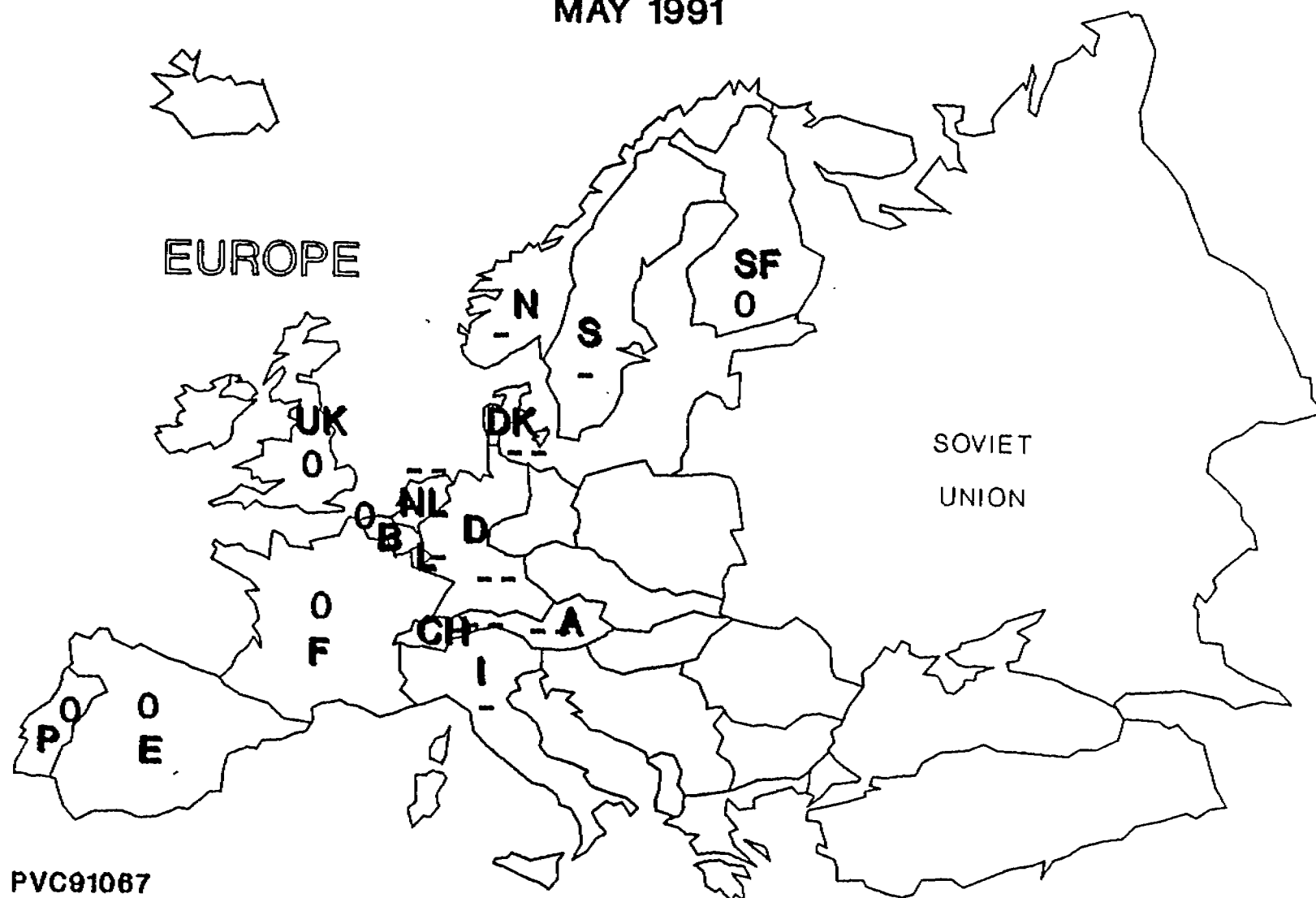


PVC AND ENVIRONMENT

'MAY 1991



PVC-updates - Plastic Waste Management

- Austria
- no ban on PVC-packaging expected for the moment
 - waste bill adopted with emphasis on reduction and recycling
 - recycling companies started for PVC and expanded PS
- Belgium
- collection system for plastic bottles in operation (Flemisch region)
- Denmark
- Voluntary PVC-agreement between government and industry:
 - . PVC-waste not incinerated together with ordinary waste;
 - . PVC-waste shall be recycled instead dumped;
 - . reduction use of lead stabilizers and chloroparaffines in PVC;
 - . environmental assessments according to "cradle to grave principle";
 - . targets for PVC-packaging, recycling of PVC-building products.
- France
- ecologist groups and industry worked together in collection scheme for (PVC-)bottles (operation Pelican, school program)
 - Dunkerque: 80% return of PVC-bottles
- FRG
- recycling scheme for PVC-flooring in action since December 1990 by PVC-flooring producers; target is to recycle 300T till end of 1991
 - PVC less discussed than before, much attention for recycling; in some federal states pressure and action for total prohibition of use / application of PVC (Green party conservative party)
 - targets for plastics packaging officially approved:
 - . 01.01.93 collecting 30% recycling 10%
 - . 01.01.95 collecting 80% recycling 64%
 - mandatory deposit on plastic bottles
- Italy
- packaging waste management law (no. 475) being implemented
 - national consortium of public bodies, industry and trade for collection and recycling of waste packs and for every type if recycling a minimum is fixed: for plastics 40% min., in period 1990-1992 financial resources 10% of cost of raw materials if target is not reached, containers will be taxed

- Netherlands - short product life application of PVC (a.o. packaging) under strong attack
- recycling projects developing
 - covenant on packaging between packaging industry and government:

packaging waste	in 2000 90% of 1986
recycling in 1995 40%	in 2000 60%
landfill in 1995 40%	in 2000 0%
incinerator	in 2000 max. 40%
- Norway - only environmental impact of production facilities is an issue
- Sweden - pressure against use of PVC fairly moderate
- proposal of forbid use of PVC for foodpackaging has been withdrawn
 - combustion of PVC in municipal waste is no longer an issue
- Switzerland - pressure to trade and industry to withdraw from PVC on the Swiss market
- on municipal level problems regarding PVC-building materials
 - recycling projects for all plastics
- U.K. - recycling extremely important key to handling the situation; local municipalities must provide recycling plans
- Finland - agreement within packaging industry to decrease PVC-consumption is difficult to put into practice. Minister of Environment accepted that substitution must mean an improvement in environmental performance
- Greece - PVC waste is considered by Greek Law as normal industrial waste. The law requires disposal to be made in certain landfills for solid industrial wastes under state supervision / control. Above state landfills have not been arranged yet.

Incinerator guidelines in Austria, FRG, Neth and Finland are for 0.1 ng/m³ of dioxins TEQ.

APME-action in framework of discussions around VCM / PVC

APME = Association of Plastics Manufacturers Europe

ECVM = European Council of Vinyl Manufacturers

Working group

- Inquiry into environmental impact of VCM- and PVC-production. Emissions / discharge of EDC, VCM, C_2H_4 , HCl, Cu, waste disposal, biodegradable compounds.
All members participated, report only available for participants.
- Design of VCM-modelplant has been finished, draft submitted to ECVM. The model is based on answers to questionnaires and personal judgement of the Working Group experts.
The design of the PVC-modelplant is in hand.

LIQUID ORGANO-HALOGENATED WASTE INCINERATION AT NORTH SEA

June 1988 Oslo commission (B, Denm, F, FRG, Neth, Nor, Sw, UK, Finl,
Ireland, Iceland, Portugal, Spain)

1st January 1991 65% reduction
1st January 1995 finished

REGULATORY ISSUES CONCERNING EDC/VCM IN EUROPE
HIGHLIGHTS AND DEVELOPMENTS

- Belgium** - No national standards concerning EDC/VCM environmental control.
In most cases Belgium authorities refer to international standards (WHO, EPA, TA-luft).
- France** - No national standards, only local regulations.
- FRG** - New regulations expected for EDC-concentration in occupational areas, because of EDC being clearly found carcinogenic in animal experiments.
- National regulations are being prepared for VCM and EDC concentration in plant effluents.
Following limit concentrations are proposed:
VCM:
All volatile halogenated hydrocarbons e.g. VCM max. 10 mg/l waste water at each isolated plant boundary.
S, mass and copo PVC 1 mg/l or 5 g/ton prod.cap. daily av. from 1991
E, microsuspension PVC 5 mg/l or 20 g/ton prod.cap. daily av. from 1991
E, microsuspension PVC 2 mg/l or 10 g/ton prod.cap. daily av. from 1993
EDC:
All adsorbable organic halogen compounds e.g. EDC 2 mg/l waste water or 20 g/ton production.
- Italy** - Mid 1990 national law regarding a number of pollutants (o.a. EDC and VCM) is expected. For VCM adoption of TA-luft of F.R.G. probably.
- Netherlands** - Expected lowering MAC-value for EDC from 200 mg/m³ to 80 mg/m³ at least.
- Authorities use TA-luft officially as reference but may go beyond.
- Much attention to Dioxin etc. formation in incineration processes.
- Norway** - The emission limits will be changed by the authorities in 1990.

U.K.

- Environmental Protection Act into operation legalising the concept of integrated pollution control to water, air and land.
- Application for authorisation for all existing VCM- and PVC-manufacturing processes required before July 1993. Her Majesty's Inspectorate of Pollution will issue a process guidance note for each process including discharge standards for air and water. Authorisation of the process based on using the Best Available Techniques not Entailing Excessive Cost.
- Except those for occupational environment revised standards for VCM and EDC are expected in line with EEC.
- Legalisation on waste management - originators responsibility for what happens to the waste within reasonable limits.

REGULATORY STANDARDS CONCERNING VCM IN EUROPE

. Emission limits (air)

- B - TA-luft
- F - 0 or 15 ppmv (local regulations).
- FRG - $< 5 \text{ mg/m}^3$ daily average, when massflow
- $> 25 \text{ g/h}$ (TA-luft, closed systems); transition from the
closed to the open system:
 - 10 mg/kg PVC monthly av. mass-PVC
 - 100 mg/kg PVC monthly av. suspension PVC
 - 1.500 mg/kg PVC monthly av. emulsion or micro-suspension PVC
- It - $< 5 \text{ mg/m}^3$ when mass flow $\geq 25 \text{ g/h}$ (TA-luft)
- Neth - $< 5 \text{ mg/m}^3$ av. hour
- Nor - $< 20 \text{ kg/h}$ (PVC plant), $\leq 25 \text{ kg/h}$ (VCM plant, VCM+EDC)
- Sw - $< 0.5 \text{ kg/ton}$ (S-PVC), $\leq 13 \text{ kg/ton}$ (PVC paste)
- U.K. - $\leq 1.4 \text{ kg/ton}$ (PVC, old plants), $\leq 0.55 \text{ kg/ton}$ (PVC, new
plants)
- Gr -

. Discharge limits (water)

- B - Total halogenated organics 150 mg/l Cl (reference
volume of water 1.1 m³/ton installed prod. capacity).
- F - not specific, COD $< 15 \text{ mg/l}$
- FRG - no legal standards at present, but expected to come.
- It - sum chlorinated hydrocarbons $\leq 1 \text{ mg/l}$ (Venice lagoon
 $\leq 0.05 \text{ mg/l}$)
- Neth - not in discussion
- Nor -
- Sw - 300 kg/year
- U.K. - $\leq 1 \text{ mg/l}$ (expected)
- Gr - sum chlorinated hydrocarbons $\leq 2 \text{ mg/l}$

. Environmental quality standards (air)

- B - international standards, local guideline 3.6 ppb
- F - nothing at border of plant
- FRG -
- It -
- Neth - 0,38 ppb year average (strive value)
- Nor -
- Sw - 1-2 ppb advise
- U.K. -
- Gr -

REGULATORY STANDARDS CONCERNING VCM IN EUROPE

. Standards for occupational environment

- B - 3 ppmv max. average year, evacuation when 15 ppmv max./
1 hr av.; 20 ppmv max./ 20 min. av.; 30 ppmv max./
2 min. av.
- F - 3 ppmv (old plants), 1 ppmv (new plants)
- FRG - 3 ppmv max. TWA (8 hrs.), old plants,
2 ppmv max. TWA (8 hrs.), new plants evacuation see B
- It - 3 ppmv max. TLV TWA (8 hrs.), technical intervention
when 15 ppmv max., evacuation when 30 ppmv max.
- Neth - 3 ppmv year average, 15 ppmv max/1 hr av; 20 ppmv max/20 min.
av; 30 ppmv max/2 min. av
- Nor - 1 ppmv (TLV); 3 ppmv/15 min. (ceiling value)
- Sw - 1 ppmv TWA (8 hrs.), 5 ppmv TWA (15 min.)
- U.K. - 3 ppmv year average, 7 ppmv (8 hrs av), remedial action if 15
ppm/1 hr; 20 ppm/20 min, 30 ppm/2 min
- Gr - EEC directive 78/610 as state law

1 year	2 ppm
1 month	5
1 week	6
8 hrs	7
1 hr	8

REGULATORY STANDARDS CONCERNING EDC IN EUROPE

. Emission limits (air)

B - TA-luft
F
FRG - $< 20 \text{ mg/m}^3$ av. daily concentration with a massflow
of $> 0.1 \text{ kg/hr.}$ (TA-luft)
It - $< 5 \text{ mg/m}^3$ when mass flow $\geq 25 \text{ g/h}$
Neth - $< 5 \text{ mg/m}^3$ av.hour
Nor - $< 25 \text{ kg/h}$ (VCM plant, VCM+EDC)
Sw - incinerator required for all EDC-containing gases
U.K. -
Gr -

. Discharge limits (water)

B - Total halogenated organics 150 mg/l Cl (reference volume
of water $1.1 \text{ m}^3/\text{ton}$ installed prod. capacity).
F - 10 mg/l monthly av.
FRG - no legal standards at present, but expected to come.
It - sum chlorinated hydrocarbons $\leq 1 \text{ mg/l}$ (Venice lagoon < 0.005
 mg/l)
Neth - 1 mg/l after biotreater
Nor - $< 1.75 \text{ kg/wk}$
Sw - $< 1.000 \text{ kg/year}$
U.K. -
Gr - sum chlorinated hydrocarbons $\leq 2 \text{ mg/l}$

. Environmental quality standards (air)

B - 158 ppb
Neth - 1 ppm advise
Sw - $100 - 150 \text{ ppb}$ advise

. Standards for occupational environment

B - 50 ppmv (TWA)
F -
FRG - 20 ppmv , in discussion, probably 5 ppmv TWA
It - $10 \text{ ppmv (TLV and TWA)}$
Neth - 50 ppmv (TWA)
Nor - 2 ppmv (TLV) ; $4 \text{ ppm/15 min. (ceiling value)}$
Sw - $1 \text{ ppmv TWA (8 hrs.)}$, $5 \text{ ppm TWA (15 min.)}$
U.K. - $10 \text{ ppm (8 hrs av.)}$, $15 \text{ ppm (10 min. av.)}$

EDC effluent limits
EEC Guidelines (1990)

Limit values for discharge of 1,2-dichloroethane

Type of plant	Type of average	Limit values expressed in: Weight (g/ton) Concentr. (mg/l)		Applicable from:
a) Installation for production of EDC	Month	4	2	1.1.1993
		2.5	1.25	1.1.1995
	Day	8	4	1.1.1993
		5	2.5	1.1.1995
b) Installation for production of EDC and conversion of EDC into VCM on the same site	Month	12	6	1.1.1993
		5	2.5	1.1.1995
	Day	24	12	1.1.1993
		10	5	1.1.1995

Ton = production - capacity of EDC incl. recycle EDC.