The International POPs Elimination Project

Fostering Active and Effective Civil Society Participation in Preparations for Implementation of the Stockholm Convention

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National Hazardous Waste Treatment Centre

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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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List of Abbreviations

BAT – Best Available Techniques
BEP – Best Environmental Practice
DDT – Dichlorodiphenyltrichloroethane
EEA – Executive Environmental Agency
EIA – Environmental Impact Assessment
EU – European Union
GEF – Global Environment Facility
HCB – Hexachlorobenzene
ISPA – Instrument for Structural Policies for Pre-Accession
MoEW – The Ministry of Environment and Water
NGO – Non-governmental organisation
NHWTC – National Hazardous Waste Treatment Centre
NIP – National Implementation Plan
PAH – Polycyclic Aromatic Hydrocarbons
PCB – Polychlorinated biphenyls
PCDD/Fs – Polychlorinated dibenzo-p-dioxins and dibenzofurans
POPs – Persistent Organic Pollutants
PVC – Polyvinyl chloride
SEEC – Supreme Environmental Expert Council
UNEP – United Nations Environmental Programme

I. Description of topic

In order to help understanding of the problem discussed in relation to its context, some background information about relevant legislation and initiatives is presented first.

Legal framework

As an applicant for EU accession (anticipated in 2007), Bulgaria has harmonized its national legislation in accordance with the EU Aquis Communitaire, and the negotiations with the EU on all chapters have been completed. There are some 32 Bulgarian laws and regulations directly or indirectly pertaining to POPs, including legislation concerning pest control, hazardous waste management, land use, protection of human health, air, water and soil quality, etc. In addition, Bulgaria is party to the following international agreements:

- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (accession 16 January 1996);
- The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (accession 25 July 2000);
- The UNECE Geneva Convention on Long-Range Transboundary Air Pollution (ratified 09 June 1981) and its Aarhus Protocol on Persistent Organic Pollutants (ratified 5 December 2001);

Bulgaria signed the Stockholm Convention on Persistent Organic Pollutants on 22 May 2001, and the Parliament ratified it on 30 September 2004.

In relation to the Stockholm Convention, Bulgaria is part of the UNEP/GEF project "*12 Pilot Countries Project for the Development of National Implementation Plans (NIPs) for the Management of Persistent Organic Pollutants"*, intended to assist and prepare countries for the implementation of the Stockholm Convention. Most of the information used for compiling this policy brief comes from the preliminary data gathered by the national research team for this project: POPs Inventory, National Chemicals Management Profile, as well as recommendations and priorities and objectives for POPs management.

Current status of POPs

The statistics provided here are only provisional and not yet formally confirmed, as the National POPs Inventory and the National Chemicals Management Profile, both of which are part of the UNEP/GEF project, have not been officially finalized yet, and further adjustments to the data might be expected. The numbers cited for HCB, PCBs and dioxins and furans are based on the CORINAIR-94, SNAP-94 calculation method, specified by the Bulgarian legislation. Although this methodology does not fit with the UNEP requirements, it was accepted by UNEP, as changing the calculation method would require approval by the Ministerial Council, which would considerably delay the progress of the inventory.

HCB emissions in Bulgaria in the past few years range between 30 and 100 kg/year, 38 kg for 2002, showing a steady decrease since 1970. The greater part of releases of HCB come from a limited number of sources, chiefly related to production processes and waste treatment and disposal. The top HCB emission sources are located in the region of Sofia (Pernik and Sofia).

Approximately 250 kg of PCBs were released in 2002, showing a slight decrease since 1990. Most of the PCB emissions originate from non-industrial combustion processes in the domestic, administrative, agricultural and commercial spheres (heating), the chief sources being thermal power plants and household heating appliances. From a total of approximately 970 industrial sources of PCBs, the major ones are located in Sofia, Shumen, Stara Zagora and Haskovo.

Significant quantities of dioxins and furans are released to the environment as a result of non-industrial combustion (heating for domestic, administrative, commercial, and other sectors). Almost half of dioxin/furan emissions come from combustion processes in the energy sector (thermal power plants), followed by almost a third from waste treatment and disposal. The fluctuation of the estimated levels of dioxins/furans in the period between 1970 and 2002 is conditioned chiefly by the level of industrial activity in the country. The sharp fall in dioxin/furan emissions since 1995 is determined by the general curtailment and closure of industries in Bulgaria, and not by any special state policy targeting the reduction of dioxin/furan emissions. The average emissions in the past few years range between 200-300 g/year, with 220 g for 2002. Calculations show an average dioxin/furan concentration in Bulgaria about 0.00197 g/km^2 and 0.000026 g per capita.

Stockpiles of obsolete pesticides are one of the chief POPs-related problems in Bulgaria – a legacy from the chemicals-intensive agricultural practices of the socialist state. Bulgaria has never been a producer of any of the nine chemicals listed in the Stockholm Convention that have application in pest control (Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Mirex, Toxaphene and Hexachlorobenzene). However, six of these chemicals were imported and used in especially large quantities between 1960-1970 (according to official data, Mirex, Hexachlorobenzene and Chlordane have never been imported in the country). The import and use of most of these pesticides was banned in 1969, with the exception of Toxaphene, banned in 1985, and Heptachlor, banned in 1991.

This explains why Heptachlor comprises the largest portion (over 28 tons) of obsolete pesticide stockpiles after DDT (28,814 tons). Table 1 presents the periods, type and quantity of pesticides imported in the country.

Table 1. Quantities of pesticides imported in Bulgaria, 1950-1990

	Import period	Quantity imported (tones/year)	Banned	Quantity Stored (tons)
Aldrin	1960-70	135-220	1969	5
Dieldrin	1960-70	100	1969	0.5
Endrin	1960-70	100	1969	0.2
Mirex	N/A	N/A	N/A	N/A
Toxaphene	1960-70	100-150	1985	0.25
Hexachlorobenzene	N/A	N/A	N/A	N/A
Heptachlor	1960-90	100	1991	28.2
Chlordane	N/A	N/A	N/A	N/A
DDT[1]	1950-65	no data	1969	28.8

Data from three consecutive years gives the following information about obsolete pesticide stockpiles: 3147 tons found in 1268 locations throughout the country (1999); 4391 tons (2000); and 6,872 tons on over 770 sites. The increase in reported quantities is due to improved identification of the stored pesticides and on new quantities of abandoned pesticides discovered.[1] The decreasing number of locations is due to the process of cleanup and transportation to more centralized storages of obsolete pesticides, undertaken by the state. In general, pesticides classified as "of unknown origin" form the greater part of the quantities reported – they are unidentified substances, often mixed with banned, obsolete or expired pesticides.

[1] Environmental Executive Agency. Annual State of the Environment Report 1999, 2000, 2001
http://nfp-bg.eionet.eu.int/eea/en/publicat/yearbook/landsoil/pestic.htm
http://nfp-bg.eionet.eu.int/eea/en/publicat/yearbook1/landsoil/pestic.htm
http://nfp-bg.eionet.eu.int/eea/en/publicat/yearbook/2001/landsoil/pestic.htm

Checks for pesticide contamination of groundwater and soil are performed periodically at selected spots; however, dioxin/furan levels are only estimated, as Bulgaria currently lacks the necessary equipment for conducting such measurements. The analyses of the data derived in this manner show no threat to human or environmental threat, as all values are below the maximum permitted value, which in Bulgaria is the same as the EU standards.

There are numerous uncontrolled stockpiles of obsolete pesticides scattered all over the country, located mainly around severely damaged and pillaged old buildings that used to be part of the infrastructure of the socialist agricultural cooperative system. Executive Environmental Agency (EEA) measurements of soil contamination have shown the presence of DDT metabolites (with the highest concentrations in the Sofia region), which indicates recent usage of the banned pesticide. [2] This can be explained by the fact that farmers are generally uninformed or careless about the hazards related to the use of obsolete pesticides.

In the past five years, the Ministry of Environment and Water (MoEW) and its regional branches have worked extensively for the collection, repackaging and safe storage of old pesticides. The two methods used are storing in buildings that reportedly comply with the EU standards for safe storage of hazardous waste, or packing the pesticides in the so-called "BB-cubes" ®[3] – 5 m^3 ferro-concrete containers, designed to fit in stacks to save space. BB-cubes are 195 cm in all three dimensions, the thickness of the walls varies between 80 and 140cm, and their weight when empty is 6 tons, reaching up to 20 tons when full. The "BB cube" container has been designed and calculated with the following technical characteristics in mind:[4]

- transportation and handling lifetime - up to 50 years;
- storage lifetime - up to 300 years;

Figure 1 shows a stack of BB-cubes at a specially designated site.

Figure 1. BB-cube site.
Source: http://www.balbok.com/Pictures/Ploshtadka.jpg

[2] Executive Environmental Agency Annual State of the Environment Report 1999 <http://nfp-bg.eionet.eu.int/eea/en/publicat/yearbook/landsoil/pestic.htm>
[3]The "BB CUBE"® container is the property of "BALBOK ENGINEERING" - joint stock company - http://www.balbok.com/.
[4]http://www.balbok.com/English/BBCubeInformationE.htm

Currently, the obsolete pesticides in 70 municipalities have been collected, packaged, transported to their respective nearest local sites and safely stored there. There are around 650 such sites in Bulgaria at the moment; about 50 of them are designated for BB-cubes. The total area taken by these sites is 3515 dka. Table 2 presents the location and state of the storage sites in 2001.

Table 2. Number and condition of pesticide storage sites in Bulgaria, 2001[5]

Regional Inspectorate of Environment and Water	No. ware-houses	No. land s	No. municipalities	Quantity of preparations, kg						
				Solid			Liquid			Total
				known	unknown	Total kg	known	unknown	Total kg	kg
Blagoevgrad	21	19	10	28345	24570	52915	6300	12320	18620	71535
Bourgas	42	39	15	22940	553771	576711	0	42517	42517	619228
Varna	90	90	17	1300	348788	350088	6	87406	87412	437500
V. Tarnovo	19	19	14	458920	0	458920	121221	0	121221	580141
Vraza	28	28	8	159670	210000	369670	43600	9000	52600	422270
Montana	80	80	21	355075	82950	438025	58730	130	58860	496885
Pazardjik	24	24	11	25059	4151	29210	14682	2400	17082	46292
Pleven	145	143	17	100056	285554	385610	0	133464	133464	519074
Plovdiv	42	42	10	257836	108178	366014	0	21376	21376	387390
Rousse	63	56	22	178901	45570	224471	78372	55945	134317	358788
Sofia	52	0	0	23697	63554	87251	8886	0	8886	96137
Pernik/Kjustendil	31	29	10	15092	430536	445628	1050	21182	22232	467860
Stara Zagora	98	98	19	4474	1432305	1436779	4017	181981	185998	1622777
Smolyan	6	6	5	48150	45950	94100	1800	3220	5020	99120
Haskovo	62	60	11	28440	234824	263264	6435	33920	40355	303619
Shumen	52	46	15	92310	196420	288730	23960	30870	54830	343560
Total	855	779	205	1800265	4067121	5867386	369059	635731	1004790	6872176

Hazardous waste

The industrial sector is also the biggest generator of hazardous waste, 94% of which is deposited in specialized landfills or storages onsite. However, of the 18 hazardous waste disposal sites in the country, none comply with the EU requirements. Although the current national legislation requires special treatment for hazardous waste from households (batteries, car batteries, fluorescent and other mercury-containing lamps, and used motor oils), no effective measures for its implementation are in place yet. Some organization exists only for retrieval and recycling of used car batteries and used motor oils.

According to information submitted by the industrial waste generators, 1,959,965 tons of hazardous waste was produced in 1999, while the amount of accumulated waste reported is 145,200,603 tons. When mining waste and waste from the petrol industry is excluded, the amount is reduced to 716,162 tons of waste accumulated and 168,208 tons of waste generated.[6]

II. Need for alternative policy

The vast majority of municipal waste landfills in Bulgaria do not comply with EU standards, nor are they properly managed and controlled – there is practically no separation of recyclable or compostable waste, and hazardous waste from households is mixed with non-hazardous municipal solid waste. The presence of waste-pickers, combined with the hazardous content of the waste and the frequent occasions of spontaneous burning, pose an immediate threat to human health. During the past 15 years in areas with no centralised heating, households have increasingly turned away from electricity to coal and wood for winter heating (the price

[5] Executive Environmental Agency Annual Bulletin 2001 <http://nfp-bg.eionet.eu.int/eea/en/publicat/yearbook/2001/landsoil/pestic.htm>

[6] Waste Survey under PHARE project BG 9810-02-01 (003)- Preparation of the ISPA Application Form for the project "Establishment of National Hazardous Waste Centre"

factor). Also, common waste containers in residential areas are often burning, especially in the heating season due to hot ash disposal, releasing dioxins.

There are thirty large enterprises that are responsible for some 97% of the volume of hazardous waste produced annually in Bulgaria, totaling 755,766 t for 2001.[7] While the greatest proportion (approximately 68% for 2001) of that amount is landfilled, around 136,123t is reported as recycled, and 101,763 t is incinerated. This information is extracted from the annual reports of waste quantity and quality that industries are obliged to submit to the MoEW. According to the National Waste Management Programme for the period 2003-2007, while the generators may have understated the reported quantities, the official waste catalogue in Bulgarian legislation has broader scope than that of the EU and that serves to boost the figure of total hazardous waste generated. The Programme expects hazardous waste to decrease in the middle and long term, in line with the environmental management plans drafted for industries that prioritise waste prevention, and minimization of the hazardous properties of the waste generated.

Practically all relevant official policy documents produced by the MoEW in the past 5 years – strategies, action plans, etc., state the intention of the government to construct a central facility for hazardous waste treatment. Although the findings of the POPs Inventory in Bulgaria conducted in the framework of the UNEP/GEF project have not been approved yet, the impression given by members of the research team is that the general tendency is leaning towards support for incineration as the only viable alternative for managing Bulgaria's hazardous waste and obsolete pesticides.

Another disturbing fact is that the MoEW has already invested and plans to continue investing huge amounts of resources in end-of-pipe solutions such as landfills and incinerators in order to deal with household, hazardous and medical waste. Although in the draft of the Environmental Strategy for 2005-2014 states that the main priorities should be reuse, reduce and recycle, this seems to be only rhetoric without practical implementation. The pilot and planned initiatives described in the Strategy regarding waste management overwhelmingly involve incineration and landfilling. In fact, certain parts of the text of the document suggest that the official line is to treat incineration with energy recovery as equivalent to recycling.[8]

Schemes for treating POPs

Five schemes for treating POPs stockpiles in Bulgaria have been devised which are still under discussion within the national working group. These schemes are not yet approved, the information about them is preliminary and unofficial, and might be changed or rejected altogether. However, these scenarios are briefly presented here as they are quite indicative of the general approach towards POPs management assumed by the governmental and other sectors collaborating under the UNEP National Implementation Plan project.

The section of the draft National POPs Inventory dedicated to POPs stockpile treatment clearly admits that not all POPs require high technological or capital-intensive solutions, such as incineration, and that no one single technology offers the only comprehensive solution for the wide spectrum of wastes usually found during investigation of stockpiles. It also states that BAT and BEP, as well as the quantities and type of POPs should be taken into account when selecting approaches for dealing with the safe elimination of POP stockpiles. However, when the scenarios provided are analysed it appears that these statements are more in the realm of political rhetoric than part of any specific implementation strategy. The five schemes are as follows:

[7] Executive Environmental Agency Annual State of the Environment Report 2001. <http://nfp-bg.eionet.eu.int/eea/en/publicat/yearbook/2001/wastes/hazwas.htm>

[8] National Environmental Strategy 2005-2014. (in Bulgarian) <http://www2.moew.government.bg/recent_doc/dialog/debate/national_strat_env/>

- **Scheme 1** involves collection of obsolete pesticides from all known locations and packaging them into BB-cubes located at especially designated sites. The old locations of the stockpiles will be cleaned up and restored. The BB-cubes will be periodically transported to and destroyed at the National Hazardous Waste Treatment Centre (NHWTC), whose construction is "imminent".
- **Scheme 2** includes collection of all POP stockpiles in storage, putting them in appropriate packaging and transporting them to the NHWTC storages. The old storages should then be destroyed and the sites cleaned up and the POP stockpiles stored in BB-cubes across the country and on the NHWTC premises should be destroyed by in the NHWTC.
- **Scheme 3** entails construction of one or more small installations for thermal destruction of hazardous waste at appropriate sites. All known POPs stockpiles should be collected and packaged in BB-cubes, stored in appropriate sites. Depending on the timeframe, alternatively the POP stockpiles could be stored onsite at the thermal plant and in different packaging.
- **Scheme 4** projects packing and temporary storage of POP stockpiles until their eventual transportation for destruction at specialized facilities out of the country.
- **Scheme 5** simply suggests packing and storing the POP stockpiles in BB-cubes that are advertised as guaranteeing 300 years of safe storage. No further action is planned after the 300-year period expires.

National Hazardous Waste Treatment Centre

On a wider scale, the general approach towards hazardous waste treatment follows a certain apparently predetermined path.

In the past 5 years, the MoEW has been actively seeking expertise and funds for the construction of a National Hazardous Waste Treatment Centre (NHWTC) as a solution to the problems related to the management of obsolete pesticides and hazardous waste in general.

The planned NHWTC comprises several hazardous waste treatment facilities, including physico-chemical treatment plant, waste incinerator, evaporation of mercury, solidification facilities, asbestos-free hazardous waste landfill and a landfill for asbestos-containing waste.

The centre is presented as the essential initial step for establishing a comprehensive modern hazardous waste treatment system. The total capacity of the Centre will be 60,000 tons/year, exceeding by far the amount generated and already accumulated. However, total reliance on the Centre as the only effective means for eliminating hazardous waste entails numerous weaknesses and threats, while presenting a dubious hazardous waste management solution.

The great controversy surrounding the NHWTC project is related not only to the government's choice of a centralised system for hazardous waste treatment, but also to the MoEW's approach used in consideration of alternative technologies, especially non-combustion, the selection of a site for the Centre, health risk assessment, and the compromised process of public participation.

Proposed treatment methods

The Waste Survey done under PHARE project BG 9810-02-01 (003) - Preparation of the ISPA Application Form for the project "Establishment of National Hazardous Waste Centre" contains an appendix describing the selection of treatment method for various types of waste. Out of twelve waste groups, seven are streamed for incineration, two for landfilling, two for physical/chemical treatment and one for solidification. That document reveals that already at the early stages of investigating the feasibility of the construction of a National Hazardous Waste Treatment Centre, a worrying bias towards incineration technologies and against non-incineration alternatives is present. The manner in which the preliminary studies, information campaigns and public hearings and consultations were conducted casts serious doubts about

the degree of importance attached by the MoEW to the basic democratic principles of transparency and public participation in environmental decision-making.

Proposed location

The proposed location for the NHWTC is situated in a heavily industrialised and polluted region. From the executive summary of the Environmental Impact Assessment (EIA) Report, the site appears to be preferred precisely because of the fact that this area is already heavily contaminated by years of polluting industrial activities.

According to the EEA the three thermal power plants that operate in the area are among the biggest dioxin/furan emitters. Table 3 shows the estimated types and quantities of some POPs emitted by sources in the region. The projected quantity of dioxins/furans to be emitted as a result of the operation of the NHWTC is 0,02932848 g/year, which, incidentally, coincides exactly with the limit set in the Directive 2000/76/EC on Waste Incineration. That fact raises doubts about the method by which this number was derived.

Table 3. Types and quantities of some pollutants in the region of the proposed NHWTC site
Source: Environmental Impact Assessment Report for the investment proposal for the National Waste Treatment Centre.

Pollutant	Thermal Power Plant (TPP) 1	TPP 2	TPP 3
PAH t/y	0,0547	0,3512	0,1641
PCB's kg/y	3,0753	19,4329	9,0436
DIOX g/y	7,4661	47,3279	21,9545

Note: The amounts provided are for 2002, derived by calculation, not actual measurements.

The highest level of dioxin/furan emissions for 2002 originates from the thermal power plant "Maritza Iztok" 2, producing over 47 grams/year (over 20% of the country's total). That thermal power plant is located less than 4 km from the village of Kovachevo in the district of Radnevo, Stara Zagora.

The second greatest dioxin/furan polluter is thermal power plant "Maritza Iztok" 3, emitting almost 22 grams/annum (over 10% of the total estimated amount for Bulgaria). Maritza Iztok 3 is located in the Stara Zagora region near the village of Mednikarovo.

The fifth biggest emitter, "Brikel", an industrial plant for briquette production, is also located in the region of Stara Zagora, near the town of Gulubovo. Collectively, the three thermal power plants emitted almost 40% of all dioxins/furans released in 2002. In addition, there are three open coal mines in the vicinity.
The construction of the NHWTC in the same area (3 km from Kovatchevo village) will create yet another source of POPs in an already heavily polluted area.

This is of major concern to many people as over 21,000 people live in the area within 10 km from the proposed site for the NHWTC. Figures 2, 3, 4 and 5 show the model of spatial distribution of dioxin/furan emissions and concentrations in the air, soil and vegetation respectively. The highest concentrations are invariably found precisely in the region of the projected site for the construction of the NHWTC.

Contaminated chicken eggs

Free-range chicken eggs collected in Kovachevo showed one of the highest levels of dioxins ever measured in chicken eggs. Dioxins in eggs from Kovachevo (Table 4) exceeded the European Union (EU) limit by more than 20-times. Levels of PCBs in eggs exceeded proposed EU limits by 2.5-times. Also levels of HCB were significant and one of the highest measured during the IPEN global sampling project. To our knowledge, this study represents the first data about U-POPs in chicken eggs from Bulgaria. For purpose of this report it is important also to

note that there was a measured sum of DDT in sampled eggs as well and the level of 547.11 ng/g of fat was found in this pooled sample.[9]

Considering the pattern in eggs dominated by PCDFs, combustion sources are the most likely. Most likely there are other sources contributing to the dioxin contamination found in the eggs. Based on prevailing winds, the thermal power plant Maritza East 2 can be major one. A minor role could also be played by an obsolete pesticides stockpile (relatively high level of DDT was found in eggs too) as well as burning of used tires in a boiler in a coal mine.

High levels of dioxins in eggs support Za Zemiata calculations allocating 20% of total[10] dioxin releases in the country to TPP Maritza East 2, based on theoretical estimates made in the Environmental Impact Assessment Report for the investment proposal for the National Waste Treatment Centre. On the other hand, taking into account comparisons with patterns from brown coal burning sources it also supports development of better monitoring of U-POPs sources.

Table 4: Measured levels of POPs in eggs collected in Kovachevo near Stara Zagora (Bulgaria) per gram of fat.

	Measured level	Limits	Action level
PCDD/Fs in WHO-TEQ (pg/g)	64.54	3.0[a]	2.0[b]
PCBs in WHO-TEQ (pg/g)	5.03	2.0[b]	1.5[b]
Total WHO-TEQ (pg/g)	69.57	5.0[b]	-
PCB (7 congeners) (ng/g)	3.04	200[c]	-
HCB (ng/g)	25.50	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 feedstuff according to S.I. No. 363 of 2002 European Communities (Feedstuffs) (Tolerances of Undesirable Substances and Products) (Amendment) Regulations, 2002.

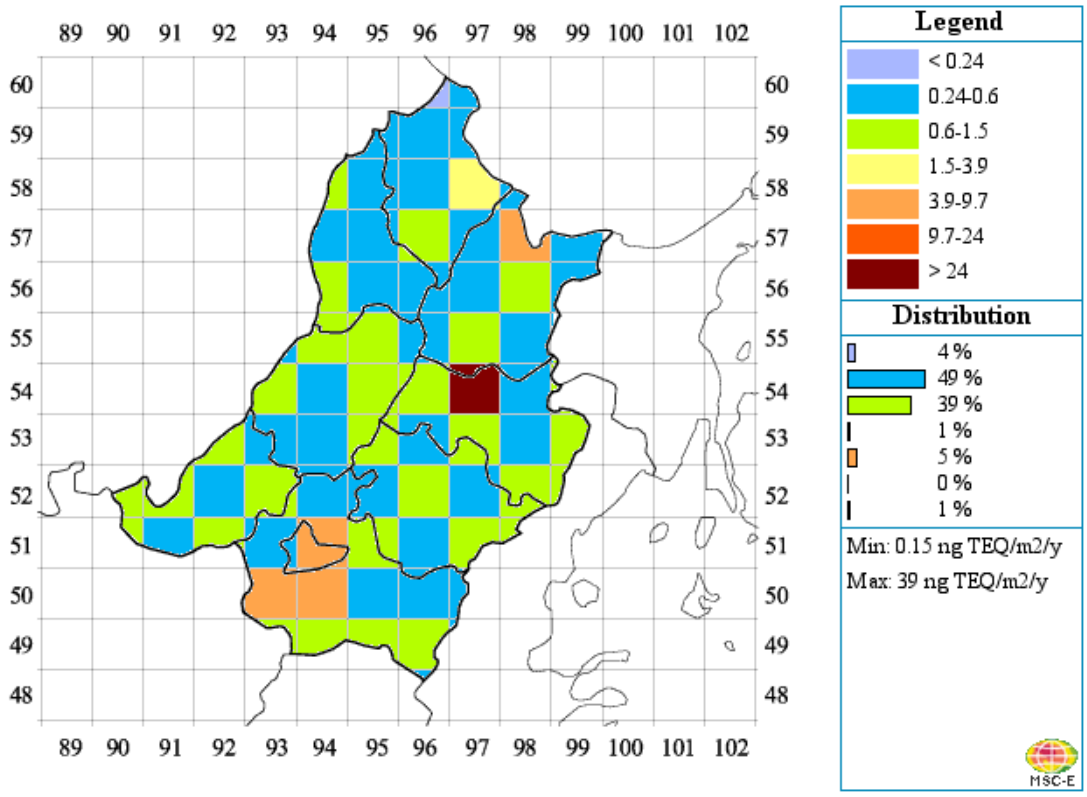
[b] These proposed new limits are discussed in the document Presence of dioxins, furans and dioxin-like PCBs in food. SANCO/0072/2004.

[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.

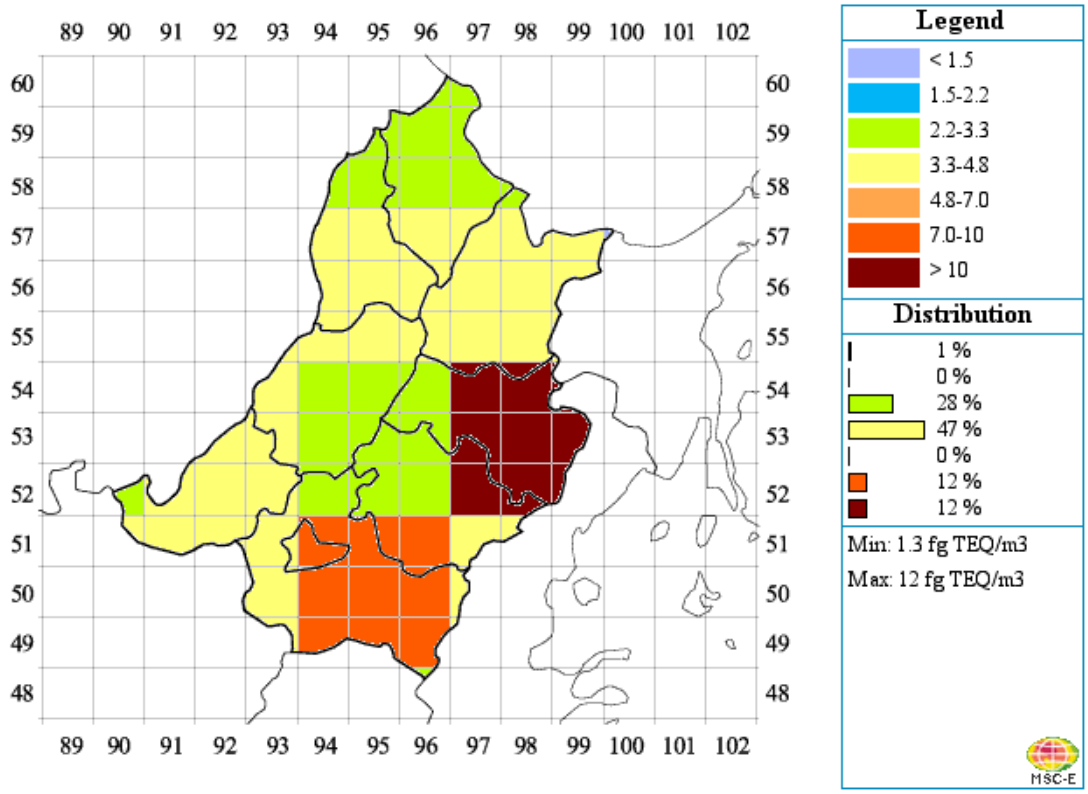
[9] Axys Varilab CZ 2005: Reports No. 618/1-10 on PCDD/Fs, PCBs and OCPs determinations of samples No. 4443-4450, 5769-5779, 5781-5787, 5783B, 5802 and 5808 issued in March 2005 in Vrané nad Vltavou.

[10] CORINAIR-94, SNAP-94 using Matrix approach (CORINAIR-94 Inventory Manual)



Spatial distribution of PCDD/Fs emissions in 2001 from Bulgaria, ng TEQ/m2/y

Figure 2. Spatial distribution of PCDD/Fs emissions in 2001 from Bulgaria, ng TEQ/m^2/y
Source: http://www.msceast.org/countries/Bulgaria/index.html#popemis



Spatial distribution of PCDD/Fs mean annual concentrations in air for 2001, fg TEQ/m3

Figure 3. Spatial distribution of PCDD/Fs mean annual concentrations in air for 2001, fg TEQ/m^3
Source: http://www.msceast.org/countries/Bulgaria/index.html#popemis

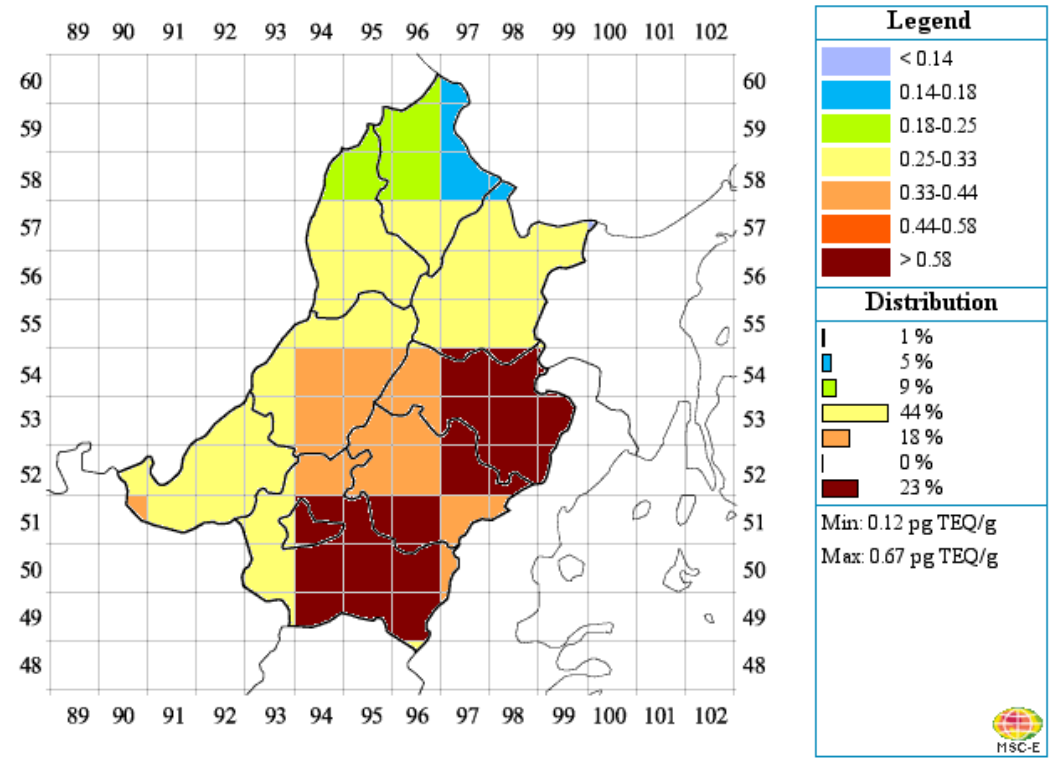


Figure 4. Spatial distribution of PCDD/Fs mean annual concentrations in soil for 2001, pg TEQ/g
Source: http://www.msceast.org/countries/Bulgaria/index.html#popemis

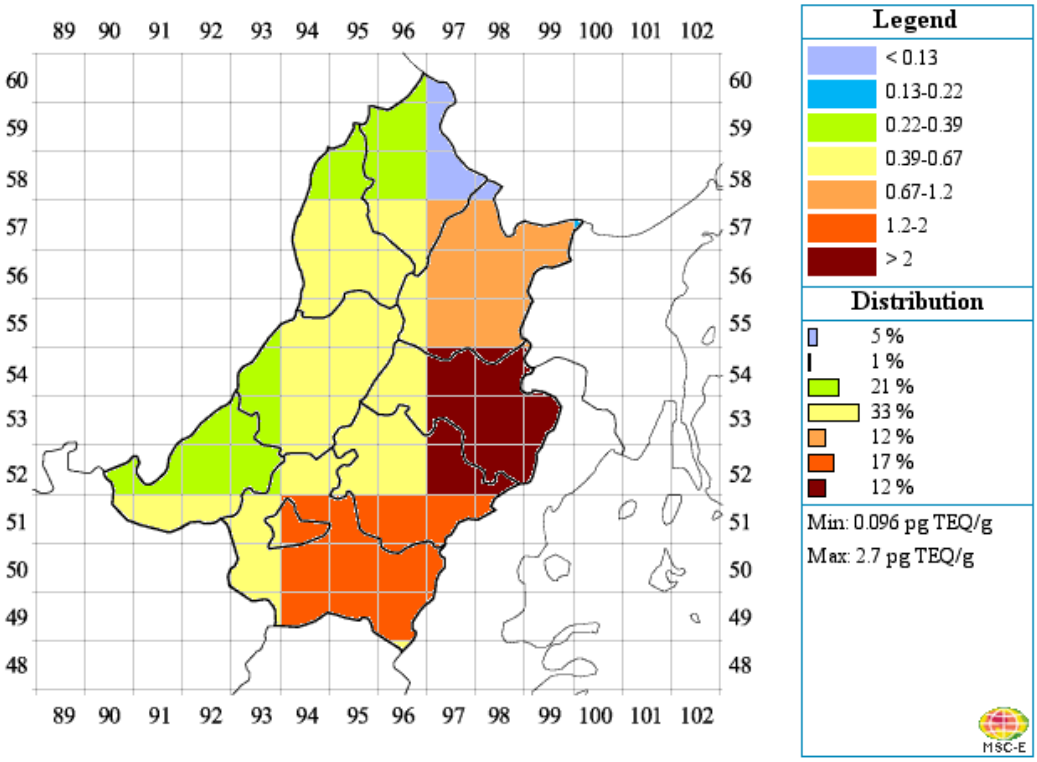


Figure 5. Spatial distribution of PCDD/Fs mean annual concentrations in vegetation for 2001, pg TEQ/g
Source: http://www.msceast.org/countries/Bulgaria/index.html#popemis

The National Environmental Strategy and Action Plan for 2001-2006 classifies the municipalities of Radnevo and Galabovo as ‘”hot spots” with regard to the environmental risk assessment.

The National Environmental Action Plan – Health section qualifies the same municipalities as “problematic” in relation to the operation of the coal mines and the thermal power plants in the region.

The cumulative and synergistic health impacts of the operation of all industrial facilities in the region have not been analysed. There is no information about any studies made with regard to presence of dioxins in the soil, water, food, animals and people and MoEW officials have stated that dioxin tests are not planned for the future.

In addition, no specific health data is cited in the EIA report, nor are any additional health studies planned for the future, which provides a rather weak basis for any serious health risk assessment. Finally, the EIA Report states that there is no health risk for the local population associated with the NHWTC, with the exception of accidents. However, no emergency action plan in case of accidents has been presented so far.

The MoEW has received support from the PHARE programme in 2001 for conducting preliminary studies for the NHWTC, and is currently negotiating for more funds from the ISPA programme and a loan from the European Investment Bank for the actual construction of the NHWTC. There are two main objections to the course of action chosen by the MoEW.

The first objection is on principle grounds with regard to two issues: first, the choice of incineration, a technology which is scientifically proved to be extremely harmful to human and environmental health, as the principal method for treating hazardous waste, and second, the decision to centralise hazardous waste treatment.

Transporting hazardous waste from all generators in the country to one central location is a costly and dangerous practice, and many EU countries are working by the 'proximity principle', meaning treatment close to the waste generator to reduce the risk of accidents en route to a centralised treatment facility.

The proposed site is not close to big hazardous waste generators: out of the thirty industrial enterprises responsible for 97% of the hazardous waste generated in the country, the closest one is located 90 km from the projected NHWTC site. The remaining 29 are all situated more than 100 km away. The top two hazardous waste generators are 230 km and 175 km away from the site.

Figure 6 shows the projected spatial distribution of hazardous waste generation in Bulgaria according to the Waste Survey conducted for the NHWTC project.

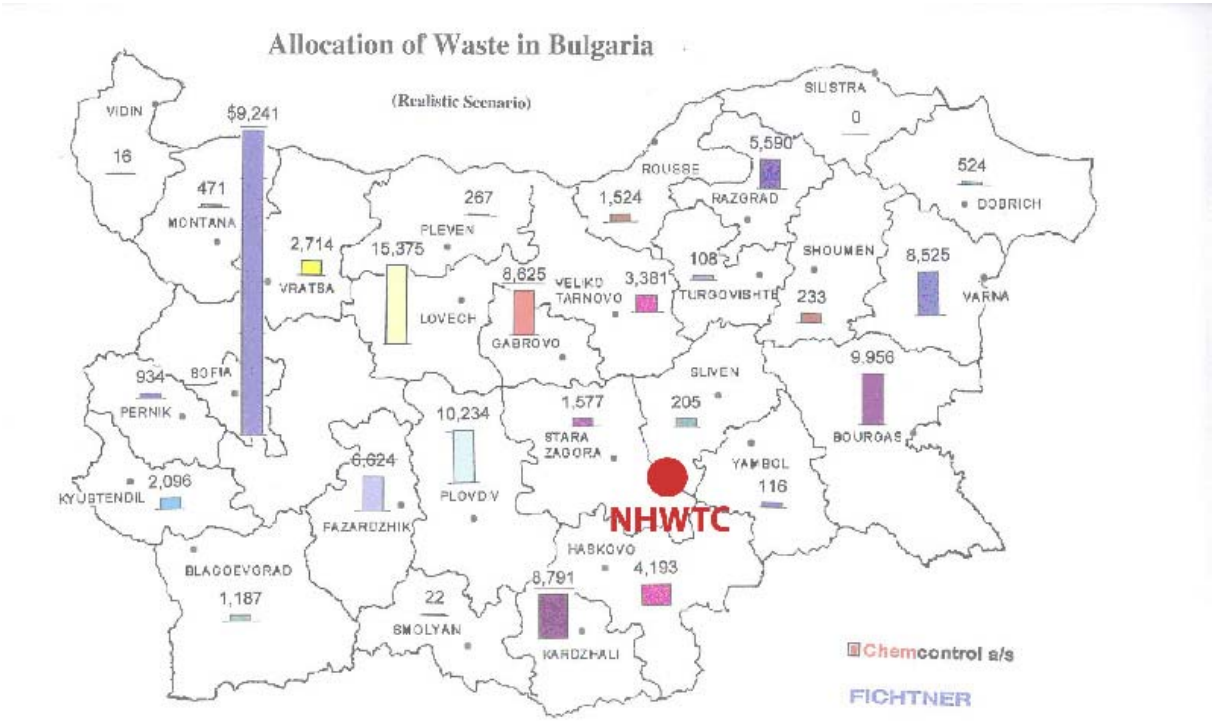


Figure 6. Model of the spatial distribution of hazardous waste generation in Bulgaria.

Note: The location NHWTC is indicated in red, including roughly the area within 10km around it.
Source: Waste Survey under PHARE project BG 9810-02-01 (003) - Preparation of the ISPA Application Form for the project "Establishment of National Hazardous Waste Centre". Chemcontrol, Fichtner, Polyconsult ECO Ltd.

Moreover, the stockpiles of obsolete pesticides are still spread across the country, despite the efforts of the MoEW, the Ministry of Agriculture and Forests and their regional structures, to collect, repackage and store them in larger, more centralised storage sites.

According to Ministry experts the exact type of waste that is going to be treated is so far unknown, that is because there are great uncertainties: "as the waste generators do not always have a clear picture themselves or are reluctant to disclose the information for competitive reason or due to the fact that the waste is not presently being disposed of properly..."[11].

"Due to the present difficult financial situation in Bulgaria it must be expected that encouraging generators to pay for the transport and treatment of their accumulated waste would be hard, furthermore the extremely large quantities make it economically very challenging to handle the accumulated waste."[12]

[11] Waste Survey under PHARE project BG 9810-02-01 (003)- Preparation of the ISPA Application Form for the project "Establishment of National Hazardous Waste Centre"
[12] Waste Survey under PHARE project BG 9810-02-01 (003)- Preparation of the ISPA Application Form for the project "Establishment of National Hazardous Waste Centre"

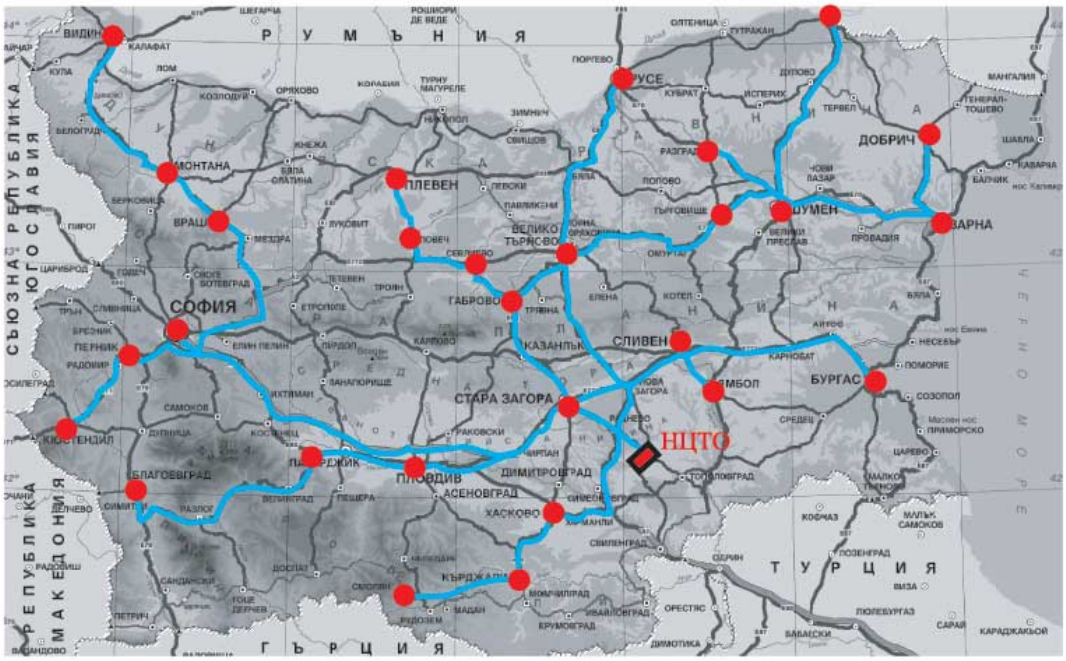


Figure 7. Transportation routes for hazardous waste from generators to the NHWTC. Source: Environmental Impact Assessment Report about the Investment Proposal for National Hazardous Waste Treatment Centre", Appendix 30.

Having in mind that such a conclusion is made in the preliminary study for the NHWTC, the rationale behind choosing a centralised system for hazardous waste treatment is not very clear. The risk management section of the Environmental Impact Assessment (EIA) Report on the NHWTC does list spillage during transportation as a possible threat, but the solutions offered are all invariably dependent on rigorous enforcement of national legislation related to hazardous waste transportation and management and on the availability of expensive specialized vehicles for hazardous waste transportation. While, on the one hand it is planned that the Centre would have such vehicles, on the other hand, hazardous wastes "which represent a low environmental risk" will be transported to the Centre by means of external vehicles.[13]
Figure 7 shows the routes for hazardous waste transportation from the biggest generators in Bulgaria.

The technology proposed for treating a considerable amount of waste (15,000 tons/annum) in the Centre is incineration in a rotary kiln. Incinerators are known worldwide as emitters of dioxins, furans, PCBs, PAH, heavy metals and many other persistent accumulative by-products.

[13] Conceptual Design - General Description for Bulgarian National Hazardous Waste Centre, Chemcontrol a/s and Polyconsult ECO Ltd. under PHARE project BG 9810-02-01 (003) - Preparation of the ISPA Application Form for the project "Establishment of National Hazardous Waste Centre" and Danish EPA project No. M128/008-0071 "Phased implementation of National Hazardous Waste Centre".

Alternatives to incineration and the position of local people

Taking into account the problems and experience in other countries[14], environmental NGOs in Bulgaria have been insisting for the last four years that non-combustion technologies be seriously considered and eventually implemented. Disturbingly, these recommendations were totally neglected by the MoEW.

The alternatives reviewed in the EIA report blatantly overlook serious non-incineration options and provide rather shallow analysis of the non-action situation and a weak explanation of the fact that no alternative sites have been taken into consideration. The only two alternative methods reviewed are plasma techniques and waste gasification, and both of them are unfavourably compared to the incineration option due to insufficient efficiency and emissions data, or high energy requirements, etc.

For the past few months, NGOs have been running an awareness-raising campaign, as dialogue with the local people is considered essential. A leaflet about the threats, problems and information about the incineration technology, dioxins/furans has been published and spread around in villages and towns in the region. During the public hearings about the project proposal a civil organisation from Stara Zagora joined in the NGO coalition and is now supporting the local people and Za Zemiata[15] and CEIE[16] in their efforts to prevent the construction of another dangerous POPs emitter. Unfortunately, the MoEW has disregarded all objections, critiques and recommendations expressed by civil society representatives.

On 9th and 10th of September, public discussions of the EIA Report were held only in the two municipal centres of Radnevo and Nova Zagora. Letters were sent to the MoEW by the Joint Initiative Committees of the affected villages, and by Za Zemiata and CEIE, requesting that public discussions be organised in the five villages nearest to the projected site for the NHWTC. This request was left with no reply from the MoEW.

Copies of the EIA Report were made available to the public in the municipality of Radnevo and in Nova Zagora who received one (1) copy each. The lack of additional copies and alternative venues for public viewing severely restricted the possibilities for the 21,000 people living within 10 km of the projected facility site (those most affected by it) to study the EIA Report and prepare informed opinions. In what would be a very time-consuming process, they would have had to travel to Radnevo and Nova Zagora in order to read a 300-page document, only available during working hours, and restricted for review exclusively on the premises of the municipal building. This way of organising the access to the information relevant for the public hearings made it nearly impossible for the local citizens to obtain preliminary technical information about the project. Moreover, those wishing to make comments were given only one month to prepare statements about such a complex issue. Some local people are still waiting for their copies of the EIA Report that they requested in accordance with the *Law for Access to Public Information.*

At the public hearings the local people complained that they did not have proper access to information and that it was impossible to receive more copies of the EIA Report. Apparently, public participation in the project proposal discussions and the decision-making process has been purposefully restricted by the MoEW. Although apparently the Ministry followed the law, the perfunctory manner in which public consultations were conducted does not guarantee that public demands and interests would be taken into consideration at all.

[14] See Greenpeace "A Review of UK Incinerator Performance." for the real-life facts about unauthorised releases in that country.

[15] Environmental Association "Za Zemiata" (For the Earth), Bulgaria, www.zazemiata.org – non-governmental organisation

[16] Centre for Ecological Information and Education, Bulgaria, www.ceie.org - non-governmental organisation

After the public hearings in September, 30 pages of critiques and suggestions regarding the EIA Report were submitted to the MoEW by NGOs and the local people. However, the resolution from 7 October 2004 by which the Supreme Environmental Expert Council (SEEC) approved the EIA Report, states that no comments were submitted to the MoEW. In view of all these facts, it is obvious that the element of public participation in this project is seriously flawed and compromised.

Nevertheless, the resistance of the local people, united in a Joint Initiative Committee against the NHWTC continues. On October 7th, 2004, the Committee organised a demonstration in front of the MoEW during the SEEC session and submitted a letter to EC (DG Environment and DG Regional Policy) and European Investment Bank with an appeal not to finance the project. Apart from over 3000 signatures against the project collected during the past few years, they presented several negative opinions and statements.

The opposition of the local people to the NHWTC was reflected in a thirty-minute broadcast on one of the National TV channels. Numerous articles and press releases devoted to the problem were published. Regional media in the Stara Zagora district also follow the development of the problem. In addition, NGOs are exchanging intensive correspondence with the EU Commission and the European Investment Bank, which are the expected funders of the project.

III. Policy proposal

More sustainable alternatives to the centralized hazard of the NHWTC are possible and feasible, as long as there is political will to pursue them. The first step towards changing the current policies for the better is a shift away from the customary top-down approach in decision-making (a legacy of the socialist regime) and towards wider public involvement.

Decentralization of hazardous waste management would serve to decrease the threats of transportation accidents – onsite treatment methods should be given preference over the centralized treatment option, which involves extremely high costs and risks. Also, non-incineration methods of reduction and elimination of POPs and POPs releases should be researched more thoroughly and given proper consideration. A number of researched and tested non-combustion technologies are available. Four of them are Gas-Phase Chemical Reduction (GPCR), Base Catalysed Decomposition (BCD), Sodium Reduction (SR) and Super-Critical Water Oxidation Reduction (SCWO). GPCR has been used for eight years already, displaying high destruction efficiencies for HCB, PCBs, and dioxins/furans-contaminated waste. BCD is usually employed in treating liquid wastes and wastes highly contaminated with DDT, PCBs and dioxins/furans. SR is a transportable technology, commonly used for treating oils contaminated with PCBs, which makes possible the reuse of treated oil. SCWO is a potentially tranportable enclosed system, high-pressure, high-temperature process, used for treating liquids and solids with limited organic content and particle size. All four technologies have demonstrated high destruction efficiencies for various POPs and have been commercially applied and used in operating plants already for a number of years.

The following general recommendations could prove helpful in steering a policy course towards a more sustainable approach to hazardous waste treatment.

- Take specific measures to encourage the reduction and elimination of the presence of POPs-forming substances in the waste streams going for incineration or landfilling, such as PVC.
- Reconsider the current practice of burning old automobile tyres in cement kilns.
- Build safe transfer stations and longer-term storage sites, encourage on-site treatment and storage.
- Avoid end-of-pipe solutions such as incineration in a centralized facility and landfills.
- Avoid transportation of hazardous waste over long distances to a central location.

Activate policies for retrieving hazardous waste from household sources – incentives for the producers and consumers; search for possible treatment solutions; build the necessary infrastructure and management system in cooperation with the relevant stakeholders (producers, importers, consumers).

- Launch public awareness-raising campaign alongside with a fact-finding campaign, regarding abandoned, uncontrolled and un-confined stockpiles of expired pesticides in rural areas to facilitate more efficient location and identification of POPs stockpiles and transportation of hazardous waste over long distances to a central location.
- Activate policies for retrieving hazardous waste from household sources – incentives for the producers and consumers; search for possible treatment solutions; build the necessary infrastructure and management system in cooperation with the relevant stakeholders (producers, importers, consumers).
- Avoid transportation of hazardous waste over long distances to a central location.
  Activate policies for retrieving hazardous waste from household sources – incentives for the producers and consumers; search for possible treatment solutions; build the necessary infrastructure and management system in cooperation with the relevant stakeholders (producers, importers, consumers).
- Conduct real measurements as opposed to calculations of dioxin/furan quantities and distribution.
- Seek alternative methods for dealing with hazardous waste treatment and POPs elimination that do not necessarily involve huge capital investments in large centralized facilities, incurring debt to international financial institutions and relying on foreign donor assistance.
- Research on possibilities for recycling, utilizing and reducing the amount and hazardous content of the waste.
- Concentrate research and devote more resources on finding and applying non-incineration technologies with 100% destruction efficiency.
- Develop legal, financial and administrative measures that would serve as incentives for large hazardous waste generators (industries) to search for and utilize cleaner production technologies, reduce the quantity and toxicity of waste generated, as well as apply onsite treatment of hazardous waste.
- Provide legal and financial incentives for the biggest hazardous waste generators to devise appropriate environmental management programmes, including safe hazardous waste treatment, and invest in the acquisition of such technologies that allow maximum utilisation of resources with minimum release of toxic substances and wastes (including POPs) into the environment.
- Ensure real involvement of NGOs, initiative committees and concerned citizens in the planning and decision-making processes.
- Include mechanisms for review and monitoring of the progress and successful performance of the National Implementation Plan for the reduction and elimination of POPs.
- Focus more research on “zero waste” strategies and study existing practical applications.
- Move towards a more holistic approach in devising policies and strategies for dealing with hazardous waste.

IV. Consequences under current and alternative policies

Keeping the current course of policy, geared exclusively towards the building of a National Hazardous Waste Treatment Centre, would mean either more blatant disregard for public opinion in case the construction of the Centre starts at the currently identified site “Gledachevo”, where local communities fiercely oppose the project, or new delays in taking action for solving Bulgaria’s hazardous waste and POPs stockpiles problem, as a new site for the Centre would have to be identified.

Having invested a considerable amount of time and resources in this project (over 1,6 million Euro), the MoEW is unlikely to give it up easily. The alternative of serious research on non-combustion technologies that have near 100% destruction efficiencies and untraceable POPs releases to air, water or soil, would also require more time and resources. Nevertheless, with proper research and public involvement, the more sustainable alternatives will stand a much better chance.

It is of utmost importance that the government reconsider its current policy-making approach which seems to be guided solely by the most obvious and readily applicable options. So far, the national strategy for waste management in general displays the disturbing tendency to rely exclusively on external funding for extremely expensive facilities served by and executed with foreign know-how and consultancy.

The problem with this general tendency is that it means that local resources and know-how in the sphere of waste management are neglected. Instead of seeking a combination of integrated and carefully targeted approaches to hazardous waste management, huge debts are incurred for the construction and maintenance of large extravagant facilities without prior consideration of low-technology alternatives that could possibly solve the problem in a satisfactory manner.

Alternatively, if scenario 5 (see schemes for POPs stockpiles destruction above) is followed, that would mean planting a time-bomb in a highly irresponsible manner. Although the BB-cubes seem to provide some degree of assurance of safety, what they provide is only a postponement of the problem in time, without regard to the hazardous legacy that they bequeath to the future generations.

Another concern is that there is the real danger that the NHWTC will be used as a revenue-raising facility by accepting imported hazardous waste for incineration. The National Environmental Strategy mentions in passing that the EU stimulates more flexible waste transportation and utilization among the member states, adding that Bulgaria has taken measures to control the transport of hazardous waste even after its accession to the EU, due to the country's low hazardous waste treatment capacity. However, that vague statement (the measures in question are not specified anywhere else in the document) appears to provide yet another chance to claim one paragraph later in the same document the need for constructing such facilities that increase Bulgaria's capacity to treat hazardous waste.[17]

The most recent draft of the National Environmental Strategy for the period 2005-2014 contains some rather disquieting statements that seriously question the Strategy's professed alignment with the EU priorities of reducing, reusing and recycling waste. A review of the set objectives and planned activities reveals internal contradictions. While the stated long-term priorities are waste reduction and recycling, the objectives and activities projected for fulfilling them during the period 2005-2014 focus on the lower levels of the waste hierarchy pyramid, namely, construction of modern landfills and incineration facilities.

Especially alarming is the manner in which various governmental policies are customarily justified as necessary in order to bring Bulgaria closer to EU accession. One striking example is found in the Strategy, which states that Bulgaria has committed to guarantee that all hazardous and industrial waste streams would be managed in compliance with the EU standards by the accession date. Next, it states that Bulgaria has made a commitment to the EU to close the current hazardous waste landfills, none of which comply with the EU standards, and the sentence goes on with the construction of a National Hazardous Waste Treatment Centre. This misleading way of constructing the sentence leaves the false impression that the building of that specific facility is also an integral part of the commitments made to the EU, and is a requirement that must be fulfilled in order to become a EU member-state. If this practice of tendentious reasoning continues, there is a great danger that more harmful and risky initiatives and policies can be sold to the unwitting public, unless civil society develops effective watch-dog and whistle-blower functions.

[17] National Environmental Strategy 2005-2014. *Objective 4: Integrating environmental policy in the development policies for the economic sectors and regions* .p. 9.

V. Experience with proposed policy in other countries

The experience with the “zero waste” approach, Gas-Phase Chemical Reduction, and civil society participation in the processes related to cleanup and elimination of POPs stockpiles in Australia is often cited as an example both of good environmental and policymaking practice.

Most Pacific island countries (PICs) have had substantial persistent organic pollutants (POPs) stockpiles in the form of agricultural pesticides and PCBs. The Australian funded 'POPs in PIC Project' grew out of the good neighbor policy developed by the National Advisory Body on Scheduled Waste (NAB). This multi-stakeholder forum, strongly supported by Australian NGOs, was responsible for the development of National Management Plans for PCBs, HCB and organochlorine pesticides in Australia. Much of the success of the project was due to the active role NGOs played in public awareness and capacity building of local populations.

Australian NGOs facilitated community acceptance of the destruction of South Pacific waste in non incineration technology in Australia. The resulting destruction took place at the BCD Technology Facility based in Brisbane, and using base-catalysed dechlorination (BCD) for the PCB oils. Due to corroded state of containers, destruction by plasma arc was utilized for the POPs pesticides. The local community living adjacent to the destruction facility was tolerant of the destruction of the imported waste, as they clearly understood the lack of capacity in the Pacific region. However, as a trade off they negotiated independent monitoring of the destruction process of the South Pacific waste. This provides the first publicly available independent monitoring of the destruction facility.

Since there is no infrastructure built so far to treat hazardous waste, Bulgaria has the chance to start using environmentally sound approaches, from the beginning. The construction of hazardous waste incinerator will predetermine the waste treatment technology for the next 20-25 years, and will undermine any efforts for safer and more responsible waste management schemes. Applying the lessons learned in Australia could be a very positive sign for the wish of Bulgaria to manage its hazardous waste in sustainable manner. The development of a waste prevention strategy is also very important and should be a priority for Bulgaria. The opportunity for Bulgaria to be a leader in implementing non-combustion technologies and hazardous waste prevention in Central and Eastern Europe is unique and would reflect in non-toxic environment, lower social and economical costs.

VI. Conclusions

So far the impression derived from official governmental documents such as environmental and health programmes, strategies, and statements given by government officials, is that the commitment to finding safe methods of hazardous waste treatment and POPs elimination that do not involve incineration is lacking.

It is also apparent that rather than investing more time and human and financial resources in developing hazardous waste and POPs treatment approaches that are best suited to the local conditions, the state chooses to take the ready offer of private companies, lobby groups or even foreign governmental agencies that have great experience in planning and executing high-cost, high-tech projects which would be interesting for international financial institutions and not necessarily represent the best solutions for the country-specific conditions.

When using such opportunities, often deadlines and limiting timeframes make for a hurried, insufficiently researched and planned out approach, which is reflected clearly in the examples of the government’s failure to ensure effective and democratic public involvement in the process, as well as the deficient quality of the documents accompanying the NHWTC, such as the Waste Survey, the Conceptual Design, and the Environmental Impact Assessment report.

In light of the findings of this policy brief, the most necessary and probably the most urgent changes are needed in the governmental approach towards the role of civil society in public policymaking, strategic planning, project development, implementation and monitoring.
The involvement of the civil sector in the decision-making processes is the most effective way to guarantee independent monitoring, control and transparency of these processes. This is especially true in the case where a specific location is concerned. The opinions of the local community should provide the most solid background and reasoning for taking specific decisions that directly concern and affect human and environmental health.

Generally, governmental administrative structures lack capacity or political motivation for proposing and developing new ideas and pursuing best practice projects. Therefore, the involvement of civil society is crucial for guaranteeing the initiation, preparation and implementation of sustainable projects. Consultation and cooperation with all stakeholders should become a priority in public policy making, especially in the sphere of environmental resource management and environ-mental decision-making. Finally, the concept of environmental justice should be internalized and observed by the governmental and private sector alike, in all policies, projects and plans that affect environmental and human health and well-being.

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