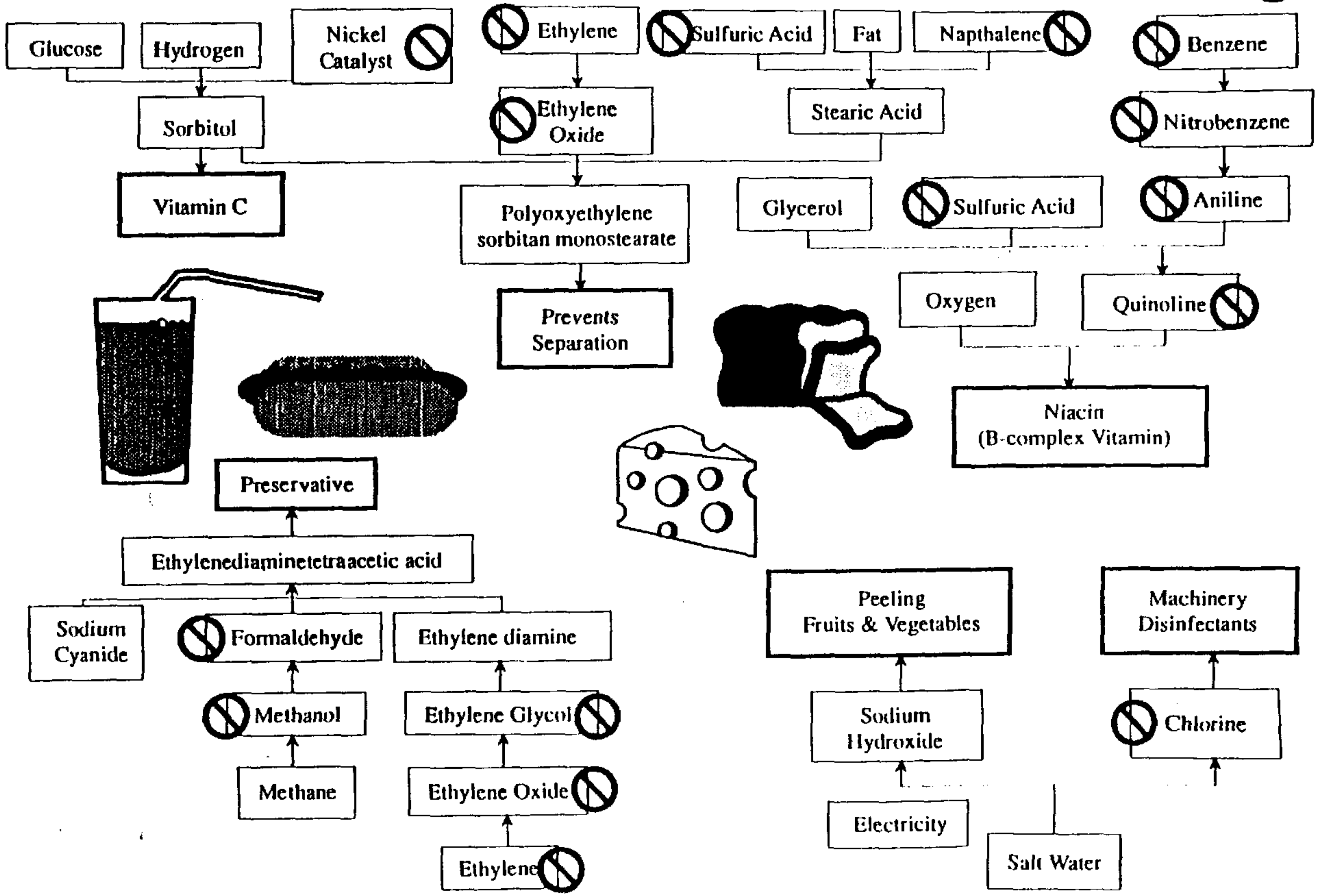
" Toxic" Chemicals In Furniture



" Toxic" Chemicals In Printing



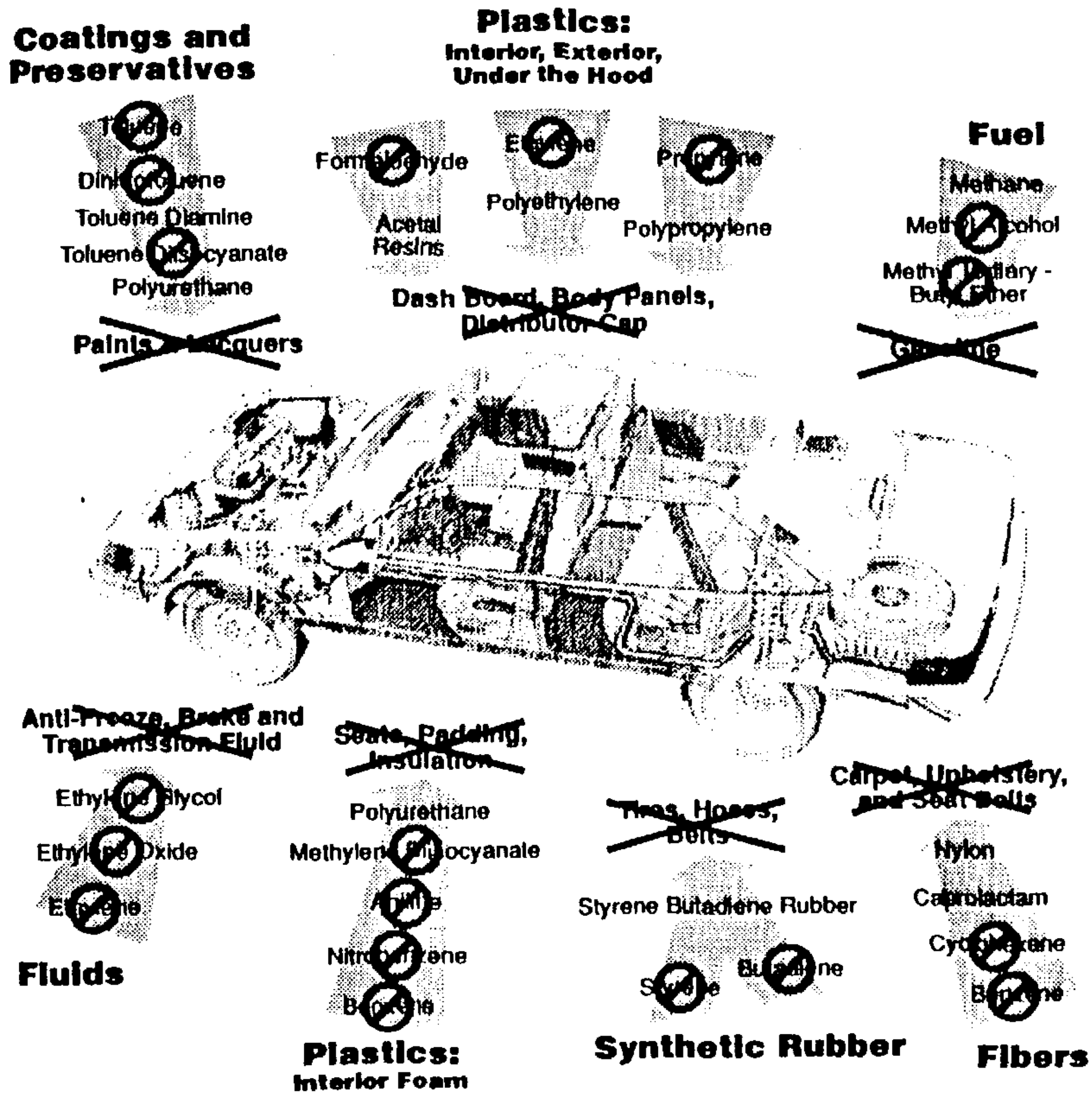
"Toxic" Chemicals In Food Processing



VRD 0002024927

No Cars Without Chemicals:

Auto Industry Examples of Eliminating Toxic Chemicals From the Production Chain



⊘ - Legislation Propc   Mandated Elimination/Reduction

No Cars Without Chemicals:

Examples of Chemical-Based Components

FLUIDS
- ❑ Gasoline (including additives)
- ❑ Brake Fluid
- ❑ Automatic Transmission Fluid
- ❑ Motor Oil
- ❑ Grease (wheel bearings, etc.)
- ❑ Radiator Coolant

RUBBER
- ❑ Tires
- ❑ Fuel Hoses
- ❑ Door Seals
- ❑ Windshield Wipers
- ❑ Grommets, bushings, gaskets, and washers

FIBERS
- ❑ Carpet
- ❑ Upholstery
- ❑ Tires
- ❑ Seat Belts
- ❑ Convertible Tops

PLASTICS -- Interior
- ❑ Upholstery (foam padding)
- ❑ Trim (door liners, etc.)
- ❑ Dashboard
- ❑ Instrument Panel
- ❑ Console
- ❑ Steering Wheel Cover
- ❑ Heating and Air-Conditioning Outlets
- ❑ Steering Column Shroud
- ❑ Turn Signal Lever
- ❑ Sun Visors
- ❑ Seat Frames
- ❑ Head-Rest Frames

Plastics – Exterior
- ❑ Fuel Tank
- ❑ Bumpers -- Front and Rear
- ❑ Headlight Shells and Lenses
- ❑ Mirror Housings
- ❑ Radiator Grille
- ❑ Tail Light Lenses
- ❑ Hub Caps
- ❑ Door Handles
- ❑ Body Side Moldings

Plastics – Under the Hood
- ❑ Air Filter Housing
- ❑ Heater Housing
- ❑ Air-Conditioner Housing
- ❑ Fuse Box
- ❑ Fans
- ❑ Distributor Cap
- ❑ Battery Case
- ❑ Heating/Air-Conditioning Ducts
- ❑ Fan Shroud
- ❑ Rocker Arm Covers
- ❑ Radiator Overflow Tank
- ❑ Electrical Wiring Insulation
- ❑ Sound Insulation
- ❑ Air Inlet Manifold

Paint
- ❑ Anti-Corrosive Coatings
- ❑ Body Panel Finish
- ❑ Color Matched Finish on Plastic Components (dashboard, etc.)

Adhesives
- ❑ Bonding of Various Components
- ❑ Brake Linings

Other Laws Regulating Chemicals

- Controlling And Reporting "Use" Is Not An Effective Means Of Achieving Environmental Gains
- Other Laws Regulating Chemicals Focus On Risk, Exposure and Pollution Abatement and Control:

Pollution Prevention Act of 1990
Comprehensive Environmental Response, Compensation, And Liability Act (Superfund)
Emergency Planning and Community Right-To-Know Act
Toxic Substances Control Act
Clean Air Act
Safe Drinking Water Act
Clean Water Act
Consumer Product Safety Act
Federal Hazardous Substances Act
Resource Conservation And Recovery Act
Federal Insecticide, Fungicide, And Rodenticide Act
Occupational Safety and Health Act
Hazardous Materials Transportation Act
Marine Protection and Sanctuaries Act
Federal Food, Drug, and Cosmetic Act
Poison Prevention Packaging Act
Flammable Fabrics Act
Surface Mining Control and Reclamation Act
Federal Mine Safety and Health Act

Key Conclusions

- Because effective substitutes cannot be found for many "toxic" chemicals that occur early in chemical production chains, a mandated reduction in "toxic" chemical production and use would force a reduction in total U.S. chemicals and manufacturing output, lowering U.S. living standards.

- Moreover, mandating a reduction in the production and use of a large number of chemicals characterized as "toxic" would not be an effective means of risk reduction because there is no meaningful correlation between the production and use of these "toxic" chemicals in producing goods -- most of which are themselves non-toxic -- and whatever risks the use of these chemicals may pose to individuals and the environment.

- Toxic use reporting -- generating data on the quantities of over 1,000 "toxic" chemicals used in many thousands of production processes in 225,000 facilities -- would generate over 90 million data points annually. These data would serve no useful purpose but would be gathered at a high cost both in terms of dollars and the diversion of resources from other uses more effective in reducing risks to individuals and the environment.

- The dollar costs of toxic use reporting -- like other costs of regulation -- are not borne by "businesses" but are ultimately passed on to individuals, to everyone in the economy. The costs of regulation are the equivalent of a tax -- a regressive tax -- on all members of the economy. Just as with other forms of regulation and spending, everyone has a stake in the amount and efficiency of environmental regulations and spending.

Appendix

Chemicals Subject To Toxic Use Reduction Legislation

- The following tables show the specific chemicals subject to toxic use reduction under each of several legislative proposals.

- The Community Right-To-Know More bills (H.R. 2880, S. 2123) would subject over 1,077 chemicals to toxic use reduction, including many products not generally considered environmental problems, such as alcoholic beverages, tobacco and human adrenalin (epinephrine).

- Note that some of the items listed, such as antimony compounds or polychlorinated biphenyls (PCB's) are chemical categories . The totals provided at the end of the listing count each of these categories -- which may include ten or more individual chemicals -- as only one chemical. Itemizing chemicals covered in these compound categories would considerably expand the list and number of chemicals covered by the legislation.

- Also, S. 976, with the Senator Lautenberg and Durenberger amendments, would mandate that EPA add 250 unspecified chemicals to the list, even though EPA currently has the discretionary authority to add chemicals to the toxic release inventory, an action which would also result in their inclusion in the chemicals covered by most TUR proposals.

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How Chemicals Subject To Toxic Use Reduction Legislation Were Selected

- Current toxic use reduction legislation selects the chemicals to be regulated primarily by relying on references to various lists of chemicals incorporated in earlier legislation, regulations, or studies. In many cases, this "list-of-lists" approach to defining "toxic" chemicals is an inappropriate means of selecting items for reporting and control.

- H.R. 2880 and S. 2123 would mandate the reduction in use of chemicals and other substances which appear in:
  (1) the toxic release inventory (section 313 of the Emergency Planning and Community Right -To -Know Act),
  (2) priority pollutants listed under regulations relating to steam electric power point source pollutants under the Federal Water Pollution Control Act,
  (3) wastes under the Solid Waste Disposal Act,
  (4) Hazardous Air Pollutants and Class I and II Ozone-Depleting substances under the Clean Air Act,
  (5) Any pesticide that has been denied registration, that is undergoing Special or administrative review, or that is classified a restricted use pesticide,
  (6) regulations under the Safe Drinking Water Act,
  (7) chemicals identified as known or probable carcinogens by the Carcinogen Assessment Group (EPA), International Agency for Research on Cancer, or the National Toxicology Program,
  (8) Extremely Hazardous Substances listed under the Emergency Planning and Community Right-To-Know Act of 1986,
  (9) reproductive toxins listed under California's Proposition 65

- The Community Right-To-Know More amendment to H.R. 3865, offered by Mr. Sikorski and Mr. Rinaldo, would apply toxic use reduction to:
  (1) the toxic release inventory (section 313 of the Emergency Planning and Community Right -To -Know Act),
  (2) wastes under the Solid Waste Disposal Act,
  (3) at least 200 additional chemicals which EPA must select and add.

- S. 976, with amendments from Senators Lautenberg and Durenberger, would apply toxic use reduction to:
  (1) the toxic release inventory (section 313 of the Emergency Planning and Community Right -To -Know Act),
  (2) Class I and II Ozone-Depleting substances under the Clean Air Act,
  (3) 250 chemicals which EPA must propose by July 1, 1994 or the list under S. 2123 will be added.

- S. 761 would apply toxic use reduction to chemicals in the toxic release inventory (section 313 of the Emergency Planning and Community Right -To -Know Act).

- S. 1081 would apply toxic use reduction to nine chemicals. In addition, it would mandate that EPA "prohibit the discharge of highly toxic or highly bioaccumulative pollutants". A highly toxic pollutant is defined as any pollutant with a level of "toxicity equivalent to or greater" than that of the original nine pollutants.

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
250 Additional Chemicals to be named						**Yes**		
200 Additional Chemicals to be named				**Yes**				
83-32-9		Acenaphthene	Yes		Yes			
208-96-8		Acenaphthylene	Yes		Yes			
75-07-0		Acetaldehyde	Yes	Yes	Yes	Yes	Yes	
75-87-6		Acetaldehyde, trichloro	Yes	Yes	Yes			
60-35-5		Acetamide	Yes	Yes	Yes	Yes	Yes	
546-88-3		Acetohydroxamic acid	Yes		Yes			
67-64-1		Acetone	Yes	Yes	Yes	Yes	Yes	
75-86-5		Acetone cyanohydrin	Yes	Yes	Yes			
1752-30-3		Acetone Thiosemicarbazide	Yes		Yes			
75-05-8		Acetonitrile	Yes	Yes	Yes	Yes	Yes	
98-86-2		Acetophenone	Yes	Yes	Yes			
75-36-5		Acetyl chloride (C,R,T)	Yes	Yes	Yes			
591-08-2	1-	Acetyl-2-thiorea	Yes	Yes	Yes			
53-96-3	2-	Acetylaminofluorene	Yes	Yes	Yes	Yes	Yes	
107-02-8		Acrolein	Yes	Yes	Yes	Yes	Yes	
79-06-1		Acrylamide	Yes	Yes	Yes	Yes	Yes	
79-10-7		Acrylic acid	Yes	Yes	Yes	Yes	Yes	
107-13-1		Acrylonitrile	Yes	Yes	Yes	Yes	Yes	
814-68-6		Acrylyl chloride	Yes		Yes			
111-69-3		Adiponitrile	Yes		Yes			
23214-92-8		Adriamycin	Yes		Yes			
		Aflatoxins	Yes	Yes	Yes			
15972-60-8		Alachor	Yes		Yes			
116-06-3		Aldicarb	Yes	Yes	Yes			
1646-88-4		Aldicarb sulfone	Yes		Yes			
1646-87-3		Aldicarb sulfoxide	Yes		Yes			
309-00-2		Aldrin	Yes	Yes	Yes	Yes	Yes	Yes
107-18-6		Allyl alcohol	Yes	Yes	Yes	Yes	Yes	
107-05-1		Allyl chloride	Yes	Yes	Yes	Yes	Yes	
107-11-9		Allylamine	Yes		Yes			
28981-97-7		Alprazolam	Yes		Yes			
7429-90-5		Aluminum (fume or dust)	Yes	Yes	Yes	Yes	Yes	
1344-28-1		Aluminum oxide (fibrous forms)	Yes	Yes	Yes	Yes	Yes	
20859-73-8		Aluminum phosphide	Yes	Yes	Yes			
39831-55-5		Amikacin Sulfate	Yes		Yes			
82-28-0	1-	Amino-2-methylanthraquinone	Yes	Yes	Yes	Yes	Yes	
117-79-3	2-	Aminoanthraquinone	Yes	Yes	Yes	Yes	Yes	
60-09-3	4-	Aminoazobenzene	Yes	Yes	Yes	Yes	Yes	
97-56-3	o-	Aminoazotoulene	Yes		Yes			
92-67-1	4-	Aminobiphenyl	Yes	Yes	Yes	Yes	Yes	

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
125-84-8		Aminoglutethimide	Yes		Yes			
2763-96-4	5-	Aminomethyl)-3-isoxazolol	Yes	Yes	Yes			
54-62-6		Aminopterin	Yes		Yes			
78-53-5		Amiton	Yes		Yes			
3734-97-2		Amiton oxalate	Yes		Yes			
33089-61-1		Amitraz	Yes		Yes			
61-82-5		Amitrole	Yes	Yes	Yes			
7664-41-7		Ammonia	Yes	Yes	Yes	Yes	Yes	
6484-52-2		Ammonium nitrate (solution)	Yes	Yes	Yes	Yes	Yes	
131-74-8		Ammonium picrate	Yes	Yes	Yes			
7783-20-2		Ammonium sulfate (solution)	Yes	Yes	Yes	Yes	Yes	
7803-55-6		Ammonium vanadate	Yes	Yes	Yes			
300-62-9		Amphetamine	Yes		Yes			
		Anabolic steroids	Yes		Yes			
62-53-3		Aniline	Yes	Yes	Yes	Yes	Yes	
88-05-1		Aniline, 2,4,6-trimethyl-	Yes		Yes			
90-04-0	o-	Anisidine	Yes	Yes	Yes	Yes	Yes	
104-94-9	p-	Anisidine	Yes	Yes	Yes	Yes	Yes	
134-29-2	o-	Anisidine hydrochloride	Yes	Yes	Yes	Yes	Yes	
120-12-7		Anthracene	Yes	Yes	Yes	Yes	Yes	
7440-36-0		Antimony	Yes	Yes	Yes	Yes	Yes	
		Antimony compounds	Yes	Yes	Yes	Yes	Yes	
7783-70-2		Antimony pentafluoride	Yes		Yes			
1397-94-0		Antimycin A	Yes		Yes			
86-88-4		Antu (Thiourea, 1-naphthalenyl	Yes	Yes	Yes			
140-57-8		Aramite	Yes	Yes	Yes			
7440-38-2		Arsenic	Yes	Yes	Yes	Yes	Yes	
7778-39-4		Arsenic acid	Yes	Yes	Yes			
		Arsenic compounds	Yes	Yes	Yes	Yes	Yes	
1303-28-2		Arsenic pentoxide	Yes	Yes	Yes			
1327-53-3		Arsenic trioxide	Yes	Yes	Yes			
1327-53-3		Arsenous oxide	Yes	Yes	Yes			
7784-42-1		Arsine	Yes		Yes			
1332-21-4		Asbestos (friable)	Yes	Yes	Yes	Yes	Yes	
50-78-2		Aspirin	Yes		Yes			
1912-24-9		Atrazine	Yes		Yes			
115-02-6		Azaserine	Yes	Yes	Yes			
446-86-6		Azathioprine	Yes		Yes			
2642-71-9		Azinphos-ethyl	Yes		Yes			
7440-39-3		Barium	Yes	Yes	Yes	Yes	Yes	
		Barium compounds	Yes	Yes	Yes	Yes	Yes	
542-62-1		Barium cyanide	Yes	Yes	Yes			
17804-35-2		Benomyl	Yes		Yes			

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Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
225-51-4		Benz(c)acridine	Yes	Yes	Yes			
56-97-6		Benz[a]anthracene	Yes		Yes			
98-87-3		Benzal chloride	Yes	Yes	Yes	Yes	Yes	
55-21-0		Benzamide	Yes	Yes	Yes	Yes	Yes	
23950-58-5		Benzamide, 3,5,-dichloro-N-(1,1-dim	Yes	Yes	Yes			
98-16-8		Benzenamine, 3-(trifluoromethyl)-	Yes		Yes			
71-43-2		Benzene	Yes	Yes	Yes	Yes	Yes	
96-87-3		Benzene, (dichloromethyl)-	Yes		Yes			
100-14-1		benzene, 1-(chloromethyl)-4-nitro-	Yes		Yes			
98-05-5		Benzenearsonic acid	Yes	Yes	Yes			
122-09-8		Benzeneethanamine, alpha,alpha-d	Yes		Yes			
98-09-9		Benzenesulfonic acid chloride (C,R)	Yes	Yes	Yes			
92-87-5		Benzidine	Yes	Yes	Yes	Yes	Yes	Yes
3615-21-2		Benzimidazole, 4,5-dichloro-2-(triflu	Yes		Yes			
205-99-2		benzo (b) fluoranthene (3,4-Benzof	Yes	Yes	Yes			
50-32-8		Benzo[a] pyrene	Yes	Yes	Yes			
205-99-2		Benzo[b]fluoranthene	Yes		Yes			
205-82-3		Benzo[j]fluoranthene	Yes	Yes	Yes			
207-08-9		Benzo[k]fluoranthene	Yes	Yes	Yes			
98-07-7		Benzoic trichloride (Benzotrichloride	Yes	Yes	Yes	Yes	Yes	
191-24-2	1,12-	benzoperylene (benzo9ghi) perylen	Yes		Yes			
98-88-4		Benzoyl chloride	Yes	Yes	Yes	Yes	Yes	
94-36-0		Benzoyl peroxide	Yes	Yes	Yes	Yes	Yes	
5411-22-3		Benzphetamine hydrochloride	Yes		Yes			
100-44-7		Benzyl chloride	Yes	Yes	Yes	Yes	Yes	
140-29-4		Benzyl cyanide	Yes		Yes			
7440-41-7		Beryllium	Yes	Yes	Yes	Yes	Yes	
		Beryllium Compounds	Yes	Yes	Yes	Yes	Yes	
319-84-6	alpha-	BHC	Yes		Yes			
319-85-7	Beta-	BHC	Yes		Yes			
319-86-8	Delta-	BHC (PCB-polychlorinated biphenyl	Yes		Yes			
15271-41-7		Bicyclo[2.2.1]heptane-2-carbonitrile,	Yes		Yes			
92-52-4		Biphenyl	Yes	Yes	Yes	Yes	Yes	
534-07-6		Bis(chloromethyl) ketone	Yes		Yes			
154-93-8		Bischloroethyl nitrosourea (BCNU)	Yes		Yes			
4044-65-9		Bitoscanate	Yes		Yes			
		Boot and Shoe Manufacture and Re	Yes		Yes			
10294-34-5		Boron trichloride	Yes		Yes			
7637-07-2		Boron trifluoride	Yes		Yes			
353-42-4		Boron trifluoride compound with me	Yes		Yes			
28772-56-7		Bromadiolone	Yes		Yes			
7726-95-6		Bromine	Yes		Yes			
598-31-2		Bromoacetone	Yes	Yes	Yes			

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
124-48-1		Bromodichloromethane	Yes		Yes			
74-25-2		Bromoform	Yes		Yes			
75-25-2		Bromoform (tribromomethane)	Yes	Yes	Yes	Yes	Yes	
74-83-9		Bromomethane (methyl bromid	Yes	Yes	Yes	Yes	Yes	
101-55-3	4-	Bromophenyl phenyl ether	Yes	Yes	Yes			
1689-84-5		Bromoxynil	Yes		Yes			
357-57-3		Brucine	Yes	Yes	Yes			
106-99-0	1,3-	Butadiene	Yes	Yes	Yes	Yes	Yes	
55-98-1	1,4-	Butanediol dimethanesulphona	Yes		Yes			
141-32-2		Butyl acrylate	Yes	Yes	Yes	Yes	Yes	
71-36-3	n-	Butyl alcohol	Yes	Yes	Yes	Yes	Yes	
78-92-2	sec-	Butyl alcohol	Yes	Yes	Yes	Yes	Yes	
75-65-0	tert-	Butyl alcohol	Yes	Yes	Yes	Yes	Yes	
85-68-7		Butyl benzyl phthalate	Yes	Yes	Yes	Yes	Yes	
25013-16-5		Butylated Hydroxyanisole	Yes		Yes			
106-88-7	1,2-	Butylene oxide	Yes	Yes	Yes	Yes	Yes	
123-72-8		Butyraldehyde	Yes	Yes	Yes	Yes	Yes	
2602-46-2		C. I .Direct Blue 6*	Yes	Yes	Yes	Yes	Yes	
4680-78-8		C. I. Acid Green 3*	Yes	Yes	Yes	Yes	Yes	
569-64-2		C. I. Bask Green4*	Yes	Yes	Yes	Yes	Yes	
989-38-8		C. I. Bask Red 1*	Yes	Yes	Yes	Yes	Yes	
2832-40-8		C. I. Disperse Yellow 3*	Yes	Yes	Yes	Yes	Yes	
3761-53-3		C. I. Food Red 5*	Yes	Yes	Yes	Yes	Yes	
569-61-9		C.I. Basic Red 9 Monohydrochl	Yes		Yes			
16071-86-6		C.I. Direct Brown 95*	Yes	Yes	Yes	Yes	Yes	
1937-37-7		C.I. Direct Black38*	Yes	Yes	Yes	Yes	Yes	
81-88-9		C.I. Food Red 15*	Yes	Yes	Yes	Yes	Yes	
3118-97-6		C.I. Solvent Orange 7*	Yes	Yes	Yes	Yes	Yes	
842-07-9		C.I. Solvent Yellow 14*	Yes	Yes	Yes	Yes	Yes	
97-56-3		C.I. Solvent Yellow 3*	Yes	Yes	Yes	Yes	Yes	
492-80-8		C.I. Solvent Yellow 34* (Aurami	Yes	Yes	Yes	Yes	Yes	
128-66-5		C.I. Vat Yellow 4*	Yes	Yes	Yes	Yes	Yes	
75-60-5		Cacodylic acid [Arsinic acid, de	Yes	Yes	Yes			
7440-43-9		Cadmium	Yes	Yes	Yes	Yes	Yes	
		Cadmium compounds	Yes	Yes	Yes	Yes	Yes	
1306-19-0		Cadmium oxide	Yes		Yes			
2223-93-0		Cadmium stearate	Yes		Yes			
13765-19-0		Calcium chromate	Yes	Yes	Yes			
156-62-7		Calcium cyanamide	Yes	Yes	Yes	Yes	Yes	
592-01-8		Calcium cyanide	Yes	Yes	Yes			
56-25-7		Cantharidin	Yes		Yes			
105-60-2		Caprolactam	Yes		Yes			
2425-06-1		Captafol	Yes		Yes			

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
			Legislation					
133-06-2		Captan	Yes	Yes	Yes	Yes	Yes	
26419-73-8		Carbamic acid, methyl-, o-(((2,4-dim	Yes		Yes			
63-25-2		Carbaryl	Yes	Yes	Yes	Yes	Yes	
1563-66-2		Carbofuran	Yes		Yes			
75-15-0		Carbon disulfide	Yes	Yes	Yes	Yes	Yes	
630-08-0		Carbon Monoxide	Yes		Yes			
56-23-5		Carbon tetrachloride	Yes	Yes	Yes	Yes	Yes	
353-50-4		Carbonic difluoride	Yes	Yes	Yes			
463-58-1		Carbonyl sulfide	Yes	Yes	Yes	Yes	Yes	
786-19-6		Carbophenothion	Yes		Yes			
41575-94-4		Carboplatin	Yes		Yes			
120-80-9		Catechol	Yes	Yes	Yes	Yes	Yes	
21725-46-2		Cayanazine	Yes		Yes			
474-25-9		Chenodiol	Yes		Yes			
58-25-3		Chlodiazepoxide	Yes		Yes			
438-41-5		Chlodiazepoxide hydrochloride	Yes		Yes			
133-90-4		Chloramben	Yes	Yes	Yes	Yes	Yes	
305-03-3		Chlorambucil	Yes	Yes	Yes			
118-75-2		Chloranil	Yes		Yes			
57-74-9		Chlordane	Yes	Yes	Yes	Yes	Yes	
6164-98-3		Chlordimeform	Yes		Yes			
115-28-6		Chlorendic acid	Yes		Yes			
470-90-6		Chlorfenvinfos	Yes		Yes			
		Chlorinated benzenes N.O.S.	Yes	Yes	Yes			
		Chlorinated ethane N.O.S.	Yes	Yes	Yes			
		Chlorinated fluorocarbons N.O.S.	Yes	Yes	Yes			
		Chlorinated naphthalene, N.O.S.	Yes	Yes	Yes			
108171-26-2		Chlorinated Paraffins (C12, 60% Ch	Yes		Yes			
		Chlorinated Phenol, N.O.S.	Yes	Yes	Yes			
7782-50-5		Chlorine	Yes	Yes	Yes	Yes	Yes	
10049-04-4		Chlorine dioxide	Yes	Yes	Yes	Yes	Yes	
24934-91-6		Chlormephos	Yes		Yes			
999-81-5		Chlormequat	Yes		Yes			
494-03-1		Chlornaphazin	Yes	Yes	Yes			
108-60-1	Bis(2-	chloro-1 -methylethyl) ether	Yes	Yes	Yes	Yes	Yes	
563-47-3	3-	Chloro-2-methylpropene	Yes		Yes			
	4-	chloro-3-methyl phenol	Yes		Yes			
59-50-7	p-	Chloro-m-cresol	Yes	Yes	Yes			
95-83-0	4-	Chloro-o-phenylenediamine	Yes		Yes			
3165-93-3	4-	Chloro-o-toluidine, hydrochloride	Yes	Yes	Yes			
107-20-0		Chloroacetaldehyde	Yes	Yes	Yes			
79-11-8		Chloroacetic acid	Yes	Yes	Yes	Yes	Yes	
532-27-4	2-	Chloroacetophenone	Yes	Yes	Yes	Yes	Yes	

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
			Legislation					
		Chloroalkyl esters N.O.S.	Yes	Yes	Yes			
106-47-8	p-	Chloroaniline	Yes	Yes	Yes			
108-90-7		Chlorobenzene	Yes	Yes	Yes	Yes	Yes	
510-15-6		Chlorobenzilate	Yes	Yes	Yes	Yes	Yes	
1620-21-9		Chlorocyclizine hydrochloride	Yes		Yes			
124-48-1		Chlorodibromomethane	Yes		Yes			
75-00-3		Chloroethane	Yes	Yes	Yes	Yes	Yes	
107-07-3		Chloroethanol	Yes		Yes			
111-91-1	Bis(2-	chloroethoxy) methane	Yes	Yes	Yes			
627-11-2		Chloroethyl Chloroformate	Yes		Yes			
110-75-8	2-	Chloroethyl vinyl ether	Yes	Yes	Yes			
111-44-4	Bis(2-	chloroethyl) ether	Yes	Yes	Yes	Yes	Yes	
13909-09-6	1-(2-	Chloroethyl)-3-(4-methylcyclohe	Yes		Yes			
13010-47-4	1-(2-	Chloroethyl)-3-cyclohexyl-1-nitr	Yes		Yes			
354-56-3		Chlorofluorocarbon-111 (CFC-1	Yes		Yes	Yes		
76-12-0		Chlorofluorocarbon-112 (CFC-1	Yes		Yes	Yes		
75-72-9		Chlorofluorocarbon-13 (CFC-1	Yes		Yes	Yes		
422-81-1		Chlorofluorocarbon-211 (CFC-2	Yes		Yes	Yes		
3182-26-1		Chlorofluorocarbon-212 (CFC-2	Yes		Yes	Yes		
1652-74-0		Chlorofluorocarbon-213 (CFC-2	Yes		Yes	Yes		
677-68-9		Chlorofluorocarbon-214 (CFC-2	Yes		Yes	Yes		
76-17-5		Chlorofluorocarbon-215 (CFC-2	Yes		Yes	Yes		
661-97-2		Chlorofluorocarbon-216 (CFC-2	Yes		Yes	Yes		
76-18-6		Chlorofluorocarbon-217 (CFC-2	Yes		Yes	Yes		
67-66-3		Chloroform	Yes	Yes	Yes	Yes	Yes	
39638-32-9	Bis(2(-	chloroisopropyl) ether	Yes		Yes			
74-87-3		Chloromethane	Yes	Yes	Yes	Yes	Yes	
107-30-2		Chloromethyl methyl ether	Yes	Yes	Yes	Yes	Yes	
542-88-1	Bis	chloromethyl) ether	Yes	Yes	Yes	Yes	Yes	
91-58-7	2-	Chloronaphthalene	Yes	Yes	Yes			
3691-35-8		Chlorophacinone	Yes		Yes			
95-57-8	2-	Chlorophenol	Yes	Yes	Yes			
		Chlorophenols	Yes	Yes	Yes	Yes	Yes	
7005-72-3	4-	chlorophenyl phenyl ether	Yes		Yes			
126-99-8		Chloroprene	Yes	Yes	Yes	Yes	Yes	
542-76-7	3-	Chloropropionitrile	Yes	Yes	Yes			
1897-45-6		Chlorothalonil	Yes	Yes	Yes	Yes	Yes	
1982-47-4		Chloroxuron	Yes		Yes			
21923-23-9		Chlorthiophos	Yes		Yes			
10025-73-7		Chromic chloride	Yes		Yes			
7440-47-3		Chromium	Yes	Yes	Yes	Yes	Yes	
		Chromium compounds	Yes	Yes	Yes	Yes	Yes	
218-01-9		Chrysene	Yes	Yes	Yes			

VRD 0002024937

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
15663-27-1		Cisplatin	Yes		Yes			
6358-53-8		Citrus Red No. 2	Yes	Yes	Yes			
50-41-9		Clomiphene citrate	Yes		Yes			
		Coal gasification	Yes		Yes			
8007-45-2		Coal Tar creosote	Yes	Yes	Yes			
		Coal-tar pitches	Yes		Yes			
		Coal-tars	Yes		Yes			
7440-48-4		Cobalt	Yes	Yes	Yes	Yes	Yes	
10210-68-1		Cobalt carbonyl	Yes		Yes			
		Cobalt compounds	Yes	Yes	Yes	Yes	Yes	
62207-76-5		Cobalt, ((2,2'-(1,2-ethanediylbis(nitri	Yes		Yes			
50-36-2		Cocaine	Yes		Yes			
		Coke Oven emissions	Yes		Yes			
		Coke production	Yes		Yes			
64-86-8		Colchicine	Yes		Yes			
		Conjugated Estrogens	Yes		Yes			
7440-50-8		Copper	Yes	Yes	Yes	Yes	Yes	
		Copper compounds	Yes	Yes	Yes	Yes	Yes	
544-92-3		Copper cyanide	Yes	Yes	Yes			
5836-29-3		Coumatetrayl	Yes		Yes			
8001-58-9		Creosote	Yes	Yes	Yes	Yes	Yes	
120-71-8	p-	Cresidine	Yes	Yes	Yes	Yes	Yes	
108-39-4	m-	Cresol	Yes	Yes	Yes	Yes	Yes	
95-48-7	o-	Cresol	Yes	Yes	Yes	Yes	Yes	
106-44-5	p-	Cresol	Yes	Yes	Yes	Yes	Yes	
1319-77-3		Cresol (mixed isomers)	Yes	Yes	Yes	Yes	Yes	
535-89-7		Crimidine	Yes		Yes			
123-73-9		Cronaldehyde, (E)-	Yes	Yes	Yes			
4170-30-3		Crotonaldehyde	Yes	Yes	Yes			
98-82-8		Cumene	Yes	Yes	Yes	Yes	Yes	
80-15-9		Cumene hydroperoxide	Yes	Yes	Yes	Yes	Yes	
135-20-6		Cupferron	Yes	Yes	Yes	Yes	Yes	
21725-46-2		Cyanazine	Yes		Yes			
		Cyanide compounds	Yes	Yes	Yes	Yes	Yes	
57-12-5		cyanides (soluable salts and comple	Yes	Yes	Yes			
460-19-5		cyanogen	Yes	Yes	Yes			
506-68-3		Cyanogen bromide (CN) Br	Yes	Yes	Yes			
506-77-4		Cyanogen Chloride	Yes	Yes	Yes			
506-78-5		Cyanogen iodine	Yes		Yes			
2636-26-2		Cyanophos	Yes		Yes			
675-14-9		Cyanuric fluoride	Yes		Yes			
14901-08-7		Cycasin	Yes	Yes	Yes			
110-82-7		Cyclohexane	Yes	Yes	Yes	Yes	Yes	

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
108-94-1		Cyclohexanone (I)	Yes	Yes	Yes			
66-81-9		Cycloheximide	Yes		Yes			
131-89-5	2-	Cyclohexyl-4,6-Dinitrophenol	Yes	Yes	Yes			
108-91-8		Cyclohexylamine	Yes		Yes			
50-18-0		Cyclophosphamide (anhydrous	Yes	Yes	Yes			
6055-19-2		Cyclophosphamide (hydrated)	Yes		Yes			
13121-70-5		Cyhexatin	Yes		Yes			
147-94-4		Cytarabine	Yes		Yes			
94-75-7	2,4-	D	Yes	Yes	Yes	Yes	Yes	
4342-03-4		Dacarbazine	Yes		Yes			
		Daminozide	Yes		Yes			
17230-88-5		Danazol	Yes		Yes			
20830-81-3		Daunomycin	Yes	Yes	Yes			
23541-50-6		Daunorubicin hydrochloride	Yes		Yes			
64-73-3		Daunorubicin hydrochloride (int	Yes		Yes			
		DBCP	Yes		Yes			
72-54-8		DDD, (Benzene, 1,1'-(2,2-dichl	Yes	Yes	Yes			
3547-04-4		DDE	Yes		Yes			
72-55-9	4,4-	DDE (p,p-DDX)	Yes	Yes	Yes			
50-29-3		DDT	Yes	Yes	Yes			Yes
17702-41-9		Decaborane(14)	Yes		Yes			
1163-19-5		Decabromodiphenyl oxide	Yes	Yes	Yes	Yes	Yes	
8065-48-3		Demeton	Yes		Yes			
919-86-8		Demeton-S-methyl	Yes		Yes			
117-81-7		Di-(2-ethylhexyl) phthalate (DE	Yes	Yes	Yes	Yes	Yes	
10311-84-9		Dialifor	Yes		Yes			
2303-16-4		Diallate	Yes	Yes	Yes	Yes	Yes	
615-05-4	2,4-	Diaminoanisole	Yes	Yes	Yes	Yes	Yes	
39156-41-7	2,4-	Diaminoanisole sulfate	Yes	Yes	Yes	Yes	Yes	
101-80-4	4,4-	Diaminodiphenyl ether	Yes	Yes	Yes	Yes	Yes	
95-80-7	2,4-	Diaminotoluene	Yes	Yes	Yes	Yes	Yes	
25376-45-8		Diaminotoluene (mixed isomers	Yes	Yes	Yes	Yes	Yes	
439-14-5		Diazepam	Yes		Yes			
333-41-5		Diazinon	Yes		Yes			
334-88-3		Diazomethane	Yes	Yes	Yes	Yes	Yes	
53-70-3		Dibenz[a,h] anthracene	Yes	Yes	Yes			
226-36-8		Dibenz[a,h]acridine	Yes	Yes	Yes			
189-55-9		Dibenz[a,i]pyrene	Yes	Yes	Yes			
224-42-0		Dibenz[a,j]acridine	Yes	Yes	Yes			
192-65-4		Dibenzo[a,e]pyrene	Yes	Yes	Yes			
189-64-0		Dibenzo[a,h]pyrene	Yes	Yes	Yes			
189-55-9		Dibenzo[a,i]pyrene	Yes	Yes	Yes			
191-30-0		Dibenzo[a,l]pyrene	Yes		Yes			

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
194-59-2	7H-	Dibenzo[c,g]carbazole	Yes	Yes	Yes			
132-64-9		Dibenzofuran	Yes	Yes	Yes	Yes	Yes	
19287-45-7		Diborane	Yes		Yes			
96-12-8	1,2-	Dibromo-3-chloropropane	Yes	Yes	Yes	Yes	Yes	
106-93-4	1,2-	Dibromoethane (ethylene dibromide	Yes	Yes	Yes	Yes	Yes	
84-74-2		Dibutyl phthalate	Yes	Yes	Yes	Yes	Yes	
764-41-0	1,4-	Dichloro-2butene (I,T)	Yes	Yes	Yes			
95-50-1	1,2-	Dichlorobenzene	Yes	Yes	Yes	Yes	Yes	
541-73-1	1,3-	Dichlorobenzene	Yes	Yes	Yes	Yes	Yes	
106-46-7	1,4-	Dichlorobenzene	Yes	Yes	Yes	Yes	Yes	
25321-22-6		Dichlorobenzene (mixed isomers)	Yes	Yes	Yes	Yes	Yes	
91-94-1	3,3-	Dichlorobenzidine	Yes	Yes	Yes	Yes	Yes	
75-27-4		Dichlorobromomethane	Yes	Yes	Yes	Yes	Yes	
110-57-6	rans-1,4	dichlorobutene	Yes		Yes			
75-71-8		Dichlorodifluoromethane	Yes	Yes	Yes			
75-34-3	1,1-	Dichloroethane	Yes	Yes	Yes			
107-06-2	1,2-	Dichloroethane (ethylene dichloride)	Yes	Yes	Yes	Yes	Yes	
540-59-0	1,2-	Dichloroethylene	Yes	Yes	Yes	Yes	Yes	
156-60-5	1,2-	Dichloroethylene	Yes	Yes	Yes			
25323-30-2		Dichloroethylene N.O.S.	Yes	Yes	Yes			
75-09-2		Dichloromethane (methylene chlorid	Yes	Yes	Yes	Yes	Yes	
149-74-6		Dichloromethylphenylsilane	Yes		Yes			
120-83-2	2,4-	Dichlorophenol	Yes	Yes	Yes	Yes	Yes	
87-65-0	2,6-	Dichlorophenol	Yes	Yes	Yes			
696-28-6		Dichlorophenylarsine	Yes	Yes	Yes			
78-87-5	1,2-	Dichloropropane	Yes	Yes	Yes	Yes	Yes	
26639-19-7		Dichloropropane N.O.S.	Yes	Yes	Yes			
26545-73-3		Dichloropropanol N.O.S.	Yes	Yes	Yes			
78-88-6	2,3-	Dichloropropene	Yes	Yes	Yes	Yes	Yes	
26952-23-8		Dichloropropene N.O.S.	Yes	Yes	Yes			
75-99-0	2,2-	Dichloropropione Acid (Dalapon)	Yes		Yes			
542-75-6	1,3-	Dichloropropylene	Yes	Yes	Yes	Yes	Yes	
62-73-7		Dichlorvos	Yes	Yes	Yes	Yes	Yes	
115-32-2		Dicofol	Yes	Yes	Yes	Yes	Yes	
141-66-2		Dicrotophos	Yes		Yes			
60-51-7		Dieldrin	Yes	Yes	Yes			Yes
1464-53-5		Diepoxybutane	Yes	Yes	Yes	Yes	Yes	
111-42-2		Diethanolamine	Yes	Yes	Yes	Yes	Yes	
814-49-3		Diethyl chlorophosphate	Yes		Yes			
84-66-2		Diethyl phthalate	Yes	Yes	Yes	Yes	Yes	
64-67-5		Diethyl sulfate	Yes	Yes	Yes	Yes	Yes	
311-45-5		Diethyl-p-nitrophenyl phosphate	Yes	Yes	Yes			
692-42-2		Diethylarsine	Yes	Yes	Yes			

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
1642-54-2		Diethylcarbamazine citrate	Yes		Yes			
56-53-1		Diethylstibesterol	Yes	Yes	Yes			
71-63-6		Digitoxin	Yes		Yes			
2238-07-5		Diglycidyl ether	Yes		Yes			
101-90-6		Diglycidyl Resorcinol Ether	Yes		Yes			
20830-75-5		Digoxin	Yes	Yes	Yes			
		Diguat	Yes		Yes			
94-58-6		Dihydrosafrole	Yes	Yes	Yes			
115-26-4		Dimefox	Yes		Yes			
60-51-5		dimethoate	Yes	Yes	Yes			
119-90-4	3,3-	Dimethoxybenzidine	Yes	Yes	Yes	Yes	Yes	
68-12-2		Dimethyl Formamide	Yes		Yes			
57-14-7	1,1-	Dimethyl hydrazine	Yes	Yes	Yes	Yes	Yes	
2524-03-0		Dimethyl phosphorochloridothic	Yes		Yes			
131-11-3		Dimethyl phthalate	Yes	Yes	Yes	Yes	Yes	
77-78-1		Dimethyl sulfate	Yes	Yes	Yes	Yes	Yes	
99-98-9		Dimethyl-p-phenylenediamine	Yes		Yes			
124-40-3		Dimethylamine (I)	Yes	Yes	Yes			
60-11-7	4-	Dimethylaminoazobenzene	Yes	Yes	Yes	Yes	Yes	
121 -69-7	N,N-	Dimethylaniline	Yes	Yes	Yes	Yes	Yes	
57-97-6	7,12-	Dimethylbenz [a] anthracene	Yes	Yes	Yes			
119-93-7	3,3-	Dimethylbenzidine (o-Tolidine)	Yes	Yes	Yes	Yes	Yes	
79-44-7		Dimethylcarbamyl chloride	Yes	Yes	Yes	Yes	Yes	
75-78-5		Dimethyldichlorosilane	Yes		Yes			
540-73-8	1,2-	Dimethylhydrazine	Yes	Yes	Yes			
105-67-9	2,4-	Dimethylphenol	Yes	Yes	Yes	Yes	Yes	
513-37-1		Dimethylvinyl Chloride	Yes		Yes			
644-64-4		Dimetilan	Yes		Yes			
534-52-1	4,6-	Dinitro-o-cresol, and salts	Yes	Yes	Yes	Yes	Yes	
99-65-0	m-	Dinitrobenzene	Yes	Yes	Yes	Yes	Yes	
528-29-0	o-	Dinitrobenzene	Yes	Yes	Yes	Yes	Yes	
100-25-4	p-	Dinitrobenzene	Yes	Yes	Yes	Yes	Yes	
25154-54-5		Dinitrobenzene, N.O.S.	Yes	Yes	Yes			
534-52-1		Dinitrocresol	Yes	Yes	Yes			
51-28-5	2,4-	Dinitrophenol	Yes	Yes	Yes	Yes	Yes	
121-14-2	2,4-	Dinitrotoluene	Yes	Yes	Yes	Yes	Yes	
606-20-2	2,6-	Dinitrotoluene	Yes	Yes	Yes	Yes	Yes	
25321-14-6		Dinitrotoluene (mixed isomers)	Yes	Yes	Yes	Yes	Yes	
39300-45-3		Dinocap	Yes		Yes			
88-85-7		Dinoseb	Yes	Yes	Yes			
1420-07-1		Dinoterb	Yes		Yes			
117-84-0	n-	Dioctyl phthalate	Yes	Yes	Yes	Yes	Yes	
123-91-1	1,4-	Dioxane	Yes	Yes	Yes	Yes	Yes	

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081	CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
78-34-2		Dioxathion	Yes		Yes						Ethyl Alcohol in alcoholic bever	Yes		Yes			
82-66-6		Diphacinone	Yes		Yes				541-41-3		Ethyl chloroformate	Yes	Yes	Yes	Yes	Yes	
122-39-4		Diphenylamine	Yes	Yes	Yes				60-29-7		Ethyl ether (I)	Yes	Yes	Yes			
57-41-0		Diphenylhydantoin (phenytoin)	Yes		Yes				62-50-0		Ethyl methanesulfonate	Yes	Yes	Yes			
122-66-7	1,2-	Diphenylhydrazine	Yes	Yes	Yes	Yes	Yes			N-	Ethyl-N-nitrosourea	Yes		Yes			
152-16-9		Diphosphoramide, octamethyl	Yes	Yes	Yes				100-41-4		Ethylbenzene	Yes	Yes	Yes	Yes	Yes	
142-84-7		Dipropylamine (I)	Yes	Yes	Yes				538-07-8		Ethylbis(2-chloroethyl)amine	Yes		Yes			
298-04-4		Disulfoton	Yes	Yes	Yes				74-85-1		Ethylene	Yes	Yes	Yes	Yes	Yes	
514-73-8		Dithiazanine iodide	Yes		Yes						Ethylene biscarbamates	Yes		Yes			
541-53-7		Dithiobiuret	Yes	Yes	Yes				371-62-0		Ethylene fluorohydrin	Yes		Yes			
564-25-0		Doxycycline (internal use)	Yes		Yes				107-21-1		Ethylene glycol	Yes	Yes	Yes	Yes	Yes	
94088-85-4		Doxycycline calcium (internal use)	Yes		Yes				75-21-8		Ethylene oxide	Yes	Yes	Yes	Yes	Yes	
24390-14-5		Doxycycline hyclate (internal use)	Yes		Yes				96-45-7		Ethylene thiourea	Yes	Yes	Yes	Yes	Yes	
17086-28-1		Doxycycline monohydrate (internal u	Yes		Yes				111-54-6		Ethylenebisdithiocarbamic acid	Yes	Yes	Yes			
316-42-7		Emetine, dihydrochloride	Yes		Yes				151-56-4		Ethyleneimine	Yes	Yes	Yes	Yes	Yes	
115-29-7		Endosulfan	Yes	Yes	Yes				103-23-1	Bis(2-	ethylhexyl) adipate	Yes	Yes	Yes	Yes	Yes	
959-98-8	Alpha-	endosulfan	Yes		Yes				75-34-3		Ethylidene dichloride (1,1-Dichl	Yes		Yes			
33213-65-9	Beta-	endosulfan	Yes		Yes				542-90-5		ethylthiocyanate	Yes		Yes			
1031-07-8		Endosulfan sulfate	Yes		Yes				33419-42-0		Etoposide	Yes		Yes			
145-73-3		Endothall	Yes	Yes	Yes				54350-48-0		Etretinate	Yes		Yes			
2778-04-3		Endothion	Yes		Yes				52-85-7		Famphur	Yes	Yes	Yes			
72-20-8		Endrin	Yes	Yes	Yes			Yes	22224-92-6		Fenamiphos	Yes		Yes			
7421-93-4		Endrin aldehyde	Yes		Yes				122-14-7		Fenitrothion	Yes		Yes			
106-89-8		Epichlorohydrin	Yes	Yes	Yes	Yes	Yes		115-90-2		Fensulfothion	Yes		Yes			
51-43-4		Epinephrine	Yes	Yes	Yes				4301-50-2		Fluenetil	Yes		Yes			
2104-64-5		EPN	Yes		Yes				2164-17-2		Fluometuron	Yes	Yes	Yes	Yes	Yes	
136-25-4		Erbon	Yes		Yes				206-44-0		Fluoranthene	Yes	Yes	Yes			
50-14-6		Ergocalciferol	Yes		Yes				86-73-7		Fluorene	Yes		Yes			
379-79-3		Ergotamine tartrate	Yes		Yes				7782-41-4		Fluorine	Yes	Yes	Yes			
12510-42-8		Erionite	Yes		Yes				640-19-7		Fluoroacetamide	Yes		Yes			
		Estrogens (Not Conjugated): Estrad	Yes		Yes				144-49-0		Fluoroacetic Acid	Yes		Yes			
		Estrogens (Not Conjugated): Ethyin	Yes		Yes				359-06-8		Fluoroacetyl chloride	Yes		Yes			
		Estrogens (Not Conjugated): Mestr	Yes		Yes				51-21-8		Fluorouracil	Yes		Yes			
		Estrogens (Not Conjugated): Estron	Yes		Yes				46-43-7		Fluoxymesterone	Yes		Yes			
1622-32-8		Ethanesul fonyl chloride, 2-chloro	Yes		Yes				13311-84-7		Flutamide	Yes		Yes			
16752-77-5		Ethanimidothioic acid, n-[methylami	Yes	Yes	Yes				944-22-9		Fonofos	Yes		Yes			
10140-87-1		Ethanol, 1,2-dichloro-,acetate	Yes		Yes				50-00-0		Formaldehyde	Yes	Yes	Yes	Yes	Yes	
57-63-6		Ethinyl estradiol	Yes		Yes				107-16-4		Formaldehyde cyanohydrin	Yes		Yes			
97-63-2		Ethl methacrylate	Yes	Yes	Yes				23422-53-9		Formetanate hydrochloride	Yes		Yes			
13194-48-4		Ethoprophos	Yes		Yes				64-18-6		Formic acid (C,T)	Yes	Yes	Yes			
110-80-5	2-	Ethoxyethanol (Ethylene glycol mon	Yes	Yes	Yes	Yes	Yes		2540-82-1		Formothion	Yes		Yes			
141-78-6		Ethyl acetate	Yes	Yes	Yes				17702-57-7		Formparanate	Yes		Yes			
140-88-5		Ethyl acrylate	Yes	Yes	Yes	Yes	Yes		21548-32-3		Fosthietan	Yes		Yes			

VRD 0002024940

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081	CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
76-13-1		Freon 113	Yes	Yes	Yes	Yes	Yes		430-57-9		Hydrochlorofluorocarbon-141 (I	Yes		Yes	Yes		
3878-19-1		Fuberidazole	Yes		Yes				338-64-7		Hydrochlorofluorocarbon-142 (I	Yes		Yes	Yes		
110-00-9		Furan (I)	Yes	Yes	Yes				75-43-4		Hydrochlorofluorocarbon-21 (H	Yes		Yes	Yes		
109-99-9		Furan,tetrahydro-(I) (tetrahydrofurar	Yes	Yes	Yes						Hydrochlorofluorocarbon-221 (I	Yes		Yes	Yes		
98-01-1		Furfural (I)	Yes	Yes	Yes						Hydrochlorofluorocarbon-222 (I	Yes		Yes	Yes		
		Furniture and cabinet making	Yes		Yes						Hydrochlorofluorocarbon-223 (I	Yes		Yes	Yes		
13450-90-3		Gallium trichloride	Yes		Yes						Hydrochlorofluorocarbon-224 (I	Yes		Yes	Yes		
18883-66-4	D-	Glucose, 2-deoxy-2-[[methylnitrosoa	Yes	Yes	Yes						Hydrochlorofluorocarbon-225 (I	Yes		Yes	Yes		
765-34-4		Glycidylaldehyde	Yes	Yes	Yes						Hydrochlorofluorocarbon-226 (I	Yes		Yes	Yes		
		Glycol ethers	Yes	Yes	Yes	Yes	Yes				Hydrochlorofluorocarbon-231 (I	Yes		Yes	Yes		
1071-83-6		Glyphosate	Yes		Yes						Hydrochlorofluorocarbon-232 (I	Yes		Yes	Yes		
70-25-7		Guanidine, N-methyl-N'-nitro-N-nitr	Yes	Yes	Yes						Hydrochlorofluorocarbon-233 (I	Yes		Yes	Yes		
23092-17-3		Halazepam	Yes		Yes				12754-83-4		Hydrochlorofluorocarbon 234 (I	Yes		Yes	Yes		
		Halomethanes N.O.S.	Yes	Yes	Yes						Hydrochlorofluorocarbon-235 (I	Yes		Yes	Yes		
76-44-8		Heptachlor	Yes	Yes	Yes	Yes	Yes				Hydrochlorofluorocarbon-241 (I	Yes		Yes	Yes		
1024-57-3		Heptachlor epoxide (BHC-hexachlor	Yes	Yes	Yes						Hydrochlorofluorocarbon-242 (I	Yes		Yes	Yes		
		Heptachlordibenzo-p-dioxins	Yes	Yes	Yes						Hydrochlorofluorocarbon-243 (I	Yes		Yes	Yes		
		Heptachlorodibenzofurans	Yes	Yes	Yes						Hydrochlorofluorocarbon-244 (I	Yes		Yes	Yes		
		Hexachlordibenzo-p-dioxins	Yes	Yes	Yes						Hydrochlorofluorocarbon-251 (I	Yes		Yes	Yes		
87-68-3		Hexachloro-1,3-butadiene	Yes	Yes	Yes	Yes	Yes				Hydrochlorofluorocarbon-252 (I	Yes		Yes	Yes		
118-74-1		Hexachlorobenzene	Yes	Yes	Yes	Yes	Yes				Hydrochlorofluorocarbon-253 (I	Yes		Yes	Yes		
77-47-4		Hexachlorocyclopentadiene	Yes	Yes	Yes	Yes	Yes				Hydrochlorofluorocarbon-261 (I	Yes		Yes	Yes		
		Hexachlorodibenzofurans	Yes	Yes	Yes						Hydrochlorofluorocarbon-262 (I	Yes		Yes	Yes		
67-72-1		Hexachloroethane	Yes	Yes	Yes	Yes	Yes				Hydrochlorofluorocarbon-271 (I	Yes		Yes	Yes		
1335-87-1		Hexachloronaphthalene	Yes	Yes	Yes	Yes	Yes				Hydrochlorofluorocarbon-31 (H	Yes		Yes	Yes		
70-30-4		Hexachlorophene	Yes	Yes	Yes				7664-39-3		Hydrogen fluoride	Yes	Yes	Yes	Yes	Yes	
1888-71-7		Hexachloropropene	Yes	Yes	Yes				7722-84-1		Hydrogen peroxide (Conc.> 52	Yes		Yes			
757-58-4		Hexaethyl tetraphosphate	Yes	Yes	Yes				7783-07-5		Hydrogen selenide	Yes		Yes			
4835-11-4		Hexamethylenediamine, N, N'-dibut	Yes		Yes				7783-06-4		Hydrogen sulfide	Yes	Yes	Yes			
680-31-9		Hexamethylphosphoramide	Yes	Yes	Yes	Yes	Yes		74-90-8		Hydrogren cyanide	Yes	Yes	Yes	Yes	Yes	
822-06-0		Hexamrthylene-1,6-diisocyanate	Yes		Yes				123-31-9		Hydroquinone	Yes	Yes	Yes	Yes	Yes	
110-54-3		Hexane	Yes		Yes				3778-73-2		Ifosfamide	Yes		Yes			
302-01-2		Hydrazine	Yes	Yes	Yes	Yes	Yes		193-39-5		Indeno [1,2,3-cd] pyrene	Yes	Yes	Yes			
10034-93-2		Hydrazine sulfate	Yes	Yes	Yes	Yes	Yes		24267-56-9		Iodine-131	Yes		Yes			
1615-80-1		Hydrazine, 1,2-diethyl-	Yes	Yes	Yes						Iron and steel founding	Yes		Yes			
7647-01-0		Hydrochloric acid	Yes	Yes	Yes	Yes	Yes		9004-66-4		Iron Dextran Complex	Yes		Yes			
76-12-0		Hydrochlorofluorocarbon-121 (HCF(	Yes		Yes	Yes			13463-40-6		Iron, pentacarbonyl-	Yes		Yes			
354-21-2		Hydrochlorofluorocarbon-122 (HCF(	Yes		Yes	Yes			297-78-9		Isobenzan	Yes		Yes			
306-83-2		Hydrochlorofluorocarbon-123 (HCF(	Yes		Yes	Yes			78-83-1		isobutyl alcohol (I,T)	Yes	Yes	Yes			
2837-89-0		Hydrochlorofluorocarbon-124 (HCF(	Yes		Yes	Yes			78-84-2		Isobutyraldehyde	Yes	Yes	Yes	Yes	Yes	
359-28-4		Hydrochlorofluorocarbon-131 (HCF(	Yes		Yes	Yes			78-82-0		Isobutyronitrile	Yes		Yes			
431-06-1		Hydrochlorofluorocarbon-132 (HCF(	Yes		Yes	Yes			102-36-3		Isocyanic acid, 3,4-dichlorophe	Yes		Yes			
431-07-2		Hydrochlorofluorocarbon-133 (HCF(	Yes		Yes	Yes			465-73-6		Isodrin	Yes	Yes	Yes			

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
55-91-4		Isofluorphate (diisopropylfluoropho	Yes	Yes	Yes			
78-59-1		Isophorone	Yes		Yes			
75-59-1		Isophorone	Yes		Yes			
4098-71-9		Isophorone diisocyanate	Yes		Yes			
67-63-0		Isopropyl alcohol (strong acid proc	Yes	Yes	Yes	Yes	Yes	
108-23-6		Isopropyl chloroformate	Yes		Yes			
119-38-0		Isopropylmethylpyrazolyl dimethylc	Yes		Yes			
120-58-1		Isosafrole	Yes	Yes	Yes	Yes	Yes	
4759-48-2		Isotretinoin	Yes		Yes			
143-50-0		Kepone (Chlordecone)	Yes	Yes	Yes			
78-97-7		Lactonitrile	Yes		Yes			
303-34-4		Lasiocarpine	Yes	Yes	Yes			
7439-92-1		Lead	Yes	Yes	Yes	Yes	Yes	
301-04-2		Lead acetate	Yes	Yes	Yes			
		Lead compounds	Yes	Yes	Yes	Yes	Yes	
7446-27-7		Lead phosphate	Yes	Yes	Yes			
1335-32-6		Lead subacetate	Yes	Yes	Yes			
1609-90-5		Leptophos	Yes		Yes			
541-25-3		Lewisite	Yes		Yes			
58-89-9		Lindane	Yes	Yes	Yes	Yes	Yes	
554-13-2		Lithium Carbonate	Yes		Yes			
919-16-4		Lithium Citrate	Yes		Yes			
7580-67-8		Lithium hydride	Yes		Yes			
846-49-1		Lorazepam	Yes		Yes			
80-05-7	4,4-	Isopropylidenediphenol	Yes	Yes	Yes	Yes	Yes	
		Magenta, manufacture of	Yes		Yes			
108-31-6		Maleic anhydride	Yes	Yes	Yes	Yes	Yes	
123-33-1		Maleic hydrazide	Yes	Yes	Yes			
109-77-3		Malononitrile	Yes	Yes	Yes			
2427-38-2		Maneb	Yes	Yes	Yes	Yes	Yes	
7439-96-5		Manganese	Yes	Yes	Yes	Yes	Yes	
		Manganese compounds	Yes	Yes	Yes	Yes	Yes	
2108-13-3		Manganese, tricarbonyl methylcycl	Yes		Yes			
71-58-9		Medroxyprogesterone acetate	Yes		Yes			
595-33-5		Megestrol Acetate	Yes		Yes			
148-82-3		Melphalan	Yes	Yes	Yes			
9002-68-0		Menotropins	Yes		Yes			
950-10-7		Mephosfolan	Yes		Yes			
57-53-4		Mercaptopurine	Yes		Yes			
1600-27-7		Mercuric acetate	Yes		Yes			
1908-53-2		Mercuric oxide	Yes		Yes			
7439-97-6		Mercury	Yes	Yes	Yes	Yes	Yes	Yes
		Mercury compounds	Yes	Yes	Yes	Yes	Yes	

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628-86-4		Mercury fulminate	Yes	Yes	Yes			
72-33-3		Mestranol	Yes		Yes			
10476-95-6		Methacrolein diacetate	Yes		Yes			
760-93-0		Methacrylic anhydride	Yes		Yes			
126-98-7		Methacrylonitrile (I,T)	Yes	Yes	Yes			
920-46-7		Methacryloyl chloride	Yes		Yes			
30674-80-7		Methacryloyloxyethyl isocyana	Yes		Yes			
3963-95-9		Methacycline hydrchloride	Yes		Yes			
10265-92-6		Methamidophos	Yes		Yes			
558-25-8		Methanesulfonyl fluoride	Yes		Yes			
67-56-1		Methanol	Yes	Yes	Yes	Yes	Yes	
91-80-5		Methapyrilene	Yes	Yes	Yes			
950-37-8		Methidathion	Yes		Yes			
60-56-0		Methimazole	Yes		Yes			
16752-77-5		Methomyl	Yes	Yes	Yes			
59-05-2		Methotrexate	Yes		Yes			
15475-56-6		Methotrexate sodium	Yes		Yes			
72-43-5		Methoxychlor	Yes	Yes	Yes	Yes	Yes	
109-86-4	2-	Methoxyethanol (Ethylene glyc	Yes	Yes	Yes	Yes	Yes	
151-38-2		Methoxyethylmercuric acetate	Yes		Yes			
298-81-7	8-	Methoxypsoralen	Yes		Yes			
96-33-3		Methyl acrylate	Yes	Yes	Yes	Yes	Yes	
79-22-1		Methyl chloroformate	Yes	Yes	Yes			
78-93-3		Methyl ethyl ketone	Yes	Yes	Yes	Yes	Yes	
1338-23-4		Methyl ethyl ketone peroxide	Yes	Yes	Yes			
60-34-4		Methyl hydrazine	Yes	Yes	Yes	Yes	Yes	
74-88-4		Methyl iodine	Yes	Yes	Yes	Yes	Yes	
624-83-9		Methyl Isocyanate	Yes	Yes	Yes	Yes	Yes	
556-61-6		Methyl isothiocyanate	Yes		Yes			
108-10-1		Methyl Isobutyl ketone	Yes	Yes	Yes	Yes	Yes	
		Methyl Mercury	Yes		Yes			
80-62-6		Methyl methacrylate	Yes	Yes	Yes	Yes	Yes	
66-27-3		Methyl Methanesulfonate	Yes	Yes	Yes			
298-00-0		Methyl parathion	Yes	Yes	Yes			
3735-23-7		Methyl phenkapton	Yes		Yes			
676-97-1		Methyl phosphonic dichloride	Yes		Yes			
1634-04-4		Methyl tert-butyl ether	Yes	Yes	Yes	Yes	Yes	
556-64-9		Methyl thiocyanate	Yes		Yes			
78-94-4		Methyl vinyl ketone	Yes		Yes			
	N-	Methyl-N-nitrosourea	Yes		Yes			
56-49-5	3-	Methylcholanthrene	Yes	Yes	Yes			
3697-24-3	5-	Methylchrysene	Yes		Yes			
74-95-3		Methylene bromide	Yes	Yes	Yes	Yes	Yes	

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S 976	S. 761	S. 1081
101-14-4	4,4-	Methylenebis (2-	Yes	Yes	Yes	Yes	Yes	
101-68-8		Methylenebis (phenylisocyanate)	Yes	Yes	Yes	Yes	Yes	
101-61-1	4,4-	Methylenebis(N,N-dimethyl)	Yes	Yes	Yes	Yes	Yes	
101-77-9	4,4-	Methylenedianiline	Yes	Yes	Yes	Yes	Yes	
58-18-4		Methyltestosterone	Yes		Yes			
56-04-2		Methylthiouracil	Yes	Yes	Yes			
75-79-6		Methyltrichlorosilane	Yes		Yes			
1129-33-0		Metolcarb	Yes		Yes			
443-48-1		Metronidazole	Yes		Yes			
80-63-7		Metyl 2-chloroacrylate	Yes		Yes			
74-93-1		Metyl mercaptan (Methanethiol (I,T	Yes	Yes	Yes			
502-39-6		Metylmercuric dicyanamide	Yes		Yes			
90-94-8		Michler's ketone	Yes	Yes	Yes	Yes	Yes	
9467-96-8		Midazolam hydrochloride	Yes		Yes			
		Mineral oils, untreated and mildly-tr	Yes		Yes			
13614-98-7		Minocycline hydrochloride (internal	Yes		Yes			
2385-85-5		Mirex	Yes		Yes			
2015-39-8		Misoprostal	Yes		Yes			
50-07-7		Mitomycin C	Yes	Yes	Yes			
0476-82-3		Mitoxantrone hydrochloride	Yes		Yes			
1313-27-5		Molybobenum trioxide	Yes	Yes	Yes	Yes	Yes	
6923-22-4		Monocrotophos	Yes		Yes			
6923-22-4		Monocrotophous	Yes		Yes			
150-68-5		Monuron	Yes		Yes			
2763-96-4		Muscimol	Yes	Yes	Yes			
505-60-2		Mustard gas	Yes	Yes	Yes	Yes	Yes	
91-20-3		Naphthalene	Yes	Yes	Yes	Yes	Yes	
130-15-4	1,4-	Naphthoquinone	Yes	Yes	Yes			
91-59-8	beta-	Naphthylamine	Yes	Yes	Yes	Yes	Yes	
134-32-7	alpha-	Naphthylamine	Yes	Yes	Yes	Yes	Yes	
16220-42-0		Nafarelin acetate	Yes		Yes			
6391-57-2		Netilmicin sulfate	Yes		Yes			
7440-02-0		Nickel	Yes	Yes	Yes	Yes	Yes	
3463-39-3		Nickel carbonyl	Yes	Yes	Yes			
		Nickel compounds	Yes	Yes	Yes	Yes	Yes	
557-19-7		Nickel Cyanide	Yes	Yes	Yes			
54-11-5		Nicotine and salts	Yes	Yes	Yes			
65-30-5		Nicotine sulfate	Yes		Yes			
4797-55-8		Nitrate	Yes		Yes			
7697-37-2		Nitric acid	Yes	Yes	Yes	Yes	Yes	
0102-43-9		Nitric oxide	Yes	Yes	Yes			
139-13-9		Nitrilotriacetic acid	Yes	Yes	Yes	Yes	Yes	
		Nitrite	Yes		Yes			

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
99-59-2	5-	Nitro-o-anisidine	Yes	Yes	Yes	Yes	Yes	
99-55-8	5-	Nitro-o-toluidine	Yes	Yes	Yes			
100-01-6	p-	Nitroaniline	Yes	Yes	Yes			
98-95-3		Nitrobenzene	Yes	Yes	Yes	Yes	Yes	
92-93-3	4-	Nitrobiphenyl	Yes	Yes	Yes	Yes	Yes	
1122-60-7		Nitrocyclohexane	Yes		Yes			
1836-75-5		Nitrofen	Yes	Yes	Yes	Yes	Yes	
67-20-9		Nitrofurantoin	Yes		Yes			
10102-44-0		Nitrogen dioxide	Yes	Yes	Yes			
51-75-2		Nitrogen mustard	Yes	Yes	Yes	Yes	Yes	
55-86-7		Nitrogen Mustard Hydrochloric (	Yes		Yes			
		Nitrogen Mustard Hydrochloric (	Yes	Yes	Yes			
126-85-2		Nitrogen Mustard N-Oxide	Yes	Yes	Yes			
		Nitrogen Mustard N-Oxide hyd	Yes	Yes	Yes			
55-63-0		Nitroglycerin	Yes	Yes	Yes	Yes	Yes	
88-75-5	2-	Nitrophenol	Yes	Yes	Yes	Yes	Yes	
100-02-7	4-	Nitrophenol	Yes	Yes	Yes	Yes	Yes	
79-46-9	2-	Nitropropane	Yes	Yes	Yes	Yes	Yes	
35576-91-1		Nitrosamines, N.O.S.	Yes	Yes	Yes			
64091-91-4	4-(N-	Nitroso methylamino)-1-)3-pryi	Yes		Yes			
759-73-9	N-	Nitroso-N-ethylurea	Yes	Yes	Yes	Yes	Yes	
684-93-5	N-	Nitroso-N-methylurea	Yes	Yes	Yes	Yes	Yes	
615-53-2	N-	Nitroso-N-methylurethane	Yes	Yes	Yes			
924-16-3	N-	Nitrosodi-n-butylamine	Yes	Yes	Yes	Yes	Yes	
621-64-7	N-	Nitrosodi-n-propylamine	Yes	Yes	Yes	Yes	Yes	
55-18-5	N-	Nitrosodiethylamine	Yes	Yes	Yes	Yes	Yes	
62-75-9	N-	Nitrosodimethylamine	Yes	Yes	Yes	Yes	Yes	
156-10-5	p-	Nitrosodiphenylamine	Yes	Yes	Yes	Yes	Yes	
1116-54-7	N-	Nitrosodithanolamine	Yes	Yes	Yes			
10595-95-6	N-	Nitrosomethylethylamine	Yes	Yes	Yes			
4549-40-0	N-	Nitrosomethylvinylamine	Yes	Yes	Yes	Yes	Yes	
59-89-2	N-	Nitrosomorpholine	Yes	Yes	Yes	Yes	Yes	
16543-55-8	N-	Nitrosonornicotine	Yes	Yes	Yes	Yes	Yes	
100-75-4	N-	Nitrosopiperidine	Yes	Yes	Yes	Yes	Yes	
930-55-2	n-	Nitrosopyrrolidine	Yes	Yes	Yes			
13256-22-9	N-	Nitrososarcosine	Yes	Yes	Yes			
86-30-6	N-	Nitrosodiphenylamine	Yes	Yes	Yes	Yes	Yes	
991-42-4		Norbormide	Yes		Yes			
68-22-4		Norethisterone (norethindrone)	Yes		Yes			
51-98-9		Norethisterone acetate (Noreth	Yes		Yes			
6533-00-2		Norgestrol	Yes		Yes			
3288-58-2		O,O -Diethyl S-methyl dithioph	Yes	Yes	Yes			
303-47-9		Ochratoxin A	Yes		Yes			

VRD 0002024943

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
			Legislation					
2234-13-1		Octachloronaphthalene	Yes	Yes	Yes	Yes	Yes	
		Oestrogen replacement theory	Yes		Yes			
		Oestrogens, nonsteroidal	Yes		Yes			
		Oestrogens, Steroidal	Yes		Yes			
		Oral contraceptives, combined	Yes		Yes			
		Oral contraceptives, sequential	Yes		Yes			
		Organorhodium Complex (PMN-82	Yes		Yes			
20816-12-0		Osmium tetroxide	Yes	Yes	Yes	Yes	Yes	
20816-12-0		Osmium tetroxide	Yes	Yes	Yes			
630-60-4		Ouabain	Yes		Yes			
23135-22-0		Oxamyl	Yes		Yes			
78-71-7		Oxetane, 3,3-bis(chloromethyl)-	Yes		Yes			
		Oxydemeton-methyl	Yes		Yes			
434-07-1	4,4'-	Oxydianiline	Yes		Yes			
2497-07-6		Oxydisulfoton	Yes		Yes			
79-57-2		Oxytetracycline (internal use)	Yes		Yes			
2058-46-0		Oxytetracycline hydrochloride (inter	Yes		Yes			
10028-15-6		Ozone	Yes		Yes			
123-63-7		Paraldehyde	Yes	Yes	Yes			
115-67-3		Paramethadione	Yes		Yes			
1910-42-5		Paraquat	Yes		Yes			
2074-50-2		Paraquat methosulfate	Yes		Yes			
56-38-2		Parathion	Yes	Yes	Yes	Yes	Yes	
52-67-5		Penicillamine	Yes		Yes			
19624-22-7		Pentaborne	Yes		Yes			
608-93-5		Pentachlorobenzene	Yes	Yes	Yes			
		Pentachlorodibenzo-p-dioxins	Yes	Yes	Yes			
		Pentachlorodibenzofurans	Yes	Yes	Yes			
76-01-7		Pentachloroethane	Yes	Yes	Yes			
87-86-5		Pentachlorophenol (PCP)	Yes	Yes	Yes	Yes	Yes	
2570-26-5		Pentadecylamine	Yes		Yes			
504-60-9	1,3-	Pentadiene (I)	Yes	Yes	Yes			
57-33-0		Pentobarbital sodium	Yes		Yes			
79-21-0		Peracetic acid	Yes	Yes	Yes	Yes	Yes	
72-56-0		Perthane	Yes		Yes			
63-98-9		Phenacemide	Yes		Yes			
62-44-2		Phenacetin	Yes	Yes	Yes			
85-01-8		Phenanthrene	Yes		Yes			
578-94-9		Phenarsazine chloride	Yes		Yes			
136-40-3		Phenazopyridine Hydrochloride	Yes		Yes			
108-95-2		Phenol	Yes	Yes	Yes	Yes	Yes	
4418-66-0		Phenol, 2,2'-thiobis(4-chloro-6-meth	Yes		Yes			
64-00-6		Phenol, 3-(1-methylethyl)- methylca	Yes		Yes			

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
			Legislation					
58-36-6		Phenoxarsine	Yes		Yes			
63-92-3		Phenoxybenzamine Hydrochlor	Yes		Yes			
106-50-3	p-	Phenylenediamine	Yes	Yes	Yes	Yes	Yes	
25265-76-3		Phenylenediamine	Yes	Yes	Yes			
59-88-1		Phenylhydrazine hydrochloride	Yes		Yes			
62-38-4		Phenylmercury(ic) acetate	Yes	Yes	Yes			
90-43-7	2-	Phenylphenol	Yes	Yes	Yes	Yes	Yes	
2097-19-0		Phenylsilatrate	Yes		Yes			
103-85-5		Phenylthiourea	Yes	Yes	Yes			
		Phenytoin	Yes		Yes			
298-02-2		Phorate	Yes	Yes	Yes			
4104-14-7		Phosacetim	Yes		Yes			
947-02-4		Phosfolan	Yes		Yes			
75-44-5		Phosgene	Yes	Yes	Yes	Yes	Yes	
732-11-6		Phosmet	Yes		Yes			
13171-21-6		Phosphamidon	Yes		Yes			
7803-51-2		Phosphine	Yes	Yes	Yes			
2665-30-7		Phosphonothioic acid, Methyl-,	Yes		Yes			
2703-13-1		Phosphonothioic acid, methyl-,	Yes		Yes			
50782-69-9		Phosphonothioic acid, methyl-,	Yes		Yes			
7664-38-2		Phosphoric acid	Yes	Yes	Yes	Yes	Yes	
3254-63-5		Phosphoric acid, dimethyl 4-(m	Yes		Yes			
2587-90-8		Phosphorothioic acid, o,o-dime	Yes		Yes			
10026-13-8		Phosphorous pentachloride	Yes		Yes			
1314-56-3		Phosphorous pentoxide	Yes		Yes			
7723-14-0		Phosphorus (yellow or white)	Yes	Yes	Yes	Yes	Yes	
		Phthalic Acid esters NOS	Yes	Yes	Yes			
85-44-9		Phthalic anhydride	Yes	Yes	Yes	Yes	Yes	
57-47-6		Physostigmine	Yes		Yes			
57-64-7		Physostigmine, salicylate (1:1)	Yes		Yes			
1918-02-1		Picloram	Yes		Yes			
109-06-8	2-	Picoline (2-methylpyridine)	Yes	Yes	Yes			
88-89-1		Picric acid	Yes	Yes	Yes	Yes	Yes	
124-87-8		Picrotoxin	Yes		Yes			
110-89-4		Piperidine	Yes		Yes			
51-03-6		Piperonyl butoxide	Yes		Yes			
54-91-1		Pipobroman	Yes		Yes			
23505-41-1		Pirimifos-ethyl	Yes		Yes			
18378-89-7		Plicamycin	Yes		Yes			
1336-36-3		Polychlorinated biphenyls (PCB	Yes	Yes	Yes	Yes	Yes	Yes
		Polycyclic Organic Matter	Yes		Yes			
151-50-8		Potassium cyanide	Yes	Yes	Yes			
506-61-6		Potassium Silver Cyanide	Yes	Yes	Yes			

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
366-70-1		Procarbazine Hydrochloride	Yes		Yes			
57-83-0		Progesterone	Yes		Yes			
2631-37-0		Promecarb	Yes		Yes			
23950-58-5		pronamide	Yes		Yes			
107-10-8	1-	Propanamine (I,T) (n-)	Yes	Yes	Yes			
1120-71-4		Propane sultone	Yes	Yes	Yes	Yes	Yes	
107-19-7		Propargyl alcohol	Yes	Yes	Yes			
106-96-7		Propargyl bromide	Yes		Yes			
57-57-8	beta-	Propiolactone	Yes	Yes	Yes	Yes	Yes	
123-38-6		Propionaldehyde	Yes	Yes	Yes	Yes	Yes	
107-12-0		Propionitrile (ethyl cyanide)	Yes	Yes	Yes			
70-69-9		Propiophenone, 4'-amino	Yes		Yes			
114-26-1		Propoxur	Yes	Yes	Yes	Yes	Yes	
109-61-5		Propyl chloroformate	Yes		Yes			
115-07-1		Propylene	Yes	Yes	Yes	Yes	Yes	
75-56-9		Propylene oxide	Yes	Yes	Yes	Yes	Yes	
75-55-8		Propyleneimine	Yes	Yes	Yes	Yes	Yes	
51-52-5		Propylthiouracil	Yes	Yes	Yes			
2275-18-5		Prothoate	Yes		Yes			
129-00-0		Pyrene	Yes		Yes			
110-86-1		Pyridine	Yes	Yes	Yes	Yes	Yes	
140-76-1		Pyridine, 2-methyl-5-vinyl-	Yes		Yes			
504-24-5		Pyridine, 4-amino	Yes	Yes	Yes			
1124-33-0		Pyridine, 4-nitro-, 1-oxide	Yes		Yes			
53558-25-1		Pyriminil	Yes		Yes			
91-22-5		Quinoline	Yes	Yes	Yes	Yes	Yes	
106-51-4		Quinone	Yes	Yes	Yes	Yes	Yes	
82-68-8		Quintozene (pentachloronitrobenzer	Yes	Yes	Yes	Yes	Yes	
50-55-5		Reserpine	Yes	Yes	Yes			
108-46-3		Resorcinol (1,3-Benzenediol)	Yes	Yes	Yes			
302-79-4		Retinoic acid, all trans	Yes		Yes			
		Retinol/retinyl esters (daily dose > 1	Yes		Yes			
36791-04-5		Ribavirin	Yes		Yes			
299-84-3		Ronnel	Yes		Yes			
83-79-4		Rotenone	Yes		Yes			
		Rubber industry	Yes		Yes			
81-07-2		Saccharin (manufacturing)	Yes	Yes	Yes	Yes	Yes	
94-59-7		Safrole	Yes	Yes	Yes	Yes	Yes	
14167-18-1		Salcomine	Yes		Yes			
107-44-8		sarin	Yes		Yes			
7783-00-8		Selenious acid	Yes	Yes	Yes			
12039-52-0		Selenious acid, dithallium(1+) salt	Yes	Yes	Yes			
7782-49-2		Selenium	Yes	Yes	Yes	Yes	Yes	

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
		Selenium compounds	Yes	Yes	Yes	Yes	Yes	
7791-23-3		Selenium oxychloride	Yes		Yes			
7488-56-4		Selenium sulfide	Yes	Yes	Yes			
630-10-4		Selenourea	Yes	Yes	Yes			
563-41-7		Semiccarbazide hydrochloride	Yes	Yes	Yes			
		Shale oils	Yes		Yes			
3037-72-7		Silane, (4-aminobutyl)diethoxym	Yes		Yes			
7631-36-9		Silica, crystalline	Yes		Yes			
7440-22-4		Silver	Yes	Yes	Yes	Yes	Yes	
		Silver compounds	Yes	Yes	Yes	Yes	Yes	
506-64-9		Silver Cyanide	Yes	Yes	Yes			
93-72-1		Silvex (2,4,5-TP) Spent Propan	Yes	Yes	Yes			
122-34-9		Simazine	Yes		Yes			
7778-43-0		Sodium Arsenite	Yes		Yes			
26628-22-8		Sodium azide (Na(N3))	Yes	Yes	Yes			
124-65-2		Sodium cacodylate	Yes		Yes			
143-33-9		Sodium cyanide (Na(CN))	Yes	Yes	Yes			
62-74-8		Sodium fluoroacetate (Flouroac	Yes		Yes			
13410-01-0		Sodium selenate	Yes		Yes			
10102-20-2		Sodium tellurite	Yes		Yes			
		Soots	Yes		Yes			
		Soots, Tars, and Mineral Oils	Yes		Yes			
900-95-8		Stannane, acetoxytriphenyl-	Yes		Yes			
3810-74-0		Streptomycin sulfate	Yes		Yes			
18883-66-4		Streptozotocin	Yes		Yes			
8001-50-1		Strobane	Yes		Yes			
57-24-9		strychnine and salts	Yes	Yes	Yes			
60-41-3		Strychnine, sulfate	Yes		Yes			
100-42-5		Styrene	Yes	Yes	Yes	Yes	Yes	
96-09-3		Styrene oxide	Yes	Yes	Yes	Yes	Yes	
9-56-7		Sulfallate	Yes		Yes			
		Sulfate	Yes		Yes			
3689-24-5		Sulfotep	Yes	Yes	Yes			
3569-57-1		Sulfoxide, 3-chloropropyl octyl	Yes		Yes			
7446-09-5		Sulfur dioxide	Yes		Yes			
1314-80-3		Sulfur phosphide (R)	Yes	Yes	Yes			
7783-60-0		Sulfur tetrafluoride	Yes		Yes			
7446-11-9		Sulfur trioxide	Yes		Yes			
7664-93-9		Sulfuric acid	Yes	Yes	Yes	Yes	Yes	
93-76-5	2,4,5-	T acid (Acetic acid, 2,4,5-trichlo	Yes	Yes	Yes			
77-81-6		Tabun	Yes		Yes			
		Talc containing asbestiform fibr	Yes		Yes			
54965-24-1		Tamoxifen citrate	Yes		Yes			

VRD 0002024945

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
13494-80-9		Tellurium	Yes		Yes			
7783-80-4		Tellurium hexafluoride	Yes		Yes			
846-50-4		Temazepam	Yes		Yes			
107-49-3		Tepp Tetraethyl pyrophosphate	Yes	Yes	Yes			
13071-79-9		Terbufos	Yes		Yes			
886-50-0		Terbutryn	Yes		Yes			
58-20-8		Testosterone cypionate	Yes		Yes			
315-37-7		Testosterone enanthate	Yes		Yes			
95-94-3	1,2,4,5-	Tetrachlorobenzene	Yes	Yes	Yes			
1746-01-6	2,3,7,8-	Tetrachlorodibenzo-p-dioxin	Yes	Yes	Yes			Yes
		Tetrachlorodibenzo-p-dioxins	Yes	Yes	Yes			
		Tetrachlorodibenzofurans	Yes	Yes	Yes			
79-34-5	1,1,2,2-	Tetrachloroethane	Yes	Yes	Yes	Yes	Yes	
630-20-6	1,1,1,2-	Tetrachloroethane	Yes	Yes	Yes			
25322-20-7		Tetrachloroethane N.O.S.	Yes	Yes	Yes			
127-18-4		Tetrachloroethylene (perchloroethyl	Yes	Yes	Yes	Yes	Yes	
58-90-2	2,4,3,6-	Tetrachlorophenol	Yes	Yes	Yes			
961-11-5		Tetrachlorvinphos	Yes	Yes	Yes	Yes	Yes	
60-54-8		Tetracycline (internal use)	Yes		Yes			
64-75-5		Tetracycline hydrochloride (internal	Yes		Yes			
78-00-2		Tetraethyl lead	Yes	Yes	Yes			
3689-24-5		Tetraethyldithiopyrophosphate	Yes	Yes	Yes			
597-64-8		Tetraethyltin	Yes		Yes			
75-74-1		Tetramethyllead	Yes		Yes			
509-14-8		Tetranitromethane	Yes	Yes	Yes			
50-35-1		Thalidomide	Yes		Yes			
1314-32-5		Thallic oxide	Yes	Yes	Yes			
7440-28-0		Thallium	Yes	Yes	Yes	Yes	Yes	
563-68-8		Thallium (I) acetate	Yes	Yes	Yes			
6533-73-9		Thallium (I) carbonate	Yes	Yes	Yes			
7446-18-6		Thallium (I) sulfate	Yes	Yes	Yes			
7791-12-0		Thallium chloride Ticl	Yes	Yes	Yes			
		Thallium compounds	Yes	Yes	Yes	Yes	Yes	
10102-45-1		Thallium(I) nitrate	Yes	Yes	Yes			
2757-18-8		Thallous malonate	Yes		Yes			
62-55-5		Thioacetamide	Yes	Yes	Yes	Yes	Yes	
2231-57-4		Thiocarbazide	Yes		Yes			
139-65-1	4,4-	Thiodianiline	Yes	Yes	Yes	Yes	Yes	
39196-18-4		Thiofanox	Yes	Yes	Yes			
154-42-7		Thioguanine	Yes		Yes			
297-97-2		Thionazin	Yes	Yes	Yes			
108-98-5		Thiophenol (Benzenethiol)	Yes	Yes	Yes			
79-19-6		Thiosemicarbazide	Yes	Yes	Yes			

CAS #		Chemical Name	Legislation H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
62-56-6		Thiourea	Yes	Yes	Yes	Yes	Yes	
5344-82-1		Thiourea, (2-chlorophenyl)	Yes	Yes	Yes			
614-78-8		Thiourea, (2-methylphenyl)-	Yes		Yes			
137-26-8		Thiram	Yes	Yes	Yes			
1314-20-1		Thorium dioxide	Yes	Yes	Yes	Yes	Yes	
7550-45-0		Titanium tetrachloride	Yes	Yes	Yes	Yes	Yes	
		Tobacco products, smokeless	Yes		Yes			
		Tobacco smoke	Yes		Yes			
49842-07-1		Tobramycin sulfate	Yes		Yes			
108-88-3		Toluene	Yes	Yes	Yes	Yes	Yes	
584-84-9		Toluene-2,4-diisocyanate	Yes	Yes	Yes	Yes	Yes	
823-40-5		Toluene-2,6-diamine	Yes	Yes	Yes			
91-08-7		Toluene-2,6-diisocyanate	Yes	Yes	Yes	Yes	Yes	
496-72-0		Toluene-3,4-diamine	Yes	Yes	Yes			
26471-62-5		Toluenediisocyanate	Yes	Yes	Yes	Yes	Yes	
95-53-4	o-	Toluidine	Yes	Yes	Yes	Yes	Yes	
106-49-0	p-	Toluidine	Yes	Yes	Yes			
636-21-5	o-	Toluidine hydrochloride	Yes	Yes	Yes	Yes	Yes	
8001-35-2		Toxaphene	Yes	Yes	Yes	Yes	Yes	Yes
299-75-2		Treosulphan	Yes		Yes			
1031-47-6		Triamiphos	Yes		Yes			
68-76-8		Triaziquone	Yes	Yes	Yes	Yes	Yes	
24017-47-8		Triazofos	Yes		Yes			
28911-01-5		Triazolam	Yes		Yes			
78-48-8	s,s,s-	Tributyl Phosphorotrithioate	Yes		Yes			
		Tributylins	Yes		Yes			
52-68-6		Trichlorfon	Yes	Yes	Yes	Yes	Yes	
1558-25-4		Trichloro(chloromethyl)silane	Yes		Yes			
27137-85-5		Trichloro(dichlorophenyl)silane	Yes		Yes			
76-02-8		Trichloroacetyl chloride	Yes		Yes			
120-82-1	1,2,4-	Trichlorobenzene	Yes	Yes	Yes	Yes	Yes	
71-55-6	1,1,1-	Trichloroethane	Yes	Yes	Yes	Yes	Yes	
79-00-5	1,12-	Trichloroethane	Yes	Yes	Yes	Yes	Yes	
79-01-6		Trichloroethylene	Yes	Yes	Yes	Yes	Yes	
115-21-9		Trichloroethylsilane	Yes		Yes			
75-69-4		Trichloromonofluoromethane	Yes	Yes	Yes			
327-98-0		Trichloronate	Yes		Yes			
95-95-4	2,4,5-	Trichlorophenol	Yes	Yes	Yes	Yes	Yes	
88-06-2	2,4,6-	Trichlorophenol	Yes	Yes	Yes	Yes	Yes	
98-13-5		Trichlorophenylsilane	Yes		Yes			
96-18-4	1,2,3-	Trichloropropane	Yes	Yes	Yes			
25735-29-9		Trichloropropane, N.O.S.	Yes	Yes	Yes			
998-30-1		Triethoxysilane	Yes		Yes			

VRD 0002024946

Chemicals Subject To Toxic Use Reduction Legislation

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
126-68-1	o,o,o-	Triethyl phosphorothioate	Yes	Yes	Yes			
121-44-8		Triethylamine	Yes		Yes			
1582-09-8		Trifluralin	Yes	Yes	Yes	Yes	Yes	
2303-17-5		Trillate	Yes		Yes			
13647-35-3		Trilostane	Yes		Yes			
127-48-0		Trimethadione	Yes		Yes			
95-63-6	1,2,4-	Trimethylbenzene	Yes	Yes	Yes	Yes	Yes	
75-77-4		Trimethylchlorosilane	Yes		Yes			
824-11-3		Trimethylolpropane phosphite	Yes		Yes			
540-84-1	2,24-	Trimethylpentane	Yes		Yes			
1066-45-1		Trimethyltin chloride	Yes		Yes			
99-35-4	1,3,5-	Trinitrobenzene (R,T)	Yes	Yes	Yes			
639-58-7		*Triphenyltin chloride*	Yes		Yes			
76-87-9		Triphenyltin hydroxide TPTH	Yes		Yes			
126-72-7		Tris (2,3-dibromopropyl) phosphate	Yes	Yes	Yes	Yes	Yes	
52-22-4		Tris(1-aziridinyl) phosphine sulphide	Yes		Yes			
52-24-4		Tris(1-aziridinyl)phosphine sulfide	Yes	Yes	Yes			
		Tris(2,3-dibromopropyl) phosphate	Yes		Yes			
555-77-1		Tris(2-chloroethyl)amine	Yes		Yes			
72-57-1		Trypan blue (2,7-Naphthalenedisulfo	Yes	Yes	Yes			
50-31-7		Trysben	Yes		Yes			
66-75-1		Uracil Mustard (2,4-(1H,3H)-Pyrimid	Yes	Yes	Yes			
51-79-6		Urethane	Yes	Yes	Yes	Yes	Yes	
26995-91-5		*Urofollitropin*	Yes		Yes			
2001-95-8		Valinomycin	Yes		Yes			
99-66-1		Valproate (Valproic Acid)	Yes		Yes			
7440-62-2		Vanadium (fume or dust)	Yes	Yes	Yes	Yes	Yes	
1314-62-1		Vanadium pentoxide	Yes	Yes	Yes			
143-67-9		Vinblastine sulfate	Yes		Yes			
2068-78-2		Vincristine sulfate	Yes		Yes			
108-05-4		Vinyl acetate	Yes	Yes	Yes	Yes	Yes	
593-60-2		Vinyl bromide	Yes	Yes	Yes	Yes	Yes	
75-01-4		Vinyl chloride	Yes	Yes	Yes	Yes	Yes	
75-35-4		Vinylidene chloride	Yes	Yes	Yes	Yes	Yes	
129-06-6		Warfarin Sodium	Yes		Yes			
81-81-2		*Warfarin, & salts, when presint at co*	Yes	Yes	Yes			
108-38-3	m-	Xylene	Yes	Yes	Yes	Yes	Yes	
95-47-6	o-	Xylene	Yes	Yes	Yes	Yes	Yes	
106-42-3	p-	Xylene	Yes	Yes	Yes	Yes	Yes	
1330-20-7		Xylene (mixed isomers)	Yes	Yes	Yes	Yes	Yes	
87-62-7	2,6-	Xylidine	Yes	Yes	Yes	Yes	Yes	
28347-13-9		*Xylylene dichloride*	Yes		Yes			
7440-66-6		*Zinc (fume or dust)*	Yes	Yes	Yes	Yes	Yes	

CAS #		Chemical Name	H.R. 2880	*H.R. 3865	S. 2123	** S. 976	S. 761	S. 1081
		Zinc compounds	Yes	Yes	Yes	Yes	Yes	
557-21-1		Zinc Cyanide	Yes	Yes	Yes			
1314-84-7		Zinc phosphide Zn3P2	Yes	Yes	Yes			
58270-08-9		Zinc, dichloro(4,4-dimethyl-5(((	Yes		Yes			
12122-67-7		Zineb	Yes	Yes	Yes	Yes	Yes	
Number of Chemicals Subject To Toxic Use Reduction			1077	784	1077	621	329	9

(Compound categories that are listed above are counted as 1 chemical even though they may include many more individual chemicals that would be subject to the legislation)

* Analysis here is of the proposed Community Right-To-Know More Amendment to H.R. 3865 offered by Mr. Sikorski and Mr Rinaldo

** S. 976 as amended by Senators Lautenberg & Durenberger