



ENVIRONMENTAL ISSUES ON PVC LATIN-AMERICA

INTRODUCTION.

IT IS WELL KNOWN THAT IN RECENT YEARS PLASTICS HAVE BEEN
SUBJECTED TO ENVIRONMENTAL REGULATIONS MAINLY IN THE US AND
EUROPE.

AMONG ALL PLASTICS, PERHAPS PVC HAS BEEN THE MOST DISCUSSED
AND CRITICIZED BECAUSE OF ITS ALLEGED HARM TO HEALTH (RVCM)
AND TO THE ENVIRONMENT (INCINERATION AND POLLUTION).

ARGUMENTS AGAINST THIS POLYMER HAVE BEEN GENERATED BY
ECOLOGICAL ORGANIZATIONS AND IT CAN BE SAID THAT THE MAJORITY
OF THIS ARGUMENTS ARE COMPLETELY UNREAL.

THIS SITUATION HAS AFFECTED PVC REPUTATION TO AN EXTENT THAT
IN SOME DEVELOPED COUNTRIES RESTRICTIONS HAVE BEEN IMPOSED
FOR PVC USE.

IN THE CASE OF LATIN AMERICA, BEFORE 1987 THERE WAS NO MAJOR
CONCERN ABOUT PVC IN HEALTH AND ENVIRONMENT. NOW,
GOVERNMENTS ARE BECOMING MORE INTERESTED ABOUT THE SUBJECT.



IN GENERAL IT CAN BE CONSIDERED THAT PRESENTLY THERE ARE NO RESTRICTIONS FOR THE USE OF PVC FROM AN ENVIRONMENTAL POINT OF VIEW. HOWEVER SOME REGULATIONS ARE IN THE PROCESS OF BEING ISSUED REGARDING THE RVCM CONTENT IN PVC FOR FOOD PACKAGING.

BEFORE DISCUSSING CURRENT SITUATION OF PVC IN LATIN AMERICA IT WOULD BE INTERESTING TO MENTION SOME ASPECTS ABOUT MARKET AND CONSUMPTION IN 1988.

A > TOTAL MARKET.

LATIN AMERICAN MARKET IS SHOWN ON EXHIBIT 1.

IT CAN BE CONCLUDED THAT THE USE OF PVC IN THIS PART OF THE WORLD IS VERY SMALL IF IT IS CONSIDERED THE HIGH POPULATION.

PVC MARKET LATIN-AMERICA 1988

METRIC TONS/YEAR

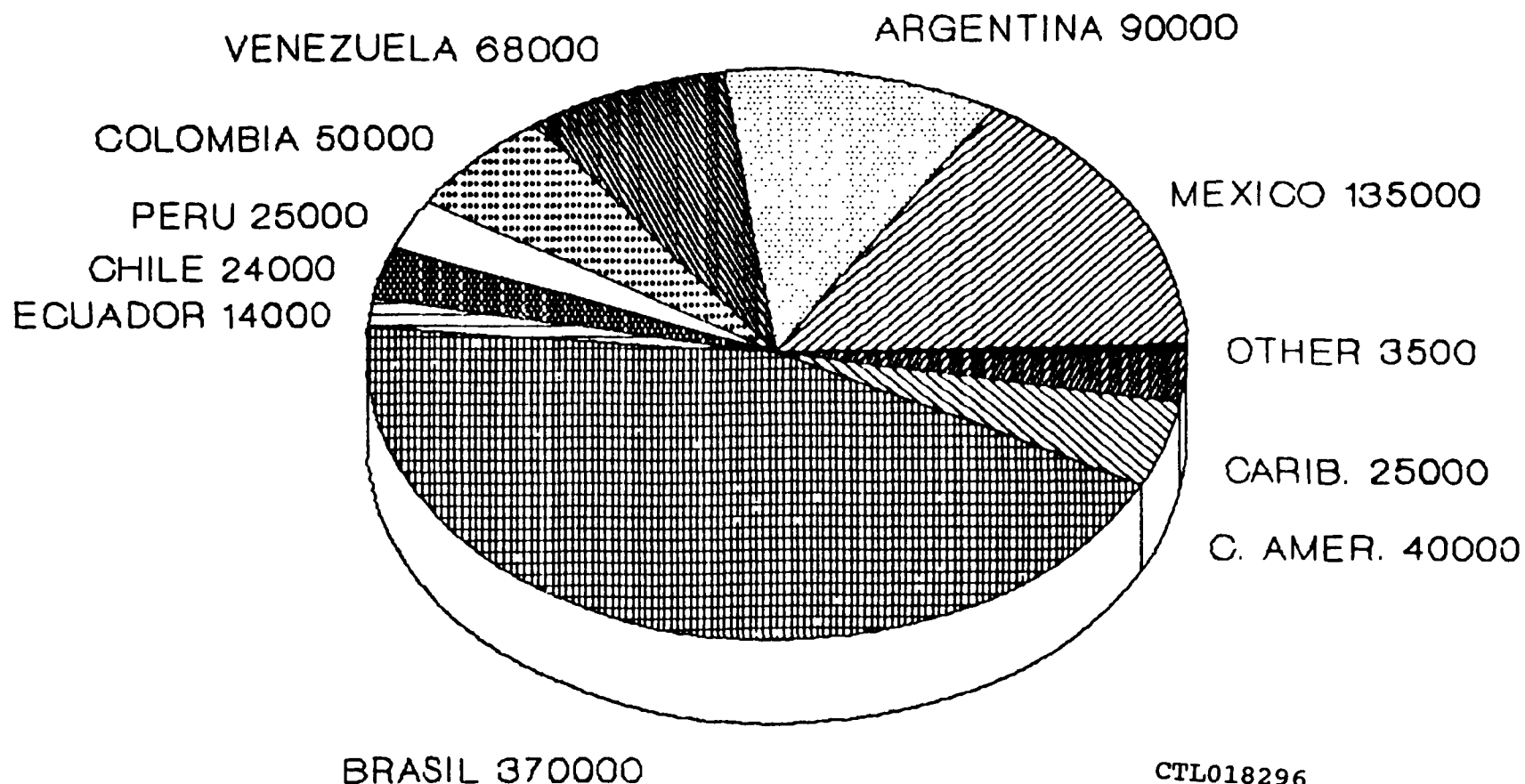


EXHIBIT 1

PVC MARKET LATIN-AMERICA
1988

METRIC TONS/YEAR

BRASIL	370,000
MEXICO	135,000
ARGENTINA	90,000
VENEZUELA	68,000
COLOMBIA	50,000
PERU	25,000
CHILE	24,000
EQUADOR	14,000
BOLIVIA	3,500
CENTRAL AMERICA	40,000
CARIBBEAN	25,000

MT/YEAR	844,500
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ONLY 845,000 MT OF PVC FOR ABOUT 350 MILLION PEOPLE. THIS GIVES A CONSUMPTION PER CAPITA OF 2.4 KG. OF PVC/YEAR WHICH IS VERY LOW AS COMPARED TO DEVELOPED COUNTRIES SUCH AS GERMANY 16 KG., FRANCE 13 KG. OR JAPAN 14 KG.

MOREOVER CONSUMPTION OF PVC IN THE US IS ABOUT 4.5 TIMES GREATER THAN IN LATIN AMERICA, BUT POPULATION HERE IS 40 PERCENT MORE SO REAL CONSUMPTION IS ABOUT 6.3 TIMES MORE.

B) MARKET SEGMENTATION.

IT IS DIFFERENT IN EACH COUNTRY BUT IN AVERAGE THE SEGMENTATION CAN BE CONSIDERED AS SHOWN IN EXHIBIT 2.

PVC MARKET SEGMENTATION 1988

LATIN-AMERICA

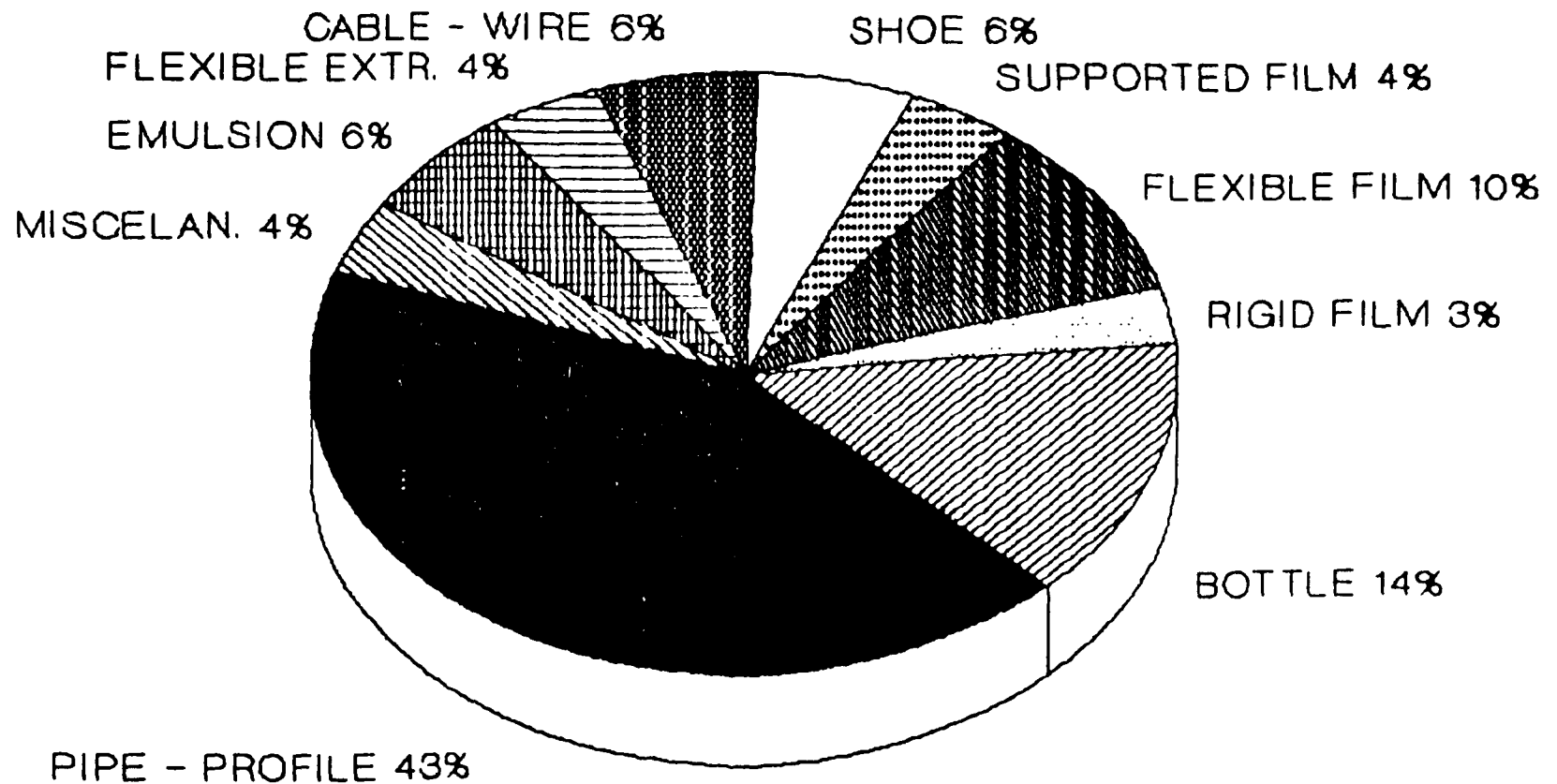


EXHIBIT 2MARKET SEGMENTATION
LATIN-AMERICA

MARKET	%
PIPE & PROFILE	43
BOTTLE	14
RIGID FILM	3
TOTAL RIGID	60
FLEXIBLE FILM	10
SUPPORTED FILM	4
SHOE	6
CABLE & WIRE	6
FLEXIBLE EXTRUSION	4
EMULSION	6
MISCELANEOUS	4
TOTAL FLEXIBLE	40



PVC PACKAGING INDUSTRY.

THE PVC PACKAGING INDUSTRY IS VERY ACTIVE IN LATIN AMERICA. THEREFORE A BAN ON PVC USE WOULD HAVE A NEGATIVE EFFECT NOT ONLY FOR PVC PRODUCERS BUT ALSO FOR USERS SUCH AS OIL, PHARMACEUTICAL, DETERGENT AND COSMETICS MANUFACTURERS.

THE MAIN USE FOR PVC PACKAGING IS FOR EDIBLE OIL. SINCE 1975 THERE WERE STRONG PROGRAMS TO REPLACE GLASS FOR PVC. THE SUCCESS WAS SO IMPORTANT THAT TODAY ALMOST 90 PERCENT OF OIL IS PACKED IN PVC BOTTLES.

OTHER DEVELOPMENTS FOR PVC WERE DIRECTED FOR RIGID FILMS IN THE PHARMACEUTICAL AND TOY INDUSTRIES (BLISTER PACK), THE PINE OIL AND THE FOOD WRAPPING SEGMENTS (FLEXIBLE FILMS).

PVC IS ALSO WELL ACCEPTED FOR SHAMPOOS AND COSMETICS, FOR VINEGAR, MINERAL WATER, FOR JUICE AND OTHER FOOD PRODUCTS SUCH AS SOYBEAN SAUCE, JAM, COFFEE AND DETERGENTS.

SOME PVC DEVELOPMENTS ARE BEING STUDIED FOR HOT-FILL APPLICATIONS AND OTHERS TO REPLACE GLASS WHICH HAS STILL A HIGH SHARE OF THE BOTTLE MARKET.

THE PATTERN OF PVC CONSUMPTION FOR PACKAGING HAS BEEN ESTIMATED IN 1988 TO BE: SEE EXHIBIT 3.

RECENTLY SOME PET RESIN AND MACHINE MANUFACTURERS HAVE PROMOTED THE USE OF THIS POLYMER TO REPLACE PVC BOTTLES AND FILM. THIS HAS CREATED UNCERTAINTY IN NEW PROJECTS BECAUSE NOW PVC TRANSFORMERS ARE LOOKING AT PET.

A BAN ON PVC WILL CERTAINLY BENEFIT PET BECAUSE IT IS BEING PROMOTED AS "COMPLETELY ACCEPTED BY FDA".

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PVC CONSUMPTION 1988 PACKAGING METRIC TONS/YEAR

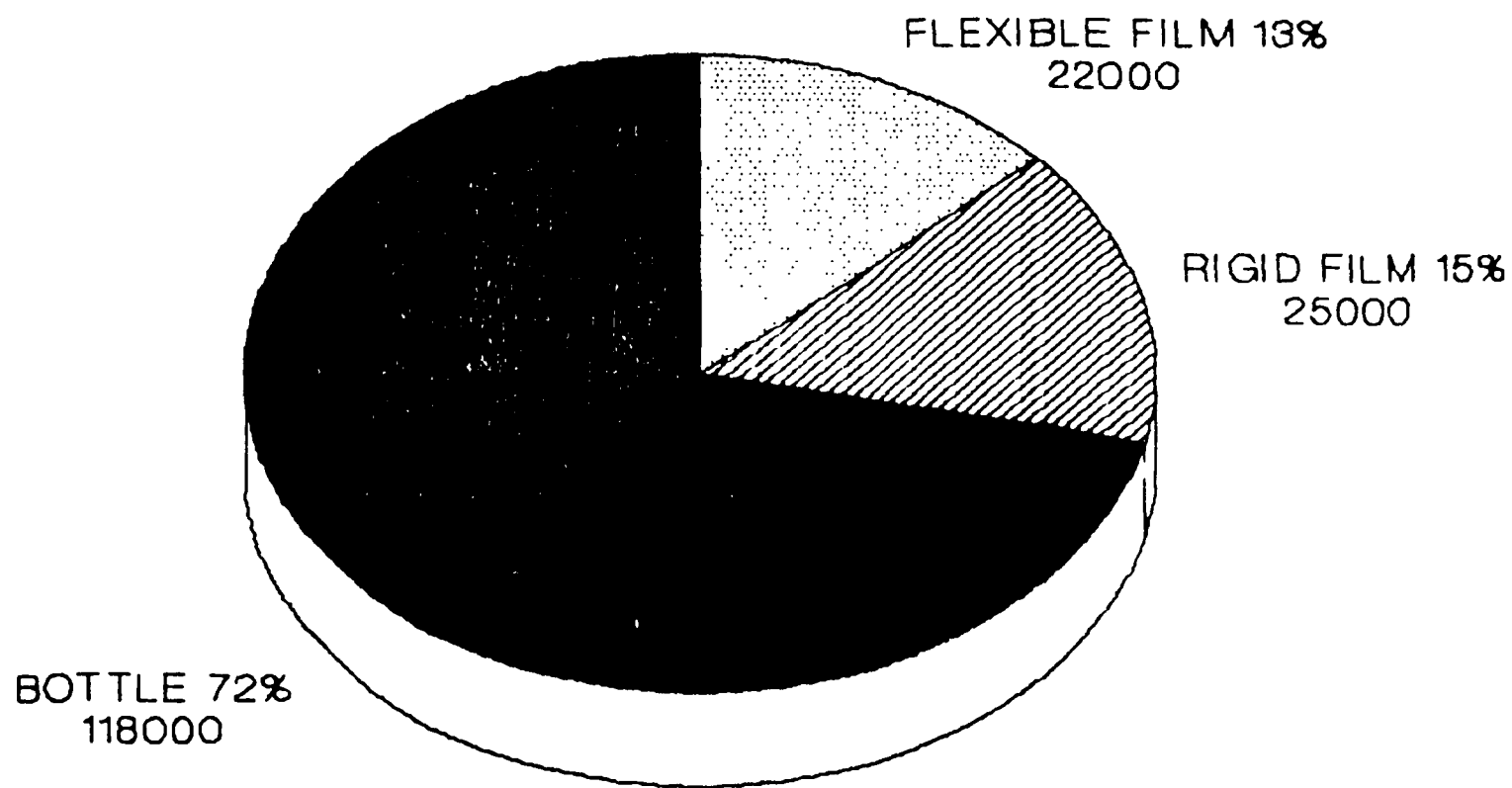


EXHIBIT 3PVC CONSUMPTION
IN PACKAGING
1988

	M/TONS	%
BOTTLES		
EDIBLE OIL	77,000	46.6
COSMETIC/ SHAMPOOS	20,000	12.0
CLEANERS/ DETERGENTS	11,000	6.6
OTHERS	<u>10,000</u>	<u>6.3</u>
	118,000	71.5
 RIGID FILM		
PHARMACEUTICAL	14,000	8.5
TOYS AND HOME PRODUCTS	5,000	3.0
OTHERS	<u>6,000</u>	<u>3.5</u>
	25,000	15.0
 FLEXIBLE FILM		
FOOD WRAPPING	14,000	8.5
OTHERS	<u>8,000</u>	<u>5.0</u>
	22,000	13.5
 TOTAL :	165,000	100.0



GENERAL OUTLOOK.

GOVERNMENTS ARE STARTING TO WORRY ABOUT ENVIRONMENT. IN LATIN AMERICA THE URBAN CONCENTRATION IS VERY HIGH. AS AN EXAMPLE WE CAN MENTION MEXICO CITY, RIO DE JANEIRO, CARACAS, BUENOS AIRES, ETC.

THIS MEANS THAT THIS CITIES HAVE A HIGH DEGREE OF POLLUTION AND WITH THE INCREASE OF POPULATION THE WASTE DISPOSAL PROBLEM HAS TURNED TO BE A MAJOR CONCERN.

NORMALLY GARBAGE IS NOT INCINERATED, IT IS KEPT IN CERTAIN PLACES WHERE A SMALL PART OF IT IS RECYCLED (GLASS, CARTON, PLASTIC) AND THE REMAINING IS USED FOR SANITARY LANDFILLS.

HOWEVER THE RATE OF GENERATION OF WASTE IN OUR COUNTRIES IS HIGHER THAN THE LANDFILL CAPACITY. THIS MEANS THAT SOMETHING HAS TO BE DONE REGARDING NON-BIODEGRADABLE SOLID WASTES.

IN THIS CASE LATIN AMERICA WILL HAVE TO LISTEN, READ, TAKE NOTES AND DESIGN FROM NOW ON PROPOSALS THAT WILL CONTROL THE USE OF DISPOSABLE PLASTIC MATERIALS, SPECIALLY PVC AND PE.

ENVIRONMENT IS NOT THE ONLY FUTURE PROBLEM FOR PVC. ACCORDING TO THE PROPOSAL OF FDA IN 1986 REGARDING THE CONTENT OF RVCM IN PVC, BIG SPECULATION HAS BEEN GENERATED IN LATIN AMERICA.



PVC FOOD-PACKAGING HAS BEEN USED SINCE 1965 MAINLY FOR BOTTLING EDIBLE OIL AND IT IS A FACT THAT LNO ANGIOSARCOMA DEATHS THAT OCCURRED IN LATIN AMERICA CAN BE DIRECTLY IMPUTED TO RVCM IN BOTTLES.

IN THOSE DAYS THERE WAS NO CONTROL OF RVCM AND NO ONE WILL KNOW WHAT WERE THE REAL LEVELS OF MONOMER.

AT THIS MOMENT IN THREE COUNTRIES SOME NORMS ARE BEING ISSUED REGARDING THE RVCM CONTENT. WE FEEL THAT THIS IS ONLY THE BEGGINING BECAUSE AS I WILL MENTION LATER, THE NORMS ARE VERY FLEXIBLE.

THERE IS A POINT THAT HAVE CONFUSED MANY PVC PRODUCERS: IN 1975 FDA PROPOSED TO PROHIBIT THE USE OF RIGID AND SEMIRIGID PVC IN FOOD CONTACT ARTICLES. SINCE THAT YEAR UNTIL 1987 IN LATIN AMERICA THERE WAS NO MAJOR CONCERN ABOUT PVC USE FOR FOOD PACKAGING, THE MARKETS GREW DURING THAT PERIOD AT A RATE OF AT LEAST 5 %.

HOWEVER, AFTER THE NEW FDA PROPOSAL WAS ISSUED CUSTOMERS AND SOME GOVERNMENTS ARE BEGGINNING TO WORRY ABOUT PVC USE.

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EXHIBIT 4

GENERAL OUTLOOK PVC

- GOVERNMENTS BEGIN TO WORRY ABOUT ENVIRONMENT AND WASTE DISPOSAL.
- COMMON PRACTICE IS TO USE WASTES FOR SANITARY LANDFILLS.
- NORMALLY INCINERATION IS NOT USED (NO DIOXIN PROBLEM).
- FDA PROPOSAL FOR RVCM GENERATED SPECULATION.
- NEW NORMS FOR PVC PACKAGING ARE BEING ISSUED.
- CERTAIN BANS FOR PVC USE HAVE BEEN ISSUED IN MEXICO.

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RECENT FACTS.

LATIN AMERICA TODAY IS OBSERVING WHAT IS HAPPENING IN THE UNITED STATES. NO FORMAL RESTRICTIONS HAVE BEEN IMPOSED FOR PVC USE BUT GOVERNMENT INSTITUTIONS ARE NOW BEGINNING TO QUESTION PVC PRODUCERS ABOUT HEALTH AND ENVIRONMENT.

THE MAIN FOCUS HAS BEEN BOTTLES AND FILMS SPECIALLY FOR FOOD PACKAGING.

THERE WILL BE TWO MAJOR CONCERNS ABOUT PVC: RECYCLING AND RVCM CONTENT.

RECYCLING.

AS IT WAS MENTIONED THE CONSUMPTION OF PVC IS QUITE LOW SO THERE IS NO MAJOR PROBLEM ON RECYCLING PVC.

IN LATIN AMERICA THERE ARE A VERY FEW FACILITIES FOR GARBAGE RECYCLING AND IN THIS CASE NO SEPARATION OF PVC IS DONE.

OUR ESTIMATE IS THAT ONLY 3 TO 5 % OF PVC BOTTLES AND FILM IS RECYCLED BUT IT IS DONE MORE FOR BUSINESS THAN FOR OBLIGATION.

WHEN THE WASTE ARRIVES TO THE MUNICIPAL AREAS RESERVED FOR GARBAGE HUNDREDS OF WORKERS SELECT BY HAND PVC BOTTLES OR

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EXHIBIT 5

ENVIRONMENTAL
ISSUES

- NO FORMAL ISSUES AT THIS
MOMENT.
- RECYCLING IS DONE FOR
BUSINESS.
- 3 TO 5 PERCENT OF BOTTLES
AND FILMS ARE CURRENTLY
RECYCLED.
- LATIN AMERICA WILL HAVE TO
WAIT, ANALYSE, AND DESIGN
PROPOSALS THAT WILL CONTROL
PVC DISPOSAL.

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FILMS THEN THEY ARE WASHED AND SOLD TO COMPANIES IN THE RECYCLING BUSINESS.

THE COST OF THIS OPERATION IS VERY LOW. THE SALARIES OF THESE PEOPLE ARE WELL BELOW FROM MINIMUM WAGES.

TODAY IN LATIN AMERICA THERE ARE NO FORMAL REGULATIONS FOR THE ENVIRONMENTAL IMPACT OF PVC.

NOTHING HAS BEEN SAID ABOUT THE DIOXIN OR ACID RAIN PROBLEM.

IN THE PIPE INDUSTRY THERE HAS NOT BEEN ANY ATTACK TO PVC. EVEN SOME PRODUCERS USE LEAD BASED FORMULATIONS FOR WATER SUPPLY SYSTEMS.

RVCM.

IN THIS CASE GOVERNMENTS HAVE BEEN MORE CONCERNED. IN EXHIBIT 6 IT IS SHOWN WHAT SOME COUNTRIES HAVE DONE ABOUT RVCM CONTENT.

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EXHIBIT 6
REGULATIONS ON
RVCM

COUNTRY	REGULATION
MEXICO	PROPOSAL 5 PPM IN COMPOUND.
VENEZUELA	0.5 PPM IN RESIN PROPOSAL
ARGENTINA	NO REGULATION
COLOMBIA	NO REGULATION
ECUADOR	NO REGULATION
DOMINICAN REPUBLIC	NO REGULATION
PERU	NO REGULATION
BRAZIL	NO REGULATION
GUATEMALA	20 PPM IN RESIN

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IT IS CLEAR THAT IN LATIN AMERICA THERE ARE ALMOST NO REGULATIONS FOR MONOMER CONTENT.

THE REASON IS VERY SIMPLE: MANY COUNTRIES PURCHASE PVC RESIN OR COMPOUNDS FROM THE US OR EUROPE AND AS LONG AS THEY ARE CLASSIFIED AS "NON-TOXIC" OR "FOOD GRADE" GOVERNMENTS WILL NOT REGULATE THIS PRODUCTS.

HOWEVER IT IS IMPORTANT TO MENTION THAT CUSTOMERS TODAY REQUEST FOR PVC TO BE USED IN FOOD APPLICATIONS A LEVEL OF 1 PPM OF VCM IN RESIN.

THIS IS NOT BUT A GENERAL FEELING AND WAS ORIGINATED FROM THE FDA PROPOSAL TO THE EXTENT THAT IN TWO COUNTRIES (MEXICO AND GUATEMALA) THE MINISTRY OF HEALTH BANNED THE USE OF PVC FOR EDIBLE OIL AND REQUESTED A LEVEL OF 10 PPB RESPECTIVELY (COMMENT).

IN MEXICO 95 % OF OIL IS BOTTLED IN PVC AND EVERY TWO YEARS OIL MANUFACTURERS HAVE TO RENEW THEIR LICENSE TO COMMERCIALIZE OIL FROM A HEALTH POINT OF VIEW.

IN LATE 1988 TWO OF OUR CUSTOMERS RECEIVED A COMMUNICATION THAT STATED LITERALLY "RENEWAL OF YOUR LICENCE IS ACCEPTED BUT PVC BOTTLES CAN NOT BE USED FOR PACKAGING SINCE IT IS BAD FOR HEALTH".

THIS GENEATED A GREAT CONFUSION, THERE WERE NO MORE REASONS GIVEN.

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IN A MEETING WITH THE MINISTRY OF HEALTH WE LEARNED THAT THIS BAN CAME FROM INFORMATION FOUND IN SWITZERLAND AND US.

SINCE THERE WERE NO FACTS THAT DEMONSTRATED THAT STATEMENT THE BAN WAS RETIRED.

THIS IS ONLY AN EXAMPLE OF HOW MISINFORMATION OF INTERNATIONAL REGULATIONS CAN LEAD TO A DRASTIC BAN.

CONCLUSION.

THE CURRENT SITUATION FOR PVC IN LATIN AMERICA IS NOT CRITICAL AS COMPARED TO THE ONE IN EUROPE AND IN THE US.

FUTURE REGULATIONS WILL SURELY COME FROM THE US SO IT IS VERY IMPORTANT THAT INFORMATION IS ACCURATE AND REAL IN ORDER TO AVOID RUMORS AND SPECULATIONS.

IN MEXICO THE IMMEDIATE CONSEQUENCE FOR MISINFORMATION HAS BEEN THAT PET IS NOW PRESENT IN FOOD PACKAGING. SOME CUSTOMERS HAVE PREFERRED THIS PRODUCT BECAUSE "PVC IS BAD FOR HEALTH".

MARKET PENETRATION FOR PET IS SMALL BUT IF WE DO NOT REACT IT WILL GAIN A LARGER MARKET SHARE.

THE GENERAL CONSENSUS IS THAT IN 3 OR 4 YEARS THERE WILL BE FORMAL REGULATIONS ON RVCM CONTENT IN LATIN AMERICA, BUT IT DEPENDS ON THE RESULTS OBTAINED IN DEVELOPED COUNTRIES.



IN THE MEANTIME MARKETS WILL CONTINUE TO DEMAND FOR PVC TO BE "NON-TOXIC" AND THIS MEANS THAT SOME CUSTOMERS WILL CHECK BY THEMSELVES THE RVCM CONTENT.

IN THE NEAR FUTURE WE DO NOT FORECAST ANY BAN FOR PVC PACKAGING USE FROM AN ENVIRONMENTAL POINT OF VIEW.

MOREOVER THE USE OF PVC FOR FOOD PACKAGING IN LATIN AMERICA IS GROWING AT A RATE OF 5 PERCENT PER YEAR, A FIGURE HIGHER THAN THE TOTAL GROWTH OF THE PVC INDUSTRY.

IT CERTAINLY WOULD BE INTERESTING AND HELPFUL IF THE VYNIL INSTITUTE COULD WORK SOME HOW WITH LATIN AMERICAN PVC PRODUCERS IN ORDER TO DEFEND AND PROMOTE THE USE OF PVC.

MANY U.S. PVC PRODUCERS EXPORT RESINS, COMPOUNDS AND ADDITIVES TO LATIN AMERICA SO IN THE EVENT A BAN ON PVC ARISES THEY WILL SURELY BE AFFECTED SO IT IS IMPORTANT TO WORK TOGETHER IN THIS MATTER AND OUR FEELING IS THAT THE BEST WAY TO DO IT IS TO RECEIVE FRESH AND RELIABLE INFORMATION SO WE CAN HANDLE THE DIFFERENT SITUATIONS WITH BETTER BASIS WITH OUR GOVERNMENTS.

03.05.1989.
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