International POPs Elimination Project

Fostering Active and Efficient Civil Society Participation in Preparation for Implementation of the Stockholm Convention

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Country Situation Report on POPs in Turkey

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About the International POPs Elimination Project

On May 1, 2004, the International POPs Elimination Network (IPEN http://www.ipen.org) began a global NGO project called the International POPs Elimination Project (IPEP) in partnership with the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Program (UNEP). The Global Environment Facility (GEF) provided core funding for the project.

IPEP has three principal objectives:

- Encourage and enable NGOs in 40 developing and transitional countries to engage in activities that provide concrete and immediate contributions to country efforts in preparing for the implementation of the Stockholm Convention;
- Enhance the skills and knowledge of NGOs to help build their capacity as effective stakeholders in the Convention implementation process;
- Help establish regional and national NGO coordination and capacity in all regions of the world in support of longer term efforts to achieve chemical safety.

IPEP will support preparation of reports on country situation, hotspots, policy briefs, and regional activities. Three principal types of activities will be supported by IPEP: participation in the National Implementation Plan, training and awareness workshops, and public information and awareness campaigns.

For more information, please see http://www.ipen.org

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The views expressed in this report are those of the authors and not necessarily the views of the institutions providing management and/or financial support.

This report is available in the following languages: English and Turkish

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Table of Contents:

1.What are POPs?

Persistent organic pollutants (POPs) are highly toxic, organic compounds. They include pesticides used to protect plants from insects (aldrin, dieldrin, endrin, heptachlor, mirex, and toxaphene) and in control of vector-borne diseases (DDT) or to protect seeds (HCB); a heat-resistant compound used primarily in electrical equipment such as transformers (PCBs); and substances generated as a by-product of incomplete combustion and chemical processes (dioxin and furans).

POPs can persist in the environment for decades. They are semi-volatile and can be circulated across country boundaries and globally. It means that they travel thousands kilometers from their source of origin. Some of these POPs eventually concentrate in cold regions, such as the Arctic and mountainous regions, which impedes re-entry into the atmosphere.

POPs resist breakdown in water but readily dissolve and accumulate in fatty tissue (in lipids). In a process known as *bioconcentration*, animals can build up concentrations of POPs at levels many times higher than those found in the environment. As well, POPs *bioaccumulate* exponentially up the food chain, reaching the greatest magnitudes in predatory birds, mammals and humans.

POPs can cause hormonal defects even in very low quantities and they threaten the reproductive health of people and animals. (They can have for instance a negative impact on male fertility). They also harm the immune system and some of them cause cancer.

2. Sources of POPs in Turkey

2.1. POPs Pesticides

In Turkey the use of organochlorine pesticides was controlled in the late 1970s, but effective restrictions were not imposed in Turkey until the 1980s. Between 1976 and 1983 the annual use of organochlorine insecticides in Turkey was 1000 – 2000 tonnes. [1]

Mirex was never registered in Turkey and aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, HCB, and toxaphene were banned by the Law on “Plant Protection and Agricultural Quarantine” in 1979, 1979, 1985, 1971, 1979, 1979, 1985, 1989 respectively.

In obsolete stocks of Turkey, there are 10.930 kg %10 DDT and 6.500 kg PCBs. There are also approximately 213 tonnes of PCBs in Turkey. These PCBs are being used by the Turkish Electricity Generation and Transmission Corparation. There are no national data about stocks of POPs pesticides other than DDT in Turkey.

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[1] *Black Sea Pollution and Pesticide Issues Ranking of Environmental Priorities,* PAN Europe Annual Conference, November 2005 Poland, *By Emma Gileva, regional coordinator of Black Sea NGO Network, Varna, Bulgaria.*

2.2 Sources of unintentionally produced POPs

In Turkey, there are no data on unintentionally produced POPs (dioxins, furans and hexa-chlorobenzene and PCBs). The major potential sources of these unintentional by-products to the environment are as follows.

⇒ **Waste incinerators:**

- The only available regulated hazardous waste facility for Turkey is located in İzmit. This incinerator has a capacity of 35,000 tonnes/year. In addition there is landfill capacity for 700,000 m^3 of industrial waste. The hazardous waste facility received a permit towards licensing in 2002. Emissions of dioxins and furans are being controlled by an additional unit to the incineration plant during incineration of industrial waste. The sludge and ashes resulting from this plant are being disposed to a sanitary land fill area which is constructed near the incineration plant as an integrated disposal facility located at İzmit.
- İstanbul Municipal Waste Incinerator has a capacity of 24 tonnes/day.
- GATA Medical Waste İncinerator (50 kg/hour).
- Ankara University Medical Waste Incinerator (it is used rarely).
- Akdeniz University Medical Waste Incinerator (150 kg/hour).
- Fethiye State Hospital Medical Waste Incinerator (50 kg/hour).
- Sivas Su Şehri State Hospital Medical Waste Incinerator (50 kg/hour).
- Kırıkkale Regional Hospital Medical Waste Incinerator (150 kg/hour).

Other sources of by-production POPs listed in Annex C of the Stockholm Convention are:

⇒ Cement kilns firing hazardous waste
⇒ Production of pulp using chlorine or chemicals that generate chlorine
⇒ Iron and Steel Plants
⇒ Primary and Secondary Plants for the Generation of Copper, Aluminum, Zinc and Lead
⇒ Power Plants
⇒ Fossil fuel fired utility and industrial boilers
⇒ Chemical Industry
⇒ Textile/Wool/Leather Drying and Finishing
⇒ Waste Oil Recovery
⇒ Open burning of waste
⇒ Motor vehicles, especially those burning leaded gasoline

3. Levels of POPs

3.1 Humans

In Turkey organochlorine pesticides (OCPs) have been monitored among the Turkish population in human adipose tissue samples by carrying out a regional survey at given time intervals since 1976 (Kayaalp 1979; Karakaya and Ozalp 1987; Cok et al. 1999).

There are some studies reporting OCPs levels in mothers' milk in different regions of Turkey (Karakaya et.al.1987; Cok et.al.1997). One of the latest studies in human milk was done in 1997 (Cok et.al.) in agricultural regions of Turkey. In this study 104 human milk samples were collected from healthy donors living in two different regions of Turkey for at least 5 years. The age of mothers ranged from 17 to 44. The regions were selected on basis of similarities and differences in their environmental and socioeconomics characters: Manisa is an industrial and agricultural area, located in the west of Turkey. Van is the agricultural and stockbreeding region, located in the east of Turkey. Collected samples were analysed using Gas Chromatography. Residues of α-BHC, β-BHC, HCB, Heptachlor epoxide, and pp'DDE were found to be the major contaminants in milk samples of Manisa and Van residents. Table 1 shows average levels of OCPs in milk from mother in different regions of Turkey in different time intervals (mg/kg fat basis).

Table 1: Average levels of OCPs in milk from mothers in different regions of Turkey (mg/kg fat basis).

City	Year	N	αBHC	βBHC	γBHC	HCB	HE**	ppDDE	ppDDT	ΣDDT	DDE/ DDT	Ref
Sivas	1983	18	0.260	0.940	0.300	0.080	-	-	-	13.97	-	1
Ankara	84-85	61	<0.010	0.920	<0.010	-	-	2.71	0.420	3.66	6.45	2
Adana	84-85	52	<0.010	1.430	<0.010	-	-	8.55	1.170	10.57	7.31	2
Kocaeli	84-85	50	<0.010	0.720	<0.010	-	-	2.56	0.370	3.30	6.92	2
Kayseri	1989	51	0.096	0.522	0.156	0.084	0.011	2.39	0.410	3.07	5.61	3
Van	95-96	41	0.050	0.417	0.016	0.058	0.078	2.26	0.141	2.67	14.74	4
Manisa	95-96	63	0.067	0.355	0.017	0.044	0.069	1.85	0.072	2.15	17.45	4

ΣDDT=1.115xp.p'DDE+p.p'DDT; **Heptachlor epoxide
1-Cetinkaya et.al. 2- Karakaya et.al. 3-Burgaz et al. 4- Cok et al.

As shown in Table 1 ΣDDT in milk tend to decrease gradually in our country. The ratio of DDE/DDT in this study is as high as those found in the most developed and developing countries where DDT use has been prohibited since 1970s (Table 2).

Table 2: Average OCPs residues in human milk from various countries (μg/kg whole milk)

Country	Year	p.p'DDE	p.p'DDT	DDE/DDT	Reference
Israel	1985	79.00	8.46	9.330	Weisenberg et al.1985
Italy	1985	1.40	0.25	5.6	Dommorco et al.1987
Canada	1987	29.22	2.45	11.92	Dewailly et.al.1989
France	1990-1991	21.83	0.79	7.30	Bordet et al.1993
Spain	1991	18.70	0.40	46.75	Hemandez et al.1993
Egypt	1993	21.37	2.93	7.30	Saleh et al.1996
Turkey	1995-1996	20.13	1.00	16.04	Cok et al.1997

Table-3: OCPs levels in adipose tissue in Ankara in Turkey (mg/kg fat basis).

Region	Year	N	ΣBHC	ppDDE	ppDDT	ΣDDT	DDE/DDT	Ref
Ankara	76-77	41	4.20±0.73	10.2±0.64	3.20±0.63	14.6±1.38	3.19	1
Ankara	84-85	48	1.72±0.83	5.83±3.31	0.62±0.50	7.12±4.10	9.40	2
Ankara	91-92	60	1.54±1.04	3.72±3.59	0.27±0.32	4.42±4.16	13.77	3
Ankara	95-96	56	0.59±0.39	1.83±0.89	0.09±0.21	2.13±1.03	20.82	4

1-Kayaalp et.al.1979, 2-Kayaalp &Ozalp 1987, 3-Burgaz et al. 1994, 4- Cok et al.1997.

Since 1996, the increase in DDE/DDT ratio and decrease in ΣDDT and ΣBHC levels in adipose tissue demonstrates the influence of restriction and prohibition for OCPs and decrease of exposure to these compounds in time (Table 3).

A study on people living in Manisa found an HCB level of 0.033 ppm in adipose tissue (Cok et al.). In Turkey in the latest study, Cok and his colleagues obtained twenty-nine adipose tissue samples and thirty-three human milk samples from different 61 mothers who live in Ankara. The samples were analysed by GC for various PCBs and the results are shown in Table 4.

Table 4: Concentration of 7 PCB Congeners in Human Milk of Residences of Ankara (ng/g on a lipid wt.basis)

Structure	IUPAC No	Mean±SD	Range	%
2,4,4' Trichlorobiphenyl	28	5.7±16,8	0,0-35,4	18,8
2,2,5,5' Tetrachlorobiphenyl	52	10.3±21,3	0,0-55,7	25
2,2,4,5,5' Pentachlorobiphenyl	101	6.6±25,2	0,0-71	9,4
2,3,3',4,4' Pentachlorobiphenyl	118	18.9±48,4	0,0-313,3	18,8
2,3,3',4',5 Hexachlorobiphenyl	138	64±124,4	0,0-329	46,9
2,2',4,4',5,5' Hexachlorobiphenyl	153	110±141,1	0,0-416,5	56,3
2,2',3,4,4',5,5' Heptachlorobiphenyl	180	59.8±101,5	0,0-266	46,8

A comparison of the level of indicator PCBs in human milk from Turkey with other countries are shown in Table 5 (Cok et.al. 2001).

Table 5: Comparison of Level of Indicator PCBs in Human Milk From Turkey (Ankara) with the similar studies From Some Other Countries (PCBs expressed in the ng/g in fat) (Source: Cok et al., 2001)

Country	28	52	101	118	138	153	180	Ref
Great Britain (1991) (n=32)	31.5	26.2	15.0	28.6	68.1	85.9	74.90	6
Czech Rep.(1996) (n=17)	Nd	Nd	Nd	28.5	289.0	379.0	240.2	7
Germany(1995) (n=68)	17	13	14.0	*	168.0	240.0	173.0	8
Norway (1994) (n=28)	7.8	*	1.1	26.2	86.8	114.4	50.6	9
Canada (1996) (n=536)	*	*	*	*	46.0	54.0	27.0	10
Ukraine (1999) (n=197)	14.0	18.0	23.0	93.0	134.0	149.0	55.0	11
Belgium (2000) (n=46)	2,8	2.7	3,0	57.1	68.3	145.3	93.7	12
Poland (1994) (n=20)	13.0	1.7	4.2	71.0	230.0	290.0	175.0	13
Turkey (2000) (n=32)	**5.7**	**10.3**	**6.6**	**18.9**	**64.0**	**110.0**	**59.8**	**14**

nd: below the limit of quantification, * not analysed

3.2 Environment

3.2.1 Meteorological Synthesizing Centre-East

The Meteorological Synthesizing Centre East calculated the emissions of some selected substances based on a spatial monitoring project called "assessment of long-range transmission of air pollutants".

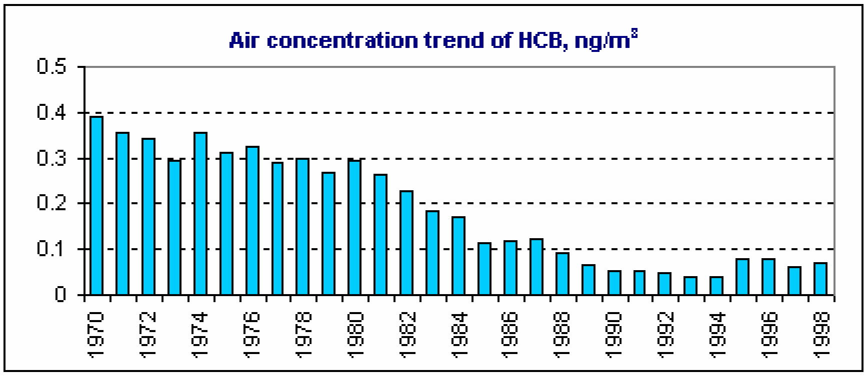
These emission data were obtained on the basis of available official data submitted to the UN ECE Secretariat by countries and/or expert estimates. These data are publicly available at: http://www.msceast.org/countries/Turkey/index.html.

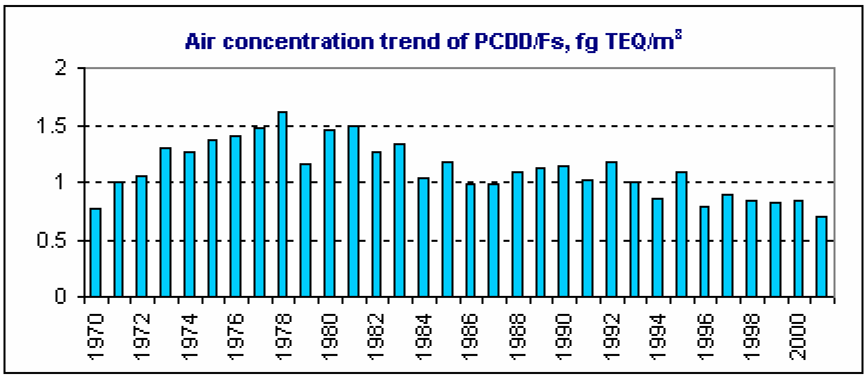
3.2.2.1 Mean annual concentrations in main environmental compartments

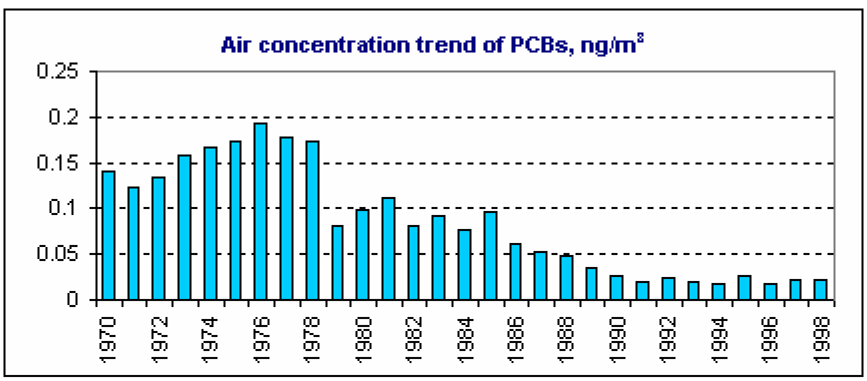
Calculated concentrations in various media including atmosphere (means over the country, minimum and maximum values in the country) are presented in Table 6. The air concentration trends of HCB, PCDD/Fs and PCBs are shown in the Graphs 1 – 3. The soil concentration trends of HCB, PCDD/Fs and PCBs are shown in the Graphs 4 – 7.

Table 6: Calculated concentrations in various media including atmosphere
(Source: http://www.msceast.org/countries/Turkey/index.html**)**

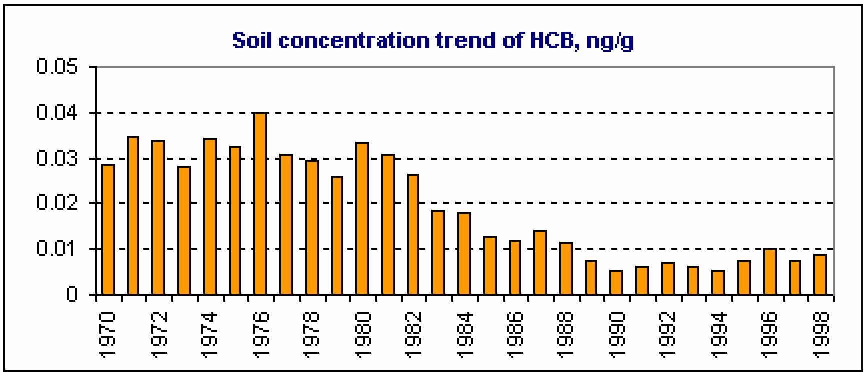
POPs	Mean	Min	Max
Air concentrations, ng/m^3 (for PCDD/Fs - fg TEQ/m^3)			
PCDD/Fs	0.71	0.21	12.40
HCB	$6.09 \cdot 10^{-2}$	$3.66 \cdot 10^{-2}$	$8.25 \cdot 10^{-2}$
PCBs	$2.65 \cdot 10^{-2}$	$7.46 \cdot 10^{-3}$	$9.28 \cdot 10^{-2}$
Soil concentrations, ng/g (for PCDD/Fs - pg TEQ/g)			
PCDD/Fs	$3.15 \cdot 10^{-2}$	$1.12 \cdot 10^{-2}$	0.67
HCB	$2.56 \cdot 10^{-2}$	$1.53 \cdot 10^{-3}$	0.27
PCBs	0.21	$3.00 \cdot 10^{-2}$	3.07

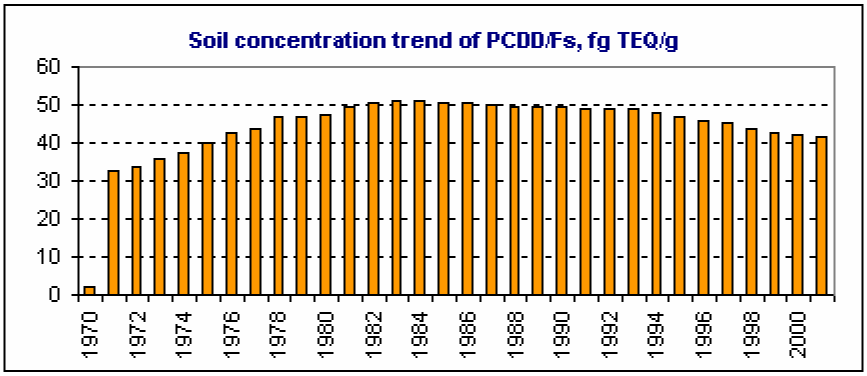


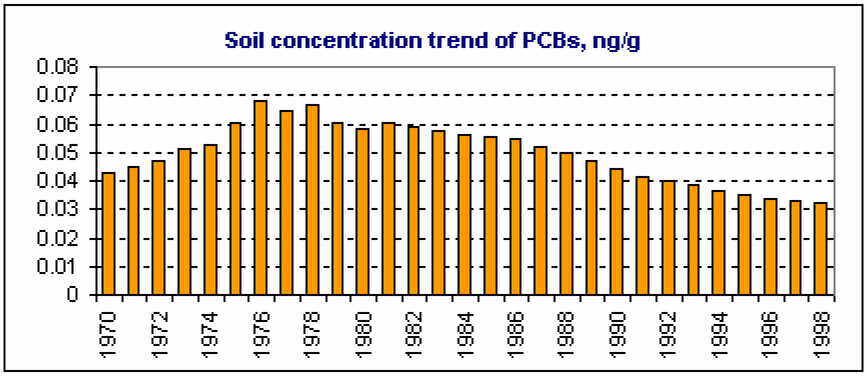




Graph 1 – 3: The air concentration trends of HCB (ng/m^3), PCDD/Fs (fg TEQ/m^3) and PCBs (ng/m^3)
(Source: http://www.msceast.org/countries/Turkey/index.html**)**







Graph 4 - 7: The soil concentration trends of HCB (ng/g), PCDD/Fs (fg TEQ/g) and PCBs (ng/g) (Source: http://www.msceast.org/countries/Turkey/index.html**)**

3.2.2 Sediments

The information about the Σ DDT, Σ HCH and PCBs concentrations in sediments are from the study ASTP: Contaminant Screening Programme - Final Report: Interpretation of Caspian Sea Sediment Data, Stephen de Mora and Mohammad Reza Sheikholeslami from February 2002.

Table 7: The concentration of DDTs and HCHs in sediments

Area Survey	Year	Σ DDT (ng/g)	Σ HCH (ng/g)	References
Bosphorus, Black Sea, Turkey	1995	0.2 - 7.2	0.08 - 1.1	Readman et al., 1999 according to S. de Mora1 and M.R.Sheikholeslami, 2002

Table 8: The concentration of Polychlorinated biphenyls (PCBs) in sediments

Area Survey	Year	Concentrations (ng/g dry weight)	References
Bosphorus, Black sea, Turkey	1995	0.4 - 4.4 (13 cong)	Readman et al., 1999 according to S. de Mora1 and M.R.Sheikholeslami, 2002

3.2.3 Fish

A total of 83 individual fishes, representing 5 species *Acanthobrama marmid*, *Cyprinus carpio* (carp), *Chondrostoma regium* (nose-carp), *Barbus rajanorum* (barbel), *Siluris glanis* (wels), were obtained from fishermen along the Sır Dam Lake (Ö.Erdogrul, A. Covaci, P. Schepens; 2004). The results of the study are shown in the Tables 9 – 10 below.

Table 9: Lipid percentages and concentrations of organohalogenated pollutants (expressed in ng/g wet weight) in muscle of selected fish species from Sır Dam Lake Turkey. (Source: Ö.Erdogrul, A. Covaci, P. Schepens; 2004)

	Acanthobrama marmid (n=24)	*Barbus rajanorum* (n=3)	*Cyprinus carpio* (n=17)	*Chondrostoma regium* (n=17)	*Siluris glanis* (n=22)
	Median / Max	Median / Max	Median / Max	Median / Max	Median / Max
Lipids	0.60 / 4.04	0.43 / 1.05	0.34 / 2.63	1.63 / 3.56	0.95 / 11.53
Sum BDEs	0.67 / 1.6	0.34 / 1.2	0.15 / 1.3	0.08 / 1.5	0.50 / 6.7
Sum PCBs	3.0 / 12.4	0.59 / 1.3	0.94 / 4.8	0.39 / 10.0	3.4 / 42.3
HCB	0.16 / 0.45	0.05 / 0.09	0.07 / 0.41	0.11 / 0.34	0.19 / 1.5
Sum HCHs	0.22 / 0.65	0.09 / 0.10	0.21 / 0.75	0.08 / 0.33	0.43 / 2.2
Sum CHLs	0.35 / 1.7	0.05 / 0.05	0.05 / 1.4	0.08 / 0.72	0.17 / 3.6
p,p'-DDE	73.5 / 272.5	21.8 / 49.8	13.3 / 156.1	32.3 / 232.8	50.2 / 901
p,p'-DDD	5.3 / 16.6	0.66 / 2.6	0.82 / 13.0	2.3 / 12.1	3.2 / 54.3
p,p'-DDT	0.13 / 0.55	0.09 / 0.12	0.08 / 1.23	0.09 / 0.74	0.62 / 4.5
Sum DDTs	77.4 / 289.7	22.5 / 52.6	14.4 / 170.3	34.8 / 245.6	53.8 / 960

Table 10: Distribution of organohalogenated contaminants between liver and muscle of carp, nose-carp and wels, expressed as $c_{liver}/(c_{muscle} + c_{liver})$. Values lower than 0.50 indicate a preferential accumulation in the muscle.
(Source: Ö.Erdogrul, A. Covaci, P. Schepens; 2004)

	Cyprinus carpio (carp) (n=8)	*Chondrostoma regium* (nose-carp) (n=3)	*Siluris glanis* (wels) (n=8)
α-HCH	0.34 ± 0.13	0.55 ± 0.14	0.39 ± 0.06
β-HCH	0.33 ± 0.12	0.46 ± 0.16	0.36 ± 0.09
HCB	0.38 ± 0.11	0.49 ± 0.07	0.41 ± 0.07
p,p´-DDE	0.46 ± 0.10	0.48 ± 0.13	0.36 ± 0.06
p,p´-DDD	0.48 ± 0.09	0.50 ± 0.09	0.40 ± 0.08
p,p´-DDT	0.45 ± 0.29	0.62 ± 0.26	0.33 ± 0.12
PCBs	0.25 ± 0.11	0.57 ± 0.11	0.24 ± 0.08
PBDEs	0.38 ± 0.22	0.58 ± 0.22	0.33 ± 0.14

Citation - Ö.Erdogrul, A. Covaci, P. Schepens; Organohalogen Compounds – Volume 66 (2004)

3.2.4 Rivers

The concentrations of PCBs in two different Turkish rivers are presented in Table 11.

Table 11: Concentration of some PCBs in Turkish rivers (in suspended matter)

Compound	Year	Concentration (ng/g dw)	Reference
PCBs	1999	26.33	Telli-Karakoc et al., 2002 according to M.Vega
	1999	22.19	Telli-Karakoc et al., 2002 according to M.Vega

Citation – M. Vega; Ecotoxicology and other issues for the Mediterranean Sea; This report is a first attempt at compiling information over a wide range of scientific disciplines. Time has not permitted consultation of experts in all these fields of an in-depth peer review. The report should thus be seen as work in progress. Comments and suggestions for its further development are welcome. Madrid, Spain

3.2.5 Free-range chicken eggs

Free-range chicken eggs collected in 2005 near the Izaydas hazardous waste incinerator in Izmit (Turkey) showed levels of dioxins exceeding EU limits for chicken eggs and elevated levels of HCB (DiGangi J., Petrlik J., 2005). The dioxin levels in eggs exceeded background levels by almost 2-fold. HCB levels were five times higher than background levels. To our knowledge, this study represents the first data about U-POPs in chicken eggs from Turkey.

The most obvious potential source of POPs releases at the site is the waste incinerator burning different types of hazardous wastes. The incinerator has operated illegally or under a temporary permit for long time until 2002, when it got the permit after having a few upgrades to cover the demands of the Ministry of Environment. Its permit was then renewed in 2004 which needs to be renewed this year again as the hazardous wastes directive has changed recently in Turkey.

The results of the analysis of a pooled sample of 6 eggs collected within a 2 km distance from the hazardous waste incinerator in Izmit are summarized in Tables 12. Pooled sample fat content was measured at 13.8%.

The sampled eggs exceeded the EU limit for dioxins by 1.13-fold. In addition, the eggs showed elevated levels of HCB. The sum of PCDD/Fs and PCBs is close to the proposed EU limit for total WHO-TEQs.

Table 12: Measured levels of POPs in the sample from Izmit, Turkey per gram of fat. (Source: DiGangi J., Petrlik J., 2005)

Contaminant	Measured level	Limits	Action level
PCDD/Fs in WHO-TEQ (pg/g)	3.37	3.0[a]	2.0[b]
PCBs in WHO-TEQ (pg/g)	0.93	2.0[b]	1.5[b]
Total WHO-TEQ (pg/g)	4.30	5.0[b]	-
PCB (7 congeners) (ng/g)	5.13	200[c]	-
HCB (ng/g)	5.30	200[d]	-

Abbreviations: WHO - World Health Organization; TEQ - toxic equivalents; pg - picogram; g - gram; ng - nanogram.

a Limit set up in The European Union (EU) Council Regulation 2375/2001 established this threshold limit value for eggs and egg products. There is even more strict limit at level of 2.0 pg WHO-TEQ/g of fat for feedingstuff according to S.I. No. 363 of 2002 European Communities (Feedingstuffs) (Tolerances of Undesirable Substances and Products) (Amendment) Regulations, 2002.

b These proposed new limits are discussed in the document Presence of dioxins, furans and dioxin-like PCBs in food. SANCO/0072/2004.

c Limit used for example in the Czech Republic according to the law No. 53/2002 as well as in Poland and/or Turkey.

d EU limit according to Council Directive 86/363/EEC.

According to the evaluation in Egg Sampling Project's analysis report, the case has been highlighted with this declaration;

"It is clear that HCB also represents a serious contaminant in the sampled eggs from Izmit, even though it did not exceed the regulatory limits. In fact, eggs from Izmit contained HCB levels that were five times higher than background levels of HCB (1 ng/g of fat)."

Possible U-POPs sources are defined due to where the egg sampling has been done. Considering the area and the only existing facility that can be a possible U-POPs source and near to the contaminated site is Izaydas, Izmit Hazardous and Clinical Waste Incinerator.

Again in the evaluation report of Egg Sampling it underlines this part;

"The elevated levels of dioxins and hexachlorobenzene in free range chicken eggs in these samples provoke the question of possible sources. As the samples were taken from villages 2 km downwind from the hazardous waste incinerator in Izmit and this waste incinerator is known to be a significant source of dioxins, it is also the most likely to be the biggest contributor to dioxin levels found in this area. On the other hand we can not simply exclude other potential sources such as local heating and/or uncontrolled burning at a waste landfill. Identifying the source of the hexachlorobenzene is even more difficult as it can have an origin in hazardous wastes as technical chemical and/or in use as pesticide. In addition hazardous waste incinerators can produce HCB as by-product as previously seen in measurements in other countries."

4. Damage caused by POPs

4.1 Illegal toxic waste dump

A recent illegal toxic waste dump revealed recently in Tuzla, Kocaeli is an indicator of the extent of the problem. Toxic barrels presumed to contain POPs and other dangerous chemicals were found buried in the region come from the factories in the vicinity. These factories were able to dump the barrels because of legal loopholes and the lack of auditing, which are crucial elements of life-long tracking of toxic chemicals.

4.2 Human Exposure

In 1954 the Turkish government distributed a supply of wheat seed that was treated with fungicides containing 10% Hexachlorabenzene (HCB). It was originally intended for planting, but the shipment arrived too late in the season to plant. Because there was a limited food supply in the Turkish provinces of Diyarbakir, Mardin, and Urfa, the seed was unintentionally diverted for food production. 5000 individuals were reported to have been affected by the HCB treated seeds.

4.3 Hot-spots in Turkey

Within the framework of International POPs Elimination Project, Bumerang, a national environmental NGO, released reports on widely known toxic hotspots in Turkey. These hotspots include the Derince Pesticide Stockpile, Izaydas Hazardous and Clinical Waste Incinerator and Aliaga Petkim PVC production facility. These studies are the first NGO initiatives in Turkey to expose the sources of POPs. As a result of these studies, it is understood that the information related to POPs are quite few or non-existing. The lack of a national database on POPs as well as the administrative chaos in this field is one of the biggest obstacles against the management and planning of POPs in Turkey.

4.3.1 Derince Pesticide Stockpile, Kocaeli

The contaminated site is located in the Sirintepe Region of the Derince town of Kocaeli (Pictures 1, 2 and 4, Table 7). This region is known as a heavily industrialized area all through the coastline with petrochemical, pulp and paper, and scrap metal industries. There are also few harbors along the coastline of Derince for transportation needs of these industries. There are 4 warehouses in the plot of 8120 square meters where the obsolete pesticides are stored. The site is approximately 300 m to the shore and 300 m to the nearest settlement, which is the Sirintepe district of Kocaeli. Roads from 4 sides surround it. The nearest facilities are the oil distribution centers of the oil companies Shell, Petrol Ofisi and BP. The facility called Koruma Tarim, where the pesticides are produced, is approximately 700 m to the site.

No certain vegetation or animal life is documented in the area.

Table 13: Geographical location

Latitude	40.7569	**Longitude**	29.8147	**Altitude (feet)**	0
Lat (DMS)	40° 45' 25N	**Long (DMS)**	29° 48' 53E	**Altitude (meters)**	0

Pictures 1 - 2: Geographical location of the site

The contaminated site is an obsolete pesticide dump, which consists of approximately 3000 tonnes of BHC and DDT. Chemicals, which were produced 20 years ago to be used in the production of lindane, are stored as white powder in 50 kg nylon bags and metal barrels in 4 warehouses within the 8120 square meters plot owned by Merkim Industrial Products Co. The warehouse was sealed by the local branch of the Ministry of Environment and Forestry (MoEF) in Kocaeli on 28.12.2003. This action was taken following the 3515-29139 numbered correspondence of (MoEF) dated 10.12.2003.[i]

At present, Merkim Industrial Products Co. legally owns the plot where the chemicals are stockpiled. Commercial activities of Merkim can be summarized as transportation, retail sales of imported chemical products and shipping according to the Board Director of Merkim, Mr. Ersan Kaynas. He also mentions that Merkim has close commercial relationship with Koruma Tarim A.S., the company that today owns the facility where the obsolete pesticides are produced. Mr. Kaynas denies any other kind of bound or legal partnership.

The contaminated site is located near the facility of Koruma Group, including the factories of its companies such as Koruma Klor-Alkali A.S., Koruma Tarim A.S, etc. Koruma Tarim produces various chlorinated herbicides and pesticides in the present. A chlorine-alkali production factory, which shifted from mercury process to membrane process in the year 2000, is also included within the facility. The chemicals stored in the stockpile were produced in this facility until 1983; however, two different companies own the facility and the plot at the present time.

There are two scientific analyses available for the chemical characterization of the waste included within the contaminated site.

The most recent chemical characterization was done by TUBITAK-MAM (Scientific and Technical Research Agency of Turkey - Marmara Research Center), a respected governmental agency for scientific research.

Three random samples were taken inside the warehouse:

- One of the samples was taken from the pile, which was located uncontained on the floor of the warehouse.
- Two other samples were taken from the substances contained in the plastic bags.

It has been confirmed that 10.25 % (by weight) of the first sample includes organic matter while 78.6 % by weight includes inorganic filling material as the result of the extraction process done in the laboratories of Material and Chemistry Technologies Research Institute of TUBITAK-MAM. The same process was applied to the other two samples and it was found that the samples included 90.35 - 99.4 % (by weight) organic matter and 0 - 0.25 % (by weight) inorganic filling material.[ii]

Afterwards, analysis proceeded for the organic proportion of these samples using the gas chromatograph-mass spectroscopy (GC/MS) method and Fourier transform infrared spectra-photometer in the TUBITAK-MAM Food Science and its Technologies Research Institute. The result of these analyzes revealed that the organic phase of the first sample is DDT (dichlorodiphenyltrichloroethane; 2-4 DDE, 4-4 DDE, 2-4 DDD, 2-4 DDT, 4-4 DDD, 4-4 DDT) while the organic phase of the other two samples taken from the nylon bags are HCH (hexachlorocyclohexane; a-HCH or a-BHC).

The other sampling was undertaken by Greenpeace Mediterranean after the Marmara earthquake in 1999 to reveal the possible toxic pollution or leakage from the industrial areas around Marmara sea. The following information comes from the Greenpeace report: "*Temuge, T.: Heavy metals and organic contaminants associated with wastes generated by industries located in Izmit Bay, Turkey. Istanbul: Greenpeace Mediterranean, 2000*."

Five samples (M-19160 and M-19164 – see Table 8) were taken around the Koruma Tarim chemical plant. All samples were analyzed in the Greenpeace Laboratories in Exeter University in UK. Organic samples were identified qualitatively and quantitatively using the GC-MS. Heavy metals were analyzed by ICP-AES. These sampling is quite significant since it is the only sampling activity around the facility that gives a certain idea about the extent of the pollution in the near environment.

Table 14: The samples taken by Greenpeace Mediterranean in 1999
(Source: Greenpeace Mediterranean, 2000)

Various industries located in Yarimca region, Izmit Bay, September 1999	
M19160	Sediment collected close to the jetty in front of Koruma Tarim chlorine plant
M19161	Sediment collected approx. 100m from Koruma Tarim Jetty, adjacent to buoys
M19162	Solid waste collected from pond on waste ground in front of Koruma Tarim
M19163	Solid waste collected from pile on waste ground in front of Koruma Tarim
M19164	Effluent collected from a channel running adjacent to Koruma Tarim

Mercury at a concentration of 170 µg / l in the aqueous sample (M-19164) collected from an effluent channel adjacent to the facility. But it is important to notice that this concentration of mercury in the effluent was present when the mercury cell technology for chlorine manufacture was in place in 1999. Mercury was also found to be elevated in the sediment.

"A sediment sample (M19160) from the shore close to the jetty in front of the plant was found to contain readily detectable isomers of DDT and of the DDT degradation products DDE and DDD. All three chemicals were also found in the offshore sediment sample (M-19161) indicating pervasive contamination with these persistent and bio-accumulative chemicals. The near shore sediment was also found to contain the isomers of chlorobenzenes. These chemicals were also found in the effluent collected as sample M-19164. DDT and its metabolites were also found in waste sample on the derelict ground (M-19162) together with isomers of the metabolite/breakdown product of DDT and chlorobenzenes. Sample M-19163, of solid waste also sampled on the derelict ground in front of the plant was also found to contain chlorinated benzene isomers together with several HCH isomers and residues of DDT. The qualitative composition of this effluent sample suggests that it is primarily production waste from the manufacture of HCH. HCH has generally been produced by the chlorination of benzene under UV-light and the final reaction mixture is known to contain partially or fully substituted chlorinated benzenes as well as various HCH isomers. The active gamma isomer can be separated from the reaction mixture leaving 85 % remaining as waste. The detection of di- and tri-chlorobenzene isomers in the sampled waste is intriguing since it might be expected that these would largely volatilize from a waste exposed in the open air over a number of years." [iii]

The analytical results obtained from samples collected in the vicinity of Koruma Tarim A.S. broadly reflect the known history of pesticide production at this plant, however the results cannot be directly indicative for the pollution caused by the stockpile. But it is probable that the pollution in the vicinity of the facility and the stockpile should be associated and that the continuous waste discharge from the facility should be considered as the main source before any cleanup efforts. However, the legal owner of the facility, Koruma Klor-Alkali, claims that they no longer discharge hazardous chemicals to the environment and that technical production stopped ten years ago. But these claims should also be further investigated.

4.3.2 Izmit Hazardous and Clinical Waste Incinerator, Izmit

Kocaeli is a city located on Izmit Bay (on the east of Marmara Sea) (Picture 3). It has undergone a dense industrialization since the 1960s, which was followed by a rapid increase in population and an irregular urbanization. These led to serious environmental problems including air, water, and soil pollution. In the absence of environmental measures, these problems increased gradually until the 1990s. In 1997, the Municipality planned and conducted a large environmental project (Integrated Environmental Project) consisting of the rehabilitation of the rivers entering into the Gulf, a wastewater treatment plant for municipal and industrial wastewaters, a landfill site for the municipal solid wastes, and an incinerator for the medical and hazardous wastes produced in large quantities by the various industrial sectors placed in Kocaeli and the surrounding areas.

Picture 3 Map of the Kocaeli Region and the land use in the area

The Izmit Waste and Residue Treatment , Incineration and Recycling Co.Inc. (Izaydas) was founded in 1996 by the Greater Izmit Municipality within the scope of the Izmit Integrated Environment Project. The company was formed to operate the Clinical and Hazardous Waste Incinerator, and the Industrial and Domestic Wastewater Treatment Plant. Both the incinerator, which has an annual capacity of 35,000 tonnes, and the landfill are located just 2 km from the Solaklar village and only 10 km from the city of Izmit. The landfill has a capacity of 790,000 m^3 of industrial waste and 3,125,000 m^3 of household waste (IGCM 1994).

The waste incinerator was constructed by the German company Lurgi, with the intension of incinerating a range of wastes (including hazardous wastes) for “power generation” (5.2 MW/hour). According to literature describing the overall waste management project (IGCM 1994), hazardous wastes to be incinerated included:

- outdated herbicides and other pesticides
- cosmetic and pharmaceutical wastes,
- refinery waste and wastes from oil and coal processing plants,
- used lubricants and oil residues,
- soil and dust contaminated with oil,
- solvents and paints,
- resins, glues and pastes,
- plastic and rubber products (including polyester and PVC products),
- used tires,
- wastes from plastic production and chlorinated residues of plastic products.

Although it was planned to begin operation in August 1997, the Ministry of Environment refused to grant an operating permit on the basis of test burns, arguing that the plant had some technical deficiencies that would lead to emissions of toxic chemicals, especially dioxins and furans. According to information from the construction company (Haznews 1998), the plant was designed to meet German emission standards from 1986. At the same time, the area within which the industrial wastes and toxic ash from the incinerator would be landfilled did not meet the standards of Hazardous Waste Control Regulations of the Ministry.

The plant operated illegally, without any permit, until action by Greenpeace Mediterranean in the late 1990’s led to an order from the Ministry of Environment to the Kocaeli Governshipto stop the transportation of all hazardous wastes to Izaydas and their incineration on site (MoE).

After the major earthquake in August 1999, the Ministry of Environment granted Izaydas a temporary operating permit to incinerate the infected waste generated during and after the earthquake. The Ministry stated in its declaration, however, that no chlorinated waste would be incinerated, in order to avoid the formation of dibenzo-dioxins and furans. In a letter to Greenpeace in March 2000, the Ministry of Environment admitted that almost 68 tonnes of clinical waste had been incinerated at Izaydas. Given that a substantial proportion of clinical waste is comprised of chlorinated materials from PVC plastics this activity violated the Ministerial order.

After the Volganeft tanker accident at Marmara sea in December 1999, thousands of tonnes of fuel oil Number six washed on the shores of Istanbul. The oily residues were collected in PVC bags and sent to Izaydas, despite repeated warnings from Greenpeace to the authorities that fuel oil could be recycled and that the burning of PVC would emit dioxins. Greenpeace notes that Izaydas continues to receive and incinerate chlorinated waste in violation of the declaration.

According to some analysis of different institutions it was determined that the facility is the responsible party for the generation of various hazardous and persistent chemicals such as heavy metals, PCBs, dioxins, furans, polyaromatic hydrocarbons, polychlorinated biphenyls etc. Studies objecting to enlighten the health assessments of the workers of the facility, has verified the risks that people are facing with. Another important point is that not only the workers but all the people living near the facility have anxiety everyday about their health. These people are also complaining about pollutants and bad smells. There are also some existing data about wind directions on site pointing out that these foul odors can be transported to the village for certain.

In addition to this there are no statistical studies comprising the increasing diseases or changing varieties of diseases etc. Also other facilities that contaminate the site in important ways complicate assigning responsibility to a specific facility (Izaydas) on health effects.

4.3.3 Adana (Incirlik Military Air Base)

Incirlik Air Base is located about 7.5 miles east of Adana (Picture 4). The coordinates of the base are 37°00'N 35°26'E. Adana, with a population of over one million, is the fourth largest city in Turkey, and is the heart of a rich agricultural region.

Picture 4: Map of Turkey

According to reports in the Turkish national press on Thursday, March 27, 1997, a PCB stockpile exists in an area of 5.080 square meters and constitutes a serious health hazard. According official documents obtained and quoted by the Turkish language Zaman newspaper (http://www.zaman.com), the PCBs were initially discovered during an investigation at the facility in 1996 but because of the seriousness of the situation, it continued in secrecy until February 1997. On February 18, 1997, the Zaman reported, officials of the Turkish Foreign Ministry, Ministry of Environment and Forestry and other relevant organizations held a meeting with military representatives to determine how to clean the contaminated area.

Results of this meeting showed a contamination above the regulatory standard of 1ppm. A decision was hence taken to dig 100 cm into the ground, remove the contaminated soil and following careful packaging, move it to competent facilities abroad for it to be burned.

Meanwhile, results of scientific work have shown that the overall tap water system in Adana, a highly populated city, have been affected with PCB contamination and that measures will have to be taken to clean and filter the water as well.

4.3.4 Petkim Petrochemical Co., Izmir

The coastal country, Aliaga, is located at $38^0 26^/$ latitude and $27^0 08^/$ longitude. Aliaga, located in Ege region, is a conjunction county to the city of Izmir (Picture 4), and has a surface area of 3.932 km^2. The landscape is mostly plain with some mountain formations: Mount Dumanli to the southeast of the county and Mount Yunt in the northeast. Generally mountains extend parallel to the coastline from west to east.

Aliaga Petrochemical Complex, which is 55 km north of Izmir, has fourteen main process factories and eight auxiliary units. Aliaga was a fishing center until metal, petrochemical, paper and chemical fertiliser industries settled there in the 1980s. Even though the area includes the ancient city of Kyme and sandy beaches, it no longer has any attraction for vacationers. The Foca region which is 25 km south of Aliaga is an important breeding area for the threatened Mediterranean monk seals.

Table 15: The main process factories and the auxiliary units in Aliaga Petrochemical Complex

PLANTS AT ALIAGA	UTILITY UNITS AT ALIAGA
Ethylene Plant	Guzelhisar Water Dam
Low Density Polyethylene (LDPE) Plant	Water Pretreatment Unit
High Density Polyethylene (HDPE) Plant	Demineralized Water
Polypropylene (PP) Plant	Steam Generation Unit
Acrylonitrile (ACN) Plant	Power Generation Unit
Ethylene Oxide / Ethylene Glycol (EG) Plant	Nitrogen & Air Supply Unit
Aromatics Plant	Waste Water Treatment Unit
Pure Terephthalic Acid (PTA) Plant	Harbor
Phthalic Anhydride (PA) Plant	
Chlorine Alkali (CA) Plant	
Vinyl Chloride Monomer (VCM) Plant	
Polyvinyl Chloride (PVC) Plant	
Bag Production Unit	

Both Aliaga and Yarimca complexes discharge their wastewater after treatment directly into the Mediterranean and Marmara seas. The waste is dumped on the shore of the Mediterranean Sea inside the Aliaga complex site (The Dark Side of Petkim 2000 – Greenpeace document).

Petkim Aliaga complex is a large PVC production site, manufacturing ethylene dichloride (EDC) and vinyl chloride monomer (VCM) as well as PVC. Chlorine and sodium hydroxide are also produced from the electrolytic separation of brine solution. (The Dark Side of Petkim 2000 – Greenpeace document)

The Petkim plant, along with the shipyards and the petroleum refinery located nearby, pollute the sea with their discharges. Local fishermen report that the wastewater discharged by Petkim emits noticeable foul odours and sometimes kills many fish. Petkim discharges more than 26,000 cubic meters of wastewater daily. Amazingly, although this industry produces and releases so much waste, it is self-regulating and not subject to any independent inspections (Muezzinoglu *et al.* 1994). Other wastes generated at the factories are sent to the treatment plant and the 800-degree centigrade incinerator. Most of the hazardous wastes including the toxic ash of the incinerator are either stored on site or dumped into the environment (The Dark Side of Petkim 2000 – Greenpeace document).

Technologies currently available for the production of chlorine and caustic soda are based on mercury-cell, diaphragm or membrane processes. Petkim's Aliaga chlor-alkali unit operated on the mercury-cell process until July 2000. The management agreed with the Trade Union of Petroleum Workers to change the system to the mercury-free membrane process and eventually converted the system to membrane-cells in 2000 (The Dark Side of Petkim 2000 – Greenpeace document).

4.3.5 Mersin

KROMSAN- MERSİN

In January 2005 it was discovered that Kromsan Chemistry Factory of the Şişe Cam Group, at Mersin, Kazanli, stored 6-7 tonnes of waste containing hazardous chemicals at a quarry which belonged to a soda factory on the Gozne road in 1986-1987. It was also discovered that the waste was stored in the region without necessary precautions taken.

According to a release by the Local Environment Authority, at the time when the waste was stored, there were no Ministry of Environment or the Regulation for the Control of Hazardous Waste; and therefore the waste was stored in the region with the permission of the Health Administration.

People who live in the contaminated region say that the water leaking from the storage place with the rain water, mixed with little streams and drinking water.

It is known that water supplied from these streams that mix with the leakage is used for the irrigation of agricultural land in the region. It is stated that the leakage also mixed into the sea through the Muftu Stream.

Kromsan Chemistry Factory of the Şişe Cam Holding, is one of the five companies in the world that are in this field. The factory was held responsible for the death of sea turtles in the region before. In 2001, there was a leakage from the waste water pool of the factory and these wastes caused the Kazanli coast to turn red. After the incident, the factory was fined 23 billion Turkish Lira. However, the problem about the disposal of the 1.5 million tons of waste inside the plant and the waste at the quarry is still there.

Again, in January 2005, it was revealed in a statement by the Mayor of Kazanli Municipality, that Kromsan's hazardous waste was used for construction in Mersin and the chemical composition of the waste damaged the construction materials and rendered the buildings unstable.

In another statement by the Kazanli Municipality, it was stated that Kromsan dumped its wastes to the coastline and to the residential areas in the region.

4.2.6 Ankara (Tarim ve Koyisleri Bakanligi)

The location of the stockpile has not been identified in NIP. But it is known that the location given is in the Yenimahalle region and the stockpile is under the structure of Ministry of Agriculture and Rural Affairs (MoARA). The situation of the barrels is not defined but according to authorities barrels are provided in a condition without any sunshine or air contact. The total amount of the wastes is 10.930 kg. As implemented in report on the NIP of Turkey the conditions of the stockpile has not been improved since the wastes are stored.

The analyses related to the DDT stockpile were not carried out regularly like in other stockpiles. There is no information about when the DDT was stored and there is no information about the destiny of these wastes. It is implied that MoEF needs funds for the disposal of the wastes.

5. Laws currently regulating POPs

5.1 National Legislation on POPs

In Turkey, The Ministry of Environment is responsible for the protection and improvement of environment. The Ministry of Environment is particularly concerned with the management of industrial chemicals, direct and indirect effect of releasing chemicals into the environment as emissions and wastes to air, water and land.

The Environment Law (code 2872) came into force in 1983. Several regulations have been put into action for the implementation of the Law. These are Control of Air Quality, Water Pollution Control, Soil Pollution Control, Solid Waste Control, Dangerous Waste Control, Medical Waste Control, Noise Control, Dangerous Chemicals and Environmental Audits.

The Regulation on Dangerous Chemicals provides a framework for the determination of programmes, policies and principles regarding the control of dangerous chemicals in terms of production, packaging, storage, labeling and handling.

The Environmental Reference Laboratory affiliated with the Ministry of Environment started to function in June 1998. The Laboratory has been carrying out the analysis of the items and /or pollutants specified in the Environmental Law and Regulations of Turkey.

The LIFE Project, Strengthening Environmental Control in Turkey-Reinforcing the National Reference Laboratory of Gölbaşı, Ankara, has been made to strengthen the capacity of laboratory to function as the Environmental Reference Laboratory.

In Turkey, after 1993 PCBs are restricted for use only in closed system and banned in 1996 by the Regulation on Hazardous Chemicals. A dioxin/ furan limit value of 0.1 ng/m^3 was set for the hazardous waste, municipal waste, clinical waste incinerators and for all the facilities which use of halogenated hazardous waste as a fuel source, by the regulation on the Hazardous Waste Control (25th September 1999, 23827). With the direction in the same Regulation, oil and solvent wastes which contain PCBs less than 50 ppm are recoverable.

Except for laws banning POPs such as chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, PCB, and toxaphene, there are no laws regulating POPs elimination. Unintentional POPs are regulated under the law of Hazardous Waste Management. In the accession process of Turkey to EU, Turkey has started research investigations and twinning projects on determination of POPs sources and finding appropriate technologies for destruction of existing POPs according to BAT/BEP criteria.

5.2 Laws Regulating the unintentional POPs

The laws existing for enforcement of hazardous wastes are:

Episode 1:

Objective: Article 1) the objective of these regulations includes legal and technical facts to determine the policies, principles and programs on the hazardous wastes from their production until their eventual elimination devoted to the following actions taken about these wastes:

- c- Banning the imports and controlling the exports,
- e- Minimizing their production level in the resource,
- g- Building elimination plants in required amounts and controlling these plants in an environmentally favored way,
- h- Sustaining an environment-friendly management of these wastes.

Principles: Article 5) Principles on the waste management are the following ones:

c- Responsible people at all stages of the waste management take precautions against any possible damages to both the nature and human health.

Episode 2:

Rights and duties of the ministry: Article 6) providing a national and international coordination needed for establishing the technology and management systems regarding the management of the wastes in an environmentally compatible way.

Obligations of the waste producer: Article 9) the waste producer is obligated,

a- to take precautions to minimize the waste production,

m- to keep the wastes permanently in such containers that are within the factory borders, located on concrete basis away from the plant and the buildings, secure and acceptable in international standards; to state on the containers that the wastes inside are hazardous; to state the amount and storage date of the wastes on the containers; to transfer the wastes to an equivalent container in the case of any damage; to ensure the containers closed any time; to store the wastes in a chemically non-reactioning way,

Obligations of the eliminator: Article 10) The eliminator is obligated

f- to make any physical and chemical analysis of the waste when it enters the plant, before the elimination process; to determine whether the waste is compatible with the definition mentioned in the waste transportation form.

Deepwell injection: Article 18) Liquid wastes in a pumpable form may be eliminated by injecting to the wells, salt conglomerates or natural holes that are geologically and hydro-geologically appropriate.

Ground storage (ultimate disposal): Article 19) It is possible to store the wastes in the containers in the out-of-use/closed mines.

Incineration: Article 20) the facts and limit values to be obeyed while incinerating the hazardous waste given in Appendix 7:

a) The minimum combustion temperature required in the last part of the kiln is 850 C˚; for the matter including halogen organics more than 1%, required minimum combustion temperature is 1100 C˚ and detention duration is two seconds.

In an incineration plant;

3- It is mandatory to have a system stopping hazardous waste feeding whenever there is a defection in the equipments used for keeping the emissions under their limit values. Incineration plants must be managed to sustain full combustion as much as possible. In order to maintain this, some technically appropriate pre-processes might be needed.

d) Dioxin and furan emissions are reduced using the most developed techniques. Any optimum value achieved in minimum six-hour, maximum eight-hour sampling periods should not exceed the limit value of 0.1 ng/m^2. This limit value is defined as the total dioxin and furan isomer concentration.

Trial incineration: Article 21) In demand, by the non-conventional incineration plants that can provide the required incineration temperature, to use the waste that the ministry approves as having the appropriate criteria, trial incineration plans and reports prepared for these plants will be evaluated by the Ministry.

It is mandatory to conduct a trial incineration and prepare a trial incineration report for the assessment of the Ministry in order to consider any kind of capacity enlargement in the incineration plants or incinerating waste other than previously authorized ones.

Episode 6:

Issuing pre-licenses for the elimination facilities
Article 27) Any individual or corporation willing to establish a waste elimination facility will apply to the Ministry with all kinds of plans, reports, technical data, explanations and documents concerning the facility; such as:

- a- Environmental impact evaluation
- b- Feasibility report
- c- All sort of engineering reports and projects of the facility in the implementation phase

Issuance of temporary licenses and authorizations to the elimination facilities
Article 28) When the administrator of the waste elimination facility applies to the Ministry for the license, the Ministry provides a maximum one-year license to the facility in order to monitor its functioning and check whether it operates in accordance with these regulations. After this period if the Ministry decides that the facility satisfies the operation requirements, a 3-year operating license is given to the facility; and if it does not satisfy the required conditions then it is shut down until the conditions are satisfied.

Cancellation of the license
Article 29) When it is observed in the Ministry supervisions that the facility is not functioning in line with the license, the requirements are not fulfilled, measurements about the facility operation are not held or recorded periodically, a period of one month to one year –depending on the source of the malfunctioning- is given to recover the defects. If the facility does not recover by the end of this period, its operation is shut down or its license is cancelled.

2

Episode 8:

Waste imports
Article 41) Wastes are not permitted to get into the customs border of Turkish Republic, including the free zones. Only import permissions for economically valuable wastes in specific sectors are given following publication of the notifications.

Provisions of this article are not applied if the facilities, licensed by the Ministry under the Domestic Processing Regime, import used rubber having carcass qualifications in order to recycle.

Waste Exports
Article 42) In the following cases, written permissions of the transitory state and importing state are asked by the Ministry before giving permission for waste export:

a- There is no facility in Turkey having the required technical capacity to eliminate the wastes.

Obligation of informing the transitory state
Article 44) No transition can be made and waste load can not be transferred or extracted inside our national authorization zone without the Ministry permit.

Facts and procedures to be obeyed in international transportation of waste
Article 45) The following are the facts and procedures to be obeyed in international transportation of waste:

d- International packaging, labeling, and transportation standards are fulfilled

Episode 9:

Special wastes
Article 48) The facts concerning the collection, transportation, processing and elimination of mine wastes under (01), oil and fuel oil wastes under (13), used batteries and accumulators under (16), medical wastes under (18) of appendix 7, in addition to used rubber are determined by the Ministry.

APPENDIX 2:

A - Elimination Methods	**B - Recycling Processes**
(D3) Deep well injection, (D4) Land filling (D5) Ground storage (D8) Biological processes (D9) Physical and chemical processes (D10) Incineration (D12) Permanent storage (D15) Temporary storage	(R1) The wastes used as main fuel or some other means. (R11) Use of all the waste achieved by the processes given above, between (R1) and (R10)

APPENDIX 3:

Hazardous waste categories according to either their natural characters or the activities used to make them up

A) Wastes that align in appendix 5 and are in the form of one of the followings;
1- Medical wastes
2- Pharmaceutical production wastes
3- Timber preservative
4- Biocides
5- Solvent residues
6- PCB, PCT or PBB including materials
7- Any material polluted by some derivatives of polychlorodibenzo furan
8- Any material polluted by some derivatives of polychlorodibenzo dioxin

APPENDIX 4:

Ingredients of the wastes that get hazardous when they gain the characteristics explained in appendix 5

(C25) Asbestos
(C32) PCBs and/or PCTs
(C34) Pesticides
(C49) Any derivative of polychlorodibenzo furan
(C50) Any derivative of polychlorodibenzo dioxin

APPENDIX 5:

Characteristics of wastes that are considered as hazardous

(H1) Explosives
(H2) Oxidizing
(H3-A) Highly blazing
(H3-B) Blazing
(H4) Causing irritation
(H5) Harmful
(H6) Toxics
(H7) Carcinogenic

(H8) Corrosive
(H9) Infectious
(H14) Eco-toxics

List of hazardous wastes (major headings in the list)

-PCB including hydraulic oils
-PCB including isolation or heat transmission oils
-PCB including compounds
-PCB including transformers and capacitors
-PCB including construction and destruction tools
-CFCs
-HCFCs
-HCFs
-pesticides

6. NGOs and POPs

Note that this section will be used to establish the "baseline" or the existing level of NGO involvement and capacity at the beginning of International POPs Elimination Project (IPEP). Later this will be compared with NGO activity at the end of the project.

6.1 Narrative on awareness of POPs of NGOs and society

Beginning with the Greenpeace Toxics Campaign and the actions done by Greenpeace Turkey, NGOs in Turkey have some familiarity with the term POPs. Before that there were no anti-POP or anti-toxic movement in the country.

When Izaydas (Izmit Hazardous and Clinical Waste Incinerator) was built and started to operate, Greenpeace and some other local NGOs and initiatives from Izmit has raised their voices. The anti-incineration movement started with the actions in the year of 1996. But before 1996 without doubt there was a concern created by Greenpeace against toxics.

Today, again with the efforts of Greenpeace more NGOs have chosen toxics as a target issue. Bumerang which was founded by two Greenpeace volunteers began last year and the Association of Physicians of Turkey and some local NGOs like Iskenderun Cevre Dernegi, Ceksam (Tarsus), Kocaeli Cevre Koruma Dernegi, are now working on toxic issues.

Generally, because of the technical details of the toxics campaign, public awareness activities cannot reach the wanted levels of interest. Among all these difficulties there have been many achievements gained on public awareness issues so far. Especially in past couple of years with the case about Izaydas.

Also the egg sampling study done in Izmit was one of the most effective. After the awareness studies done in the region people became more familiar with terms like dioxins and furans. An important outcome of the egg sampling project was changing the understanding of toxicity in our lives. Eggs were the most appropriate tools for giving the idea that contamination is taking place in all the places in our daily life and exposing our body using the bridge of food that people are always consuming.

6.2 Narrative on NGO capacity on POPs

In general, many of the NGOs are working on more publicly-known issues like energy, recycling, soil erosion, forestry, city planning and landscape. However, a few NGOs have the information and are working on waste management and toxic chemicals.

The technical details of the toxics campaign and the time needed for achieving the campaign objectives have demotivated the NGO movement from acting on POPs issues. Therefore, only a few NGOs are leading the movement for issues like toxics, especially on POPs and Stockholm Convention ratification.

At the same time, the negative attitude of the government against NGOs that respond with strong arguments to the implemented environmental policies also has an adverse effect on NGO work on toxics. Besides, industrial organisations which have become the general target regarding hazardous chemicals and which are pushed by the NGOs to take responsibility, are also acting to hinder NGO work. They try to sound objective and characterize the solutions recommended by the NGOs as “damaging to the economy”.

Recently, with toxic materials and contaminated regions quickly entering the agenda in Turkey, the number of NGOs working in this field has increased. In general, it became the topic for discussion among regional networks and the national environmental platform which could be considered especially new formations. However, due to its hard to understand concepts, the need for too much technical information, and its content which is updated continuously, the toxics campaign is still seen as a difficult campaign to follow.

The huge dimension of the environmental disaster that originates from the political inefficiency of the Ministry of Environment on hazardous waste management has helped mobilise environmental NGOs. Especially the NGOs which are active in the contaminated regions, all started media work; and the Turkish Chamber of Environmental Engineers, stated in a written press release dated April 17, 2006 that “If the Minister of Environment in a country like Turkey, at the beginning of the 21st century, does not know the toxic waste inventory of his own country, is helpless facing the disposal of these wastes, cannot prevent illegal acts and cannot enforce the law in a strict manner on those who are responsible, there is no way to explain this situation in any other way, than negligence of duty”. The Chamber of Environmental Engineers filed a complaint against the Minister of Environment, Osman Pepe. It is evident that this process is important for NGOs to come together and meet on a common denominator, accelerating the movement.

At this critical stage, it will be a very important step to inform NGOs about toxic materials, laws and public rights. By doing this, the understandability of the toxic materials issue will increase, it will become publicly-known and as a result of this, the NGO movement will become stronger as it is also supported by the public.

Greenpeace which was the only NGO working on POPs until recently, contributed to help strengthen the local movement by supporting the NGOs, which went through problems in a regional context, by supplying information to them since 1995.

Greenpeace has also played rather an important role in founding and strengthening the infrastructure of Bumerang, which is a national NGO.

6.3 The current level of NGO communication and coordination on POPs

There are several regional networks in addition to an international network of NGOs. These bodies can be said that they are new structures. In general, before founding the national network, regional networks were just working on their regions and the issues that networks were in charge of was about the local problems that have been taking place in their region. This understanding keep them apart for a while.

Today with the coordination of these regional networks all the environmental NGOs are finding a platform to declare their point of view and add their outputs to the processes of decision. Also the government is taking National Network’s decisions into consideration which means that with this way many of the NGOs are sharing their points with decision makers.

The energy issue comes as the major issue on which a national cooperation has been sustained. After the cases of environmental disasters caused by industries irresponsibility that we are facing today has changed the agendas of the networks. But again as is mentioned before the toxics issues seem very technical to deal with.

TURÇEP (Turkey Environmental Platform);
West Black Sea Environmental Platform (BAKÇEP)
East Mediterranean Environmental Platform (DAÇEP)
East Black Sea Environmental Platform (DOKÇEP)
İç Anatolian Environmental Platform (İÇAÇEP)
Marmara Environmental Platform (MARÇEP)

6.4 National Implementation Plan process and NGOs

In the NIP preparation process several NGOs have attended but these NGOs cannot be classified as environmentalist. The NGOs like Turkish Technology Development Foundation are not able to consider the situation of Turkey with regards to POPs contamination in a way that an environmental NGO can declare. Assessment should include NGOs that have been working on these technical issues for a long time and which have an adequacy on setting a policy on management of these chemical substances. In addition, the Convention reminds us that wider participation of civil society in decision-making is vital.

6.5 NGOs currently active on POPs versus the total number of NGOs

According to STGM (Center of Public Development) data base there are 541 NGOs working on environmental issues. Although the number that has been given is right, the real situation of the environmental movement is different. Depending on legal status and the charters of these NGOs it can be said that in a general view most of them are working in this area, however, details of the charters are showing that almost all of these NGOs are working on basic issues like keeping the cities clean and campaigning on forestation.

The number of national NGOs working on POPs are two. There are some local NGOs also working on POPs issues but their situation does not containing any certainty. These local NGOs can be related with the issue by supplying support (information & motivation).

7. Efforts to deal with POPs

Turkey has signed the Stockholm Convention, which is a very important step in the environmental struggle against POPs, in May 23rd, 2004. Turkey got $480,000 from the GEF to constitute the NIP, one of the obligations of the agreement. The NIP was supposed to end in January 2006. Now, it is officially seen as ended. The act of determining existing stocks has started as the agreement requires, and appropriate disposal technologies are being explored.

Although the Convention was signed in 2001, Turkey still has not approved the agreement in the parliament.

Actions mentioned above contradict the policy of the Ministry of Environment on incineration. Besides the fact that what will be done about the existing incinerators or whether license will be given to new ones are not clear, at the same time, no measure has been taken against cement factories that incinerate without permission.

It is also not clear how the existing POPs stocks in Turkey will be disposed of. This issue has been put on the agenda, after Bumerang published the Derince Hotspot Report in April 2005. However, no improvements have been achieved yet. The government's reaction towards the eggs sampling report which was published by Bumerang and Greenpeace in April 2005 and which is the only indicator showing that POPs in Turkey are contaminating the food chain, was to deny the data included in the report instead of taking emergent measures about the issue.

No official statistical data on the content of existing POPs sources, on chimney gas emissions, on the environmental and health problems they create, exists, and no regular monitoring and documentation work is held by Ministry of Environment. Thus, Turkey does not have an inventory on POPs.

Corporate policy on POPs is not very encouraging. A great majority of the factories –that contain POPs or not- send their waste to either cement factories that incinerate illegally or illegally leave them in vacant places (e.g. Tuzla case); and a minority send them to İZAYDAŞ, the only incinerator in Turkey, due to reasons such as the Ministry's choice of preferring incineration, and İZAYDAŞ as the hazardous waste disposal methods and being a monopoly, the arbitrary price policy this corporate carries out, and the Ministry's inadequacy in taking measures and controlling.

8. State of Stockholm Convention Ratification and the National Implementation Plan

8.1 Agencies related to POPs

The Ministry of Environment is the POPs National Focal Point of Turkey. The National Coordinating Committee, for the preparation of National Implementation Plan related to POPs, is comprised of the Ministry of Environment, the Ministry of Health, the Ministry of Rural Affairs, the Ministry of Energy and Natural Resources, Undersecretary for Foreign Trade, Turkish Scientific and Technical Research Council-Marmara Research Centre (TUBİTAK-MAM), Middle East Technical University, Gazi University, Turkish Chemical Manufacturer's Association, Turkish Cement Manufacturer's Association, Turkish Technology Development Foundation.

The Ministry of Health is responsible for controlling the production, marketing, registration, and control of pharmaceuticals, cosmetics, food additives, and household pesticides. The Refik Saydam Hygiene Centre is a government research institute affiliated directly with the Ministry of Health. The mandates of the centre are controlling, diagnosing, production, training and research. It has also been undertaking two major activities: human poisoning caused by chemicals and other agents through the activities of the Poison Centre.

The Ministry of Agriculture and Rural Affairs is responsible for the production, marketing, registration, and control of agrochemicals. The Central Plant Protection Research Institute is affiliated with the Ministry of Agriculture and Rural Affairs. The Institute has been working on quality control of agrochemical formulation and resistance/efficacy of agrochemicals.

The Ministry of Energy and Natural Resources is concerned with the production of energy and determination and uses of natural resources. The Ministry of Energy and Natural Resources is responsible for the management of power plants.

The Undersecretary for Foreign Trade is responsible for the management of import, export and their registration and some special goods.

Turkish Scientific and Technical Research Council-Marmara Research Centre (TUBİTAK-MAM), established in 1972 in Gebze near Istanbul, is the first multidisciplinary research centre of Turkey to bridge the university and the industry. The Centre has laboratories for routine analysis sea water and waste water quality. In addition, there is more sophisticated analytical equipment in the centre. The Centre is trying to establish the dioxin/ furan analysis laboratory.

The Middle East Technical University in Ankara is carrying out research on air and water pollution. The Chemistry Department is carrying out analysis of pesticides and PCBs. University is carrying out analysis of organochlorine pesticides and PCBs and research on their effects on environment and human health.

Some researchers of Department of Toxicology in faculty of Pharmacy of Gazi Turkish Chemical Manufacturer's Association currently perform research on chemical impacts on humans and the ecosystem and hold an annual workshop on the industry's public relations program, Responsible Care.

The Turkish Cement Manufacturer's Association represents the interests of this industry with respect to waste disposal.

The Turkish Technology Development Foundation helps gather financial support development of technology with the Turkish corporate sector.

8.2 National Implementation Plan

Work on the National Implementation Plan (NIP) started in 2004 with funding from the Global Environmental Facility (GEF). The funding was $480,000 USD. The implementing organisation for the process of NIP preparation was UNIDO.

The preparation has to be finished and the NIP has to be declared in January 2006. Recently NIP preparation ended according to the process but the complication occurs in the inventories for PCBs. There is no official information on the amount of existing PCBs. It has been decided to prepare and do the needed research about PCBs and postpone the date of finishing the NIP. GEF has offered another fund for just the determination of the amount of PCBs in Turkey and obtaining an action plan for the disposal of PCBs. In July 2006 the NIP process will be completed.

Places that are shown as Hotspots of Turkey in the NIP are
-Derince Pesticide Stockpile, in Kocaeli,
- Italian wastes, in Sinop and Samsun,
- DDT Stockpile, Ankara Ministry of Agriculture and Rural Affairs, in Ankara
- PCB contamination in Incirlik Air Base, in Adana.

The NIP consists of action plans determined for the disposals of wastes and stockpiles in hotspots with appropriate alternative disposal techniques and also for the preparation of the emission and hotspots database for POPs. The NIP does not contain any information about the emissions of POPs and no research has done about the emissions during the NIP preparation process.

According to inventory regarding to PCB contamination in Turkey; the draft consists of issues like; determining the amount of the existing PCBs in transformers and condensers, developing a national infrastructure for effectively managing of POPs, preparing a book on PCBs and the need for setting a time frame for the disposal of all PCBs.

In National Legislation Draft, the subjects that have been targeted for implementation are; Ministry's authorization, formation of capacity and infrastructure and raising awareness in public.

Also the draft spotlights that the financial sources are not adequate for dealing with the potential harms caused by POPs and emphasizes that the responsible party for finding out new financial sources is the Stockholm Convention.

Participating institutions to NIP process are ;

National Project Coordinator : Prof. Dr. Altan Acara

Institutions:

Ministry of Environment and Forestry (Responsible institution)
Ministry of Agriculture and Rural Affairs
Ministry of Health
Refik Saydam Center of Hygiene
Tubitak MAM
Middle East Technical University
Hacettepe University
Ministry of Energy
Tedas
Teiaş
Eüaş
Kocaeli Chamber of Industry
Izaydas (Izmit hazardous and Clinical Waste Incinerator)
Donkasan
Turkish Cement Producers Association
Turkish Technology Development Foundation
State Planning agency

9. Public awareness activities

There is no official state action regarding that issue. No activity in the name of public awareness has been observed regarding the issue except for denying the striking egg sampling data that NGOs put on the public agenda by declaring that there is nothing to fear.

The attitude of the Ministry of Environment on POPs tends to keep the NGOs out of the decision making processes, rather than to raise public awareness. The fact that the incinerator company representatives attended the meetings throughout the NIP process while the NGOs working on the issue for years had not been invited to meetings although it was mandatory for them to attend, stands for the most solid examples of the Ministry's policy about the issue.

The 6-year-long campaign of Greenpeace on the issue and on-going efforts of national NGOs such as Bumerang and Çevre İçin Hekimler Derneği along with local NGOs founded in contaminated sites, are trying to keep the issue in the agenda of the country. Press releases, actions, seminars, and meetings for informing the civil society living in the contaminated sites are examples of the activities taken. Bumerang and Çevre İçin Hekimler Derneği have organised the first POP symposium of Turkey in December 24th, 2005. Because the seriousness of the issue has not been fully understood yet, and because of the speculative statements on waste policy of the country, a very limited number of NGOs carries on work on POPs.

10. Recommendations on eliminating POPs

- The first step is to make an inventory of sites and sources of POPs in Turkey.
- To develop a database of sources of POPs.
- The ratification and implementation of the Stockholm Convention – the most effective international agreement for eliminating POPs.
- Routine control of POPs sources, measurement of emissions and necessary analysis to be done by internationally accredited "independent" organisations,
- Heavy metals and dioxin focused routine health surveys on locals who live close to POPs sources,
- Putting together a "rapid response plan" that can be used in a possible emergency
- R&D work done in BAT/ BEP criteria, investigating alternative disposal methods,
- Transferring resources to investments on clean production; providing subsidies to investors in this direction; ensuring government support and working in order to spread initiatives like these,
- Consultancy on the initiatives of the private sector towards clean production,
- Making legal obligations implemented on environmental pollution today more strict,
- Providing public awareness and training for NGOs,
- Including NGOs and civil society in policy making
- Providing the workers of plants that could be sources for POPs, high level safety equipment and routine health controls,
- Having a long-term waste management policy for the country and having this policy not to be based on end-of-pipe solutions, but on clean production.

11. Recommendations on inventories

In Turkey much of the research has been done by individuals from universities. Most of these studies are not updated again according to changing levels year by year.

Government has no regular studies or research on emissions. The technical inadequacies of the laboratories are also another reason for not getting enough information about the sources and the levels of POPs and U-POPs.

The needed action steps are;
- Strengthening and supporting accredited laboratories by supplying technical needs,
- Supporting independent researchers, academicians and NGOs,
- Making new laws on regular POPs surveys
- Implementing periodic public health surveys,
- Founding objective counsels for observations.

12. Alternatives to POPs

There are many alternatives to pesticides as it is given in the table below. But the most important point for the alternatives to POPs part is: clean production. Choosing to phase out all the toxics from production processes can eliminate the problem of POPs from the beginning. There are always ways to dispose of the unwanted toxics but by determining this way as an answer to environmental hazards is just an end-of-pipe solution which will reflect the problems back to waste management.

The 6 Principles of Clean Production that should be taken under consideration immediately;

1. Preventative approach,
2. Right to know,
3. Right to participate in decisions affecting public, occupation and environmental health,
4. Precautionary approach,
5. The responsibility of producers- extended producer responsibility
6. Citizen responsibility for sustainable consumption.

The brief info about 12 POPs and their alternatives are mentioned in the Table 10.

Table 16 - 25: Alternatives to POPs (Source: WWF)

Aldrin/ Dieldrin	
Chemical characteristics	●Aldrin and dieldrin are synthetic organochlorine insecticides with similar chemical structures. ●Aldrin quickly breaks down to dieldrin in the environment or in the body. ●Dieldrin persists in the environment and bioaccumulates in body fat.
Production and use	● have been in used for agricultural insecticides, veterinary agents, termiticides and vector control agents since the 1950s. ● Aldrin has been used as a soil insecticide to control root worms, beetles, and termites.

	●Dieldrin has been used for soil and seed treatment in agriculture, for control of disease vectors such as mosquitoes and tsetse flies, for veterinary purposes as a sheep dip, and for the treatment of wood and the mothproofing of woolen products. ●Many countries restrict or ban the use of aldrin and dieldrin. Some countries continue to permit import for termite control or other purposes.
Exposure and effects	●Animals and people may be exposed via consumption of fish, seafood, dairy products, fatty meats, and root crops grown in contaminated soil or water. ●Aldrin and dieldrin are highly toxic. Animal studies have linked these chemicals to liver damage, central nervous system effects, and suppression of the immune system. Aldrin and dieldrin also disrupt the endocrine system, with evidence that exposure of pregnant women may harm the developing fetus. ●Aldrin and dieldrin demonstrate very high acute toxicity to aquatic organisms such as fishes, crustaceans, and amphibians. ●The U.S. Environmental Protection Agency designates aldrin and dieldrin as probable human carcinogens.
Alternatives	●Numerous environmentally sound alternatives are available to replace aldrin and dieldrin. ●For agricultural purposes, for example, integrated pest management techniques can provide equivalent protection to food and fiber crops. These approaches include the use of fostered and augmented beneficial insects and mites, crop rotations, and mechanical cultivation. ●Many cotton growers, for instance, have achieved high productivity and increased profits by relying on short season cotton varieties, plowing, crop rotation, reintroduction of beneficial insects, growing in proximity to alfalfa plants, and other approaches. From Benin to Peru to California, cotton farmers are recognizing public health, environmental, and economic advantages of chemical-free cotton production. ●For termite control, aldrin and dieldrin can be replaced by natural repellents, physical barriers, and a range of parasites, predators, and biological pathogens. Selection of the appropriate management technique depends on the biology and behavior of the particular variety of termites causing the problems. Climate, soil, and building type are important considerations as well.

Endrin	
Chemical characteristics	● Endrin is a persistent, acutely toxic organochlorine insecticide used mainly on field crops. ● It is estimated that endrin can remain in soil for more than 14 years. ● Endrin does not easily dissolve in water. ● Generally endrin is not found in air except where it has been applied to fields.
Production and use	● Introduced in 1951, endrin has been used as a pesticide to control birds on buildings and insects and rodents in fields and orchards. ● Endrin is applied in the production of cotton, maize, sugarcane, grains, apples, and ornamentals. ● Many countries, including the U.S., banned the use of endrin in the 1980s. However, many other countries continue to permit the import and use of endrin.

Exposure and effects	● Monitoring data suggest that endrin continues to contaminate air, water, sediment, soil, and fish and other aquatic organisms. ● Human exposure takes place primarily through consumption of contaminated food and water, or in occupational settings. ● Most endrin that enters the body is expelled within a few days. Small amounts may accumulate in fatty tissue. ● Exposure to endrin can cause endocrine effects, liver damage, and disorders of the nervous system. ● Animal studies suggest that exposure during pregnancy—e.g., via high consumption of endrin-contaminated fish—may lead to birth defects in the developing fetus. ● Endrin exhibits very high acute toxicity among crustaceans, fishes, and other aquatic organisms. ●The U.S. Environmental Protection Agency has determined that endrin cannot be classified as to its human carcinogenicity because there is not enough information.
Alternatives	●Integrated pest management offers a wide range of alternative substances and processes that can replace the use of endrin. ● No country has identified uses for endrin for which effective substitutes do not exist.

Chlordane	
Chemical characteristics	• Chlordane is a broad-spectrum organochlorine insecticide known for its toxic effects and its capacity to persist and bioaccumulate in the environment. • It is stable in soil and breaks down very slowly when exposed to the ultraviolet action of sunlight; chlordane can remain in the soil for decades. • Chlordane does not readily dissolve in water. • The chemical builds up in the fatty tissues of fish, birds, and mammals.
Production and use	• Introduced in 1945, chlordane was used in the greatest quantities as a soil insecticide for controlling termites and soil-borne insects whose larvae feed on the roots of plants. • It has been used as a pesticide on corn, citrus, and other crops. In the U.S., chlordane was registered for use on more than 40 vegetable and 27 fruit crops; the U.S. banned nearly all uses in 1988. Many other countries prohibit or restrict the use of chlordane as well. • Chlordane has been used also on livestock; on home lawns and gardens; for fire ant control around power transformers; and underground around the foundation of buildings to control termites. • Structures treated with chlordane remain protected from termite damage several decades later.
Exposure and effects	• Exposure to chlordane may occur through several routes, including consumption of contaminated meats, fish, shellfish, root crops, and other foods; maternal transfer; contact with soil around the foundation of chlordane treated homes; and by living near chlordane contaminated waste sites. Even many years after application, chlordane may be present in the air of homes that were treated for termites. • Occupational exposures may occur among persons involved in the chemical industry and among farmers, lawn-care specialists, and pest-control workers. • Chlordane has been linked to liver and blood disorders, severe neurological effects, and damage to the endocrine and reproductive systems. Effects on the kidneys and on the cardiovascular, respiratory, and gastrointestinal systems have also been observed. • The chemical is very highly toxic to aquatic organisms, particularly crustaceans and fishes. • Chlordane is designated a possible human carcinogen by the International Agency for Research on Cancer, and a probable human carcinogen by the U.S. Environmental Protection Agency.
Alternatives	Alternative materials and processes exist for virtually all uses of chlordane. These include a range of integrated pest management and integrated vector control techniques, each developed to address the particular pest species of concern and the environmental conditions in which it operates.

Heptachlor	
Chemical characteristics	• Heptachlor is characterized by its toxicity, environmental persistence, and ability to bioaccumulate in the fat of living organisms. It has been found in remote environments and has a half life of up to two years in soils.
Production and use	• Heptachlor is primarily used to kill soil insects and termites. It has also been used against cotton insects, grasshoppers, some crop pests, and to combat malaria. • Heptachlor is now banned in many countries throughout the world. • Some countries are using heptachlor in wood treatment or for control of termites underground. • Heptachlor is also used to protect underground cable boxes from fire ants.
Exposure and effects	• Contaminated food is probably the major exposure route for most species including humans. This can include eating crops grown in soil that contains heptachlor or eating fish, dairy products, and fatty meats from animals exposed to heptachlor. • Inhalation may be an exposure route, particularly in homes treated for termites. Drinking contaminated water or dermal contact can also result in exposure. • In mammals, heptachlor is metabolized to heptachlor epoxide, which has similar toxicity and can accumulate in fatty tissues. • Heptachlor residues have been measured in the tissue and eggs of wild birds. The chemical has been implicated in the decline of several wild bird populations. • Studies on laboratory animals have shown that heptachlor can have adverse effects on reproduction and the endocrine system. • Heptachlor is considered to cause cancer in animals, and may be linked to bladder cancer in humans.
Alternatives	• Integrated pest management solutions include consideration of growing varieties of crops that mature before the harmful insects arrive, and the re-introduction of beneficial insects. • For termites, workers in Kenya have found that *Tithonia diversifolia,* a native shrub, can have a protective effect and enhance soil fertility. • To protect buildings from termites, building design is important, as is the choice of building materials. Once termites have invaded, the use of extreme cold or heat has proved effective. Other methods include the judicious use of less toxic insecticides in bait stations that attract the termites. • The choice of construction materials is important to protect electric power transformers and underground cable television and telephone boxes.

PCBs (Polychlorinated biphenyls)	
Chemical characteristics	• PCBs are a family of 209 compounds made up of attached benzene rings with varying numbers and locations of chlorine atoms. • PCBs are characterized by their low flammability, low electrical conductivity, high resistance to thermal breakdown and to other chemical agents, and high degree of chemical stability. These qualities make them effective coolants, lubricants, and insulators. • The physical attributes that make PCBs useful in industry also make them a serious health threat to workers, wildlife, and communities. • PCBs' environmental persistence and long-range transport properties facilitate their movement to the earth's poles, which have become a storage reservoir for PCBs from temperate and tropical regions.
Production and use	• First manufactured commercially in 1929, PCBs were produced by many countries including the U.S., China, Slovakia, Germany, Japan, Russia, and the United Kingdom. • PCBs were exported throughout the world. • PCBs have been used in transformers and capacitors, heat transfer and hydraulic systems, carbonless copy paper, industrial oils, paints, adhesives, plastics, flame

	retardants, and even to control dust on roads. • Most countries outlawed PCB production in the 1970s, but large quantities are still in use. Of the estimated 3.4 billion pounds of PCBs manufactured worldwide (not including in the former Soviet Union) by 1989, up to two-thirds remain in use or in the environment.
Exposure and effects	• PCBs continue to enter the groundwater, soils, and atmosphere from multiple sources including old industrial equipment, recycled oil and materials, chemical manufacturing, landfills, and incineration of industrial and municipal waste. • Even so-called “closed” industrial systems can release large amounts of PCBs. • PCBs concentrate in the food web and bioaccumulate in the fatty tissue of wildlife and people. Virtually everyone has PCBs in their bodies. • Chronic low level PCB exposures can cause liver damage, reproductive abnormalities, immune suppression, neurological and endocrine system disorders, retarded infant development, and stunted intellectual function. • Scientists are studying possible links to immune system damage and fertility problems in many marine mammals. • The International Agency for Research on Cancer ranks PCBs as a probable human carcinogen.
Alternatives	• Substitute materials, processes, and products have been developed to replace current uses of PCBs. Numerous alternatives are available. • Cutting-edge non-incineration destruction technologies can eliminate PCBs, contain all residues, and minimize risk to workers and communities. • Due to costly past investments in incinerators and landfills many countries including those in North America and Europe have been reluctant to shift to safer PCB destruction technologies.

DDT (dichlorodiphenyltrichloroethane)	
Chemical characteristics	• DDT is an organochlorine compound that persists in the environment and bioaccumulates in human and animal tissue. • DDT was recognized as a effective insecticide in the 1930s.
Production and use	• DDT currently is produced in only two countries—China and India. India’s production capacity is less than 10,000 metric tonnes per year and is not fully utilized. China’s production capacity is unknown. • Mexico recently ceased production when its malaria control program shifted to alternative approaches. • DDT’s remaining legal use is for malaria control. Each year there are more than 300 million cases of malaria in the world resulting in one million deaths annually. Most cases and deaths occur in sub-Saharan Africa. • Malaria has been increasing in many places around the globe for many reasons including wars, civil strife, changes in weather and climate, population movements, economic changes, resistance to insecticides and drugs, and reductions in public health budgets. Malaria has also increased where DDT spraying has ceased without effective replacement • The World Health Organization (WHO) estimates that approximately two dozen countries use DDT for controlling malaria. • More than 80 countries have banned or restricted use of DDT.

Exposure and effects	• Exposure results from consuming contaminated food, and from contact in homes that have been sprayed with DDT for malaria control. • DDE, a breakdown product of DDT, has contributed to eggshell thinning in predatory birds. The bald eagle population in the U.S. declined in part because of exposure to DDT and its metabolites. • DDT has been shown to be a hormone disrupting chemical that can affect the reproductive and nervous systems. • Studies in mice, rats, seals, and dolphins indicate that DDT compromises the immune system. • The U.S. Environmental Protection Agency has identified DDT as a probable human carcinogen, based on laboratory studies.
Alternatives	• The World Health Assembly, WHO's governing body, has stated that countries should reduce reliance on insecticides for controlling malaria by promoting integrated vector management and other measures, and that DDT should be used only within such an integrated approach. • Alternatives include case detection and treatment with drugs, control of mosquito larva by chemical and non-chemical methods, use of chemical substitutes for spraying houses, and distribution of bed nets treated with alternative chemicals. • Until all nations can transition to effective and affordable alternatives, appropriate mechanisms are necessary to ensure that human health is not compromised as reliance on DDT is reduced. • WHO, the World Bank, and other institutions play a critical role in the development of alternatives to DDT.

Dioxins and Furans (Polychlorinated dibenzo-p-dioxins and dibenzofurans)	
Chemical characteristics	• Furans and dioxins are made up of pairs of benzene rings joined together by one or two oxygen atoms, respectively. • These chemicals (generally known together as "dioxins") are found virtually everywhere due to their multiple sources, environmental persistence, and ability to travel long distances. • Dioxins have poor solubility in water and thus are not easily excreted by wildlife and people. They accumulate in body fat and concentrate in the food web.
Production and use	• Dioxins have no intended use or value. Rather, they are byproducts of chemical and combustion processes involving chlorine. • Industrial sources include: ! medical, municipal, sewage sludge, and hazardous waste incineration; ! cement kilns, especially those burning hazardous waste; ! metals smelting and refining; ! pulp and paper bleaching; ! manufacturing, processing, and disposal of chlorinated plastics and other chemicals. • Dioxins deposited on trees and fields from industrial sources are re-released into the atmosphere through open field burning and forest fires. • Backyard trash burning is also a significant source of dioxins in some countries, as is automobile exhaust. • Transnational companies and global development institutions continue to promote the use of waste incineration and other dioxin releasing technologies in developing countries and transitional economies.

Exposure and effects	• There is no safe level of dioxins; even concentrations of parts-per-trillion can wreak havoc in human and animal tissue. • Some of the health effects of dioxins occur at levels to which all of us are exposed in our daily lives. Among these low-exposure effects are altered immune function, increased susceptibility to infections, and thyroid and liver function abnormalities. • Higher levels of dioxin exposure have been linked to birth defects, child growth retardation, reduced levels of male reproductive hormones, altered ratios of male to female births, diabetes, and cancer. • Dioxins are classified by the International Agency for Research on Cancer as a known human carcinogen.
Alternatives	• A global transition to chlorine-free materials, products, and industrial processes, and the development of waste management systems based on separation, re-use, and noncombustion technologies would dramatically reduce dioxin production. • Many effective, affordable, environmentally sound alternatives are available; others are within scientific reach. • Examples of alternatives include: chlorine-free paper bleaching methods, e.g., oxygen, ozone, peroxide; or use of nonwood fibers that do not require bleaching; ! chlorine-free plastics e.g., polyethylene and polypropylene, or materials such as glass and steel, instead of PVC.

HCB (Hexachlorobenzene)	
Chemical characteristics	• HCB is a synthetic crystalline compound first produced in the 1940s for use as a fungicide. • HCB is characterised by its toxicity, very high environmental persistence and long-range transport ability, and significant bioaccumulation in wildlife.
Production and use	• HCB has been widely used as a fungicide to protect the seeds of onions, wheat, and sorghum. • It has also been used as a solvent and as a manufacturing intermediate or additive in the production of synthetic rubber, PVC plastic, pyrotechnics, ammunition, wood preservatives and dyes. Production and use have ceased in many countries. • HCB continues to be created as a by-product in the manufacture of many chlorinated solvents and pesticides and in other chlorination processes. It is found as a contaminant in several pesticides. HCB is also released in the burning of municipal waste.
Exposure and effects	• Contaminated food is probably the major route of exposure for most organisms. HCB accumulates in fish; whales and other marine mammals; birds; lichens; and animals that eat fish or lichens, e.g. caribou. It can also build up in wheat, grasses, certain vegetables such as carrots, and other plants. • Sources of human exposure include the consumption of fish, meat, dairy products, grains, and breast milk. Some people are also exposed via occupational sources or by living near industrial facilities where HCB is produced, or near hazardous waste sites. • HCB is toxic by all routes of exposure and can damage the liver, thyroid, kidneys, as well as the endocrine, immune, reproductive, and nervous systems. There is evidence of increased susceptibility to infections, immune effects, and decreased survival rates in infants exposed to HCB. • The International Agency for Research on Cancer designates HCB as a possible carcinogen.
Alternatives	• HCB can be phased out through the use of clean production systems, pollution prevention, and the use of substitute materials and processes. • HCB-containing pesticides such as dacthal (DCPA), chlorothalonil, picloram, pentachloronitrobenzene (PCNB) and pentachlorophenol (PCP), as well as those which are sometimes contaminated — atrazine, simazine, and lindane—can all be replaced using integrated pest management techniques.

	• Alternative materials and processes can be used in place of chlorinated solvents, the production of which generates HCB. For example dry cleaners—the largest users of perchloroethylene—can shift to multiprocess wet cleaning. Instead of chlorinated solvents, this approach relies on a combination of heat, steam, vacuum, water, and natural soaps to clean clothing.

Toxaphene	
Chemical characteristics	• Toxaphene is an insecticide containing more than 670 chemicals. • Toxaphene is characterized by its toxicity, persistence, and ability to bioaccumulate in animals and travel long distances. It does not dissolve well in water, so it is likely to be found in air, soil, or sediment at the bottom of lakes or streams.
Production and use	• Toxaphene was one of the world's most widely used pesticides in the 1970s. • Toxaphene was used to control insect pests on cotton, cereal grains, fruits, nuts, and vegetables. Fish and game agencies also used toxaphene in the 1970s to kill fish species that were considered undesirable. In addition, it was used to control ticks and mites on livestock and poultry. • Toxaphene is now banned in the U.S. and in 57 other countries worldwide, and is severely restricted in another 12. • In the early 1990s, toxaphene was produced in Africa and Central America; the heaviest current use is thought to be in Africa.
Exposure and effects	• Exposure may result from eating contaminated animals, particularly fish and shellfish, drinking water from contaminated wells, or ingesting contaminated soil. Breathing air near hazardous waste sites where toxaphene has been disposed, or near other contaminated sites or obsolete stockpiles, can also result in exposure. • Toxaphene has not been shown to accumulate in humans to a great extent, although it has been found in breast milk. • At high exposures, toxaphene has been associated with kidney and liver damage, central nervous system effects, possible immune system suppression, and cancer. • Acute exposure to toxaphene is typically lethal to mammals, birds, and aquatic species. • Toxaphene has been linked with shortened life-span, endocrine disruption, reproductive problems, reduced fertility, and behavioral changes in animals. • Damage to the liver, kidneys, adrenal glands, and the immune system have also been noted in exposed animals, as have birth defects resulting from prenatal exposure. • The U.S. Environmental Protection Agency ranks toxaphene a probable human carcinogen.
Alternatives	• Toxaphene can be replaced by integrated pest management solutions, relying on safer and reduced pesticide inputs. Often these are site and crop specific. Examples include consideration of growing varieties of crops that mature before the harmful insects arrive, and the re-introduction of beneficial insects.

Mirex	
Chemical characteristics	• Mirex is considered to be one of the most stable and persistent pesticides in soil, sediment, and water, with a half life in soil of up to 10 years. It does not dissolve easily in water, but sticks to soil and sediment particles such that it is not likely to travel far through the soil and into underground water. • Mirex can bioaccumulate in wildlife and people.
Production and use	• Mirex was formerly used as an insecticide to kill ants in the southeastern U.S., South America, and South Africa. It has been used to combat fire ants, leaf cutters, harvester termites, Western harvester ants, and mealybug of pineapple. Mirex is still used against termites in both Australia and China. • Mirex also had extensive use as a fire retardant in plastics, rubber, paint, paper, and

	electrical goods.
Exposure and effects	• Most exposures now occur thorough eating contaminated food, particularly fish and other animals living near contaminated sites. • Exposure can also arise via the touching or ingesting of contaminated soil, or through inhalation. • Exposure to mirex can affect liver and endocrine function and reproduction in wildlife. It may also increase the chance of miscarriage in pregnant women. • At high concentrations mirex is lethal to fish and birds. Residues have been measured in many wildlife species including gulls, frogs, shrews, lizards, fish, seals, and turtles. • The U.S. Department of Health and Human Services has labeled mirex a probable human carcinogen.
Alternatives	• Integrated pest management solutions can replace the use of mirex. These may be site and insect specific. • To protect crops from leaf cutter ants, a variety of alternative measures have proved successful including physical barriers such as plastic skirts coated with sap or adhesives. Even waste from another ant colony can be used to repel the ant colony posing the threat. Planting lemon grass and other repellent plants around crops and nurseries is another useful defense. • For termites, workers in Kenya have found that *Tithonia diversifolia,* a native shrub, can have a protective effect and enhance soil fertility. • To protect buildings from termites, building design is important, as is the choice of materials. Once termites have invaded, the use of extreme cold or heat has proved effective. Other methods include the judicious use of less toxic insecticides in bait stations.

13. New POPs

According to official sources there is no existing research, analysis or information on new POPs in Turkey. However, the waste in Derince Pesticide Stockpile also contains lindane and as revealed during the egg sampling project in Turkey, the PBDE contamination in the Izmit region was very high.

13.1 BHC

According to Stringer and Johnston, BHC is the incorrect name used for HCH[iv]. But the name BHC is used all during this report not to continue a mistake but to prevent any confusion by the parties involved. Lindane is the 99% pure gamma isomer of hexachlorocyclohexane.[v] Lindane is known to be a persistent organic pesticide that accumulates in the body fat of living organisms. As all other persistent organic substances lindane can migrate over long distances and thus is found throughout the global environment including human tissues. Lindane has been banned in many countries; India and Romania remain the only producers of this toxic chemical according to IPEN pesticides working group. In many countries where lindane is still in use it faces pressure for phase out and substitution.[vi]

13.1.1 Health Consequences of BHC

Short term and long term effects of exposure to lindane are as follows according to USA EPA (Environmental Protection Agency):
Short-term: EPA has found lindane to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: high body temperature and pulmonary edema.
Long-term: Lindane has the potential to cause the following effects from a lifetime exposure at levels above the MCL: liver and kidney damage.

13.1.2 Environmental Consequences of BHC

When released to water, lindane is not broken down by microbes, but it is attacked by chemicals in basic waters. It is degraded by soil microbes, and may evaporate from the surface, or slowly leach to ground water. Lindane will accumulate slightly in fish and shellfish.[vii]

The lindane concentration from Uzmit – Turkey are shown in the Table 26 below.

13.3 PBDEs

PBDEs are a subclass of brominated flame retardants (BFRs.) Brominated and chlorinated flame retardants together make up approximately 25% of the world's market in chemical flame retardants (2). BFRs are a growing business at over 200,000 metric tons globally in 2001 (3). The PBDEs used in manufacturing occur in three primary forms, penta, octa, and deca-BDE, with five, eight, and ten bromine atoms, respectively, around a common chemical core. Octa and deca-BDE are used primarily in plastics for electronics, while penta is found in the polyurethane foam of upholstered furniture. Two other BFRs, hexabromocyclododecane (HBCD) and tetra-bromo-bisphenol A (TBBPA) are increasingly used in electronics as well (4). The Bromine Science and Environment Forum (BSEF), an association of bromine manufacturers, estimates that 90% of electronic appliances contain BFRs (5).

13.3.1 Human health and Environmental Consequences of PBDEs

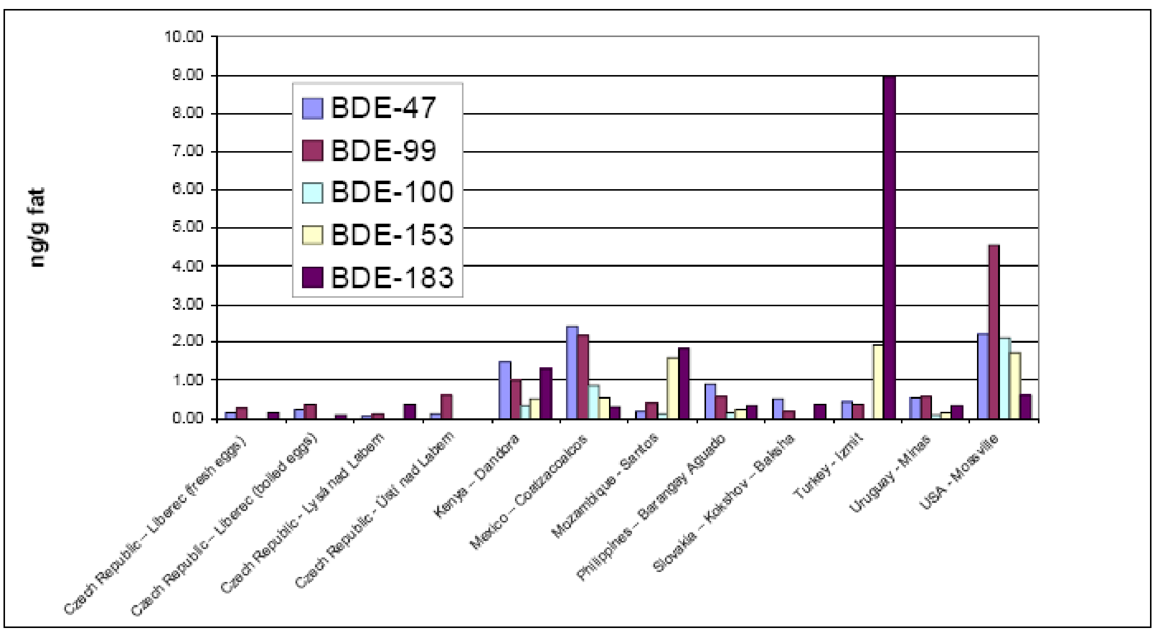
PBDEs are of concern to human and animal health because of their effects on the developing brain, causing long-term neurological damage even at low levels of exposure (6). Human health concerns center around the exponential increase in PBDE levels in human breast milk in both Europe and North America over the past two decades (7). PBDEs are ubiquitous, they are found in rivers, sediment, sewage sludge, indoor and outdoor air, house dust, and a wide range of food products (8). PBDEs have been found in fish, birds, and marine mammals, and show a strong tendency to bio-magnify up the food chain. Both in North American breast milk and in Scandinavian birds of prey, PBDE concentrations reported in 2004 are reaching levels that have caused neurological damage in laboratory mice (9). All sources of PBDE exposure have not been identified. However, diet is regarded as the most likely route of exposure for the general population (10). Recent studies have shown PBDEs and other chemicals present in house dust (11). Air inside homes and offices can carry PBDE concentrations that are estimated to be almost ten times higher than levels in the air outside the buildings (12). Moreover, house dust has been identified as an important pathway of PBDE exposure for young children (13). Despite the ubiquity of PBDEs, information on their toxicology is limited (14). It is unclear whether the main exposure to humans and wildlife comes from BFR manufacture, or from the use and disposal of common consumer products.(15)

As a result of growing health concerns, some PBDEs have been banned or phased out in the European Union and in several states in the United States. The Intergovernmental Forum on Chemical Safety has stated that BFRs "should not be used where suitable replacements are available, and future efforts should encourage the development of further substitutes" (16).

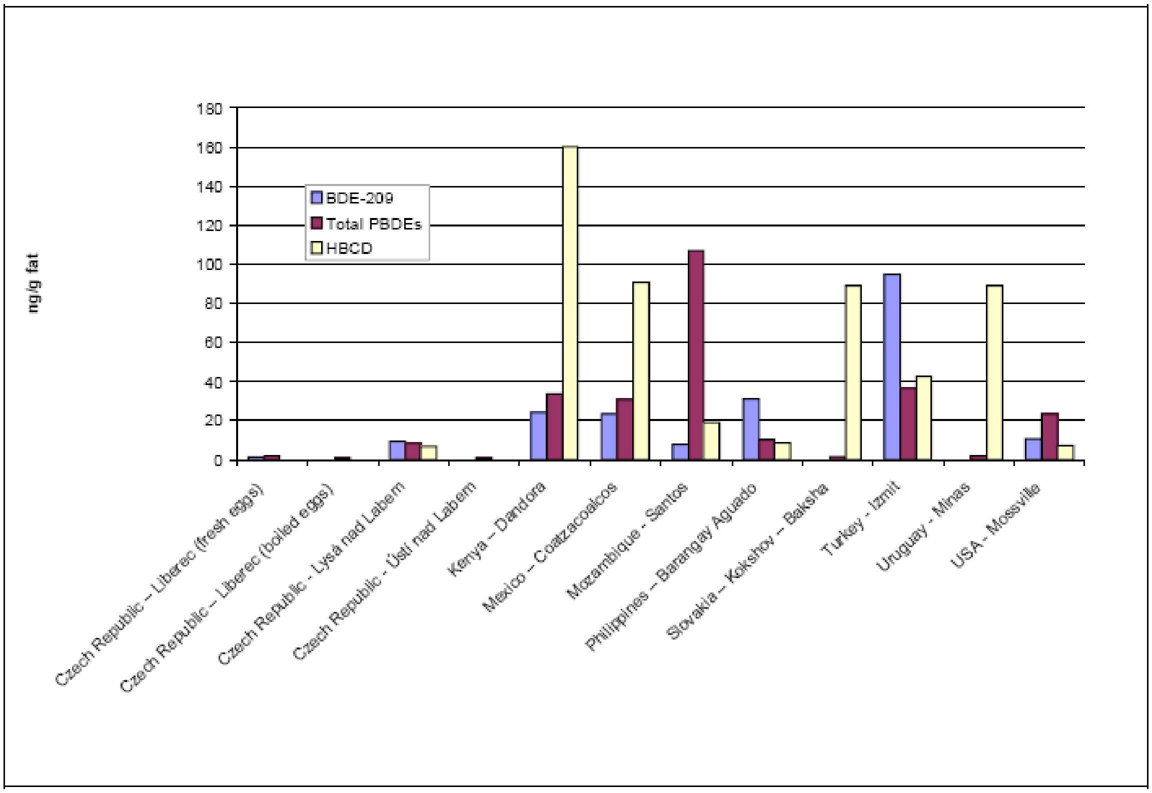
The Σ PBDEs concentration from Uzmit – Turkey are shown in the Table y below. The concentrations of BDE-47, BDE-99, BDE-153, BDE-183, BDE-209, Total PBDEs and HBCD in composite egg samples (ng/g fat) are shown in the Graph 8 and 9.

Table 26: Sampling location, concentrations of total PBDEs, HBCD, lindane and Beta HCH in composite egg sample, and characterization of sampling site, Turkey
(Source: Blake A. -The Next Generation of POPs: PBDEs and Lindane – Keep the Promise, Eliminate POPs Campaign, 2005)

Sample location	Σ PBDEs (ng/g fat)	Σ HBCD (ng/g fat)	Lindane (ng/g fat)	Beta HCH (ng/g fat)	Characterisation of sample site
Turkey - Izmit	106.8	42.8	0.60	3.70	Hazardous waste incinerator



Graph 8: Concentrations of BDE-47, BDE-99, BDE-153, and BDE-183 in Composite Egg Samples (ng/g fat)



Graph 9: Concentrations of BDE-209, Total PBDEs and HBCD in Composite Egg Samples (ng/g fat)

14. Resources on POPs

14.1 Websites

14.1.1 Governments / IGOs / Institutions

1. Stockholm Convention website - http://www.pops.int/
2. UNEP Chemicals website – http://www.unep.org/ http://www.unep.org/themes/chemicals/
3. UNDP – POPs - http://www.undp.org/gef/05/portfolio/chemicals.html#pops
4. UNIDO – POPs - http://www.unido.org/doc/46478
5. UNDP / GEF – http://www.undp.org/gef/05/
6. GEF - Small Grants Programme - http://sgp.undp.org/
7. World Health Organisation - http://www.who.int/en/
8. Basel Convention website - http://www.basel.int/

9. EU (European Union) website – POPs - http://www.europa.eu.int/comm/environment/dioxin/index.htm
10. World Bank POPs website - http://lnweb18.worldbank.org/ESSD/envext.nsf/50ParentDoc/PersistentOrganicPollutants?Opendocument
11. Meteorological Synthesizing Centre-East - http://www.msceast.org/about.html
12. U.S. Environmental Protection Agency - http://www.epa.gov/
13. Danish Environmental Protection Agency - http://www.mst.dk/homepage/
14. Food and Agriculture Organization of the United Nations - http://www.fao.org/
15. Protocol on Pollutant Release and Transfer Registers - http://www.unece.org/env/pp/prtr.htm
16. EUNECE (United Nations Economic Commission for Europe - http://www.unece.org/
17. European Environmental Agency - http://www.eea.eu.int/
18. OECD (Organisation for Economic Co-operation and Development) - http://www.oecd.org/

14.1.2 NGOs / NGOs Networks

19. IPEN (International POPs Elimination Network) website - http://ipen.ecn.cz/
20. IPEP (International POPs Elimination Project) website - http://www.oztoxics.org/ipepweb/
21. Greenpeace website - http://www.greenpeace.org/international_en/
22. Greenpeace Mediterranean - http://www.greenpeace.org/turkey/
23. WWF website - http://www.panda.org/ http://www.panda.org/about_wwf/what_we_do/toxics/index.cfm
24. GAIA (Global Anti- Incinerator Alliance, Global Alliance for Incinerator Alternatives) - http://www.no-burn.org/
25. PAN (Pesticide Action Network International) website - http://www.pan-international.org/
26. Health Care Without Harm –http://www.noharm.org

14.2 Databases / Magazines

1. ATSDR (Agency for Toxic Substances and Disease Registry) - http://www.atsdr.cdc.gov/
2. INCHEM (Chemical Safety Information from Intergovernmental Organizations) - http://www.inchem.org/
3. Haz-Map Occupational Exposure to Hazardous Agents - http://hazmap.nlm.nih.gov/index.html
4. Environmental Health Perspectives - http://ehp.niehs.nih.gov/

14.3 Focal Points

IFCS National Focal Point
Ministry of Environment
General Directorate for Environmental Pollution Prevention and Control Chemicals Management Section
Attn: Mrs Mufide Demirural, Head of Chemicals Management Section
Address: Eskisehir Yolu 8 km, Ankara 06530, Turkey
Tel: (90) 312 287 99 63 / 43 18
Fax: (90) 312 285 58 75
www pages: http://www.who.int/ifcs/focalpoints/turkey/en/index.html

UNDP - The United Nations Development Programme in Turkey
www pages - English: http://www.undp.org.tr/undp/homepage.asp
www pages – Turkish: http://www.undp.org.tr/undp_tur/anasayfa.asp

UNIDO
UNIDO National Director: Mr. Mehmet Celal ARMANGIL
E-mail: C.Armangil@unido.org
Address: Birlik Mahallesi, 2 Cadde, No:11, 06610, Cankaya, Ankara
Telephone: +90 312 454 1078
FAX: +90 312 496 1475
E-mail: +90 312 496 1475
www pages: http://www.unido.org/data/country/contact.cfm?c=TUR

UNEP - Stockholm Convention focal point
(Turkey is not a Party to the Stockholm Convention. It is a Signatory. – According to the UNEP file Update: 13 April 2006, source: http://www.pops.int/documents/focalpoints/focalpoints.doc)

Mr. Sami Agirgun, General Director
Ministry of Environment
General Directorate for Environmental Pollution Prevention and Control
Address: Eskisehir Yolu 8. km, Ankara, Turkey
Tel: (+90 312) 285 10 40
Fax: (+90 312) 285 58 75

GEF Small Grants Programme in Turkey
Address: Birlik Mah. 2. Cad. No.11 Cankaya, Ankara, RBEC 06610

Ms. Z. Bilgi Bulus
National Coordinator

Ms. A. Ozge Gokce
Programme Assistant

Phone: 90-312 4541131
Fax: 90-312 4961463
Email: bilgi.bulus@undp.org
www pages: http://www.gefsgp.net

14.4 NGO´s Reports about POPs from Turkey

<u>IPEP nad IPEN Reports:</u>

Petkim Petrochemical Co.
A) Turkish language -
http://www.oztoxics.org/ipepweb/library/reports/Turkey%20Petkim%20PVC%20Turkish.pdf
B) English language -
http://www.oztoxics.org/ipepweb/library/reports/Turkey%20Petkim%20PVC%20English.pdf

Pesticide stockpile in Derince, Kocaeli, Turkey
A) Turkish language -
http://www.oztoxics.org/ipepweb/library/reports/Turkey%20Kocaeli%20Pesticide%20Stock%20Turkish.pdf
B) English language -
http://www.oztoxics.org/ipepweb/library/reports/Turkey%20Kocaeli%20Pesticide%20Stock%20English.pdf

Contamination of chicken eggs near the hazardous waste incinerator in Izmit, Turkey by dioxins, PCBs and hexachlorobenzene –
http://www.oztoxics.org/ipepweb/egg/HotspotReports/Turkey_eggsreport.pdf

The Egg Report -
http://www.oztoxics.org/ipepweb/egg/egg%20reports/GLOBAL_eggsreport%20FINAL.pdf

Annexes to The Egg Report -
http://www.oztoxics.org/ipepweb/egg/egg%20reports/Annexes%20FINAL.pdf

<u>Greenpeace Mediterranean reports</u>
Temuge, T. Heavy metals and organic contaminants associated with wastes generated by industries located in Izmit Bay, Turkey. Istanbul: Greenpeace Mediterranean, 2000

Greenpeace , The Dark Side of Petkim, 2000

List of Abbreviation:

BFRs - Brominated flame retardants
BDE - Brominated diphenyl ethers
BHC – Benzene hexachloride
BSEF - Bromine Science and Environment Forum
DDE – dichlorodiphenyldichloroethylene
DDD - dichlorodiphenyldichloroethane
DDT - dichlorodiphenyltrichloroethane
GC – Gas chromatography
GC/MS - Gas chromatograph-mass spectroscopy
GEF - Global Environmental Facility
HBCD - Hexabromocyclododecane
HCB – Hexachlorobenzene
IFCS – Intergovernmental Forum on Chemical Safety
IPEN - International POPs Elimination Network
IPEP - International POPs Elimination Project
MoEF - Ministry of Environment and Forestry
NGO – Non-governmental organization
NIP – National Implementation Plan
OCPs - Organochlorine pesticides
PBDEs – Polybrominated diphenyl ethers
PCBs – Polychlorinated biphenyls
PCDD/Fs – Polychlorinated dibenzo-p-dioxins or dibenzofurans
PBDEs – Polybrominated diphenyl ethers
POPs – Persistent organic pollutants
TBBPA - tetra-bromo-bisphenol A

kg – kilogram (1,000 grams)
m^3 – cubic meter
ng - nanogram
ppm –
tonne – it is 1,000 kg

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15. Cok et al. Bull.Environ.Contam.Toxicol (in press) 2002

Ministry of Environment of Turkey, General Directorate of Environmental Management. “Report of the evaluation commission regarding the pre-feasibility report on the destruction of BHC.” 19 March 2004.

[ii] See ref. 2

[iii] See ref. 4

[iv] Stringer, R. and P. Johnston, 2001, Chlorine and the Environment, Kluwer Academic Publishers

[v] <http://www.headlice.org/faq/treatments/whatslindane.htm>

[vi] <http://ipen.ecn.cz/index.php?z=&l=en&k=documents&r=viewtxt&id=77&id_rubriky=9>

[vii] <http://www.epa.gov/safewater/contaminants/dw_contamfs/lindane.html>