ICELAND

National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

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Contents

Executive Summary

Persistent Organic Pollutants (POPs) are substances that pose threat to human health and the environment by possessing toxic characteristics and being bioaccumulative. Their persistence and proneness to long-range transport and deposition have made the substances ubiquitous in the environment, resulting in significant quantities in wildlife even in areas such as the Arctic, far from the sources of the contamination. Owing to the transboundary transport of POPs, a global effort is needed in order to deal with the problem by agreeing on minimizing or eliminating the releases of POPs to the environment.

Iceland ratified the Stockholm Convention 29 May 2002 and the Convention entered into force 17 May 2004. The Convention obliges Parties to reduce or eliminate releases of POPs, both substances that are intentionally used, Annex A and B substances i.e. aldrin, chlordane, dieldrin, endrin, DDT and PCBs, and substances that are released unintentionally Annex C substances, i.e. dioxins and dibenzofurans, and PCBs. See www.pops.int.

Each Party to the Stockholm Convention shall develop and transmit to the Conference of the Parties an implementation plan for meeting its obligations under the Convention. An action plan shall be developed and implemented as part of the implementation plan for reduction or elimination of releases from unintentional production.

Legislation

New chemicals Act No. 61 was implemented in 2013, which among other things implemented the substitution principle. Iceland has implemented the European legislation on POP´s, REACH, CLP and other major chemical legislations.

Regulation set in 1996 imposed a ban on the import and uses of all nine pesticides listed under the Convention with the exception of mirex, banned in 1998. Production of the pesticides or PCBs has never occurred in the country. Import and uses of PCBs and equipment containing PCBs were banned by regulation in 1988, and disposal and cleaning of PCB containing equipment had to be completed before the end of 2010.

Operating permits are required for installations that may cause pollution. Application of best available techniques (BAT) is demanded in sectors where the techniques have been described and emission limits should be set. Emission limits values for dioxins and dibenzofurans from waste incineration have been set by regulation.

Iceland already meets its obligations under Convention to take measures by passing acts and setting regulations to reduce or eliminate releases of the listed chemicals.

Status

Research and monitoring show that POPs are widespread in the marine environment and that POPs accumulate in top predators. While concentrations of POPs in Arctic charr and sediments from the greatest lake in Iceland are at or close to their analytical detection limits and the levels are low in residential terrestrial and fresh water birds, POPs are more concentrated in seabirds and levels are high in the Icelandic gyrfalcon. Measurement of POPs in edible muscle part of marine fish from Icelandic waters show that levels are well below limits set for consumption. Presence of the POP pesticides in the Icelandic environment is a result of long-range transportation since historical local uses of the substances are negligible. Emissions of PCDD/PCDF have decreased substantially since 1990, owing largely to decreased emissions from waste

incineration. Efforts to phase-out uses of PCB containing transformers began in the 1980s. A check is made of PCBs in remaining equipment when removed from use.

Actions

Since the last implementation plan was published, improvements have been made in many areas. A new chemical legislation was implemented in 2013, the chemicals Act No. 61/2013. Measurements of dioxin and furan from older existing waste incineration plants were done in 2007 and showed that pollution was higher than to be expected and in 2012 regulations were changed in a way that they needed to be shut down. In all, five waste incineration plants were closed in 2010 – 2013. A project aimed at identifying contaminated sites has been completed[1]. Iceland participated in a Nordic screening project for PFOS and PFOA[2]. Regulation (EC) No. 850/2004 on Persistent Organic Pollutants and amending Directive 79/117/EEC, was transposed into Icelandic legislation with regulation No. 954/2013.

Actions set out in this implementation plan are to set the legal basis for a new regulation on contaminated soil. Construction of a landfill for contaminated soil and certain hazardous wastes will enable improved local management of these wastes. Mapping of contaminated sites, that are the results of a 2005 project mentioned above, will be made publicly available at the Environmental Agency´s website. MATÍS is also participating in an European project; Industrially Contaminated Sites and Health Network 2015-2019.

1 Introduction

This implementation plan was prepared by the Environment Agency of Iceland in cooperation with the Ministry for the Environment and Natural Resources. The elements recommended in the UNEP interim guidance for developing a national implementation plan were used as a structure for the plan. After the executive summary and introduction the document is thus divided into the following two main sections:

Section 2, with information about geography, government and economy, policy and legislation, approaches and management procedures. The section also provides an assessment of the POPs issue in Iceland.

Section 3, which contains the strategy and action plan elements of the implementation plan. References are listed as footnotes and abbreviations and acronyms are listed after

[1] Report on Soil Protection and Remediation of Contaminated Sites in Iceland www.ust.is

[2] http://nordicscreening.org/index.php?module=Pagesetter&func=viewpub&tid=5&pid=5.

2 Country baseline

2.1 Country profile

2.1.1 Geography and population

Iceland is located in the North Atlantic between Norway, Scotland and Greenland. It is the second-largest island in Europe and the third largest in the Atlantic Ocean, with a land area of some 103 thousand square kilometers, a coastline of 4,970 kilometers and a 200-nautical-mile exclusive economic zone extending over 758 thousand square kilometers in the surrounding waters.

Iceland is situated just south of the Arctic Circle but enjoys a warmer climate than its northerly location would indicate because a part of the Gulf Stream flows around the southern and western coasts of the country. Relatively mild winters and cool summers characterize Iceland's oceanic climate. The average monthly temperature varies from -3 to +3 °C in January and from +8 to +15 °C in July. Storms and rain are frequent, with annual precipitation ranging from 400 to 4000 mm on average annually, depending on location.

Geologically, the country is very young and bears many signs of still being in the making. Iceland is mostly mountainous and of volcanic origin. Glaciers are a distinctive feature of Iceland, covering about 11% of the total land area. The largest glacier, also the largest in Europe, is Vatnajökull in Southeast Iceland with an area of 8,100 km^2. Glacial erosion has played an important part in giving the valleys their present shape, and in some areas, the landscape possesses alpine characteristics. Regular monitoring has shown that all glaciers in Iceland are presently receding. Rivers and lakes are numerous in Iceland, covering about 6% of the total land area. Freshwater supplies are abundant, but the rivers flowing from the highlands to the sea also provide major potential for hydropower development. Geothermal energy is another domestic source of energy.

The population of Iceland is close to 330 000 inhabitants. The country is the most sparsely populated in Europe with a population density of three inhabitants per square kilometer. Sixty three percent[3] of the nation lives in the capital, Reykjavik, and surrounding areas. In 1990 this same ratio was 57%, demonstrating higher population growth in the capital area than in smaller communities and rural areas. Almost four-fifths of the country is uninhabited and mostly uninhabitable, the population therefore being concentrated in a narrow coastal belt, valleys and the southwest corner of the country.

Iceland has access to rich marine resources in the country's 758,000-km^2 exclusive economic zone. The abundance of marine plants and animals results from the influence of the Gulf Stream and the mixing of the warmer waters of the Atlantic with cold Arctic waters. Approximately 270 fish species have been found within the Icelandic 200-mile exclusive economic zone; about 150 of these are known to spawn in the area.

2.1.2 Political and economic profile

Iceland has a written constitution and is a parliamentary democracy. A president is elected by direct popular vote for a term of four years, with no term limit. Most executive power, however, rests with the Government, which must have majority support of Althingi, the Parliament. Althingi has 63 members, and parliamentary elections are held every four years. The government is headed by a prime minister, and the executive branch is currently divided among 8 ministers. Judicial power lies with the

[3] Statistics Iceland, November 2015, http://www.statice.is/

Supreme Court and the district courts, and the judiciary is independent. The country is divided into 74 municipalities, and local authorities are elected every four years. The largest municipality is the capital, Reykjavík, with approximately 122,000 inhabitants, but the greater capital area has over 211.000 inhabitants in 6 municipalities. The tasks of local authorities have grown increasingly complex in recent years. The local authorities have their own sources of revenue and budgets and are responsible for various important areas. This includes physical planning, granting industry licenses, environmental and food inspection and the design and operation of public transport. Municipalities also play an important role in education.

Iceland is endowed with abundant natural resources. These include the fishing grounds around the island, within and outside the country's 200-mile exclusive economic zone. Furthermore, Iceland has abundant hydroelectric and geothermal energy resources. Policies of market liberalization, fiscal consolidation, privatization and other structural reforms were implemented in the late 1980s and 1990s, including membership of the European Economic Area by which Iceland was integrated into the internal market of the European Union. Tourism's share of foreign exchange earnings has grown from 18.8% to 27.9% between 2010–2014 according to measurements on the export of goods and services. In 2014 tourism was the largest single sector in foreign exchange income, larger than the fisheries industry ore aluminium production.

There are large-scale enterprises in the aluminum and power intensive sector, with a total production capacity of aluminum smelters of 850,000 tons per year, with 840,975 tons being produced in 2013, up from 270,000 in 2005 and 90 thousand in 1995. Relative to the size of the Icelandic economy these investment projects are very large. The Icelandic economy is the smallest within the OECD, reflecting the small population size, generating GDP of ($ 17.07) billion[4] in 2014. GNI per capita measured in terms of Purchasing Power Parities amounted to 42.5 thousand USD[5] in 2014.

2.1.3 Profiles of economic sectors

The basic sectors of the economy are private and public services accounting for 67% of the Gross Domestic Product (GDP) and employing 72% of the workforce. In 2013 there was a reduction in agriculture, fishing and construction from 17% of GDP in 2002 to 14.9% in 2013. Meanwhile other industrys growing from 16.8% in 2002 to 19.3% of GDP in 2013. The service sector increasing from 66.3% of GDP in 2002 to 67.9% of GDP in 2013.

Tourism is a fast growing sector of the economy. In 2010 it represented 6% of the GDP. Exports play a significant role in the economy. In 2012 the exports were 59% of GDP. Exports are mainly based on fisheries products and the primary metals industries constituting over 95% of the export value.[6]

2.1.4 Environmental overview

Environmental burdens associated with local releases of POPs in Iceland are small owing to the low population density, lack of major industrial sources and limited agriculture. Cold climate is characteristic for the subarctic location of the country with unstable weather and a growing season limited to 3-4 months. Agriculture has therefore mainly been based on growing grass for animals to produce meat and dairy products, requiring little use of pesticides due to low pest and disease pressure. No local uses are known for five of the pesticides listed in annex A. Other pesticides, except DDT, were not

[4] http://www.tradingeconomics.com/iceland/gdp

[5] http://www.tradingeconomics.com/iceland/gni-per-capita-ppp-us-dollar-wb-data.html

[6] Statistics Iceland, November 2015, http://www.statice.is/

used after 1970. Uses of DDT after 1975 were limited to treatment of horses and the substance was banned in 1996.

POPs chemicals have never been produced in Iceland. Potential local releases of PCBs therefore stem from uses of the substances that have mainly been in electric equipment. Main local sources of dioxins and dibenzofurans in the past were uncontrolled open burning of waste, which was widely practiced before 1995.

Meteorological conditions favor westerly winds over the North Atlantic. Easterly winds carrying air masses from Europe are considerably less frequent (2). Therefore, the main origins of POPs deposited in Iceland as a result of long-range air transport are likely to be the North American Continent[7]. Dominant POPs contaminants in fish muscle from Icelandic waters are PCBs, DDT and toxaphene. The presence of toxaphene illustrates the importance of the long-range transport to the area[8].

The main concerns regarding POPs i.e. human exposure, sensitive animal species and use of natural resources are all linked to the contamination levels in marine biota. Monitoring shows that POPs levels in edible parts of fish catches from Icelandic waters are well within the limits set for consumption[9].

2.2 Institutional, policy and regulatory framework

2.2.1 Environmental policy, sustainable development policy and general legislative framework

A first comprehensive environmental policy, Towards Sustainable Development, was prepared in Iceland in 1993, largely based on decisions made at the UN Conference on Environment and Development in Rio de Janeiro in 1992. The strategy was followed by an implementation plan in 1996. Current strategy, Welfare for the Future, Iceland's National Strategy for Sustainable Development 2002 - 2020, is a general framework for policies set by authorities relating to sustainable development[10]. Main purposes with the Strategy are to set long-term goals, set priorities for the near future and to define and develop criteria to measure progress. Regular updates of the Strategy contain goals for shorter time-frames, the most recent with main goals for 2010 – 2013[11].

Main drivers for the rapid development of environmental legislation in Iceland since 1990 have been the establishment of the Ministry for the Environment that year, international agreements and participation in the European Economic Area. The environmental legislation has undergone major changes since the foundation of the Ministry for the Environment in 1990, which became the Ministry for the Environment and Natural Resources in 2013. Main environmental principles are embedded in the legislation where they act as framework. Examples are the precautionary principle, the polluter pays principle and environmental impact assessment as a national instrument. Economic incentives have been used to a certain extent in Iceland, for instance with the levy of a fee on hazardous waste and a deposit fee on disposable beverage containers. Acts set by the Parliament allow for certain latitude for the Executive to issue regulations for policy setting and implementation. With the membership of the European Economic

[7] Jörundsdóttir et al. 2009. Assessment of emerging and traditional halogenated contaminants in Guillemot (*Uria aalge*) egg from North Western Europe and the Baltic Sea, Science of the Total Environment 407(2009) p. 4174-4183.

[8] Sturludóttir et. al. Temporal trends of contaminans in cod from Icelandic waters. Science of the Total Environment 476- 477(2014) p. 181 - 188.

[9] Sturludóttir et. al. Spatial and temporal trends of contaminants in mussel sampled around the Icelandic coastline Science of the Total Environment 454-455(2013) p. 500-509.

[10] https://www.umhverfisraduneyti.is/media/PDF_skrar/Velferd_til_framtidar_2002.pdf

[11] https://www.umhverfisraduneyti.is/media/PDF_skrar/Velferd-til-framtidar-2010-2013.pdf

Area, Iceland is committed to introduce the European legislation in the fields of pollution prevention and chemicals.

The main objectives for the goal of an environment free of hazardous materials, set forth in the National Strategy for Sustainable Development are:

- The use of chemicals and chemical products should not threaten the environment or human health
- Consumers should have access to conclusive information on how to utilize products with chemicals, and information on potential hazards that may arise from chemicals in the product.
- The use of biocides and pesticides should be decreased
- The disposal of materials hazardous to health and the environment should be limited as much as possible, and cease completely within 25 years.

2.2.2 Roles and responsibilities of ministries, agencies and other governmental institutions

The Ministry for the Environment and Natural Resources is responsible for the implementation of the Stockholm Convention and coordinated national policymaking in cooperation with the Ministry of Industries and Innovations (agriculture, fisheries, industry and commerce), Ministry of the Interior (transport and communications), Ministry of Foreign Affairs and the Prime Minister's Office. The Environment Agency of Iceland prepared the national implementation plan in cooperation with the Ministry for the Environment and Natural Resources.

Operating permits for installations that may cause pollution, i.e. industries and waste operators, are issued by the Environment Agency and by local municipal environment authorities depending on the type and size of the operation. These authorities are also responsible for inspections and ensuring that relevant monitoring is carried out.

Monitoring programs receive funding through the Ministry for the Environment and Natural Resources. The Environment Agency administers funding of the different monitoring programs.

Governmental funding for monitoring the occurrence of POPs in humans and the environment is channeled to different projects by the Ministry for the Environment and Natural Resources through the Environment Agency.

The Administration of Occupational Safety and Health in Iceland under the Ministry of Welfare is responsible for enforcing the legislation regarding workers safety.

2.2.3 Relevant international commitments and obligations

Iceland is a party to the Basel Convention on the Control of Transboundary Movement of Hazardous Waste and Their Disposal and has ratified the POPs protocol of the Convention on Lang-Range Transboundary Air Pollution (CLRTAP).

Iceland is a member of the OECD and EFTA. Since 1994, the Agreement on the European Economic Area (EEA) has been in force between the European Union and Iceland, Norway and Liechtenstein. With the EEA agreement most of the environmental legislation of the three EFTA countries is harmonized with that of the member states of the European Union.

Iceland has ratified the Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention). Iceland became a member of the International Maritime Organization (IMO) in 1960 and is a party to the Convention for

the Prevention of Pollution from Ships (MARPOL 73/78, Annexes I, II, III and IV, where Annex VI ratification is expected to be finalized in 2016), the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, the Convention on Civil Liability of Oil Pollution Damage, the Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage and the Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties. Also international Convention of Oil Pollution Preparedness, Response and Co-operation (OPRC), Cooperation on Marine Oil Pollution Preparedness and Response (MOSPA) and Framework Plan for Cooperation on Prevention of Oil Pollution from Petroleum and Maritime Activities in the Marine Areas of the Arctic.

Iceland is a party to the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction. Iceland is also a party to the Copenhagen Agreement, a regional Nordic countries agreement concerning co-operation in measures to deal with pollution of the sea by oil and other harmful substances.

Iceland was one of the founders of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities within the United Nations Environmental Programme. The programme is an intergovernmental programme that addresses the inter-linkages between freshwater and coastal environment.

2.2.4 Description of existing legislation and regulations addressing POPs

Manufactured chemicals

Manufactured chemical substances have to meet the obligation of regulation No. 888/2015 which transposes regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). Legal basis is in the Chemicals Act of 2013.

Regulation No. 954/2013 transposes regulation (EC) no. 850/2004 on persistent organic pollution and is based on the Chemicals Act No. 61/2013. It covers the prohibition, phasing out and restriction of the production, placing on the market and use of substances subject to the Stockholm Convention on Persistent Organic Pollutants.

The REACH Regulation No 888/2015, based on the Chemicals Act of 2013 and the Hygiene and Pollution Prevention Act of 1998, covers management of PCBs and preparations of which PCBs are a constituent. Import and uses of PCBs, and equipment containing PCBs, is prohibited. Disposal of PCBs and cleaning of PCB containing equipment shall be completed before the end of 2010.

Admixture of PCBs, PCTs or other hazardous wastes with waste oils is prohibited according to Regulation No 809/1999, on waste oils, based the Act on Hygiene and Pollution Prevention of 1998 and the Act on Pollution Prevention of the Sea and Coastal Areas of 2004. Preparations, including waste oils and hydraulic fluids containing more than 0.005% of PCBs shall be treated as hazardous wastes. Discarded equipment and components removed from discarded equipment containing PCBs are classified as hazardous waste according to Regulation No 184/2002, on a list of hazardous wastes and other wastes, based on the Chemicals Act of 2013 and the Hygiene and Pollution Prevention Act of 1998.

Manufacture, import, sale or use of aldrin, chlordane, dieldrin, endrin, heptachlor, mirex, toxaphene, DDT and HCB and the new POP´s for uses in agriculture and horticulture or for pest control is prohibited according to the REACH Regulation previously banned by Regulation No 857/1999, on prohibition of uses of certain toxic and dangerous substances.

Unintentionally produced POPs

Emission limits should be set and application of best available techniques is required in permits for installations issued in accordance with Regulation No. 785/1999, on operating permits for installations that may cause pollution, the Hygiene and Pollution Prevention Act of 1998, the Act on Pollution Prevention of the Sea and Coastal Areas of 2004 and the Act on Genetically Modified Organisms of 1996. Dioxins and dibenzofurans are listed in the regulation among substances that should preferably be considered for setting emission limits.

Requirements made with respect to composition of wastes and emission limit values for waste incineration are set in Regulation No 739/2003, on incineration of waste, based on the Act of 2003 on Handling of Waste. Air emission limit values for the sum of dioxins and dibenzofurans are 0.1 ng/Nm^3. The regulation was amended in 2012 such that now there are no longer exemptions for existing incineration plants (in operation before December 28th 2003), in fulfilling the air emission limit values stated above.

Regulation No 990/2008, on pollution release registers, based on the Hygiene and Pollution Prevention Act of 1998 Act on Toxic and Hazardous Substances of 1988, requires facilities to report, to the Environment and Food Agency, releases of HCB to air in excess of 10 kg/year and HCB releases to water exceeding 1 kg/year. Facilities are also required to report releases of PCDD/Fs to air in excess of 0.0001 kg /year (TEQ).

Measurements on releases of PCDD/Fs were done in 2007. Of the six operating incineration plants at that time, no set emission value for PCDD/F was in place due to exemptions in legislation. In December 2010, The Icelandic Food and Veterinary Agency measured elevated values of PCDD in milk, produced close to the waste incineration plant at Isafjordur. As a follow up the plant was closed. The Directorate of Health took blood samples, in early 2011, from workers at the plant and other operating plants and from a neighbouring villages. All samples were deemed to be under limit values, with a little elevated values for the workers and close neighbours, with values in the range of 2,7 – 16,2 pg/g fat[12].

The Environment Agency measured PCDD/F in soil samples in the vicinity of then existing waste incineration plants, industrial sites and background sites. No limit values have been set for PCDD/F in soil, but when evaluating the samples, values from Germany were used. Forty four samples had PCDD/F values lower than 5 pg/ g soil and six six samples taken in the vicinity of two of the incineration plants had values in the range 5-40 pg/g soil[13]. In 2012 legislation was amended in such away, that all operating incineration plants, had to comply with emission values set for newer plants of 0,1 ng/m^3. As a result five of the plants closed.

Food safety

Maximum allowed concentrations of pesticides are set in Regulation No 672/2008, implementing Regulation (EC) No. 396/2005 of the Parliament and of the Council No. 396/2005/EU on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC. Maximum allowed concentration of PCB and dioxin are set in Regulation No. 265/2010, implementing Commission Regulation (EC) No. 1881/2006 setting maximum levels for certain contaminants in foodstuffs (section 5). These regulations are based on the Act on Foodstuffs of 1995 and the Act on Chemical Act 61/2013.

[12] http://www.landlaeknir.is/um-embaettid/frettir/frett/item13891/Nidurstodur-dioxinmaelinga-i-folki

[13] http://www.ust.is/umhverfisstofnun/umraedan/grein/2012/03/30/Dioxin-i-jardvegi

Waste and wastewater management

Permits are required for operation of installations for management of hazardous wastes and for transport of hazardous wastes, in accordance with Regulation No 806/1999, on hazardous wastes, based on the Hygiene and Pollution Prevention Act of 1998, and Regulation No. 785/1999, on operating permits for installation that may cause pollution.

Waste acceptance criteria for landfills are set in Regulation No 738/2003, on landfill of waste, based on the Act of 2003 on Handling of Waste. Maximum allowed concentration of PCB_7 in wastes buried in landfills for inert wastes is 1 mg/kg.

Hazardous wastes are listed and criteria set for definition of hazardous wastes in Regulation No 184/2002 on a list of hazardous wastes and other wastes.

Handling and registration of hazardous wastes are prescribed in Regulation No 806/1999 on hazardous wastes, based on the Hygiene and Pollution Prevention Act of 1998.

Provisions of the Basel Convention are in regulation No. 822/2010, on shipment of waste, were brought into force by implementing Regulation of the European Parliament and Council (EC) No. 1013/2006 on the supervision and control of shipments of waste within, into and out of the European Community. Regulation No 822/2010 is based the Hygiene and Pollution Prevention Act of 1998 and Waste Treatment Act of 2003.

Regulation No 798/1999 on wastewater and management of wastewater, based on the Hygiene and Pollution Prevention Act of 1998 and the Act on Pollution Prevention of the Sea and Coastal Areas of 2004, covers collection, cleaning and discharge of wastewater from urban areas and certain activities.

Act on support for development of municipal wastewater management was launched 1995 in order to contribute with financial support from the government to the local authorities to facilitate the development of municipal wastewater discharge systems.

Persistent Organic Pollutants

Regulation (EC) No 850/2004 on Persistent Organic Pollutants and amending Directive 79/117/EEC was implemented with Regulation 954/2013, on persistent organic pollutants. The objective of the Regulation is protection of human health and the environment with regard to substances subject to the Stockholm Convention and the 1998 Protocol to the 1979 convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants.

2.2.5 Key approaches and procedures for POPs chemical and pesticide management including enforcement and monitoring requirements

Approval and registration is required for all pesticides in Iceland. The Environment Agency maintains a registry and issues licenses that are required for import and sale of all pesticides and for import inspection and signing import documents for pesticides. Imports of certain chemicals, including PCBs, are prohibited. Permits are required from the Ministry for the Environment and Natural Resources for import and sale of toxic substances. Pesticides are grouped into four classes based on hazard and risk. Depending on these classes purchase and use of pesticides must be registered or a permit from the local police commissioner is required. Waste pesticides and chemicals exhibiting hazardous characteristics are classified as hazardous waste, which requires appropriate handling and disposal at licensed hazardous waste reception facilities.

Production, import, sale and use of PCBs and pesticides listed in Annexes A and B to the Stockholm Convention are prohibited.

2.3 Assessment of the POPs issue in Iceland

2.3.1 Assessment with respect to research and monitoring data

Air

Persistent organic pollutants, e.g. PCBs, DDT, HCB, HCH isomers, trans-nonachlor, trans and cis chlordane, have been monitored in air and precipitation since 1995 at Stórhöfði in the Vestman Islands off the south coast of Iceland. The measurements, reported as monthly mean concentrations, are made as part of the European Monitoring and Evaluation Program (EMEP) that involves twelve measurement sites in nine countries[14] .

Biota

The upper bound levels of contamination of POPs in edible muscle part of fish, caught in Icelandic waters, are shown in Table 2. Median concentrations and ranges are shown for 12 species of lean fish[15]. Herring and Greenland halibut are shown separately because fish with higher fat content deviate with higher contaminant levels owing to the hydrophobic nature of the POPs.

POPs have been monitored in the Icelandic marine environment since 1991. The activities involve sampling of cod at three stations around Iceland and measurements of POPs in cod livers. The figure shows the median values of wet weight concentrations of PCBs, DDE and HCB in cod livers[16] Variations are considerable both within and between years. Similarities in the pattern of PCBs and DDE suggest a common pool of these contaminants, which might be sign of long range transport. A different pattern is observed for HCB. The Figure suggests downward trends in contaminant loads. Assessment of OSPAR monitoring data from the North East Atlantic confirms widespread downward trends in concentrations of hazardous substances in the area. Contaminants remain, however, above long-term targets [17].

A temporal trend study of POPs in black guillemot, resident seabirds in Breiðafjörður bay West-Iceland, was carried out on archived samples from a 20 year period from 1976 to 1996. A slow decline was observed ($T_{1/2}$ = 12 - 20 years) in the levels of PCBs, DDE and HCB. Close correlation between PCB and DDE indicate long-range transport as a major source of the compounds[18].

High age-dependent levels of POPs in Icelandic gyrfalcon, a resident top predator, promted research into POPs levels in six prey species of birds. Lowest levels were found in residential terrestrial and freshwater birds, ptarmigan and mallard duck, while migratory birds, tufted duck and golden plover, were more contaminated. Still higher levels were found in the resident seabird black guillemot reflecting the influence of the marine habitat [19].

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[14] Persistent Pollutants in the Environment EMEP Status Report 3/2014 http://www.msceast.org/reports/3_2014.pdf

[15] Based on information from: Undesirable substances in seafood products– results from the monitoring activities in 2004. Icelandic Fisheries Laboratories Report No. 33 – 05 (http://www.matis.is/media/utgafa//Skyrsla_33-05.pdf).

[16] Sturludóttir et. al. Temporal trends of contaminans in cod from Icelandic waters. Science of the Total Environment 476- 477(2014) p. 181 -188.

[17] OSPAR Commission 2006. 2005/2006 CEMP Assessment - Trends and concentrations of selected hazardous substances in the marine environment.

[18] Kristín Ólafsdóttir et al. 2005. Temporal trends of organochlorine contamination in Black Guillemots in Iceland from 1976 to 1996. Environmental Pollution 133 (2005) 509-515.

[19] Kristín Ólafsdóttir et al, 2001. Persistent Organochlorine levels in six prey species of the gyrfalcon *Falco rusticolus* in Iceland. Environmental Pollution 112 (2001) 245-251

Humans

Combined results of measurements of the levels of organochlorine contaminants in human blood from four geographic regions in Iceland were presented in the 2002 AMAP (Arctic Monitoring and Assessment Program) assessment of human health in the Arctic[20]. Blood plasma levels of PCBs for Icelandic and Finnish mothers were intermediate for non-indigenous women in the region. Lower levels were found in Arctic Canada and higher levels in Norway, Sweden and Russia. Levels of PCBs and DDE were higher in males than females.

Risk assessment of the exposure of the POPs was made in the AMAP report and Health Canada guidelines used for interpretation purposes. Two levels were defined for pregnant women, 'Level of Concern', i.e. blood $PCB_{Aroclor1260}$ above 5 g/L, and 'Action Level' above 100 g/L. Percentage exceedance of the 'Level of Concern' ranged from 22% to 50% in the Icelandic cohort depending on geographical region. Corresponding values for northern regions of Norway, Sweden and Finland were 70%, 68% and 7.7% respectively. 'Action levels' were not exceeded.

2.3.2 Assessment with respect to Annex A and B chemicals

The Stockholm Convention substances focuses on on list of sixteen substances, 11 of which are pesticides. Organochlorine pesticides and restrictions that have been applied to their uses are shown in Table below. The compounds have never been produced in Iceland. The compounds chlordecone, dieldrin, endrin, heptachlor, mirex and toxaphene are not known to have ever been used in Iceland. Two compounds, aldrin and chlordane were probably used before 1970. The only compound not banned until 2009 is lindane. The last recorded sale of lindane took place in 1992 when 1 kg was sold. In 1990 and 1991, 2 and 16,2 kg were sold, respectively. It is assumed that the lindane sold was applied during the same year. The uses of DDT were limited after 1975 to the treatment of scabies in horses. A ban was imposed on the uses of DDT in 1996.

Table Annex A and B chemicals

Chemical	Restricted use	Banned
Aldrin (CAS: 309-00-2)	Never registered. Was probably used between 1940/50 - 1960/70	Banned 1996
Chlordane (CAS: 57-74-9)	Never registered. Was probably used between 1940/50 - 1960/70	Banned 1996
Dieldrin (CAS: 60-51-1)	Never registered	Banned 1996
Endrin (CAS:72-20-8)	Never registered	Banned 1996
Heptachlor (CAS:76-44-8)	Never registered	Banned 1996
Mirex (CAS: 2385-85-5)	Never registered	Banned 1998
Toxaphene (CAS: 8001-35-2)	Never registered	Banned 1996
DDT (CAS: 50-29-3)	Never registered	Banned in 1996.

[20] Arctic Monitoring and Assessment Programme (AMAP), Oslo, 2003. AMAP Assessment 2002: Human Health in the Arctic.

Hexachlorobenzene (CAS: 118-74-1)	Never registered	Banned in 1996
Pentachlorophenol	Never registered	1998
Lindane	Was last sold and presumably used in 1992	2009
Polychlorinated biphenyls (PCBs)	Used in electrical equipments and sealing material	See description of relevant regulation in section 2.2.4.

2.3.3 Assessment with respect to Annex A, part II chemicals (PCBs)

An effort was made in Iceland in the 1980s to eliminate PCBs in electrical equipment. Transformers have routinely been checked for PCBs since then in connection with maintenance. From 1988 to 2004 close to 200 tons of PCB contaminated oil and equipment have thus been identified and destroyed by incineration.

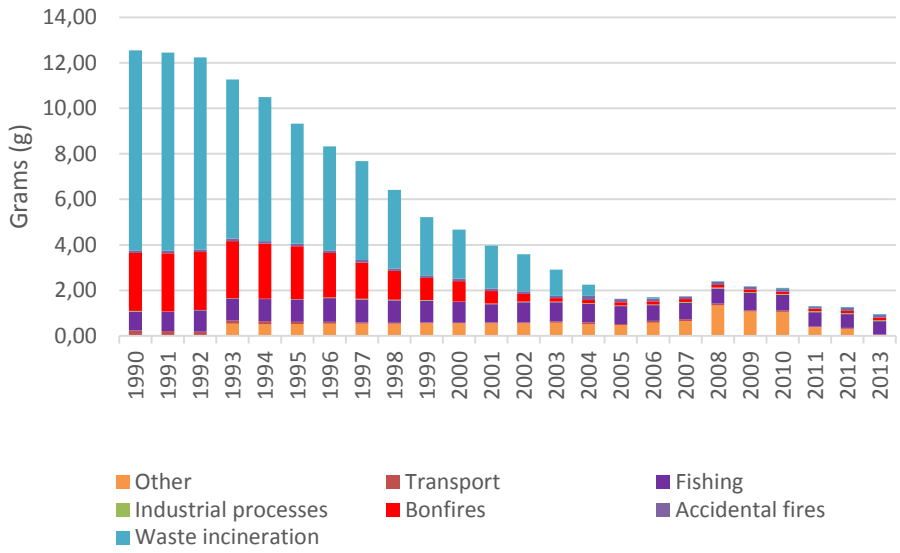
About 7000 transformers are in use in the country and almost all of these are either new equipment or transformers that have been checked for PCBs. All large equipment has been checked. The transformers are checked for PCBs as they are removed from use.

Other uses of PCBs, e.g. in fluorescent light ballasts, caulk and double-pane insulating glass have not been documented. PCBs have never been produced in Iceland.

2.3.4 Assessment of releases form unintentional production of Annex C chemicals

Release estimates

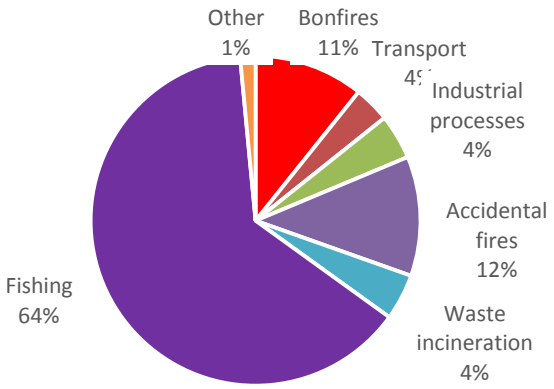
Total releases of PCDD/PCDF into air during 1990 – 2013 decreased from 12,54 g I-TEQ in 1990 to 0,95 g in 2013[21]. This implies a decrease of 92% over the time period. Figure below shows the PCDD/PCDF emissions by source from 1990 to 2013. The trend which is depicted in the figure shows that decreased emissions can largely be accounted for by decreased emissions from waste incineration. The total amount of incinerated waste decreased during the period and open burning of waste ceased almost.



PCDD/PCDF emissions 1990 - 2013

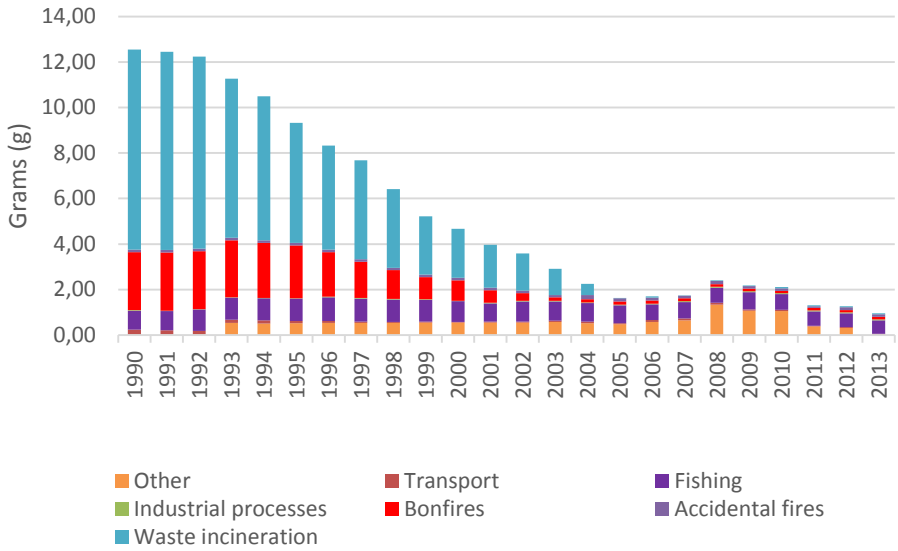
[21] Annual Iceland Informative Inventory Report to UNECE

The relative importance of dioxin sources, in 2013, is shown in the figure below. Emissions from the fisheries fleet accounted for the largest part (64%) followed by accidental fires (12%) and bonfires (11%). The fisheries fleet is, interestingly, a significant source owing to higher emission factors for combustions engines at sea, where the inlet air contains salt (chloride). However emissions have decreased 27% since 1990. In 1990, emissions from commercial fishing were 7% of the national total. In 2013, emissions from commercial fishing amounted to 64% as emissions from most other sources have decreased drastically since 1990. In 2004, incineration of waste accounted for 42% of the dioxin emission but in 2013 it accounted for 4%.



PCDD/PCDF emissions 2013 by source

Analysis of trends in HCB emissions in Iceland must be interpreted with care as only few sources have been estimated. HCB is currently emitted as a by-product in the manufacture of several chlorinated solvents. On the whole processes resulting in di PCDD/PCDF formation also result in HCB formation. In 1990, the total estimated emissions of HCB in Iceland were 77,4 g. In 2013 total emissions were 29,1 g. This implies a decrease of 62% over the time period. The figure below represents the trend in HCB by source from 1990 to 2013.



HCB emissions estimates 1990 – 2013 by source

The main source of HCB emissions are waste incineration (76%) with and without energy recovery and industrial processes (secondary aluminium production and cement

production). A sudden increase in HCB emissions from industrial processes was seen in 2008 when a secondary aluminium production plant was established. (Annual Iceland Informative Inventory Report to UNECE)

Waste incineration

In 2013, the total amount of waste in Iceland was 524 474 tons, of which 10 257 tons were incinerated. In 2005 waste was incinerated at six sites, processing 17000 tons of waste, down to incineration at one site in 2015, processing 10257 tons. The incineration plants were closed due to stricter legislation, including the PCDD/PCDF emissions.

Industrial processes

The main industrial sources of PCDD/PCDF are production of non-ferrous metals, i.e. primary aluminum and ferrosilicon production. Closed prebake systems with point feeding of alumina are used at the aluminum smelters. The prebaked anodes are imported. These industries fulfill requirements of applying best available techniques as described in the IPPC Reference Document on Best Available Techniques in the Non Ferrous Metals Industries and the POPs protocol to CLRTAP. Dioxin emissions from industrial processes sector have increased by 164% during the period 1990 – 2013, due to increased activity in the non-ferrous metals production sector. Aluminum production has increased from 87.839 tonnes in 1990 to 840.975 tonnes in 2013, with the main increase after 2005. Production of ferrosilicon has increased from 62.792 tonnes to 119.609 tonnes in the same period. Iceland had one cement plant but it ceased operation in 2011.

2.3.5 Information on contaminated sites and wastewater

Contaminated sites

Contaminated sites are potential sources of persistent organic pollutants to the marine environment. Untreated leachates from landfills, containing transformers and other electric equipment with PCB oils or dioxin contaminated fly ashes from waste incineration flue gas cleaning, may contribute to contamination of coastal areas. Contaminated industrial sites located close to the sea or rivers can also be potential sources. The organic contaminants do not, however, dissolve easily in water and they have a tendency of attachment to particles which reduces the risks of water contamination.

Overall assessment of contaminated sites was conducted in Iceland in 2005[22]. Individual case studies have been made in the Reykjavík area. A scrap yard in Reykjavik's harbor area, known to be contaminated with PCB oils and dioxins/dibenzofurans from cable burning was cleaned few decades ago by removing the contaminated topsoil. An effort was made at the Environment Agency to collect information about potentially contaminated sites by sending out questionnaires to local health authorities. The survey produced information about old landfills that have a potential of being contaminated.

Municipal wastewater

Studies were made of the chemical composition of wastewater and caged mussels deployed along the ocean outfall in relation to the construction of the municipal sewage system in Reykjavík.

The concentration of PCBs, DDE and HCB in mussels decreased with distance from land, reaching background values 4.5 – 5 km from the shore. The concentrations closest to the shore were generally a factor of 3 – 5 above the background. Measurements of PCBs in the wastewater, made in 1993 and 2000/2001, showed that

[22] Report on Soil Protection and Remediation of Contaminated Sites in Iceland www.ust.is

concentrations had decreased by a factor of 10 – 100 during that period. Significant changes in the concentrations of the POPs in caged mussels were not observed between 1993 and 2000, with one exception where the levels close to land have declined. Later measurements show that concentrations have decreased at most of the sampling locations[23] .

2.3.6 Future production and requirements for exemptions

Production and new uses of POPs are prohibited in Iceland and no exemptions are required. This also applies to the new substances under the Convention.

2.3.7 Programs for monitoring releases and environmental and human health impacts

Environment and Food

Annual monitoring of the marine biosphere around Iceland began in 1989. The program is coordinated by the Environment Agency. MATÍS Ltd (Icelandic Food and Biotech R&D) coordinates the monitoring and is responsible for sampling, preparation, chemical analysis and reporting of results. The program includes measurements of PCBs, HCHs, DDTs, toxaphene, chlordanes, transnonachlor and trace metals in cod and blue mussels. The data is submitted to the ICES databank in Copenhagen and a full report is written annually and made publilcly available at MATÍS website www.matis.is[24].

The Icelandic Meteorological Office participates since 1980 in the European Monitoring and Evaluation Programme (EMEP) with daily monitoring of sulphur in precipitation and air at Irafoss and since 1995 in the Comprehensive Atmospheric Monitoring Programme (CAMP) with two weekly monitoring at Storhöfdi of both heavy metals and PCBs, DDTs, HCB, HCHs, nonachlor and chlordanes in air and precipitation. All data is sent to the joint data base at NILU (Norwegian Institute for Air Research) where processed data can be retrieved.

A project was initiated in 2003 by the Ministry of Industries and Innovation with a main purpose of gathering information for evaluating the status of Icelandic seafood with regard to undesirable substances. Persistent organic substances and trace elements are measured in edible parts of main exported species of fish, in fishmeal and in different fish oils intended for feeds and human consumption. The program includes measurements of dioxin-like PCBs, marker PCBs, PCDD/PCDF, HCB, DDTs, HCHs, aldrin, endrin, dieldrin, chlordanes, toxaphene, endosulfan, PAHs and brominated flame retardants. Annual reports with results are available at MATÍS website (http://www.matis.is/english/), the newest from 2013[25].

The Agricultural Authority of Iceland, under the Ministry for Industries and Innovation, participated in a Nordic program monitoring PCDD/PCDF and PCBs in meat, dairy products, farmed salmon and trout, eggs and potatoes in 2003 - 2005.

Humans

Levels of persistent organochlorines in samples from humans were first studied in Iceland by Ólafsdóttir et al. in 1997[26]. Levels of PCBs, HCB, HCH and DDE were studied in

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[23] Sturludóttir et. al. Spatial and temporal trends of contaminants in mussel sampled around the Icelandic coastline Science of the Total Environment 454-455(2013) p. 500-509.

[24] http://www.matis.is/media/matis/utgafa/16-13-Undesirable-substances.pdf

[25] http://www.matis.is/media/matis/utgafa/22-13-AMSUM.pdf

[26] Kristín Ólafsdóttir et al. 1997. Þrásetin kórkolefnissambönd í íslenskri móðurmjólk. Læknablaðið 1997:83, 157-161. (In Icelandic)

breast milk from Icelandic women. The studies continued with measurements of POPs, reported in the AMAP Assessment 2002: Human Health in the Arctic[27]. Additional samples of maternal blood plasma were taken in 1999 and 2004 for time trend analysis.

Industry

Measurements of PCDD/PCDF are stipulated in operating permits for industries known to be significant sources of these substances. The results are reviewed by authorities responsible for environmental inspections at the facilities. The activities concerned are included in Annex C of the Convention, i.e. waste incinerators.

2.3.8 Information exchange with other Parties to the Convention and systems to communicate information

Iceland has ratified the POPs protocol under the Convention on Long Range Transboundary Air Pollution (CLRTAP). In accordance with the protocol, emissions from sources in Iceland are reported to the Convention and thus made available to parties and non-parties alike.

Through the agreement with the EU on the European Economic Area (EEA-agreement) information is shared between the parties. Iceland is an active participant in Nordic Cooperation within the framework of the Nordic Council and the Nordic Council of Ministers. Working groups under the Nordic Council of Ministers plan and coordinate work within areas of air and sea, chemicals, natural life, outdoor life and cultural environment, food, products and waste products, and environmental surveillance and data[28].

The Environment Agency of Iceland is responsible for chemicals and chemical products with regard to implementing regulations, controlling them, harmonization of legislation in relation to the EEA-agreement and other international agreements, and dissemination of information. The Agency publishes information sheets, arranges public seminars and training courses and provides current information at its website. A committee with participation from the Agency and local health inspectorates is a venue for contacts, exchange of information and initiating implementation programs. The target groups are retailers and users of chemical products, both businesses and individuals.

2.3.9 Non-governmental organizations

The Ministry for the Environment and Natural Resources cooperates formally with about 20 nongovernmental organizations that operate both locally and nationwide and supports many of them financially. The organizations are engaged in work regarding both environmental issues and nature conservation.

2.3.10 Overview of technical infrastructure for POPs assessment, measurement, analysis, and research

The Environment Agency is responsible for ensuring that monitoring and research is carried out in relation to the Hygiene and Pollution Prevention Act of 1998. The Agency is furthermore responsible for monitoring the sea and coastal areas with regard to pollution in accordance with the Act on Pollution Prevention of the Sea and Coastal Areas of 2004.

The Department of Pharmacology and Toxicology of the University of Iceland carries out the measurements of POPs in two monitoring programs; the annual survey of

[27] Arctic Monitoring and Assessment Programme (AMAP), Oslo, 2003. AMAP Assessment 2002: Human Health in the Arctic.

[28] http://www.unece.org/fileadmin/DAM/env/documents/2008/EB/EB/Norway%20HBCDD%20dossier.pdf

POPs in marine biota and monitoring of POPs in air and precipitation. Recent research projects at the department include studies of POPs in birds and samples from humans.

MATÍS organizes sampling of marine biota, foods and feeds for measurements of POPs. MATÍS compile, interpret and reports on the data collected. A report on survey of POPs in marine biota is published annually and reports the results of a monitoring study of POPs in foods and feeds.

The Institute of Biology at the University of Iceland is involved in studying the occurrence and spatial distribution of POPs. The project, CAPNE - "comparative assessment of persistent organic pollutants and their metabolites, with emphasis on non- traditional contaminants, in the West-Nordic and the Baltic Proper environments", is an example of Nordic cooperation with participants from Iceland, Sweden, Norway and the Faeroe Islands[29].

Wide range of POPs can be analyzed by laboratories in Iceland, but samples have been sent abroad for analysis of PCDD/PCDF since the domestic laboratories do not offer these services.

2.3.11 Identification of impacted populations, threats to public health and social implications

Sustainable management of marine resources is a key component of the Icelandic economy. With marine products accounting for majority of the total value of exported goods from Iceland, it is clear that any threat to these products may have severe consequences for workers and communities in the country. Another important concern is the negative impacts pollutants may have on the consumption of fish. Intake of fish has unequivocally been shown to have beneficial health effects, especially towards reducing the risks of cardiovascular diseases. Two meals a week with fish as a main component is a general official recommendation in many European countries. This recommendation is regarded as a minimum in Iceland, where two to three meals a week with fish as a main component is recommended[30]. Reduced consumption of fish caused by high levels of contaminants or because of concerns due to a tarnished image of the products may have adverse effects on the health status of whole populations.

Recent surveys of contaminants in fish most commonly consumed in Iceland show that levels of PCDD/PCDF, PCBs and pesticides are lower than set limits, by an order of magnitude or more[31]. Special recommendations have thus not been issued by health authorities that limit consumption with respect to intake of POPs exceptions for few species such as large halibut for pregnant women[32].

2.3.12 Details of any relevant system for the assessment and listing of new chemicals

Icelandic regulation is harmonized with EU regulation with regard to assessment and listing of new chemicals, in accordance with the agreement on the European Economic Area (EEA). Regulation No. 888/2015 which transposes regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) prescribes the requirements manufacturers and importers must comply with before placing new substances on the market.

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29 Jörundsdóttir et al. 2009. Assessment of emerging and traditional halogenated contaminants in Guillemot (*Uria aalge*) egg from North Western Europe and the Baltic Sea, Science of the Total Environment 407(2009) p. 4174-4183.

30 http://www.landlaeknir.is/servlet/file/store93/item25796/radleggingar-um-mataraedi-2015.pdf

31 http://www.matis.is/media/matis/utgafa/16-13-Undesirable-substances.pdf

32 http://www.landlaeknir.is/servlet/file/store93/item11446/MaturMedganga3ja_utg_2008.pdf page 5

3. Strategy and action plan elements of the national implementation plan

3.1 Policy statement

Iceland has set a National Strategy for Sustainable Development 2002 – 2020, and the strategy has been reviewed twice since 2002[33]. The substitution principle is implemented in the Chemicals Act from 2013. The precautionary principle is implemented in the Act on Nature Conservation, and the principle is under consideration regarding other legislations. The national implementation plan for the Stockholm Convention is an integral part of Iceland's strategy for sustainable development.

3.2 Implementation strategy

The following subsections of the strategy and action plan correspond with minor modifications to the structure proposed in the UNEP Interim guidance. Areas where information is lacking or actions are needed are identified and actions described. A timetable is provided with a list of scheduled projects. With existing infrastructure and Icelandic legislation prohibiting chemicals and requiring best available techniques, much of the requirements of the Convention have already been implemented. An account is given of instances where further measures are not needed.

3.3 Activities

3.3.1 Institutional and regulatory strengthening measures

Regulations have been implemented in Iceland, which cover the use and management of POP substances. Operating permits are required for activities that may emit unintentionally produced POPs and emission standards have been set. Institutional and legal framework is in place for permitting and compliance with and for implementing regulations, which to a large extent harmonizes with the regulation of the European Union.

Regulation (EC) No 850/2004 on Persistent Organic Pollutants and amending Directive 79/117/EEC, is transposed into Iceland legislation i.e. Regulation No. 954/2013. This new regulation supplements existing regulations that implement the provisions of the Stockholm Convention. There is furthermore a need to strengthen the legal basis for and adopt a new regulation on contaminated soil with the aim of strengthening the regulatory framework for the management of contaminated sites.

3.3.2 Measures to reduce or eliminate releases from use, stockpiles and wastes of Annex A and Annex B pesticides

Icelandic regulation prohibits production, import and use of Annex A and Annex B pesticides. Pesticides have never been produced in Iceland and the Annex A and B pesticides, with the exception of aldrin, chlordane, lindane and DDT, have never been used in the country. Aldrin, chlordane and DDT were banned in 1996, lindane in 2009.

The likelihood of any significant quantities of Annex A and B pesticides

[33] https://www.umhverfisraduneyti.is/media/PDF_skrar/Velferd_til_framtidar_2002.pdf
https://www.umhverfisraduneyti.is/media/PDF_skrar/Velferd_til_framtidar_2002.pdf

to be stored in Iceland is considered low, and current regulation is sufficient to block future uses of these substances. Further measures are not viewed as needed in Iceland to eliminate releases of Annex A and Annex B pesticides.

3.3.3 Measures to reduce or eliminate releases of PCBs (Annex A, part II chemicals)

Identified uses of PCBs in Iceland are mainly as dielectric fluid in electrical transformers. Other uses, e.g. PCB containing cured caulk, paint, and seal in double-pane insulating glass, have not been documented. PCBs have never been produced in Iceland.

A drive in the late 1980s raised awareness and projects were initiated to identify and replace transformers and capacitors containing PCBs. It is estimated that approximately 82% of all transformers in use in the country are either too recent to contain PCBs or units that have been checked to be free of PCBs. These include all larger equipment, but around 1200 small transformers are still in operation. The majority of these units contain less than 100 kg of oil, and it is estimated that less than 2% contain PCB contaminated oil. With ongoing renewal of the electrical distribution system the pole mounted small transformers are gradually disappearing. The equipment is checked when removed from use.

Regulation No. 888/2015 prohibits all uses of PCBs after 2010. Oils containing more than 0,005% of PCBs are classified as hazardous waste.

3.3.4 Register for specific exemptions and the continuing need for exemptions

Iceland has not registered for specific exemptions. The general exemption in Para. 5 Art. 3, which applies to laboratory-scale quantities of the substances for research and monitoring purposes, meets the requirements of national laboratories.

3.3.5 Measures to reduce releases from unintentional production

Inventories have been made as part of Iceland's obligations in relation to the POPs protocol to the Convention on Long-Range Transboundary Pollution, with estimates of dioxin and dibenzofurans releases from sources in Iceland[34]. The inventories show that releases of PCDD/PCDF decreased in the period 1990 - 2004 from 12,54 g I-TEQ to 0,95 g I-TEQ. Decreased emissions are mainly attributable to closing of facilities for waste incineration. Landfilling is the main route for waste disposal in Iceland. In 2016, one incineration plant is operating in Iceland, down from six in 2010. The other five incineration plants that closed down were operating on an exemption which expired in 2013).

The application of BAT is prescribed by law in Iceland for sources where best available techniques have been described. Since 1999, BAT has been a requirement for all new sources and is a requisite for existing since 31 October 2007. The provisions of the Icelandic regulation are harmonized with Council Directive 96/61/EC concerning integrated pollution prevention and control. Environmental permits are required and compliance visits are mandatory. Measurements of PCDD/PCDF are prescribed in permits for relevant source categories. Regulation 739/2003 on incineration of waste, prescribes emission limit values for PCDD/PCDF; the limits are 0.1 ng/m^3 for waste incinerators. Emission limit values for wastewater from cleaning of exhaust gases are set at 0.3 ng/l.

Current legislation provides adequate provisions for management of releases from the source categories in Annex C.

Current inventories of PCDD/PCDF are based on estimates using the UNEP Toolkit and other available emission factors. To improve the inventories it is desirable to be able

[34] Annual Icelandic Informative inventory Report to UNECE, Emissions of Persistent Organic Pollutants & Other Air Pollutants in iceland 1990- 2013, 2015

to check the emission factors against actual measurements. Measurements of PCDD/PCDF are prescribed in permits for waste incinerator. Iceland had one cement plant but it ceased operation in 2011

The largest source of PCDD/PCDF in Iceland in 2013 was the fishing fleet. Emission factors used for this source take into account the chloride content of the engine air intake. This source is not among categories listed in Annex C. Pollution from ships is the subject of a separate convention; The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78). Annex VI to MARPOL 73/78 deals with prevention of air pollution from ships.

Accidental fires and bonfires were the second and third largest sources of PCDD/PCDF emissions from Iceland in 2013, while waste incineration and industrial processes each accounted for 4% of the emission. The main industrial sources were from production of non-ferrous metals, i.e. primary aluminum and ferrosilicon production. These industries are operated in accordance with BAT as described in the IPPC Reference Document on Best Available Techniques in the Non Ferrous Metals Industries, and the POPs protocol to CLRTAP.

Releases of PCDD/PCDF from incineration of waste was measured in 2007 in accordance with Regulation No 739/2003, for incinerators processing less than 5000 tons of waste per year. Now with only one operating plant incinerating waste, the operation permit requires annual measurements.

3.3.6 Measures to reduce releases form stockpiles and wastes

Wastes

Regulation 806/1999 sets the framework for management of hazardous wastes in Iceland covering packaging and labeling, classification and hazardous risk estimate, permits for waste reception facilities and transport operators, documentation, reporting and transport. Transboundary transports of wastes are subject to the provisions of the Basel Convention in accordance with Regulation No 224/2005.

Stockpiles

The occurrence of stockpiles of Annex A and B pesticides in Iceland is highly improbable, and no knowledge of such stockpiles exists.

Contaminated sites

The Act on Pollution Prevention of the Sea and Coastal Areas of 2004 prohibits dumping of wastes and other matter into the maritime area, which is in accordance with Annex 2 to the OSPAR Convention. The law is aimed at preventing placement of matter in the maritime area without authorization. Permits may be obtained from the Environment Agency for dumping of dredged material and inert materials of natural origin. All dredged material must be characterized with regard to contamination and disposed of in accordance with criteria set by the competent authority.

Remediation of contaminated sites on land may be needed in connection with land use changes. Land use changes require that amendments be made to municipal or local plans. Approval by the Planning Agency is a requisite for amendments of municipal plans. Local plan amendments require advertisement, procedure for accommodating objections and consultation with the Planning Agency before their adoption. The Strategic Environmental Assessment Act No. 105/2006, was set to promote sustainable development, reduce negative environmental impacts and to encourage environmental issues to be taken into consideration in relation to developmental planning. The law stipulates environmental assessment of development plans that have impacts on issuing of permits that fall under the Environmental Impact Assessment Act of 2000.

Activities:

- Annually measurements of dioxin and furan from waste incineration plants.
- A regulation on contaminated soil is under preparation in the Ministry for the Environment and Natural Resources. The aim is to further strengthen the regulatory framework for the management of contaminated sites. The Ministry also intends to place a bill before Parliament to set the legal basis for the regulation.
- A landfill suited for contaminated soil and certain hazardous wastes will be constructed.
- Mapping of identified contaminated sites will be done in 2018.
- Iceland will also participate in the European project on Industrially Contaminated Sites and Health Network in 2015- 2019.

3.3.7 Listing of chemicals in Annexes A, B and C

Iceland recognizes the importance of the Stockholm Convention for dealing with the global threats of POPs to human health and the environment and is therefore in support of adding relevant substances to the lists in the annexes of the Convention.

Iceland participated in 2007 in a Nordic project to prepare a document on hexabromocyclododecane (HBCDD) as a possible global POP[35].

3.3.8 Information exchange and public awareness

The Envrionment Agency of Iceland has been designated as a focal point for exchange of information under Article 9.

The pesticides listed in Annexes A and B have either been banned in Iceland since 1996/1998 or never been used in the country. Information or training programs for handling the substances are therefore not considered necessary.

Results of annual monitoring of POPs in the marine biosphere and reports on measurements of POPs in seafood have been made public on the Internet[36]. General information on the POPs issue is provided at the website of the Environment Agency.

Consumption of fish has been traditionally high in Iceland compared to many European countries. Even if levels of POPs in seafood from the maritime area around Iceland are well within the limits set by regulation, intake studies are needed focusing on populations with special dietary habits, for a better estimate of the risks of POPs for these groups.

3.3.9 Effectiveness evaluation

The results of ongoing monitoring of POPs in the marine biota, air and precipitation, as well as targeted studies involving humans, birds and marine mammals will be used to the extent possible for effectiveness evaluation. Additional monitoring and studies will be conducted as needed to provide monitoring data in accordance with decisions that will be made by the Conference of the Parties.

3.3.10 Research, development and monitoring

Programs are being run in Iceland focusing on the recipient by monitoring POPs in marine biota and on transport by measuring POPs in air and precipitation. The marine program provides data to OSPAR as part of the Coordinated Environmental Monitoring

[35] http://www.unece.org/fileadmin/DAM/env/documents/2008/EB/EB/Norway%20HBCDD%20dossier.pdf).

[36] http://www.matis.is/media/matis/utgafa/22-13-AMSUM.pdf
http://www.matis.is/media/matis/utgafa/16-13-Undesirable-substances.pdf

Program (CEMP) and the air and precipitation data are part of OSPAR's Comprehensive Atmospheric Monitoring Program (CAMP).

Monitoring of POPs in food has been carried out by MATÍS. The Ministry of Industries and Innovation initiated monitoring of edible portion of marine catches, involving over 20 species of fish and shellfish, fish oils and fish meal for feed. Main agricultural products were also monitored for the Icelandic Veterinary Services. The monitoring programs contribute to a European effort to examine how products measure up against limits, and as basis for setting limits. MATIS publishes annual reports on their webpage.

The Department of Pharmacology at the University of Iceland is active in research concerning POPs in birds; falcons, eiders, and guillemots. Studies have also been made of POPs in breast milk and maternal blood, the latter being a contribution to the Arctic Monitoring and Assessment Program (AMAP).

Iceland participates within the framework of the Nordic Council in work aimed at providing information for strengthening international conventions, e.g. the Stockholm Convention and CLRTAP. The projects have different character; examples are preparation of background documents such as that made for pentabromodiphenyl ether or assessments of the occurrence and spatial distribution of POPs. Iceland participated in 2007 in a Nordic project to prepare a document on hexabromocyclododecane (HBCDD) as a possible global POP[37].

Continued emphasis will be on monitoring and research, where regional cooperation and the Arctic have special significance.

3.3.11 Technical and financial assistance

The Icelandic International Development Agency (ICEIDA) is a government agency and an autonomous department of the Ministry for Foreign Affairs. It has been ICEIDA's policy to focus its efforts on only a few areas where Icelandic expertise is thought to be most useful and where Icelanders are well advanced. Thus, the agency's major projects have all been related to training and capacity building in fisheries, as well as fisheries research. However, recently ICEIDA has placed more emphasis on supporting health, education and social sectors. Presently, ICEIDA is engaged in development co-operation with four countries in Africa: Malawi, Mozambique, Namibia and Uganda.

3.4 Timetable for implementation

Activity	**Timeframe**
Landfill site for contaminated soil will be established	2022
Legal basis for regulation on contaminated soil	2019
New regulation on contaminated soil	2020
Annual measures of PCDD/PCDF releases from waste incineration plant	
Mapping of contaminated sites, and made publicly available	2018
Industrially Contaminated Sites and Health Network [38]	2015 - 2019

[37] http://www.unece.org/fileadmin/DAM/env/documents/2008/EB/EB/Norway%20HBCDD%20dossier.pdf).

[38] http://www.cost.eu/COST_Actions/isch/IS1408

Abbreviations and acronyms

AMAP	Arctic Monitoring and Assessment Programme
BAT	Best Available Techniques
CAMP	Comprehensive Atmospheric Monitoring Programme
CAS	Chemical Abstracts Service
CLRTAP	Convention on Long-Range Tranboundary Air Pollution
DDE	Dichloro Diphenyl Ethane
DDT	Dichloro Diphenyl Trichloroethane
EEA	European Economic Area
EC	European Council
EEC	European Economic Community
EFTA	European Fair Trade Association
EMEP	Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air pollutants in Europe
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNI	Gross National Income
HBCDD	Hexabromocyclododecane
HCB	Hexachlorobenzene
HCH	Hexachlorocyclohexane
ICEIDA	Icelandic International Development Agency
ICES	International Council for the Exploration of the Sea
IMO	International Maritime Organization
IPPC	Integrated Pollution Prevention and Control
MARPOL	International Convention for the Prevention of Pollution from Ships
MATÍS	Icelandic Food and Biotech R&D institute
NILU	Norwegian Institute for Air Research
OECD	Organisation for Economic Co-operation and Development
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PCB	Polychlorinated biphenyls
PCT	Polychlorinated terphenyls
PCDD	Polychlorinated dibenzodioxins
PCDF	Polychlorinated dibenzofurans
TEQ	Toxic Equivalent
WHO	World Heath Organization