International POPs Elimination Project

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

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Analysis of information in the Integrated Pollution Register concerning year 2004, from the point of view of POPs monitoring

Arnika - Toxics and Waste Programme

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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 Government 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 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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Analysis of information in the Integrated Pollution Register concerning year 2004, from the point of view of POPs monitoring

Rankings of the biggest polluters and analysis of further information in the Integrated Pollution Register (IPR) concerning the year 2004

The Integrated Pollution Register (IPR) is a database providing detailed information on the use and releases of chemical substances hazardous to the environment or human health. Thus, everybody can find data on the amounts of substances released by specific industrial or agricultural plants into the environment in one place. In the Czech Republic the IPR was introduced by the Act No. 76/2002 Coll. on integrated prevention. Government Order No. 368/2003 Coll. defines its content more precisely. For the first time data reported by the individual companies into the Czech IPR were published on the internet page http://www.irz.cz on September 30, 2005. Reported data were partially based on measurements, calculations, and expert estimates, depending on individual technologies and companies.

In total, reports on releases and transfers of chemical substances were provided by 871 plants from locations throughout the Czech Republic, but this is a poor response compared to the actual number of companies.[1] Even industry claimed that the number of companies that would have to report information on released substances would be on the order of thousands. This number would significantly exceed that of the companies who have to apply for the so-called integrated permit, according to the Act on integrated prevention. However, the number of the latter companies is much higher today – 1,327.

Within the framework of the Toxics Free Future campaign we have tried to analyse data collected in the IPR and to evaluate the biggest polluters in relation to persistent organic pollutants (POPs). Unfortunately this is proving somewhat difficult as it is not possible to simply add all the released substances without taking into consideration their hazards to the environment and human health. While transfers of PCBs are counted in tons, mere micrograms of dioxins released per year may represent very hazardous amounts. Because of that, we have drawn up several orders which reflect this difference to a certain extent.

The substance most often reported into the IPR was ammonia from 411 plants. For more than a fifth of substances in the present IPR (specifically 16 substances from the total 72), not a single value was reported. This concerns the following substances:

DDT
1,1,1-trichloroethane;
1,1,2,2-tetrachloroethane;
anthracene;
polybrominated diphenylethers (PBDE);
chloroalkanes (C10 - 13), called also Short Chained Chlorinated Paraffins - SCCPs);
ethylene oxide;
sulphur (VI) fluoride (SF_6);
fluorinated hydrocarbons (HFC);
halones;
Lindane;

pentachlorophenol (PCP);
perfluorocarbons (PFC);
organotin compounds (as the total Sn);
trichlorobenzenes (TCBs);
vinyl chloride.

In addition to this, a low number of substances in releases were reported, (about two thirds, totaling 46 substances). From this number 36 substances were reported in emissions to air, 24 in emissions to water and 10 in emissions to soil. The companies reported 34 substances in wastes, and 32 substances in waste waters transferred from the plant. However, transfers were only reported by 23 facilities. In certain cases a very likely reason for the absence of data on substances is because of the failure to monitor emissions to water or soil, or in waste (for example, in the case of DDT or PBDE), or the fact that the reporting companies were not aware of the duty to report releases and transfers into the IPR. In a number of cases this is a consequence of wrongly set reporting thresholds. Their values may be found in the table in Annex 1, copied from the Government Order No. 368/2003. Simultaneously, this Annex also provides overview of substances reported into the Czech IPR.

The fact that none of the plants reported the amount of accidental releases is striking. In both chemical plants manufacturing chlorine (Spolana, a.s. Neratovice and Spolek pro chemickou a hutní výrobu, a.s. Ústí nad Labem) there have been several accidents connected with the release of the reported substances. This is a result of the interpretation published by the Ministry of the Environment, according to which accidental emissions are to be reported only in cases that exceed the reporting thresholds.[2] Such interpretation can only be regarded as a regressive step in environmental and public health protection, and a helpful step to the industrial lobby.

Picture 1: Spolana Neratovice is one of the biggest polluters by carcinogens. It is also hot spot contaminated by dioxins. Photo shows flood in 2002.

Carcinogenic substances

Classification of carcinogenicity of substances is not unified over the whole world. While the US EPA classifies a number of substances as carcinogens, the International Agency for Research on Cancer (IARC) does not classify them in this way. Generally it can be said that IARC classification is more conservative. Nevertheless it is an internationally recognised classification of substances and activities which cause, or can cause, cancer. As a result our analysis includes substances which IARC classifies as carcinogenic (1) probably carcinogenic (2A) possibly carcinogenic (2B) to humans (hereinafter, for the purpose of simplification, we will collectively call them as carcinogenic).[3]

Concerning the year 2004, carcinogenic substances in emissions to air, water, or soil (i.e., in releases) in wastes and in waste waters (i.e., in transfers) exceeding thresholds for reporting into the IPR were reported by a total of 303 plants.

We have drawn up two tables for carcinogenic substances. The first table shows the order of plants according to releases (emissions to air, water, and soil) of carcinogenic substances. The second table includes the sum of releases and transfers (i.e., it adds content of the substances in wastes and waste waters).

The plant IVAX Pharmaceuticals in Opava was catapulted to first place in releases due to high amounts of dichloromethane[a] in emissions to air and water. In the pharmaceutical industry this substance is used as a solvent during production of steroids, antibiotics and vitamins. It is also used in dental care during the production of acrylic dentures (50% in mixture with methacrylate), or as an inhalation anaesthetic agent in medicine. Dichloromethane in releases helped the company s r.o. Kurt O. John in Březůvky and the company Tusculum a.s., Rousínov to get into the top ten emitters. Wastes of the company IVAX Pharmaceuticals in Opava also contained high amounts of dichloromethane, as is obvious from comparisons of Tables Nos. 1 and 2.

Table No 1. The order of plants according to the amount of substances and compounds thereof, classified by IARC (International Agency for Research on Cancer) as (1) carcinogenic (2A) probably carcinogenic (2B) and possibly carcinogenic to humans, contained in the total releases to air, water and soil, according to the data published in the Integrated Pollution Register for the year 2004 (http://www.irz.cz).

Order	Organisation/company and Plant location	Type of source	Amount (kg)
1.	IVAX Pharmaceuticals s.r.o., Opava	Pharmaceutical industry	173,773.0
2	SPOLANA Neratovice	Chlor-alkali plant, PVC production	40,733.6
3.	Kurt O. John, spol. s.r.o., Březůvky	Shoe manufacture and road cargo transport	39,112.0
4.	Federal-Mogul Friction Products a.s., headquarters Koestler nad Orlicí	Automotive field	30,300.0
5.	Mittal Steel Ostrava a.s.	Steel industry	25,015.4
6.	Tusculum, a.s., Rousínov	Furniture industry	23,100.0
7.	DEZA, a.s. závod Valašské Meziříčí	Chemical industry, Benzene	21,641.7
8.	JIP - Papírny Větřní, a.s.	Pulp and paper	19,719.0
9.	Fuchs Europlastics s.r.o., shoes production Otrokovice	Shoes production, Plastics	18,740.0
10.	KRONOSPAN CR, spol. s r.o. Jihlava	Furniture industry	16,525.0

The following chemical substances and compounds thereof, reported into the IPR, belong in IARC group 1: arsenic, cadmium, chromium, benzene, asbestos, and formaldehyde. The following chemical substances, and compounds thereof, reported into the IPR, belong in IARC groups 2A and 2B: tetrachloroethylene, trichloroethylene, polychlorinated biphenyls (PCBs), mercury, nickel, lead, 1,2-dichloroethylene (DCE), dichloromethane (DCM), hexachlorobenzene (HCB), 1,2,3,4,5,6-hexachlorocyclohexane (HCH), tetrachloromethane (TCM), trichloromethane, ethylbenzene, naphthalene, styrene, and heptachlor.

Spolana, a. s. Neratovice got into second place in the table for releases of carcinogenic substances due to the high emissions of trichloroethylene to air. In Spolana, this substance is used in

[a] More information on this substance may be found at http://bezjedu.arnika.org/chemicka-latka.shtml?x=592823

manufacture of caprolactam. Increased incidence of leukaemia in children is linked with this substance and tumours of the lungs, liver, and testicles in animals.

DEZA, a.s. Valašské Meziříčí is the biggest source of emissions of benzene, ranked by IARC among proven human carcinogens. Benzene production is one of the main activities of DEZA, a.s.[b]

The order in the second table, which includes the contents of carcinogenic substances in wastes and waste waters was influenced, with respect to the first three places, by high amounts of lead in wastes (in particular, batteries) handed over to other companies for processing or disposal. Sokolovská uhelná, a. s. produces high amount of wastes containing benzene, and Třinecké železárny, a.s. high amount of wastes containing chromium. Wastes of Spolek pro chemickou a hutní výrobu, a. s. Ústí nad Labem contain too much hexachlorobenzene (HCB). [c]

Table No. 2. The order of plants according to the amount of substances and compounds thereof, classified by IARC (International Agency for Research on Cancer) as carcinogenic (1) probably carcinogenic (2A) and possibly (2B) carcinogenic to humans, contained in the total releases (emissions to air, water and soil), and transfers (in waste waters and wastes), according to data published in the Integrated Pollution Register, concerning the year 2004 (http://www.irz.cz). Please see heading of Table No. 1 for classification of substances into groups 1, 2A and 2B.

Order	Organisation/company and Plant location	Type of source	Amount (kg)
1.	AUTOBATERIE, spol. s r.o.	Automotive field – battery pickers	6,072,870.0
2	ŽDB, a.s., Bohumín	Metal works	5,810,484.2
3.	AKUMA, a.s.	Production and storage of batteries	2,466,669.0
4.	Sokolovská uhelná, a.s., Sokolov	Mining industry (brown coal, and its processing)	947,518.8
5.	Třinecké železárny, Třinec	Metal works and steel industry	901,480.4
6.	Kovohutě Příbram, a.s.	Non-ferrous metal works and recycling	549,719.8
7.	Mittal Steel Ostrava a.s.	Steel industry	505,158.5
8.	Spolek pro chemickou a hutní výrobu, a. s., Ústí nad Labem	Chlor-alkali plant, chlorinated effluents production and other chemical industry	455,095.1
9.	LG.Philips Displays Technology Center Hranice	Electronic industry - production of televisions	406,232.0
10.	IVAX Pharmaceuticals, s.r.o., Opava	Pharmaceutical industry	333,473.0

In conclusion of the evaluation of releases and transfers of carcinogenic substances, it is necessary to note that IARC classifies 66 chemical substances as proven human carcinogens.[4] Our IPR includes only 8 of them (one of this number being in the wider group of dioxins). A

[b] More information on benzene may be found at http://bezjedu.arnika.org/chemicka-latka.shtml?x=221638
[c] More information on hexachlorobenzene may be found at http://bezjedu.arnika.org/chemicka-latka.shtml?x=214894

similar disproportion applies also to substances classified into groups 2A and 2B. This under representation of carcinogens on the IPR list is due to the fact that a number of them were eliminated due to political pressure in the beginning of the formation of the IPR. The Register provides only a limited amount of information necessary, for example, for physicians, but also for state institutions engaged in protection of the environment and human health and for the companies themselves.

Persistent organic pollutants - total

In the overview of persistent organic pollutants (POPs), we have incorporated chemical substances and groups thereof, which are subject to the Stockholm Convention only. This is a relatively conservative list of these substances. In the Czech IPR this concerns the following substances: hexachlorobenzene, dioxins (PCDD and PCDF), polychlorinated biphenyls (PCBs), aldrin, endrin, DDT, dieldrin and heptachlor. From the twelve substances contained in the list of the Stockholm Convention the Czech IPR lacks toxaphene, mirex, and chlordane.

Picture 2: Mittal Steel Ostrava is one of the biggest polluters by POPs according to IPR data for year 2004.

Table No. 3. The order of plants emitting Stockholm Convention persistent organic pollutants (POPs) in total releases (emissions to air, water and soil), according to the data published in the Integrated Pollution Register, concerning the year 2004 (http://www.irz.cz). The sum includes dioxins (PCDD/F) given in g expressed in I-TEQ[d] (for more information, please see Table No. 5).

Aldrin, endrin, and dieldrin were reported by a single company (Fosfa a. s. Břeclav), in amounts on the order of about 1 g/year in waste waters (transfers to water). According to the set reporting thresholds (1 kg), this company did not have to report these amounts. Simultaneously, this case documents how badly the reporting thresholds are set. Fosfa also reported the total transfer of 50 g of HCH in waste waters.

[d] I-TEQ = international toxic equivalent, to which the measured absolute values of concentrations of 17 toxic dioxin congeners in the environment are converted.

Order	Organisation/company and Plant location	Type of source	Amount (g)
1.	Elektrárna Opatovice	Power plant burning brown coal	2,837.1
2.	VÁLCOVNY PLECHU, a. s., heat and power plant, Frýdek - Místek	Heat and power plant in metal works	378.0
3.	Třinecké železárny, a.s.; Třinec	Steel industry and metal works	240.0
4.	ŽDB a.s., Bohumín	Metal works	190.0
5.	Mittal Steel Ostrava a.s.	Steel industry	140.0
6.	ALIACHEM, a.s.; o.z. SYNTHESIA, Pardubice	Chemical industry	100.0
7.	VYSOKÉ PECE Ostrava, a.s.	Steel industry.	52.0
8.	KOVOHUTĚ MNÍŠEK, a.s., Mníšek pod Brdy.	Non-ferrous metals production, foundry	27.0
9.	Slezský kámen, a.s.; Foundry Písečná	Foundry	23.0
10.	Teplárny Brno, a.s.; Facility Brno-sever, Brno, Obřanská	Heat and power plant	10.4

The first version of our analysis[5] included a table (Table No. 4) showing the order of plants according to the amounts of POPs in the total releases and transfers (i.e., wastes and waste waters). This order does not reflect the different hazardous levels of the individual substances and therefore it was not essentially influenced, for example, by dioxin emissions which were analysed in a separate table in the first version. Because of this, we consider it important to include Table No. 3, showing the order according to POPs releases into the environment. In the same way in separate tables we have analysed releases and transfers of polyaromatic hydrocarbons, which are ranked among POPs, but are not present in the list of the Stockholm Convention. They are however in the POPs Protocol to the Convention on Long-Range Transboundary Air Pollution (LRTAP).[e]

The order in Table No. 3 (order of plants according to POPs amounts in releases) was influenced, on the first two places, by the amounts of polychlorinated biphenyls in emissions. The third place was influenced by the amount of dioxins in emissions. Mittal Steel Ostrava, a.s. took 5th place because of the high amount of PCBs in its emissions.

[e] The Protocol includes also other POPs monitored in the IPR: 1,2,3,4,5,6-hexachlorocyclohexane (HCH) and lindane. Lindane was not reported by any plant, and 1,2,3,4,5,6-hexachlorocyclohexane was reported by Fosfa, a.s. in the amount of 0.05 kg in transfers to waste waters (reporting threshold is 1 kg).

Table No. 4. The rank order of plants emitting Stockholm Convention persistent organic pollutants (POPs) in the total releases (emissions to air, water and soil) and transfers (wastes and waste waters transferred from the plant).

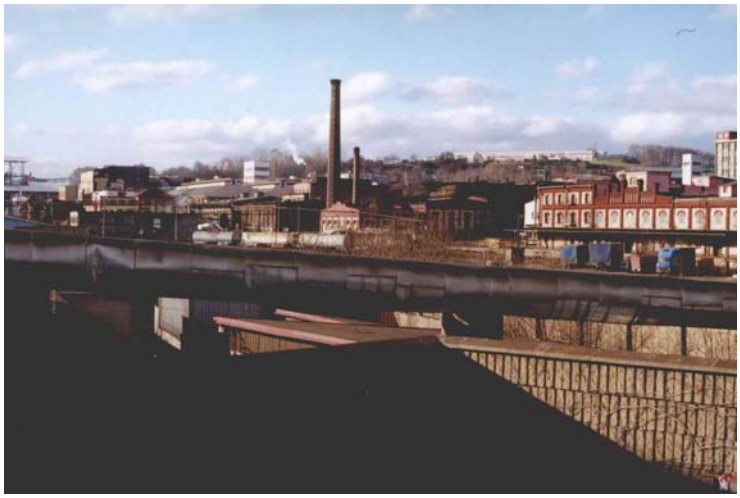
Order	Organisation/company and Plant location	Type of source	Amount (kg)
1.	Spolek pro chemickou a hutní výrobu, a. s. Ústí nad Labem	Chlor-alkali plant, chlorinated effluents production and other chemical industry	423,392.7
2	ŽDB, a.s., Bohumín	Metal works	8,555.2
3.	LASSELSBERGER a.s., závod RAKO 3, Lubná	Production of raw and building materials and ceramic products	288.0
4.	Severočeské vodovody a kanalizace, a.s.*; ČOV Chanov	Sewage plant	210.0
5.	FOXCONN CZ, Pardubice *	Electronic industry, production of consumer electronics	137.4
6.-9.	Severočeské vodovody a kanalizace, a.s.*; ČOV Rýnovice	Sewage plant	120.0
6.-9.	Strojírny Poldi, spol.s.r.o., Kladno	Machine-works	120.0
6.-9.	Vodárna Plzeň, a.s.*; ČOV Plzeň	Sewage plant	120.0
	Table 4 Continued		
6.-9.	VOS zemědělců, a.s.*; živočišná výroba Uhřice	Livestock production	120.0
10.-11.	Sušárna Pohořelice, s.r.o.*; Poultry farm Vranovice	Poultry farm	75.0
10.-11.	HAMAG, spol.s.r.o., foundry of ferrous and non-ferrous metals, Zlín *	Foundry of ferrous and non ferrous metals	75.0

Data according to the data published in the Integrated Pollution Register, concerning the year 2004 (http://www.irz.cz). In the case of companies marked with *, the amount concerns PCBs in wastes. In most cases these are probably PCBs in old transformers and capacitors, but this is not mentioned in the IPR and if the companies do not declare (for example FOXCONN CZ), it can be difficult to find the data. This concerns old environmental burdens caused by widespread use of PCBs in oils in this equipment.

The total order of plants in the Table No. 4 was influenced mainly by the amount of polychlorinated biphenyls (PCBs) or hexachlorobenzene (HCB) in wastes. In the case of Spolek pro chemickou a hutní výrobu, a. s. in Ústí nad Labem, there was a considerable amount of hexachlorobenzene in wastes. This substance is still produced at the plant as a by-product during the manufacture of other chemical substances.[f]

The remaining places were influenced solely by the amounts of PCBs in wastes. However, admission of these amounts does not show environmentally unsound behaviour on the part of the companies, as they could well represent the contents of PCBs in old transformers and capacitors - i.e., environmental burdens inherited by the present operators from their predecessors. However the IPR does not contain the information if PCBs in waste are transformer and capacitor oils, and it can be difficult to find unless companies declare it (for example, FOXCONN CZ). Companies which give wastes containing hazardous PCBs to unknown locations will probably not appear in the IPR. This is the case of the store in Mratín, where wastes containing PCBs were "lost" from

[f] More information on hexachlorobenzene may be found at http://bezjedu.arnika.org/chemicka-latka.shtml?x=214894



Picture 3: Spolek pro chemickou a hutní výrobu, a. s. in Ústí nad Labem (Spolchemie) still produces large volumes of HCB wastes.

the store of the joint-stock company NESTREL (formerly, EKOBO) (see http://bezjedu.arnika.org/tz.shtml?x=208229).

Interesting data not influencing the order in Tables Nos. 3 and 4 includes information on the transfers of hexachlorobutadiene (HCBD): in 2004, wastes of Spolek pro chemickou a hutní výrobu, a. s. in Ústí nad Labem contained 161,289.6 kg, and Fosfa, a. s. Břeclav handed over 10 g in waste waters to another company.

Dioxins

The order of the biggest polluters of the environment by dioxins (or, more exactly, polychlorinated dibenzo-p-dioxins and dibenzofurans, i.e., PCDD and PCDF) should be shown in Table No. 5. The conditional is used because not all the plants that should have taken part reported the amounts of dioxins in wastes and waste waters into the IPR. These substances are not monitored in these environmental components, in spite of the fact that it is required by the Regulation of the European Parliament and of the Council No. 850/2004/EC on POPs also in the Czech Republic since the last year. However, unfortunately in a number of cases the state administration does not insist on measurements of dioxins and other POPs in wastes. Thus, for example, the Liberec municipal waste incinerator Termizo, a.s. did not report dioxins in wastes into the IPR. However, according to a study of Arnika Association[6], dioxins are contained in wastes in the order of hundreds of grams I-TEQ.[g] With the exception of Spalovna Malešice (it reported 8 g I-TEQ in wastes in 2004), the plants got into the list of the top ten emitters due to dioxin emissions to air.

A simple sum of dioxin emission to air from the first eight plants is 579 g I-TEQ. However, according to a calculation of the authors of the National Implementation Plan of the Stockholm Convention in the Czech Republic, the total emissions of these substances to air in 2001 were 179 g I-TEQ.[7] But data reported by the three biggest dioxin polluters into the IPR were calculated on the basis of mandatory measurements done at least once per year according to the Czech legislation. Therefore, it is obvious that a mistake must have been made somewhere in NIP and/or in IPR data.

[g] I-TEQ = international toxic equivalent, to which the measured absolute values of concentrations of 17 toxic dioxin congeners in the environment are converted.

Table No. 5. The order of plants according to the amount of dioxins (PCDD/Fs) in the total releases (emissions to air, water and soil) and transfers (wastes and waste waters handed over out of the plant), according to the data published in the Integrated Pollution Register concerning the year 2004 (http://www.irz.cz).

Order	Organisation/company and Plant location	Type of source	Amount (g-I-TEQ)
1.	TŘINECKÉ ŽELEZÁRNY, a.s.; Třinec	Steel industry and metal works	240.0
2	ŽDB, a.s., Bohumín	Metal works	190.0
3.	VYSOKÉ PECE Ostrava, a.s.	Steel industry	52.0
4.	Elektrárny Opatovice, a.s.; Power plant Opatovice	Power plant burning brown coal	27.1
5.	KOVOHUTĚ MNÍŠEK, a.s., Mníšek pod Brdy	Non-ferrous metal works, foundry	27.0
6.	Slezský kámen, a.s.; Foundry Písečná	Foundry	23.0
7.	Teplárny Brno, a.s.; Facility Brno-sever, Brno, Obřanská	Heat and power plant	10.4
8.	Mittal Steel Ostrava a.s.	Steel industry and metal works	10.0
9.	Pražské služby, a.s.; Waste Incinerator Malešice	Municipal waste incinerator	8.0
10.	TOS-MET, spol. s r.o., Čelákovice	Iron foundry	4.2

A mistake was made in setting too high a reporting threshold for dioxins (1 g I-TEQ per year). In the United Kingdom, the reporting threshold for dioxins is a hundred times lower. If the same threshold were introduced in the Czech Republic, the data in the IPR would provide a better overview of the producers of these substances. The number of plants that reported dioxins in releases and transfers corresponds to the present level of reporting thresholds, and also to the level of supervision of the duty to measure dioxins in wastes performed by the state administration - this number is only 20. After criticism on the internet pages of Arnika[h], the absurd number of 6.7 kg I-TEQ[i] of dioxins in emissions to air reported by Válcovny plechu, a. s. Frýdek-Místek disappeared from the IPR. Therefore we do not list this company and its figures.

Polychlorinated biphenyls in releases to air

Polychlorinated biphenyls (PCBs) in emissions to air were reported by only 7 plants. Their order is given in Table No. 6. Unfortunately, from the data published on the internet it is not possible to ascertain whether the given data are in absolute values or converted to g WHO-TEQ. All data, with the exception of the company on the 5th place in the table, were calculated on the basis of a single measurement. In any case, the power plant burning brown coal as the highest emitter gives the impression that it was a mistaken calculation or measurement. However, it is also not possible to exclude the possibility that the power plant was incinerating wastes illegally at the time of the measurement. This should be verified by the Ministry of the Environment of the Czech Republic. Metallurgical plants are on the next two places with high PCB emissions, as is the plant in seventh place. A chemical plant was in fourth place and heating plants were in fifth and sixth places. The generally low number of reports of PCB releases to air shows that the reporting

[h] News item dated September 30, 2005

[i] Overall estimated dioxin air emissions for whole Czech Republic are less than two hundreds of grams I-TEQ!

threshold (0.1 kg) was wrongly set. A much more suitable threshold for releases to air would be 0.1 g WHO-TEQ as it is set for unintentional dioxin releases in the UK register for example.

Table No. 6. The order of plants according to the amount of **polychlorinated biphenyls (PCBs)** in releases to air, according to the data published in the Integrated Pollution Register, concerning the year 2004 (http://www.irz.cz).

Order	Organisation/company and Plant location	Type of source	Amount (g)
1.	Elektrárny Opatovice, a.s.; Power plant Opatovice	Power plant burning brown coal	2,810.0
2	VÁLCOVNY PLECHU, a. s., teplárna, Frýdek - Místek	Metal works	378.0
3.	Mittal Steel Ostrava a.s.	Steel industry and metal works	130.0
4.	ALIACHEM, a.s.; o.z; SYNTHESIA, Pardubice	Chemical industry	100.0
5.	Ostrovská teplárenská, a.s.; Heat and power plant Ostrov	Heat and power plant	0.245
6.	Plzeňská teplárenská, a.s.	Heat and power plant	0.0173
7.	KOVOBRASIV Mníšek, spol. s r.o., Mníšek pod Brdy	Production of air-blast material	0.000259

Polycyclic aromatic hydrocarbons

Polycyclic aromatic hydrocarbons (PAU) in releases and transfers were reported by a total of 24 plants throughout the Czech Republic. From this number, 10 plants reported emissions to air, 1 plant emissions to water, no plant submitted emissions to soil, 2 plants transfers in waste waters, and 15 plants transfers in wastes. This generally reflects the setting of too high a reporting threshold. In the United Kingdom, the thresholds are by one to two orders of magnitude lower. The first three places in Table No. 7 reflect only PAH amounts in wastes (none of these three companies reported PAHs in emissions to air). Důl Darkov got to fifth place due to high PAH amounts in waste waters handed over out of the plant.

Table No. 7. The order of plants according to the amount of polycyclic aromatic hydrocarbons (PAHs) in the total releases (emissions to air, water and soil) and transfers (wastes and waste waters handed over out of the plant), according to the data published in the Integrated Pollution Register, concerning the year 2004 (http://www.irz.cz).

Order	**Organisation/company and Plant location**	**Type of source**	**Amount (kg)**
1.	ŽDB, a.s., Bohumín	Metal works	482,138.0
2	ČEZ, a. s.; Power plants Prunéřov	Power plants burning brown coal	4,275.0
3.	Vítkovice Steel,a.s., Ostrava	Steel industry	2,120.9
4.	TŘINECKÉ ŽELEZÁRNY, a.s.; Třinec	Steel industry and metal works - steel	1,926.2
5.	OKD, a. s., člen koncernu KARBON INVEST, a.s.; Mine Darkov	Mining industry, pit-coal	1,045.0
6.	OKD, OKK, a.s.; Coke plant Jan Šverma, Ostrava	Coke plant	1,002.3
7.	VYSOKÉ PECE Ostrava, a.s.	Steel industry, iron working and steel making.	781.0
8.	Mittal Steel Ostrava, a.s.	Steel industry and metal works	716.6
9.	RESON, spol. s r.o., Němčice nad Hanou	Hazardous waste landfill	411.1
10.	Jihomoravská armaturka spol.s r.o., Hodonín	Production of armour	369.0

Comments to information in Table No. 8 below: Positions from the seventh place in the list of top-ten PAH releases must be taken with a pinch of salt because the reporting threshold for PAHs released to air is 50 kg. This is, naturally, a very high threshold in view of the fact that this group of substances ranks among persistent organic pollutants. Only in the case of Koksovna Jan Šverma in Ostrava, is the position not distorted by this threshold, because, in the case of this plant, PAHs emissions to water are concerned with the emission threshold of 5 kg.

Table No. 8. The order of plants according to the amount of polycyclic aromatic hydrocarbons (PAHs) in the total releases (emissions to air, water and soil), according to the data published in the Integrated Pollution Register, concerning the year 2004 (http://www.irz.cz). The order was influenced, in particular, by emissions to air.

Order	Organisation/company and Plant location	Type of source	Amount (kg)
1.	TŘINECKÉ ŽELEZÁRNY, a.s.; Třinec	Steel industry and metal works	1,575,10
2	OKD, a. s., člen koncernu KARBON INVEST, a.s.; Mine Darkov	Coke plant	1,045.00
3.	VYSOKÉ PECE Ostrava, a.s.	Steel industry, iron working and steel making a.s.	781.00
4.	Mittal Steel Ostrava a.s.	Steel industry, smelting and engineering industry	641.28
5.	Jihomoravská armaturka spol.s r.o., Hodonín	Production of armour	369.00
6.	ECK Generating, s.r.o.; ELEKTRÁRNA Kladno	Power plant	57.89
7.	Plzeňská teplárenská, a.s.; Central heating facility, Plzeň	Heat and power plant,	45.50
8.	OKD, OKK, a.s.; Coke plant Jan Šverma, Ostrava	Coke plant	15.70
9.	Ostrovská teplárenská, a.s.	Heat and power plant	0.21
10.	KOVOBRASIV Mníšek, spol. s r.o., Mníšek pod Brdy	Production of air-blast stuff	0.18

Mercury and its compounds

In view of the fact that the organic form of mercury is sometimes ranked among persistent organic pollutants, we have included it in our analysis. Mercury in releases and transfers was reported by a total of 86 plants. On the basis of their data published in the IPR, we have drawn up the order of plants concerning the sum of releases and transfers of mercury (Table No. 9), and concerning emissions to air, water and soil (Table No. 10).

The order of the top emitters in Table No. 9 was significantly influenced by mercury amounts in wastes transferred from the plant. However, the reality is distorted in the case of companies which have their own hazardous wastes landfill within a plant and where wastes containing mercury can be deposited. The IPR does not include these on site transfers, despite the fact they influence the environment in the same way as transfers out of the plant. Because of that, we do not know, for example, what amount of mercury is contained in wastes produced by Spolana, a. s. Neratovice.

Table No. 9. The order of plants according to the amount of mercury and its compounds in the total releases (emissions to air, water and soil) and transfers (wastes and waste waters handed over out of the plant), according to the data published in the Integrated Pollution Register, concerning the year 2004 (http://www.irz.cz).

Order	Organisation/company and Plant location	Type of source	Amount (kg)
1.	Spolek pro chemickou a hutní výrobu, a. s., Ústí nad Labem	Chemical industry	2,200.2
2	Českomoravské doly, a.s., member of the syndicate KARBON INVEST, a.s.; Mine ČSM	Production of pit-coal	1,446.0
3.	SPOVO, s.r.o.; Ostrava	Industrial Waste Incinerator,	910.0
4.	Mittal Steel Ostrava a.s.	Smelting and engineering industry	669.6
5.	DEZA, a.s. závod Valašské Meziříčí	Chemical industry	639.4
6.	ALIACHEM, a.s.; o.z. SYNTHESIA, Pardubice	Chemical industry	479.8
7.	CHEMOPETROL, a.s., Litvínov	Petrochemical industry	279.8
8.	ČEZ, a. s.; Elektrárny Prunéřov	Power plant	271.0
9.	Heat and power plant Ústí nad Labem, a.s.	Heat and power plant	205.0
10.	VYSOKÉ PECE Ostrava, a.s.	Iron working and steel making	193.0

Table No. 10. The order of plants according to the amount of mercury and its compounds in the total releases (emissions to air, water and soil), according to the data published in the Integrated Pollution Register, concerning the year 2004 (http://www.irz.cz). The order was influenced, in particular, by emissions to air. If we compared mercury emissions to air only the order of plants would remain the same.

Order	Organisation/company and Plant location	Type of source	Amount (kg)
1.	Mittal Steel Ostrava a.s.	Steel industry, smelting and engineering industry	669.6
2	CHEMOPETROL, a.s., Litvínov	Petrochemical industry	279.8
3.	VYSOKÉ PECE Ostrava, a.s.	Steel industry, iron working and steel making	193.0
4.	SPOLANA Neratovice	Chlor-alkali plant, PVC production	161.6
5.	ČEZ, a. s.; Power plants Prunéřov	Power plant burning brown coal	160.0
6.	ČEZ, a. s.; Power plant Chvaletice	Power plant burning brown coal	123.0
7.	United Energy, a.s.; PJ Komořany	Heat and power plant burning brown coal	119.0
8.	Příbramská teplárenská, a.s.; Příbramská teplárenská a.s. - CZT, Příbram	Heat and power plant	115.0
9.	Nejdecká comb wool plant, a.s.; Nejdek	Comb wool plant,	108.0
10.	Heat and power plant Ústí nad Labem, a.s. Trmice	Heat and power plant	107.0

Picture 4: River Bílina is highly polluted by POPs because it passes Spolek pro chemickou a hutní výrobu, a. s. Ústí nad Labem.

The order in Table No. 10 is essentially the order of plants according to the amount of mercury released to air, with the exception of Spolana, a. s. Neratovice and Elektrárny Prunéřov. Spolana got to a high position due to higher mercury emissions to water (7.7 kg).

Brief conclusion

In total, 53 plants reported Stockholm Convention POPs emissions (i.e., without PAHs and HCH) into the Register. Data on this group of substances in the Integrated Pollution Register concerning the year 2004 reflect the generally high reporting thresholds, and the insufficient pressure of the state administration authorities on the companies to monitor these substances. This conclusion is valid also for the evaluation of some other substances that have not been incorporated into our tables, but which, according to their properties, are classified as POPs: Lindane, hexachlorobutadiene (HCBD), polybrominated diphenylethers (PBDEs), organic tin compounds, short chain chlorinated paraffins (SCCPs) and pentachlorophenol (PCP). Data in the IPR concerning 2004 are present only for hexachlorobutadiene from two plants. Some of POPs are not even included in IPR: chlordecone, hexabromobiphenyl (HBB), perfluorooctane sulfonate (PFOS) and others.

Undoubtedly, the Integrated Pollution Register (IPR), as presented on internet pages http://www.irz.cz, is a breakthrough in informing the public on releases and transfers of chemical substances hazardous to the environment and human health. The simple fact that the Register exists is progress in comparison with the situation before September 30, 2005. On the other hand, it is not possible to neglect its defects as a result of pressure from the industrial lobby, the Ministry of Industry and Trade, and the Ministry of Agriculture at the time of its creation.

In this brief analysis we have tried to bring attention to several defects in the present IPR, and to draw up rankings of the biggest polluters concerning four groups of substances and several selected chemical substances. Our brief analysis shows the need to amend the IPR in order to:

1) Include transfers inside the plants (in foreign registers called "on site transfers");
2) Contain data on inputs of substances which would help the public to understand certain high amounts of hazardous substances in outputs from the plants;
3) In the internet presentation, distinguish amounts of substances in liquidised wastes from the amount in wastes handed over to further use;
4) Require reporting thresholds that better reflect the situation in releases and transfers of the individual substances in the Czech Republic (for example in the way that at least 2/3rds of the monitored chemicals in emissions, wastes and waste waters, were reported into the IPR);
5) Cover a larger scope of substances hazardous to human health and the environment.

In addition to this our analysis documents examples of the failures in monitoring the duty of reporting, or of obligations to monitor certain hazardous substances from the state administration authorities. Specifically this is documented by the following facts:

a) Complete absence of data on accidental releases, caused by interpretation of the Government Order No. 368/2003 Coll. by the Ministry of the Environment of the Czech Republic[8];
b) Enforcement of the obligation to measure persistent organic pollutants in wastes, as required under the Regulation of the European Parliament and of the Council No. 850/2004/EC on

POPs, and, because of that, low number of reports containing data on POPs in wastes and waste waters;

c) Gaps in comparison of data from the IPR with emission inventories of certain substances (in our analysis, this is documented in the example of dioxin emissions).

From the point of view of utilisation of the IPR to meet the requirements of the Stockholm Convention, and for checking the compliance with the National Implementation Plan, it is very important to:

1) Include all substances subject to the Stockholm Convention into the IPR; and, further,
2) Include substances that are being evaluated by the POPs Review Committee into it; and
3) Introduce lower reporting threshold for all POPs.

The drawn up rankings showed high amounts of POPs released into the environment by metallurgical plants, chemical plants, power production plants and waste incinerators. The most important problems include high amounts of hexachlorobenzene and hexachlorobutadiene in wastes and waste waters from Spolek pro chemickou a hutní výrobu in Ústí nad Labem.

In spite of a number of defects, we believe that the IPR has proved its worth as a useful tool in monitoring of compliance with the objectives of the Stockholm Convention.

Prague, March 9, 2006

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Annex 1: Table of reported substances and reporting thresholds, as contained in the Government Order No. 36/2003 Coll.

No.	CAS	Chemical compound	emission thresholds			transfer thresholds (kg/year)
			air (kg/year)	water (kg/year)	soil (kg/year)	
1	74-82-8	methane (CH_4)	100 000	-	-	-
2	630-08-0	carbon monoxide (CO)	500 000	-	-	-
3	124-38-9	carbon dioxide (CO_2)	100 000 000	-	-	-
4		fluorinated hydrocarbons (HFC)	100	-	-	-
5	10024-97-2	nitrogen monoxide (N_2O)	10 000	-	-	-
6	7664-41-7	ammonia (NH_3)	10 000	-	-	-
7		non-methane volatile organic compounds (NMVOC)	100 000	-	-	-
8		nitrogen oxides (NO_x/NO_2)	100 000	-	-	-
9		perfluorinated hydrocarbons (PFC)	100	-	-	-
10	2551-62-4	sulphur fluoride (SF_6)	50	-	-	-
11		sulphur oxides (SO_x/SO_2)	150 000	-	-	-
12		total nitrogen	-	50 000	50 000	50 000
13		total phosphor	-	5 000	5 000	5 000

Annex 1 Continued

14	7440-38-2	arsenic and its compounds (expressed as As)	20	5	5	50
15	7440-43-9	cadmium and its compounds (expressed as Cd)	10	5	5	5
16	7440-47-3	chromium and its compounds (expressed as Cr)	100	50	50	200
17	7440-50-8	copper and its compounds (expressed as Cu)	100	50	50	500
18	7439-97-6	mercury and its compounds (expressed as Hg)	10	1	1	5
19	7440-02-0	nickel and its compounds (expressed as Ni)	50	20	20	500
20	7439-92-1	lead and its compounds (expressed as Pb)	200	20	20	50
21	7440-66-6	zinc and its compounds (expressed as Zn)	200	100	100	1 000
22	85535-84-8	chlorinated alkanes (C10-13) - SCCPs	-	1	1	10
23	107-06-2	1,2-dichloroethane (DCE)	1 000	10	10	100
24	75-09-2	dichloromethane (DCM)	1 000	10	10	100
25		halogenated organic compounds (as AOX)	-	1 000	1 000	1 000
26	118-74-1	hexachlorobenzene (HCB)	10	1	1	1
27	87-68-3	hexachlorobutadiene (HCBD)	-	1	1	5
28	608-73-1	1,2,3,4,5,6-hexachlorocyclohexane (HCH)	10	1	1	1
29		PCDD +PCDF (polychlorinated dibenzo-p-dioxins + dibenzofurans) (in TEQ)	0,001	-	0,001	0.001
30	87-86-5	pentachlorophenol (PCP)	10	-	1	5
31	127-18-4	tetrachloroethylene (PER)	2 000	-	-	1 000
32	56-23-5	tetrachloromethane (TCM)	100	-	-	1 000
33	12002-48-1	trichlorobenzenes (TCBs)	10	-	-	1 000
34	71-55-6	1,1,1-trichloroethane	100	-	-	1 000
35	79-01-6	trichloroethylene	2 000	-	-	1 000
36	67-66-3	trichloromethane	500	-	-	1 000
37		polybrominated diphenylethers (PBDE)	-	1	1	5
38		organotins (expressed as total Sn)	-	50	50	50
39	108-95-2	phenols (as total C)	-	20	20	200
40		polycyclic aromatic hydrocarbons (PAHs)[b/]	50	5	5	50
41		total carbon (TOC) (as total C or COD/3)	-	50 000	-	-
42		chlorides (as total Cl)	-	2 000 000	2 000 000	2 000 000

Annex 1 Continued

43		chlorine and its inorganic compounds (as HCl)	10 000	-	-	-
44		cyanides (as total CN)	-	50	50	500
45		fluorides (as total F)	-	2 000	2 000	10 000
46		fluorine and its inorganic compounds (as HF)	5 000	-	-	-
47	74-90-8	hydrogen cyanide (HCN)	200	-	-	-
48		particle matters (PM_{10})	50 000	-	-	-
49	71-43-2	benzene	1 000	200 (as BTEX) a/	200 (as BTEX) a/	2 000 (as BTEX) a/
50	108-88-3	toluene	-	200 (as BTEX) a/	200 (as BTEX) a/	2 000 (as BTEX) a/
51	100-41-4	ethyl benzene	-	200 (as BTEX) a/	200 (as BTEX) a/	2 000 (as BTEX) a/
52	1330-20-7	xylenes	-	200 (as BTEX) a/	200 (as BTEX) a/	2 000 (as BTEX) a/
53	1336-36-3	polychlorinated biphenyls (PCB)	0,1	0,1	0,1	1
54	79-34-5	1,1,2,2-tetrachloroethane	50	-	-	1 000
55	1332-21-4	asbestos	1	1	1	10
56	75-01-4	vinyl chloride	1 000	10	10	100
57	75-21-8	ethylene oxide	1 000	10	10	100
58	91-20-3	naphthalene	100	10	10	100
59	309-00-2	aldrin	1	1	1	1
60	72-20-8	endrin	1	1	1	1
61	50-29-3	DDT	1	1	1	1
62	60-57-1	dieldrin	1	1	1	1
63	100-42-5	styrene	100	-	-	10 000
64	50-00-0	formaldehyde	50	-	-	10 000
65	76-44-8	heptachlor	1	1	1	1
66	608-93-5	pentachlorobenzene	1	1	1	5
67		hydrogenchlorofluorocarbons (HCFC)	1	-	-	100
68		chlorofluorocarbons (CFC)	1	-	-	100
69		halons	1	-	-	100
70	120-12-7	anthracene	50	1	1	50
71	117-81-7	di-(2-ethyl hexyl) phthalate (DEHP)	10	1	1	100
72	58-89-9	Lindane	1	1	1	1

Explanatory notes:
CAS number of the pollutant according to the Chemical Abstracts Service.; Dash (-) designates that the given parameter does not cause the duty of reporting; TEQ - toxic equivalent expressed in equivalents of toxicity of 2,3,7,8 – tetrachlorodibenzodioxin (TCDD)
Notes: a/ The individual pollutants should be reported in the case that the threshold value for BTEX (summary parameter for benzene, toluene, ethyl benzene, and xylene) is exceeded. b/ Polycyclic aromatic hydrocarbons (PAHs) are measured as benzo(a)pyrene (50-32-8), benzo(b)fluoranthene (205-99-2), benzo(k)fluoranthene (207-08-9), indeno(1,2,3-cd)pyrene (193-39-5) (derived from the Protocol on

Persistent Organic Pollutants to the Convention on Long-Range Transboundary Air Pollution). c/ As inorganic compounds

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