



International POPs Elimination Project
*Fostering Active and Efficient Civil Society Participation in
Preparation for Implementation of the Stockholm Convention*

Pesticide contamination in the abandoned chemical plant, Porto Romano

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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 Non Governmental Organisation (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 each country's 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 the preparation of reports on a country's 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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General information

Albania is situated on the western edge of the Balkan Peninsula. It has a 476 km-long coastline on the Adriatic and Ionian Seas. Its area is 28 748 square km. The current total population is around 3.3 million and is young compared with other European countries, with an average age of 28.6 years.

After the Second World War II, over four decades, Albania went through economic policies that have been focused on meeting only production targets, without considering their environmental impacts. After the 1990s, Albania moved towards more democratic forms of governance and a market driven economy. From the environmental point of view the problems of industrial pollution are seen as a legacy of the past. However, changes since 1991 have not led to significant environmental improvements. A number of new challenges have arisen, in addition to inherited problems. It is observed that most of the factory sites have few resources available for clean-up, or were privatized under conditions that did not clearly establish the responsibility for environmental management.

A major crisis broke out in early 1997, when the collapse of financial pyramid schemes led to social unrest and a burst of violence. The environment was again damaged very seriously, being one of the major victims. Albania restarted its recovery after 1999.

In 1999, at the request of the Albanian Government an environmental assessment of the post-conflict situation in the country was undertaken by the United Nations Environment Program (UNEP), with support from the Dutch Government. The UNEP assessment found that the key environmental issues are soil and water contamination and the key impacts are on the health of the local population. However, the report published in 2000, did not intend to be a comprehensive environmental survey, but instead was a rapid, strategic assessment aimed at identifying the most urgent environmental needs of Albania, in order to prioritize rehabilitation funding. The report focused on the country's severely polluted hot spot sites requiring immediate attention. Nine "hot spot" sites were visited after consultations with national experts. From them, UNEP identified five dangerous sites requiring urgent attention (see the map).

Based on the assessment of the impacts of an individual site on human health and environmental quality, the Durres industrial area (pesticide and heavy metal contamination) in Porto Romano has been determined as one of five priority environmental pollution "hot spots".

The hot spots of Durrës, which represents a strong Lindane/ HCH and hexavalent chromium contamination source, cover a considerable surface, including a destroyed chemical plant (Lindane and dichromate production), a dumpsite nearby, a new part of the chemical plant and a sulphur dumpsite, and a chemical storage site at Bishti Palles, 2 km north of the chemical plant. In this storage there are not only large quantities of chemicals, originating from the former production process (raw materials), but also several hundreds tons of

technological residues from the Lindane production that are still stored today. The site is situated in an area that has a large potential for tourist development.

As the state has been owner of the industrial areas, it was invaded (like many other sites) by illegal settlers from 1992 onwards.

In 2003-2004 a Japanese grant of about 250 000 USD has been used through the World Bank for the project “Institutional strengthening and environmental cleanup”, which aimed to evaluate the environmental situation and socio-economic impacts of the Durres hot spot.

Two years ago, the Ministry of the Environment financed the construction of a fence at the most critically contaminated area, where the Lindane and sodium dichromate factories were located.



Picture 1: View on the fenced area of the former chemical plant

In July 2005, International Development Association (IDA), as an administrator of the grant, informed the Albanian Government that grant funds of about 3.11 million USD were provided by the Netherlands Minister for Development Cooperation. The purpose of the grant was to assist Albania in the implementation of the Integrated Coastal Zone Management and Clean-up Project. It will be used to reduce the human and environmental health hazards at the Porto Romano chemical plant and dump site in this region.

We visited the site and it seems that the project is in the implementation phase. A project unit is has been established at the Ministry of the Environment.

Capacity building

For the first time in Albania, a Committee of Environmental Protection (CEP), reporting to the Ministry of Health, was established in 1991 as a regulatory and coordination body for environmental legislation and environmental impact assessment. A network of 12 Regional Environmental Agencies was created at the prefecture level in 1993, to be in charge of environmental impact assessment. In 1998 the CEP was transformed into the National Environmental Agency, reporting directly to the Council of Ministers. In September 2001 the government established the country's first Ministry of the Environment (MoEn). The strengthening of environmental protection has been increased in 1993 by the development of a new environmental policy and strategy, which established the basic rules and structures for monitoring, control and licensing. Assisted by international and bilateral organizations, the first National Environmental Action Plan (NEAP) has been developed and approved already in 1994 and updated in 2001 (UNEAP). Several additional environmental strategies have been adopted: National Waste Management Plan, National Environmental Health Action Plan, National Biodiversity Action Plan, and the Coastal Zone Management Plan.

However, we should point out that a great number of strategies have been developed during the last 15 years, which in most cases have had a poor correlation with financial sources. Consequently their impacts have been insignificant.

New environmental principles were introduced in the new Constitution in October 1998. A number of laws, government decisions and regulations have been developed, as well. The main challenges however, are not linked to legislation, but to their limited implementation and enforcement. This is due to both to a general lack of respect for the law, as well as to the low priority of environmental issues within the political class and society in general. The main medium term objectives of the country are included in the National Strategy for Socio-Economic Development (NSSED). However, although environmental degradation is a serious concern in Albania, it seems that environmental policy is still not a real priority in the NSSED.

The Environment in Albania Assessed by the European Commission National Plan of EU Legislation Approximation

In Albania, during the recent years, the legal framework in the environmental field has been steadily improved, with the tendency to align it with that of European Union. In addition, we are member, and have ratified several conventions, including them in the Albanian legal framework. One of them is the Stockholm Convention.

Actually, Albania is in the early stage of adopting EU legislation. In 2005, a National Plan for the Approximation of the Legislation and Stabilization Association Implementation was prepared. This document pointed out that EU integration is an absolute priority for the definition of reforms and foreign policy in the program of the government of the Republic of Albania. In this plan, the Chapter 3.2.3 deals with environmental issues, focused on air quality, water management, nature protection, legal framework etc.

In the Report of 2004 of the European Commission, "Albania, Stabilisation and Association Report", paragraph 4.2.3. is dedicated to the environment. It has been pointed out that:

“Albanian environmental problems remain acute. Little has been done to address the toxic hotspots identified in Durres and Vlora. Pollution from the Ballsh Oil Refinery as well as nearby oil wells is considered to be unacceptably high. Some secondary legislation has been adopted in areas such as biodiversity, environmental management of polluted waters, and conservation of trans-boundary lakes. However, overall implementation of legislation remains weak. Albania has ratified the UN’s Aarhus Convention, but is not yet in a position to implement it.

The five national institutions responsible for environmental matters continue to have problems in respect of coordination and monitoring. Methodological standards for data collection, management, and scientific analysis do not exist, and no central electronic database has been created. Nonetheless, the present environmental situation remains grave and much more needs to be done if Albania wishes to prevent its environmental problems from becoming a serious handicap to socio-economic development in the country. Albania has adopted the most important international Conventions and Protocols, which often are not accompanied with necessary by-laws in order to make use their implementation. However, key environmental decisions continue to be made beyond the MoEn control and communication and cooperation among government institutions remain weak. At local levels the Regional Environmental Agencies possess weak legislative authority and inadequate resources.”

Physical description of site

With around 200 000 inhabitants, Durres is one of the larger cities in Albania. It is located in the central-western part of the country at the Adriatic Sea Coast (see the map). The city is located in the southern part of Durres Hills, having the highest peak at 182 m above mean sea level. Durres is the major harbor of the country. The former chemical plant of chromium and pesticides is located some 6.5 km north east of the city centre. On one side are hills and behind the hills (1-2 km off) is the Adriatic Sea Coast.



Picture 2: Map of Albania

When visiting the site a clear smell linked to the dumped Lindane can be detected. It is estimated that about 20 000 tons of hazardous waste containing chromium, Lindane and other substances were dumped on an area of about 6 ha.

Porto Romano is a dynamic settlement. The population is growing, both by new people settling and through the birth of new children. Until 2003, no measures had been taken to stop the settling of migrants. Near the entrance of the site there is a school. Public transport passes on the unpaved road causing a lot of dust in the dry season. According to our rough assessment in the area, some 4000 people have settled there. Four families, in total 17 people, have been settled at the former pesticide factory, which means within the critical contaminated area.

The four families in January of 2006 are displaced from the contaminated area and are accommodated in a former chemical factory in Shkozë, which we believe has no chemical contamination problems. This building is under the jurisdiction of the Durrës municipality and was reconstructed with the sponsorship of the Ministry of Environment. The reconstruction was completed in early December 2005.

On Tuesday March 2006, Besnik Baraj, Ladislav Kleger and Hana Kuncova conducted a visit to the Porto Romano “hot spot”. At the entrance of the fenced area a family was still there, having no information for a new accommodation somewhere safer. In the factory area demolition of the houses was carried out and it looked like the implementation project for the remediation of the area was on going. The dichromate spots were clearly observed in the soil and the yellow color in some water pools was very intense, demonstrating the high concentration of Cr(VI) that still remains. We think that due to the fact that Cr(VI) residues are in open air, in rainy seasons a good part of it has migrated into the soil or to the drainage channel, which has at its end a pump station at the Adriatic Sea. This is due to the high solubility of Cr(VI) compounds. Cr(VI) is chemically very reactive and normally in the environment is turned to Cr(III) which in its hydroxide form is insoluble.



Picture 3: In the cottage situated in the area of former plant is still living one family, which also keeps own cattle grazing on the contaminated soil.



Picture 4: Ruins of the former chemical plant.

We visited as well the storage sites located about 2 km North of the factory, which are very close to the sea coast. Bad smells and very bad conditions of the chemical products were observed. In one of the barrels we could see releases of white smoke. The site was

unprotected and nobody was found there during our inspection, which could be dangerous for local people passing by, especially for small children who by curiosity might contact the chemicals.



Picture 5: Unsecured storage houses for the obsolete chemical at Bishti Palles.



Picture 6: Barrels with chemicals in one of the storage houses.

The field visit resulted in collection of several samples. Two of them were later analyzed for the content of organochlorine pesticides. The first sample was eggs from chickens grazing in the vicinity of the plant. Results of the analysis can be seen in the table 1 and is obvious that especially levels of Beta HCH and Lindane are very high. In the table 2 are shown levels of the selected organochlorine pesticides, which have been found in free range chicken eggs samples from different parts of the world. In diagrams 1, 2 is graphic comparison of the detected values. Concentrations of Beta HCH and Lindane in eggs collected in the vicinity of the abandoned chemical plant in Porto Romano are substantially higher than in eggs from another sample sites. For example second highest concentration of Beta HCH, which was detected in eggs collected close to unsecured medical waste incinerator and 25 km far from the pesticides factory (in the Chinhath Industrial Area) in Lucknow, India is still about 4 times lower than in eggs collected in the vicinity of the abandoned chemical plant in Porto Romano.

Table 1: Concentrations of particular organochlorine pesticides in the sample (free range chicken eggs) collected close to obsolete chemical plant in Porto Romano

Chemical	Amount ng/g (fat)
TeCB*	4,5
1,2,3,4 TeCB	3,5
Hexachlorobenzene	10
Beta HCH	1800
Lindane	59,8
delta HCH	11,4
o,p' DDE	ND
p,p' DDE	220
o,p' DDD	ND
p,p' DDD	1,6
o,p' DDT	1,5
p,p' DDT	39,9

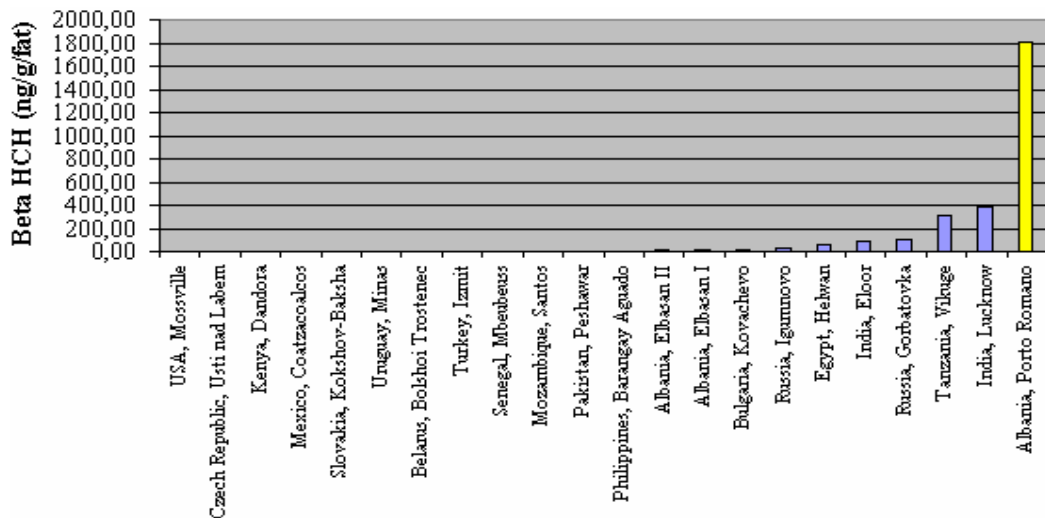
*total sum of 1,2,4,5 and 1,2,3,5 isomers

Table 2: Sampling locations, concentrations of total hexachlorobenzene, Lindane and Beta HCH in composite egg samples, and characterization of sampling sites (based on data from Blake, 2005 and the field measurements).

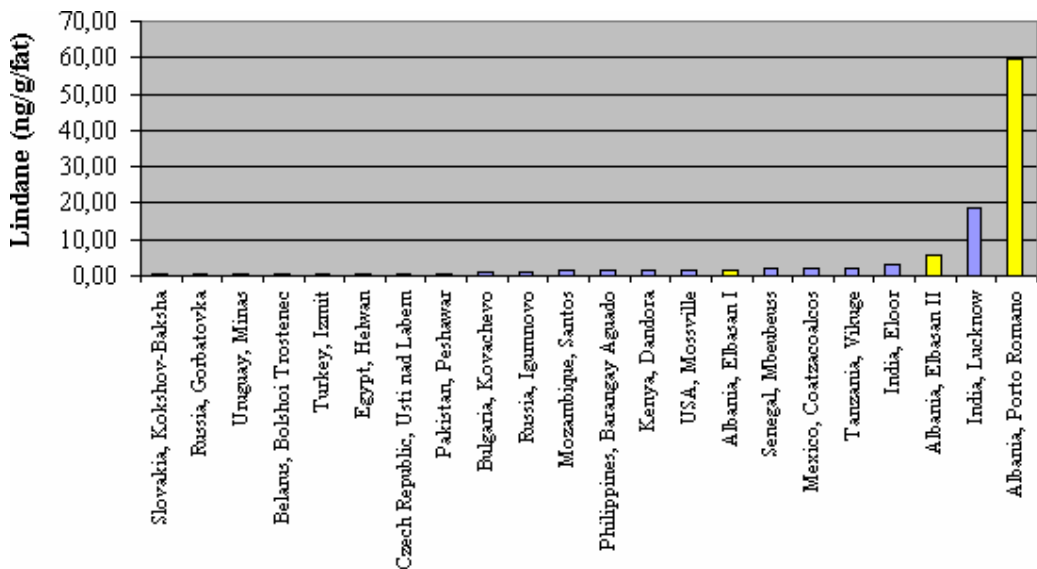
Sample Location	HCB (ng/g fat)	Lindane (ng/g fat)	Beta HCH (ng/g fat)	Characterization of sample site
Albania, Elbasan I	3,4	1,8	14,7	Metallurgical complex
Albania, Elbasan II	23,9	5,5	12,5	Cement kiln
Albania, Porto Romano	10	59,8	1800	Chemical plant
Belarus, Bolshoi Trostenec	4,7	0,58	2,40	Dumpsite (fires)
Bulgaria, Kovachevo	25,5	1,10	19,50	Power plants, industrial area
Czech Republic, Lysa nad Labem	46,4	NA	NA	Hazardous waste incinerator
Czech Republic, Usti nad Labem	35,8	0,68	0,54	Chlorine chemical industry site, hazardous waste incinerator
Egypt, Helwan	15,1	0,66	52,50	Metallurgy, cement kilns
India, Eloor	7,7	3,00	85,40	Organochlorine pesticides production
India, Lucknow	34,5	18,90	390,00	Medical waste incinerator
Kenya, Dandora	4,4	1,40	1,10	Dumpsite (fires)
Mexico, Coatzacoalcos	34,5	2,20	1,40	Petrochemical complex
Mozambique, Santos	0,9	1,30	4,50	Cement kiln burning waste
Pakistan, Peshawar	1,1	0,75	4,70	Mixed waste dumpsite
Philippines, Barangay Aguado	1,7	1,30	6,80	Medical waste incinerator
Russia, Gorbatovka	68,9	0,50	100,00	Chlorine chemical industry site, hazardous waste incinerator
Russia, Igumnovo	11,8	1,10	36,30	Chlorine chemical industry site, hazardous waste incinerator
Senegal, Mbeubeuss	1,7	2,00	4,00	Dumpsite (fires)
Slovakia, Kokshov-Baksha	10,7	0,48	1,80	Municipal waste incinerator

Tanzania, Vikuge	19,1	2,30	310,00	Obsolete pesticides storage
Turkey, Izmit	5,3	0,60	3,70	Hazardous waste incinerator
Uruguay, Minas	1,4	0,51	2,00	Cement kilns burning waste
USA, Mossville	1,2	1,70	0,27	PVC and oil industries

Graph 1: Comparison of Beta HCH levels found in composite egg samples from various countries



Graph 2: Comparison of Lindane levels found in composite egg samples from various countries.



Second sample was mud collected in one of the storage houses in Bishti Palles. Again very high concentrations of Beta HCH and Lindane were found (Table 3). These findings confirm this area as one of the most contaminated environmental hot spot in the Balkan region.

Table 3: Concentrations of particular organochlorine pesticides in the sample (mud) collected in storage house in Bishti i Palles. Source: Axys Varilab CZ 2006.

Chemical	Amount ng/g(dm)
TeCB*	0,56
1,2,3,4 TeCB	1,3
Hexachlorobenzene	3,7
Beta HCH	3900
Lindane	120
delta HCH	570
o,p' DDE	ND
p,p' DDE	2,9
o,p' DDD	0,62
p,p' DDD	1,4
o,p' DDT	1,1
p,p' DDT	1,2

*total sum of 1,2,4,5 and 1,2,3,5 isomers

History of site

Before 1992, the Lindane plant was for years a source of pollution from organochlorine compounds mainly due to a low-level technology and the mishandling of the technological residues. At this site the manipulation activities of all pesticides used in Albanian agriculture activities have been concentrated, including sodium dichromate production for its use in the leather industry. The pollution problem was aggravated after the 1992 when the Chemical Enterprises was destroyed and all the technological residues, mostly technical hexachlorocyclohexane (HCH), but also other chemicals, were left outside. In 1998 about 250 tons of residues of technical HCH, were packed in about 10 000 inappropriate sacks and removed and placed in a depot.

In the major Albanian crisis of the last century, which broke out in early 1997, almost all industrial centers, including Durres Chemical plant, were destroyed.

At present, according to the municipality authorities, the area of Porto Romano is under the jurisdiction of Durres municipality, but the Pesticides Factory building where the families had found shelter, is the property of Ministry of Economy which had not handed over the ownership of it to the Durres municipality or its administration.

A review of all available reports on the environmental state and on socio-economic impacts caused by the Durrës hot-spot, have confirmed that this site represents an apparent environmental and human health problem. Intensive surveys on site and sampling and chemical analysis carried out by different teams has reinforced this conclusion.

Tens of thousands of tons of chemicals and contaminated materials have been dumped next to the plant, but according to verbal information there are also other unknown dumpsites in the area. Building materials from the destroyed plant have been used to build houses on and near the former chemical plant site. Due to the expansion of the pollutants, the plain nearby the former chemical plant and the drainage channels discharging into the sea are polluted as well.

Proposed remediation scheme

Based on Dutch and German standards and the special situation in Porto Romano, the GWK consultant proposed to describe the contaminated area using three contamination levels. The proposed contamination levels are combined with proposals for remediation activities. The

“Acceptable Level” and “Low Level” will only be combined with general monitoring activities defined in the Long Term Monitoring Program. The “High Level” will implement further investigations described in the Special Contaminations Monitoring Program in order to define limitations of land use. The “Critical Level” implements remediation activities to be carried out immediately. The final decision about these preliminary standards should be done within an iterative process during the proposed Long Term Monitoring program.

As one of the results of investigations and the discussions with stakeholders the encapsulation of the Lindane dichromate site is proposed as the most suitable option in order to reduce the main source of health risk in Porto Romano. The option has to be combined with other options in the Lindane dichromate site itself as well as resettlement of four families, excavation and disposal / treatment of HCH residues and eventually sanitation of groundwater. Disposal and treatment of chemicals stored in the waste storage area of Bishti Palles and in the sulphur site have to be carried out before any other activity. Additional investigations of soil and debris of the waste storage area of Bishti Palles have to be done after disposal of chemicals in order to define and to quantify all the contaminated materials that have to be covered by the encapsulation. The first steps of basic institutional strengthening of the local Environmental Agency concerning supervision and monitoring of the remediation measures are needed before starting the activities.

About two years ago the national options were disposal of contaminated soil and debris in military galleries as proposed by the Ministry of Environment and the Ministry of Defense. These still have to be investigated in more detail and could eventually be part of interim solutions for storage of materials without final character.

Geological and hydrogeological investigations have shown that a clay layer below the contaminated material of the Lindane Dichromate site is impermeable and thick enough to be used as the basis of encapsulation. Contaminated groundwater of the aquifer under the clay layer has to be treated separately by pumping from newly installed wells and cleaning with activated carbon. The preferred option provides concentration of contaminated soil on one area of about 30.000 m² in the western part of the site. During excavation of the eastern part of the dichromate dumpsite the area has to be drained. Groundwater level and direction of groundwater flow mainly depends on the activities of the pumping station north of Porto Romano. Contaminated soil of the other sites and partially sediments of the drainage channels will be included in the encapsulated area and covered by contaminated debris generated on the Lindane dichromate site itself as well as the debris of the sulphur site and the waste storage buildings of Bishti Palles.

According the GWK study, after carrying out all proposed remediation activities there will be an estimated health risk reduction of about 90%. A remaining high risk originates from dumped HCH residues. Its exact location is unknown. Therefore controlling excavation and construction activities in a defined area is proposed as part of a long term monitoring program and as one of the important tasks of the local environmental agency and other authorities involved in permitting and monitoring of construction activities.

As a conclusion, in the frame of the Dutch Project Implementation, the former chemical plant in Porto Romano – Durres, contaminated with chromium residues, hexacyclohexane and other chemicals will be encapsulated in an area within the former chemical plant. The work is underway.

As for the stock of hazardous chemicals, including hexacyclohexane in Bishti i Palles, there is another project financed by Dutch government for their repackaging and removal from Albania for final disposal

Chemical characterization

More than 100,000 synthetic organic chemicals are in use today, and the long term effects of most are unknown. The worst of these nasty substances are known as Persistent Organic Pollutants (POPs). Three types of POPs exist:

1. Pesticides (herbicides, insecticides and fungicides).
2. Industrial chemicals like PCBs, flame retardants and the many synthetic chemicals used in computers, paints and other household goods.
3. Waste by-products like dioxins and furans, which serve no useful purpose and are produced "unintentionally" by industry. Incinerators are among the worst offenders. Particularly, they are released during the combustion of organochlorine products.

In Albania, not only in civilian sectors, but also in the military ones, the presence and uses of some substances belonging to the abovementioned group can be identified for a relatively broad spectrum of activities. Certain types of pesticides are used in the agriculture enterprises, civilian or military property. Lindane and DDT in particular, are used. In addition, to fight parasites, various chemical substances are used, among them DDT.

Related to PCBs usage, we can acknowledge the existence of a great deal of transformers in different units, whose oil may contain PCBs. From the inventory of transformers in Albania, it is found that about 12 000 units exist, half of them produced before the 1990 and mainly made in eastern countries like China, Russia, Bulgaria etc.

Some characteristics of POPs

POPs are dangerous for their contaminating nature to human beings and animals. Pesticides, as well as PCBs, have the ability to bioaccumulate, representing one of the disadvantages of their usage. The issue of long-term exposure against the low level of DDTs and other organochlorine substances still remains an open discussion among scientists though none doubt that concentrations rise over time due to bioaccumulation.

In general, POPs are thermally and chemically stable. POPs are nicknamed "poisons without passports" because they ride around on air and sea currents without breaking down.

Being stable, they have the ability to be transported from natural factors at great distances. Thus, even the uninhabited zones such as North and South Poles are touched from these agents. They have the ability to concentrate up the food chain. This is the reason that they are found at considerable proportion in sea food and other food products, and consequently in humans. Having the ability to bioaccumulate in fatty tissues, a high percentage especially of DDT and dioxins can be found in mothers' breast-milk.

POPs need to be carefully stored and disposed of, because they can leak and pollute the soil. If POPs are burned they generate other POPs. This is the reason why there are a lot of polluted hotspots worldwide.

Organochlorine Pesticides

The term pesticides generally refers to a chemical or microbial agent, or any mixture of both, which is used as an active part of industrial formulations of various organisms control, which endanger human health or crops. Pesticides with natural origin, such as caffeine, nicotine, pyrethrum, etc, were used by humanity centuries ago. The second generation of pesticides before 1940 was made of inorganic components containing toxic metals, like arsenic, mercury, cooper, etc. The history of synthetic pesticides started in 1930, with discovery of the insecticide characteristics of DDTs by Paul Muller, winner of Nobel Prize. During the Second World War it was used to protect soldiers from the typhus. In table 1 are given years when synthetic pesticides started to be used:

Table 1 Years of synthetic pesticides production beginning.

YEARS	PESTICIDES TYPES
1939	DDT
1940 - 1950	Other chlorinated hydrocarbons
1950	Carbamate
1958	Paraquat and atrazine
1970	Synthetic Pyrethroids
1954, 1980	Micro-organism Insecticides
1973	EPA banned production of DDT
1975	EPA banned production of aldrin, dieldrin

In general, pesticides (insecticides, herbicides and fungicides) are not used as clean substances, but as mixtures of isomers or mixtures of other components. They can be in the powder, grain, liquid, aerosol form, etc. Their success in some degree depends on the form and manner they are prepared.

The most known name is DDT, which has chemical-physical characteristics and biological activity that a few other substances possess. It has been used for around 50 years in exaggerated amounts, approximately 1.8 million tons.

PCBs

PCBs, polychlorinated biphenyls, are very stable chemical substances. They have low electrical constants and a high thermal capacity, which makes them ideal for use in transformers and capacitors. Their commercial mixtures are viscous liquids with a density higher than water. PCBs combinations have different commercial names, based on the country of origin they are produced such as: Aroclor (USA), Phenoclor (France), Clophen (Germany), Kanechlor (Japan), Sovol (Russia), Fenclor (Italy) etc.

Distribution ways into environment

The atmosphere is increasingly known as an important route of PCB distribution in the environment. It is assessed that up to 98% of PCBs entering the oceans, are coming from the atmosphere. The main source of this pollution is caused by industrial discharge. They enter into the atmosphere through the evaporation of leakages from transformers, capacitors, heat exchange and hydraulic systems, and from the leaks and evaporation in the production plants, from the discharge of industrial liquids, from burning in the open areas of residues and other wastes, etc. PCBs are found in the atmosphere in form of steam (90 %) and associated with solid forms.

PCBs have the characteristic to be easily absorbed from the soil and this amount is strongly correlated with the content of total organic carbon in soil. Great amounts of PCBs are distributed in the environment through polluted waters with PCBs.

Photochemical, thermal and biological degradation

Photo degradation is one of the main ways PCBs break up in the environment. Hydrolyses of PCBs at 700 degree Celsius creates various toxic products. Metabolic breakdown of PCBs from microorganisms is considered as one of principal ways of their destruction in the environment. From natural samples are isolated bacteria which degrade and destruct PCBs.

PCBs effects on living organisms

People are exposed to PCBs through contaminated food. Babies are exposed during breast-feeding from their mothers and the daily amount may reach several micrograms per body kilogram. A lot of data on their toxic effects were collected from the Yusho incident in Japan, in 1968, where thousands of people were intoxicated, (hundreds were reported dead) from contaminated oil use.

Dioxins and furans (D/F)

Dioxins and furans are chlorinated derivates of two benzene rings joined by two oxygen atoms. D/F, are anthropogenic and in general are not synthesized, but formed unintentionally in different industrial or humankind activities involving chlorine. Among them, as the most principal and well-known sources are considered:

- Combustion of municipal, hazardous, or hospital wastes and residues or sewage sludge
- Cement kilns firing hazardous waste
- Production of pulp using chlorine
- Various processes in the metallurgical industry
- Chemical industry processes
- Open burning of waste
- Motors with two and four burning phases using leaded fuel
- Leather processing with chloranil
- Waste oil refineries

Reaction, Stockholm Convention

The United Nations Environment Program has already started the battle to fight the POPs proliferation. As result, production and use of 12 kinds of “dirty POPs” has been earmarked for phase-out, reduction, and elimination where possible. From the legal viewpoint, the process of limitation and prohibition of toxic substances dates back to the Stockholm Convention, adopted in May 2001. It has been ratified by more than 120 countries. This

Convention entered into force on 17 May 2004, after France became the 50th country that ratified this Convention. From that date, the number of countries that ratified this Convention reached 98, including Australia, which had been skeptical at the very beginning of this process. The Convention is based on principles of the attention and awareness to be shown and given, when various chemical substances are used; furthermore, it is focused on the so-called list of “Dirty Dozens”.

The objective of the Convention is to “protect human health and the environment from persistent organic pollutants.” This main goal is foreseen to be achieved through:

- Prohibition of production of pesticides classified as POPs; aldrin, endrin, dieldrin, chlordane, heptachlor, hexachlorobenzene, mirex, and toxaphene.
- Stopping the production of PCBs. It is foreseen that in 2025 PCBs are not to be used any more, giving up of transformers using this substance.
- Development of capabilities of each nation to eliminate them. Developed countries must assist with funds for this purpose.
- To take measures to prevent the proliferation of POPs since their source of origin. Convention encourages nations to set up regulations, which prohibit the production of chemical substances with similar POPs characteristics, as well as to initiate new ways, means, and products that do not disseminate POPs related substances.

The Convention recommends using of alternative processes and substances, aiming at preventing the formation of POPs. The Convention notes that incineration of medical residues and other dangerous substances, during the combustion process, potential major sources of POPs releases. However, it has been clear that the POPs decontamination process will be a long one. These substances will continue for a long time to have damaging effects to the living organisms.

POPs monitoring

In general, the analytical sector in Albania has the capacity to monitor pesticides. Since the 1970s some of the labs have been equipped with techniques such as gas-chromatography, which have the capability to determine some POPs. Today, you could find GC-MS, but it needs to be stressed that these capacities are not involved in monitoring projects at a national level. Also, in Albania, there has not been any national plan for assessing or monitoring POPs. This is clearly observed from the consultation during the publication of national reports on the state of the environment (publication of Ministry of Environment), where there is no information at all regarding POPs .

Sporadic studies exist. Initially they are carried out in the Natural Science Faculty, in the framework of a doctorate thesis, or any other project. In the context of cooperation with Ioanina University, the Department of Analytical Chemistry in Tirana has participated during the evaluation of various pollutants in some rivers and arable land in the central and southern Albania (Tirana-Durrës-Lushnje). Among the measured POPs are Lindane, DDT, DDE, endrin, HCB and dieldrin. The total concentration of chlorinated pesticides varies from 0.03 to 0.16 ppm; and those concentrations range are small, compared with those found in other

countries. In addition, the permitted limits for these substances in some EU countries ranges from 0.5 to 2 ppm.

In addition, a restricted number of analyses has been conducted for two hotspots: in Porto Romano and the garbage collection point in Sharrë. Starting from 1992, Albania has been a member country of the Barcelona Convention, and has systematically participated in evaluating the pollution level of the Albanian coastline. In this project, several institutions were involved including Tirana University, where two departments, that of Chemical Analysis and Organic Chemistry were involved to assess heavy metals and pesticides in sediments and bios in some coastline stations. In general, the Albanian coastline zone does not have high levels of POPs.

Additional analytical data can be found at the GKW study Report, Faculty of Natural Sciences studies and at the Public Health Institute.

The Faculty of Natural Sciences has full technical and expertise capacities to be involved in any monitoring process.

National infrastructure for management of POPs pesticides and PCBs

The Stockholm Convention on Persistent Organic Pollutants (POPs) is an international treaty designed to end the production and use and reduce and eliminate some of the world's most poisonous chemicals. The Convention was adopted in 2001 after several years of negotiations between representatives of more than 120 countries. Albania signed the Convention in 2001, whilst the Parliament ratified it in 2004.

Though DDT is one of the twelve identified chemicals, the Convention allows countries to continue using DDT for malaria control, if necessary. The Convention will guide Parties in cleaning up stockpiles of unwanted and obsolete chemicals, and it will restrict the production of others. Parties will develop a plan detailing how each country will meet its obligations under the Convention. Recognizing that it will be too costly and difficult for some countries to clean up the chemicals on their own, the Convention commits richer countries to provide technical and financial assistance to less-developed countries.

Legal framework

The Ministry of Environment is charged with development of laws and regulations in the field of environmental protection and as well as their enforcement. The Ministry of Environment has a limited official staff of which some are located in the Regional Environment Agencies. The modest number of staff and the lack of a technical support agency are stretching the resources of the Ministry to its limits.

The responsibility for the control of chemicals is further shared between Ministry of Environment and Ministry of Industries and Energy. Environmental legislation regarding POPs is missing so far.

Controlling of agricultural pesticides is under the responsibility of the Ministry of Agriculture and Food, which has established a regulatory framework similar to EU Council Directive 91/414/EEC on the control of plant protection products in 1994 and further, amended in 1999.

The Ministry of Agriculture is chairing an inter-ministerial group authorizing plant protection products in Albania.

Laws for gaseous and liquid emissions have been passed. These do not, however, contain provisions for POPs e.g. dioxins and furans or Best Environmental Practices and Best Available Techniques for the minimization of these pollutants.

As for the environmental legislation it should be pointed out that most of it has been adopted by the Parliament mainly after 2001. Most of these laws are the strong base for the further improvement in the environmental legislation including the legal acts for POPs.

Some of most important laws are:

- The Law on Environmental Protection (2002),
- The Law on Water Resources (1996),
- The Law on the regulatory framework of the water supply sector and the treatment of the polluted waters (1996),
- The Law on Protected Areas (2002)
- The Law on Protection of Sea Environment from pollution and damages (2002),
- The law on EIA (2003)
- The law on Environmental Management of Wastewater(2003)
- The law on Environmental Management of Solid Waste(2003)
- Decree of Council of Ministers on Environmental Monitoring (2002)
- Law “ The hazardous waste management “ 2006

Regarding the legislation on plant protection, there is a Council Decision, adopted by the Government and prepared based on EU Directive 91/414 EEC which covers not only the substances for plant protection but environmental impacts as well. The same situation is also for the legal acts dealing with the management and disposal of PCBs.

Assessment of the institutional frame

The main central institution for the protection of the environment and environmental health in Albania are: the Ministry of Environment, Forestry and Water Management, the Ministry of Health and the Ministry of Agriculture, Food and Consumer Protection. The management of toxic chemicals, plant protection chemicals, their residues, drafting legislation regarding these issues, inspections, and international cooperation are among their tasks.

The Environmental Inspectorate under the Ministry of Environment, Forestry and Water Management enforces the environmentally related issues. Currently, there are only five inspectors at the central level and 12 other inspectors based at the Regional Environmental Agencies, which highlight the necessity of capacity building and human resource enlargement. They have the authority to take samples and control the working processes in order to check if the protection of the environment is implemented. Meanwhile, the Environmental Inspectorate has signed memorandums of understanding with the other inspectorates at the country level, in order to become more powerful and skilled at checking activities for compliance with the environmental legislation.

The General Directorate of Customs, under the Ministry of Finance is in charge of control and enforcement of the regulations related to trade, export and import of goods. The employees on

the border are frequently moved from one post to another in order to avoid any legal deviations. The Ministry of Environment, Forestry and Water Management has recently organized workshops with the employees of Customs Administration, to explain the environmental legislations, which have been very fruitful and cooperative.

For the control of food, pesticides and plant material import and export (quarantine) the inspectors from the Food Inspectorate and Directorate of Plant Protection in The Ministry of Ministry of Agriculture, Food and Consumer Protection are in charge.

The Ministry of Health is responsible for the preparation of regulations on poison management. It participates in plant protection substance management, the procedure for classification of substances (new chemicals) in the group of poisons, and their inclusion in the list of approved chemicals. It is also involved in inspections. The analyses are performed by the Institute of Public Health. The inspections are the responsibility of the Sanitary Inspectorate.

Other central institutions related with chemicals in general are:

- Ministry of Economy, Trade and Energy which has the responsibility for the remediation of hazardous waste related to hot spots within the country and related pollution from industry and energy sectors;
- Ministry of Defense, who is responsible for the management and destruction of chemical weapons and related waste.

At local level, there are also the local authorities together with regional environmental agencies and local inspectorates to take measures to avoid health and environment damage from chemicals.

Environmental, Socioeconomic, and Health Consequences

High levels of HCH isomers found in the blood of persons living in the area of the former plant show clear evidence that there has been a high degree of exposure to chemical agents.

In the framework of the UNEP study and of the project “Institutional strengthening and environmental cleanup” different samples have been collected for analysis. The materials, which were analysed comprised: soil, soil air, building material, sediments of the drainage channels as well as surface and ground water. Different biomass materials, such as milk, meat, mussels and snails were also included in the analysis program. The executed analyses mainly focused on the parameters Lindane/ HCH and Cr/ Cr_{VI}.

The results obtained through the analysis program showed, particularly for the area of the Lindane / dichromate site, of the sulphur site and for the „dumpsite“ located near the pumping station, very high Lindane- / HCH-contents and partly very high Cr / Cr(VI) -contents. These values call for immediate rehabilitation actions. Furthermore, the surrounding settlements and the sediments of the drainage channels showed considerably increased Lindane / HCH-contents as well, which require either rehabilitation measures / safeguarding measures or constant and detailed supervision and monitoring measures. Some data produced from the

Faculty of Natural Sciences have shown detectable level of Cr(VI) in sea water samples collected at the pump station site.

As far as the area of the Lindane / dichromate site is concerned, high Lindane / HCH and Cr-contents were found in the groundwater while high benzene contents were detected in the soil air. In the vicinity of Porto Romano, where the plant producing Lindane was established, analysis of soil and the milk of a farmer's cow was carried out where high level of Beta-HCH isomers were found. The concentration level, in soil reached 3.1 g/Kg, a very high level compared to the Netherlands, where 2 mg/Kg concentration is considered contaminated and needs to be addressed. Existence of these isomers in the cow milk, grazing within this territory, resulted in concentrations 100 times higher than normal concentration within EU countries. These contamination sources have been taken into account during the elaboration of the rehabilitation and remediation options (UNEP study, GKF Consult).

We have contacted medical services, near the site, but due to the lack of systematic data collection it is difficult to draw a final conclusion regarding health impact. According to the doctor interview of the medical post, there are many cases of local people coming to the medical post complaining of headaches. He even added that he does not like to stay more than four hours considering the area rather contaminated

Some people living there claim that sometimes they have skin problems. However, knowing that they live near a hot spot they grow vegetables and keep animals (cows, chicken etc). Unfortunately, no data exists to correlate the health and the environmental conditions. We think that it would be very interesting to follow a study of such a correlation. Special attention should be paid to high-risk groups such as pregnant women and children. We have seen children playing in the core of the contaminated area.

At the discharge point of the drainage channel to the Adriatic Sea systematic monitoring of water sediment and biota should be carried out. Using mussels as an indicator would be very appropriate. At the discharge point any kind of tourism should be prohibited.

Public Information in Albania

Up to the early 1990s there was very little access to or dissemination of environmental information in Albania. The concept of provision of information, particularly environmental information, is relatively new. The Albanian Constitution of 1998 recognizes everyone's rights "to be informed on the environmental situation and its protection" and "to participate in decision-making processes". Another step forward was the approval of the Guidelines "On the environmental information and public access for environmental information," No. 7, dated 19.1.1998 by the Minister of Health and Environment.

These guidelines determine the type of information that the MoE should possess and guarantees the right of every citizen to have access to information, regarding the environmental elements, the activities that have or might have negative impacts on the environment and human health, as well as the measures for their protection, including administrative measures and the programs for the environmental administration and conservation policies and strategies, designed for this purpose. The guidelines also determine how the request must be presented, the format for the information requested by the public, and the deadlines for providing the information or refusing the request.

A significant accomplishment in the field of public information and participation was the signing on 25 June 1998 and ratification on 27 June 2001, of the UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, commonly known as the Aarhus Convention. This Convention was translated into the Albanian language during 1999, and then distributed to national level institutions and NGOs for comments and then to the Ministry of Foreign Affairs for submission to the Council of Ministers and Parliament for ratification.

In order to fulfill the obligations of this Convention, a Draft-Law on "The Public Rights on Environmental Information" was prepared. This project was undertaken with the legal assistance of the PHARE Program. In collaboration with the Regional Environmental Center (REC), a meeting of the Parliamentary Commission of Health and Environment and Parliamentary Commission of Laws was held in July 2000 in order to facilitate its ratification by the Parliament. According to the agreement on Association and Stabilization with the EU and the governmental program for the four-year period from 2002-2006

In addition, there are several other international legal frameworks with provisions on access to environmental information, public participation and access to justice such as the Universal Declaration of Human Rights, the Convention on Climate Change (ratified in October 3, 1994), and Biodiversity Convention (ratified in January 4, 1994)

Access to Information

Environmental information is mainly disseminated through electronic and print media. A considerable number of information leaflets, posters, and fact-sheets on the environment have been produced and distributed. The regular publications include the Environmental Bulletin of MoE (100 printed copies, four editions per year), the State of Environmental Reports in Albanian and English (1 000 printed copies), the biweekly newspaper "Ekolevizja" ("Ekovement") published in 600 copies and managed from 22 environmental associations group named "Ekolevizja", and the REC Daily Environmental News (disseminated electronically to approximately 300 addresses.

Information about the MoE is available through the Internet www.moe.gov.al. There are about five articles or news stories per day per eight-to-ten independent daily newspapers. Limited environmental information is disseminated through TV and radio.

The articles of the newspapers are very much focused on "news" and not analysis. There is a lack of investigative journalism that could give more in-depth analyses of environment-economic related issues.

The only professional edition in the environmental issues is biweekly newspaper "Ekolevizja" which have investigative articles and environmental news and is distributed in all Albania.

Nevertheless Albanian citizens are not generally well informed about the risks of pollution, the relationship between the environment and public health, and the benefits of a clean environment for the economy and society as a whole. This is also true among national and local politicians and the international community. There is a great need for improved environmental awareness at all levels of the society. Additionally, measures to facilitate and stimulate the public's right to seek environmental information should be taken.

Even if the Ministry of the Environment receives only about four-to-five official requests for environment-related information a month, public interest in and concern for environmental issues have increased during the last few years. In the newly established Environmental Information Centre one to two individuals visit the centre per day and search for the environmental information.

If the public is interested in certain environmental issues, requests for information have to be made to the public authorities. It should be noted that there are existing procedures on answering public requests. The procedure is defined by the guidelines "On the environmental information and public access for environmental information," The practice, however, shows that some of the requests made to the MOFF (Ministry of Environment Forest and Fishery) have been denied.

An accessible pollutant release and transfer register (PRTR) or a similar system does not exist at the moment. However, theoretically the public has the right to access environmental information in individual facilities on, for example, released pollution, produced waste and wastewater or similar activities either from public authorities or directly from the facilities. On the other hand, the practice shows that the inspectors of the Regional Environmental Agencies do not have the right to enter a factory if the owner does not agree. Requests to public authorities for information on confidential activities, international affairs, national defense, public security, issues under investigation or already investigated, materials which if announced might further damage the environment, and unfinished draft materials may be refused.

Public awareness and participation.

In the last 5 years, public information has increased as a result of numerous activities of civil society in general and the environmental NGOs in particular. Mass media, especially the printed and the electronic media, have been and remain the most committed in this area.

The number of NGOs acting in the environmental field has increased. In 1994 there were only seven, while at the end of 2000 the number had reached 70 NGOs. The projects implemented by these organizations have increased year by year and their main topic has been informing the public and raising awareness about environmental protection.

In order to formalize the cooperation with the environmental NGOs, MoE has signed a Memorandum of Understanding with the NGOs. MoE and the local government in many cities of Albania implement activities in coordination with NGOs, especially on the national and international environmental days.

Nevertheless, the developments and achievements in the field of public information, awareness and participation can be considered to be modest.

An Environmental Information Centre is in the process of being established within the MoE, but is not organized yet to publish and offer the necessary environmental information upon request.

Although the media are paying increasingly more attention to subjects of environmental concern, a professional approach is lacking in some cases. Training of journalists to treat environmental problems in an objective, professional and timely manner, is another field which should be supported and encouraged by the MoE. Until now the association “Masmedia and Environment” have performed trainings of print journalists in environmental journalism but these projects are supported from foreign donors, not from MoE.

Public Education and Awareness

Environmental education in the country today is poorly funded and it is only offered to a limited number of young Albanians. It seems that schools are not actively promoting environmental education through environmental project weeks or similar activities. Methodological materials, textbooks, and training are lacking for teachers and students. The Albanian Development Education Project (SOROS) has proposed a new curriculum model for primary, secondary and high schools, but aspects of environmental education are not incorporated. To try out the curriculum sixteen schools were chosen as pilot schools.

The fulfilling of the tasks in the Action Plan will depend on the involvement of directors of all levels of the administration and of NGOs.

The representatives of central institutions and NGOs have participated in the process of preparing the Action Plan and will continue to be important partners for effectively and sustainably implementing UNEAP - 2001.

A special emphasis should be put on the preparation of education programmes for the interested parties, including central and local institutions.

The critical components for increasing the environmental awareness of the public will be the collection, processing and analysis of environmental data and the dissemination of the information, to all the interested parties involved in the implementation of the Action Plan, including managers and users of natural resources, researchers, NGOs and the public.

The improvement of public environmental awareness is considered one of the priority activities of the Plan and, beside the participation of central and local administration directors, NGOs will play a key role. The partnership of state institutions with NGOs is critical to the achievement of the objectives of Action Plan with respect to public awareness and participation.

The main activities that are made in the framework on POPs related issues in Albania:

- Identify and investigate Albanian print and electronic media about the public information on POPs effect and its situation in Albania during last 2 years .Analyze the good and missing points of this information (September 2005)

- Follow each step of the inventory process of other teams, continuously informing the public about it, between news or reports published in “Ekolevizja” newspaper (like specialized newspaper in environmental issues) or in daily newspaper and TV stations

- Collecting information and awareness material for creating a leaflet about POPs and then printing it. ON the day of report the leaflet is prepared and ready to print 1000 copies

-Till now we are prepared with good information for filming about POPs We have started documentation on a film inventory work of other teams creating basic material for producing a short documentary on POPs in Albania.

As well as the need for broad public participation the success of the awareness on POPs depends on the active participation of many groups in the implementation of the activities anticipated by the Plan

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