TOXIC THREADS

Toxic Threads: Under Wraps

Exposing the textile industry's role in polluting Mexico's rivers

GREENPEACE

image © Marizilda Cruppe / Greenpeace

Contents

Acknowledgements:
We would like to thank the following people who contributed to the creation of this report. If we have forgotten anyone, they know that our gratitude is also extended to them.

Kevin Brigden, Alejandro Cadena, Kristin Casper, Madeleine Cobbing, Maria Colin, Tommy Crawford, Alexandra Dawe, Steve Erwood, Raúl Estrada, Nadia Haiama, Martin Hojsik, Christian Rojas, Tony Sadownichik, Angelica Simón, Pierre Terras, Ieva Vilimaviciute, Alex Yallop

Front cover image photo: Lance Lee
Back cover image: Mexican models Juanjo Herrera and Gala Koksharova show their support for the Detox campaign in a Greenpeace "cat walk" action in Mexico, November 2012. © Ivan Castaneira / Greenpeace

Art Direction & Design by: Toby Cotton @ arccomms.co.uk

Toxic Threads: Under Wraps
JN 429c
Published December 2012
by **Greenpeace International**
Ottho Heldringstraat 5,
1066 AZ Amsterdam,
The Netherlands
greenpeace.org

Terminology used in this report

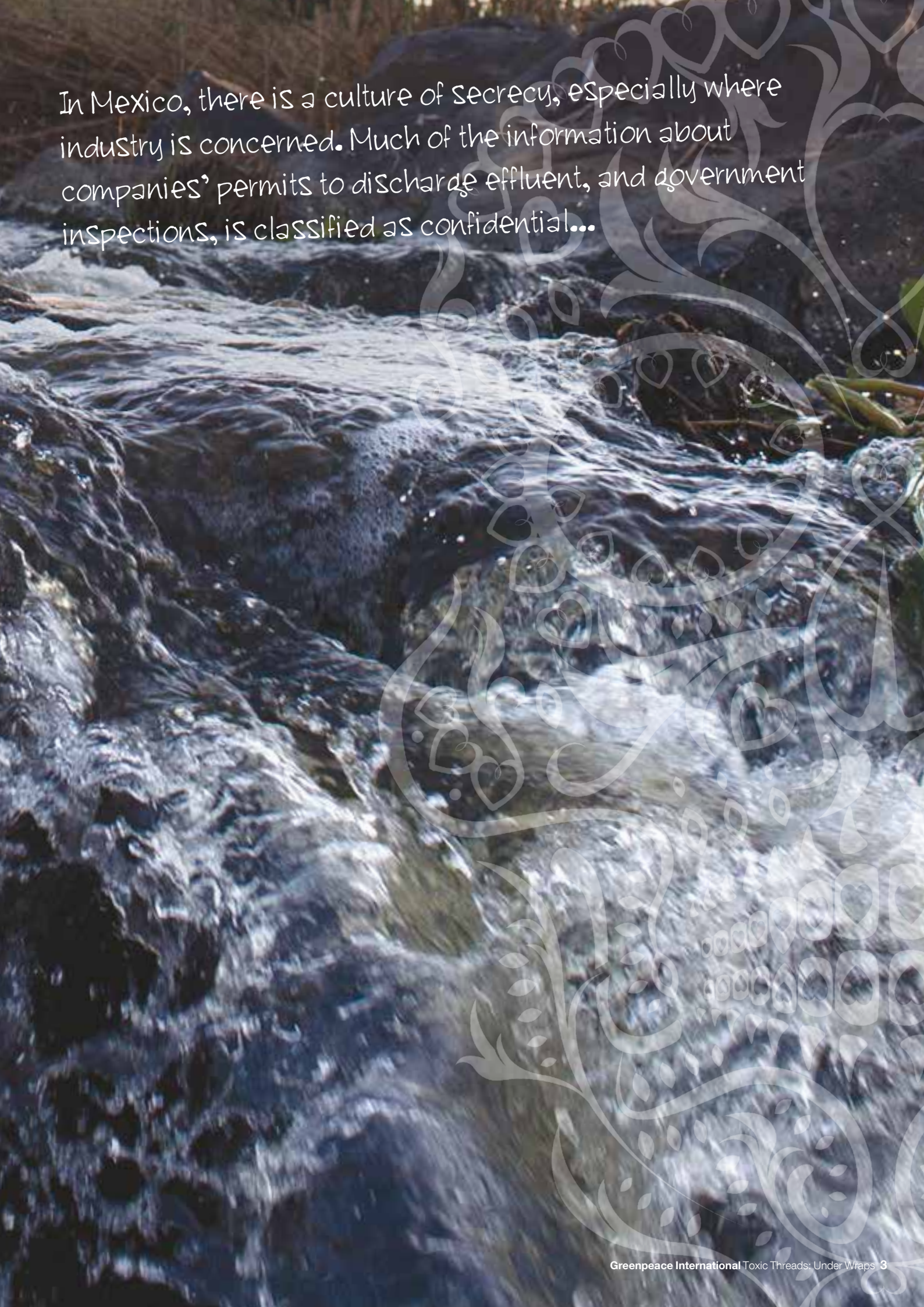
Bioaccumulation: The mechanism by which chemicals accumulate in living organisms and get passed along the food chain.

Hormone disruptors: Chemicals known to interfere with hormone systems of organisms. For nonylphenol, the most widely recognised hazard is the ability to mimic natural oestrogen hormones. This can lead to altered sexual development in some organisms, most notably the feminisation of fish*.

Persistence: The property of a chemical whereby it does not degrade in the environment, or degrades very slowly.

Surfactants: Chemicals used to lower the surface tension of liquids. They include wetting agents, detergents, emulsifiers, foaming agents and dispersants used in a variety of industrial and consumer applications including textile manufacture.

**Jobling S, Reynolds T, White R, Parker MG & Sumpter JP (1995). A variety of environmentally persistent chemicals, including some phthalate plasticisers, are weakly estrogenic. Environmental Health Perspectives 103(6): 582-587; Jobling S, Sheahan D, Osborne JA, Matthiessen P & Sumpter JP (1996). Inhibition of testicular growth in rainbow trout (Oncorhynchus mykiss) exposed to estrogenic alkylphenolic chemicals. Environmental Toxicology and Chemistry 15(2): 194-202.*



In Mexico, there is a culture of secrecy, especially where industry is concerned. Much of the information about companies' permits to discharge effluent, and government inspections, is classified as confidential...

image © Marizilda Cruppe / Greenpeace

image Industrial pollution of the River Santiago, one of the most important watersheds in the state of Jalisco, Mexico.

TOXIC THREADS

#1

Unmasking Mexico's textile pollution

Textile manufacturing is a global business, and a major contributor to water pollution.

Greenpeace International has been taking a closer look at textile manufacturers outside China to demonstrate that the problem is not limited to Asia. This first investigation into textile manufacturing facilities in Mexico has found a wide range of hazardous substances in wastewater being discharged from two facilities[1]. Both are involved in the manufacture and pre-sale washing of textile products in Mexico: the Lavamex facility located in Aguascalientes and the Kaltex facility in San Juan del Río, Queretaro. Wet processes, such as the dyeing and washing of denim textiles, are carried out at both of these facilities.[2]

Mexico is one of the largest producers of denim in the world, and a major supplier to the US market.[3] It is, therefore, an important country for textile manufacturing. As a developing country that is particularly susceptible to the effects of climate change, with many inequalities and inadequate regulations and enforcement, water resources in Mexico are especially vulnerable.

Water is considered sacred in Mexican culture, yet it is under threat from many environmental pressures, including pollution to such an extent that people suffer from water scarcity. More than 70% of freshwater resources in Mexico are affected by pollution from all sources, and concerns about health effects from water pollution have led to conflicts in several parts of the country.[4]

This report builds on previous reports by Greenpeace International (see Box 1) that have investigated the discharge of hazardous substances in the effluent of textile manufacturing facilities in China, both in direct discharges to waterways and in communal discharges from industrial zones, where a high proportion of textile manufacturers are located.

image Lavamex facility entrance © Guadalupe Szymanski / Greenpeace

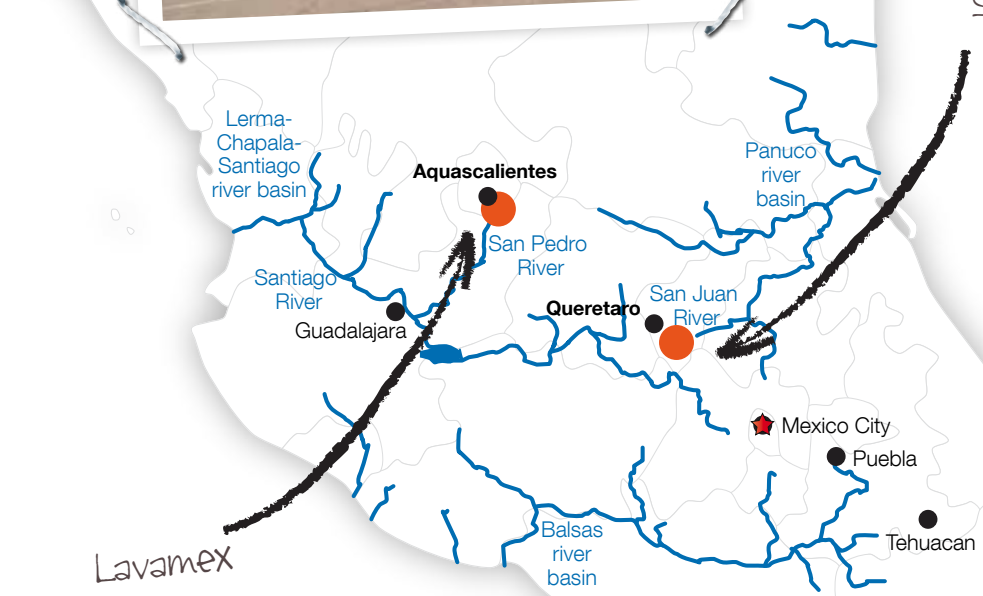


image Kaltex facility in San Juan del Río © Guadalupe Szymanski / Greenpeace

Key findings

A diverse range of chemicals was identified in the wastewater samples, many with known hazardous properties. Some are toxic to aquatic life, while others are persistent and will therefore remain in the environment long after their release.

The Lavamex facility was the most notable in terms of hazardous chemicals identified in wastewater samples. In particular, **nonylphenol (NP)** was found, along with **nonylphenolethoxylates (NPEs)**. NPEs are used as detergents and surfactants in textiles manufacturing and later can degrade back to NP. NP is a well-known persistent environmental contaminant with hormone disrupting properties. Other substances found included the hazardous chemicals benzotriazoles, **tributyl phosphate** and **trichloroaniline**, which are toxic to aquatic life.

TMDD, a surfactant used in dye formulations among other things, was found in the effluent of both facilities (see Box 4). TMDD is persistent in the aquatic environment and moderately toxic to aquatic life. Another hazardous chemicals found at the Kaltex facility was hexa(methoxymethyl)melamine **(HMMM)** – used to produce resins – which is moderately toxic to aquatic life. Traces were also detected of two **trichlorinatedbenzenes**, widely recognised persistent toxic chemicals that are used as solvents and dye carriers, and the **phthalates** di-2-ethylhexyl phthalate **(DEHP)** and diisobutylphthalate (**DiBP**) as minor components, which are reproductive toxins with numerous industrial uses, including in the manufacture of textiles. However, for these two phthalates, sources other than textile manufacture cannot be altogether excluded.

Many of the chemicals identified are used during textile manufacturing processes, or are created as a result of the breakdown of chemicals used in textiles processing. Some of the hazardous chemicals identified in this study have also previously been reported by Greenpeace in industrial wastewaters discharged in China (see Box 1), including those released from textile manufacturing facilities.

As well as finding hazardous substances from the two manufacturing facilities investigated, this report also reveals that while all types of water pollution in Mexico are a problem, the full extent of pollution by hazardous substances is unknown. Regulation is limited and there is little enforcement.

In Mexico, there is a culture of secrecy, especially where industry is concerned. Much of the information about companies' permits to discharge effluent and government inspections is classified as confidential. An extensive study commissioned by the government into pollution of the Santiago river basin was also considered confidential. To obtain these basic documents – including those concerning discharges of effluent from the facilities investigated in this study – Greenpeace Mexico had to request for them to be disclosed, a lengthy and frustrating process.

The Lavamex and Kaltex facilities are only two examples of what is likely to be a more widespread problem of hazardous substances in the effluent of textile manufacturers, as well as other industrial sectors in Mexico, where there is little information about the use of hazardous substances in production processes or their release in wastewater. Some of the responsibility for this problem lies beyond the facilities concerned and government authorities.

The investigation found that several global fashion brands have business relationships with these two facilities, either currently or in the recent past. To solve this problem, transparency of information between suppliers and brands, as well as full supplier engagement through hazardous substance-use inventories, is needed and should be enforced. Corporate and governmental policies to eliminate the releases of hazardous substances and their substitution with safer alternatives also need to be enforced.

It is equally vital to have full facility public disclosure, in line with the right-to-know principle.[5] This will create wider and deeper awareness within local populations and provide critically needed information for civil society organisations and local citizens.[6] It will also build societal awareness and lead to informed pressure for comprehensive chemical management laws. **Companies have a duty, therefore, not to just focus on internal supply chain enforcement, but also to engage fully in public disclosure that results in progress towards zero discharge of hazardous chemicals.**

Action to eliminate hazardous substances and achieve greater openness in public disclosure of emissions from industry also needs to come from the Mexican government. Brands can help to change the current culture of secrecy by ensuring that information on the release of hazardous substances by their suppliers is made available to the public, and that this leads to reductions in the discharges of these substances.

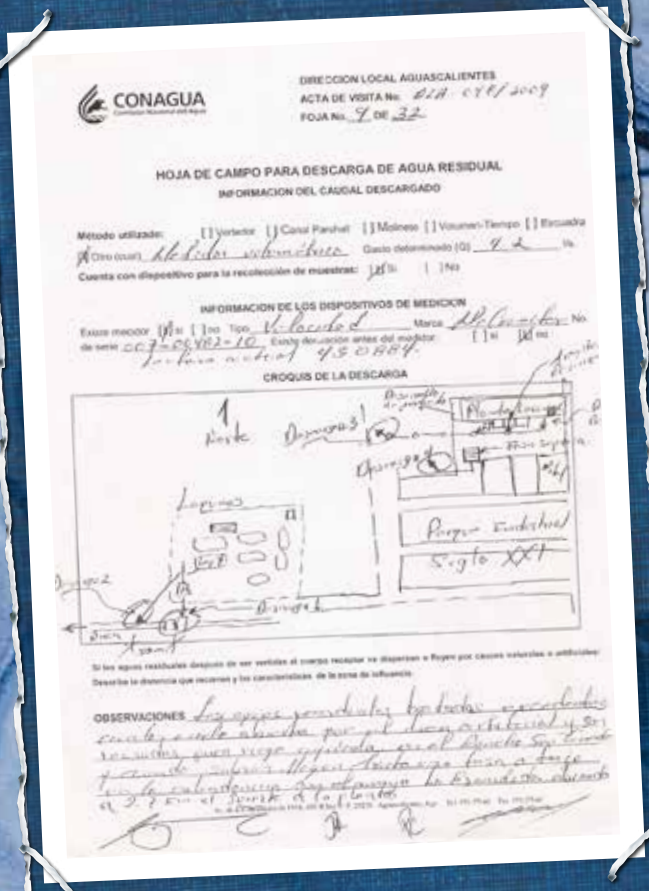
Box 1: Fashion – a dirty business

This investigation follows five recent Greenpeace reports – *Dirty Laundry, Dirty Laundry 2: Hung Out To Dry, Dirty Laundry Reloaded*, and more recently *Toxic Threads: The Big Fashion Stitch-Up* and *Toxic Threads: Putting Pollution on Parade*[7] – which investigated the discharge of hazardous substances from textile manufacturing and their presence in clothing and footwear.

Dirty Laundry found a range of hazardous substances being discharged into the Yangtze and Pearl River deltas from two textile manufacturers in China,[8] with commercial links to many major clothing brands. Most recently, as outlined in *Toxic Threads: Putting Pollution on Parade*, Greenpeace found a range of hazardous substances discharged from two industrial zones in China with a high proportion of textile manufacturers.[9]

The remaining reports sampled for the presence of hazardous substances in clothing products. Together, these reports demonstrate the release of hazardous chemicals at two points in the textiles chain. Firstly, that the presence of hazardous chemicals in finished products shows that they were used in the manufacturing facilities – this would have consequently led to their release in the country of production, as was found to be the case for two facilities in *Dirty Laundry*. Secondly, that these substances continue to pollute the environment and waterways around the world, wherever a product is sold to a customer and is subsequently washed.[10]

image © Lu Guang / Greenpeace



CONAGUA

DIRECCION LOCAL AGUASCALIENTES
ACTA DE VISITA No. [illegible]
FOJA No. 1 DE 32

HOJA DE CAMPO PARA DESCARGA DE AGUA RESIDUAL

INFORMACION DEL CAUDAL DESCARGADO

Método utilizado: [ ] Vertedor [ ] Canal Parshall [ ] Molinete [ ] Volumen-Tiempo [ ] Escuadra
[X] Otro (cual) [illegible] Gasto determinado (Q) 4.2 lps
Cuenta con dispositivo para la recolección de muestras: [X] Si [ ] No

INFORMACION DE LOS DISPOSITIVOS DE MEDICION

Existe medidor [X] Si [ ] No Tipo Velocidad Marca [illegible] No. de serie CC7-06VR2-10 Existe derivación antes del medidor [ ] Si [X] No
Lectura actual 43084

CROQUIS DE LA DESCARGA

Si los aguas residuales después de ser vertidas el cuerpo receptor se dispersan o fluyen por causas naturales o artificiales:
Describa la dinamica que recorren y las caracteristicas de la zona de influencia

OBSERVACIONES [illegible]

image Conagua inspection document, successfully disclosed to Greenpeace Mexico after a lengthy process.

image The familiar colour of blue denim takes on a more ominous tone when discharged into wastewaters.

TOXIC THREADS

#2

Two Mexican denim manufacturers investigated

Samples were collected from the main wastewater discharges of the Lavamex facility in Aguascalientes and the Kaltex facility in San Juan del Río, Queretaro, in May 2012, with two samples collected from each facility on consecutive days. The samples were intended to provide a snapshot of the type of hazardous chemicals present in these industrial wastewaters, which typically contain a variety of substances. All samples were analysed at the Greenpeace Research Laboratories (University of Exeter, UK), using qualitative analysis to detect the presence (though not the concentrations) of semi-volatile and volatile organic compounds, as well as to determine the concentrations of a range of metals and metalloids.

The Lavamex facility and the Kaltex facility in San Juan del Río in particular are considered to be among the biggest facilities carrying out wet processing in Mexico, including denim fabric-related manufacturing.[11] To undertake this investigation, Greenpeace had to obtain documentation from the regulatory authority Conagua (the National Water Commission) on the permits to discharge wastewater from these facilities, as well as the Conagua inspection records. In many countries, this type of information is easily accessible. In Mexico, however, it is considered to be confidential. Greenpeace therefore had to enter into a lengthy process to have this documentation disclosed.

2.1 Lavamex

The Lavamex facility is located in Aguascalientes City, in the small state of Aguascalientes in the centre of Mexico. The economy of Aguascalientes relies on industry (including the manufacture of textiles, electronics and automobiles), tourism, business and agriculture. The majority of its territory is semi-desert. San Pedro is the region's main river, which drains into the Santiago River, part of the Lerma-Chapala-Santiago river basin. However, it is dry for part of the year due to the climate, dams and other hydraulic infrastructures.

The Lavamex facility is one of several production plants that belong to the INISA group.[12] It is one of at least three INISA facilities in Aguascalientes, together with "Planta 2000" and "Planta Georgina",[13,14] which undertakes garment manufacturing. The Lavamex facility is almost exclusively dedicated to denim washing and dyeing operations.[15,16]

There is no publicly available data on INISA's revenue, and the company does not have a public website. This seems to demonstrate the company's intention to keep a low profile and it rarely appears at textile events, although it is an important player within the Mexican textile sector. However, public information lists INISA's Georgina facility as the 5th-biggest exporter in Aguascalientes, with more than 4,000 workers, a figure that was also mentioned by the State Governor in his inauguration speech in 2010.[17,18]

Greenpeace Mexico was successful in having the confidential Conagua inspection documents disclosed. These documents state that, in 2009, INISA's Lavamex facility employed about 1,600 workers, was producing 20 million pieces of clothing a year, that the water released came mainly from the "denim washing process", and that at this time it had about 36 washing machines.[19]

The Lavamex facility is publicly known for water pollution. In particular, the NGO Consciencas Ecologistas Aguascalientes has questioned whether its discharges, which are described as a blue colour, could endanger a protected natural area, "El Sabinal". An article mentions Lavamex as one of three companies highlighted by the NGO for its wastewater discharges. There was no response from Lavamex in the article.[20]

Discharge pipe from Lavamex

According to the Conagua register, Lavamex has had a valid wastewater discharge permit[21] since 2000 (although the company and the facility itself may have begun its activities a few years earlier). Lavamex literally "creates" a river from its main discharge pipe connected to its wastewater treatment plant (WWTP). It is a dry area and the water discharged is the sole source of a network of streams flowing through more than 20 acres of surrounding fields. Water from these streams is used for agricultural purposes. In rainy seasons, when flow rates are naturally high, diluted wastewater from the Lavamex facility may reach the San Pedro River. Studies show that the water quality in the San Pedro River is unacceptable, despite the presence of WWTPs.[22]

The pipe sampled by Greenpeace is Pipe 1[23] (see Figure 1), the only "official" pipe that is connected to the WWTP and solely discharges effluent from the industrial process. Government (Conagua) documentation[24] shows that this pipe discharges 24 hours a day, throughout the year. However, the Conagua inspectors also found two other illegal, unregistered pipes. Greenpeace observed that effluent from one of these is still being discharged (Pipe 4). Another pipe (Pipe 2) still exists, although it seems that it is no longer being used by the facility.[25]

Single samples were collected on two consecutive days – 2 May and 3 May 2012 – from Pipe 1. The discharge was continuous and operating at high capacity at the time of sampling.

Key findings – Lavamex

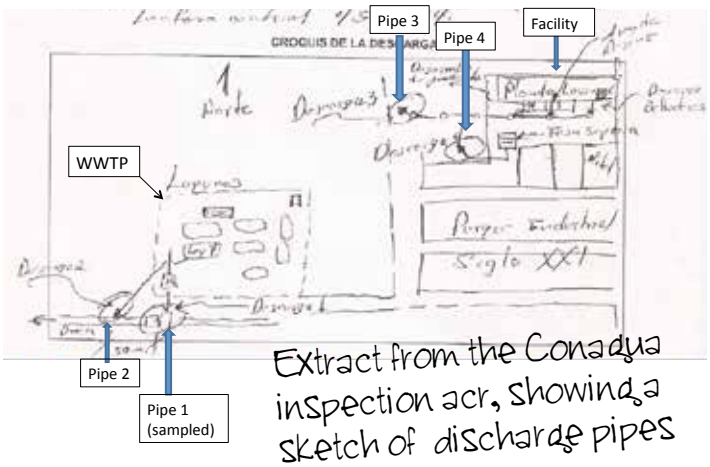
Most of the chemical compounds identified were found in both samples collected from the Lavamex wastewater discharge pipe. The majority of the chemicals isolated from each sample could not be reliably identified, and their properties and potential impacts cannot therefore be fully assessed. A wide range of organic compounds was found in the wastewater samples, and the key findings are as follows:

- **Nonylphenol (NP)**, a well-known persistent environmental contaminant with hormone disrupting properties, together with **nonylphenolethoxylates (NPEs)**, which are used as detergents and surfactants in textile manufacture and washing, and which degrade back to NP. (See Box 3)
- **TMDD**, a surfactant associated with the use of dye formulations (among other industrial applications), which is persistent in the aquatic environment and moderately toxic to aquatic life. (see Box 4)
- Two **benzotriazoles**, which are commonly used as corrosion inhibitors, and are moderately toxic to aquatic organisms.
- **Tributyl phosphate**, a hazardous chemical used in the textile industry, and a **trichloroaniline** (see Box 4), related to the manufacture and use of dyes and which is toxic to aquatic life, were both present as minor components.

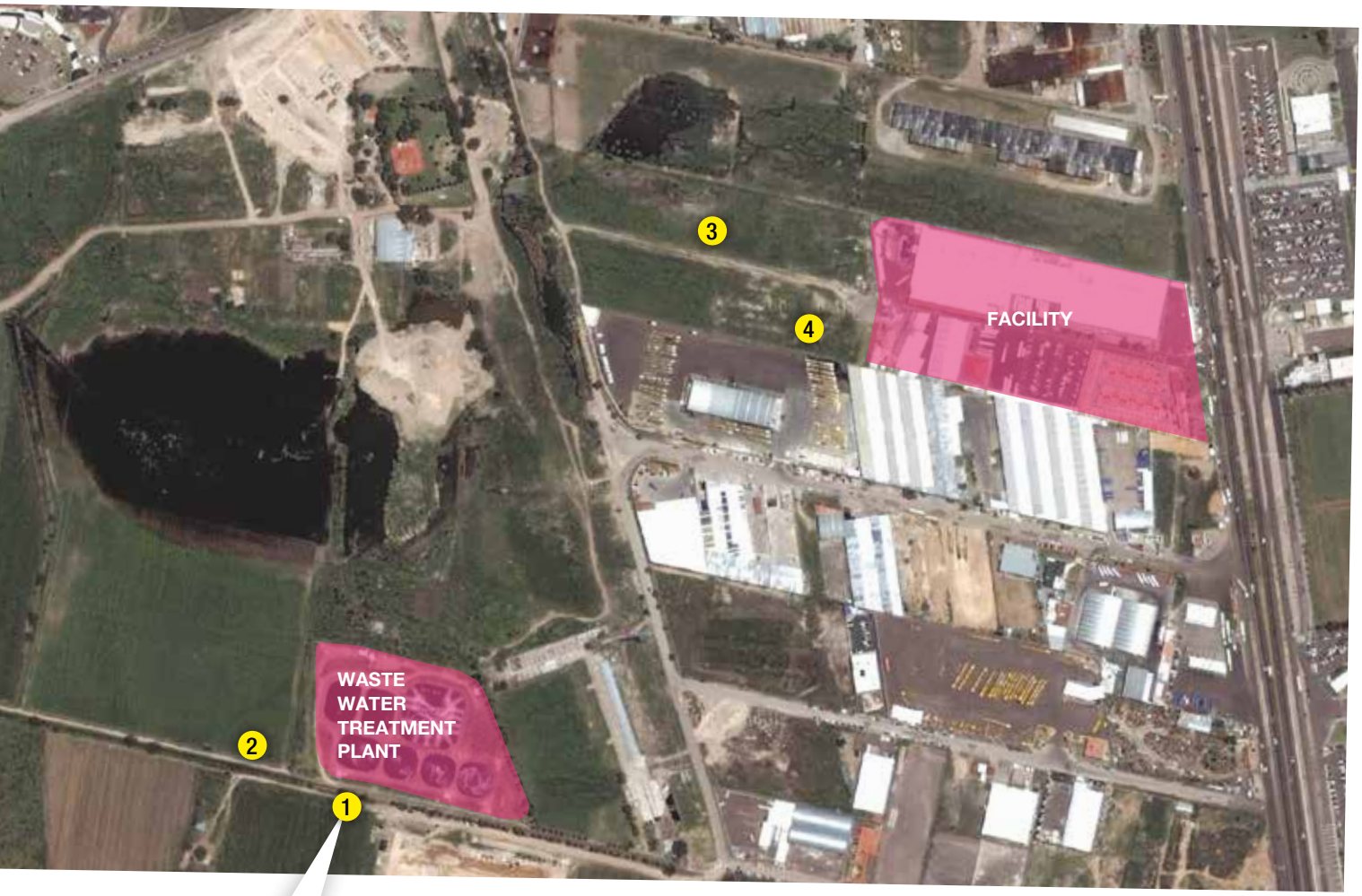
The NPEs and nonylphenol identified in the wastewater are regulated in some regions with respect to their manufacture, use and release. This is due to the toxicity, persistence and bioaccumulative potential of nonylphenol (see Box 3). The use of conventional wastewater treatment processes cannot effectively address the presence of these compounds in effluents. Their presence, together with the other hazardous chemicals identified provides a clear example of the use and consequent release of hazardous chemicals from textile manufacturing.

Figure 1: Lavamex complex in Aguascalientes

1. Pipe 1 (sampled)
2. Pipe 2
3. Pipe 3
4. Pipe 4



Extract from the Conagua inspection acr, showing a sketch of discharge pipes from Lavamex.



Outlet for pipe

Following the canals created by the discharge from Pipe 1 irrigating some fields.

2.2 Kaltex

The investigated Kaltex facility is located in San Juan del Río, a medium-sized city in central Mexico, in the state of Queretaro. The regional economy is based on industry, tourism and commerce and Kaltex is one of the largest companies. The region is mainly semi-desert (arid) with a very long dry season and a rainy summer.

The group that owns and operates this Kaltex facility is GrupoKaltex, which includes Kaltex Apparel, Kaltex Home and KaltexFibers.[26] It is the largest textile company in Latin America.[27] It has offices in various countries in the Americas and Europe, its major export markets are the US, Canada, Europe, and Central and South America[28], with over 60% of its products being exported.[29]

GrupoKaltex manufactures synthetic fibres, yarn, fabrics, garments, and home products, and can perform "all physical, and chemical finishes, prints, and dyeing that our customers require" in its textile manufacturing plants in Mexico and Latin America.[30] It is reported that GrupoKaltex manufactures 30% of all the denim made in Mexico.[31] It is an important supplier to the fashion industry, including the Mexican brand Trista.[32]

The Kaltex complex in San Juan del Río, Queretaro undertakes the washing and dyeing of apparel and home products for Kaltex in Mexico, including finishing garments, fabric, printing and textile finishing, making of clothing, and distribution. It employs more than 3,500 people. However it is likely that the wet processing is the most dominant activity.[33] This facility is believed to carry out denim washing and dyeing operations for Kaltex in Mexico.[34]

Discharge pipe from Kaltex in San Juan del Río

Kaltex[35] has two official permits to discharge its effluent, one into the San Juan River, part of the Panuco river basin, and another smaller discharge into a "field". The permits are limited to setting allowable levels for general pollution parameters and certain heavy metals.[36] An inspection document, which has been recently disclosed to Greenpeace, shows that the effluent from the main pipe (see Figure 2) is from "textiles finishing" and "sanitation services" for facility workers. This is discharged into the river after treatment in the WWTP via the main pipe, which operates 24 hours a day.[37] This formerly confidential information also shows that between 2007 and 2011 there was only one inspection, and not one single sample was taken by the government between 2002 and 2009 despite the fact that Kaltex is one of biggest industrial producers in the whole region.[38]

Two samples were collected by Greenpeace on two consecutive days – 2 May and 3 May 2012 – from the same discharge channel. At the time of sampling, wastewater was being discharged to the channel via a pipe that was operating at high capacity.

Toxic chemicals found

Both samples collected from the Kaltex facility discharge pipe showed very similar patterns of organic compounds that could reliably be identified, as well as a significant proportion that could not be reliably identified, which is not uncommon in complex industrial effluents. The main chemicals of concern in the samples included:

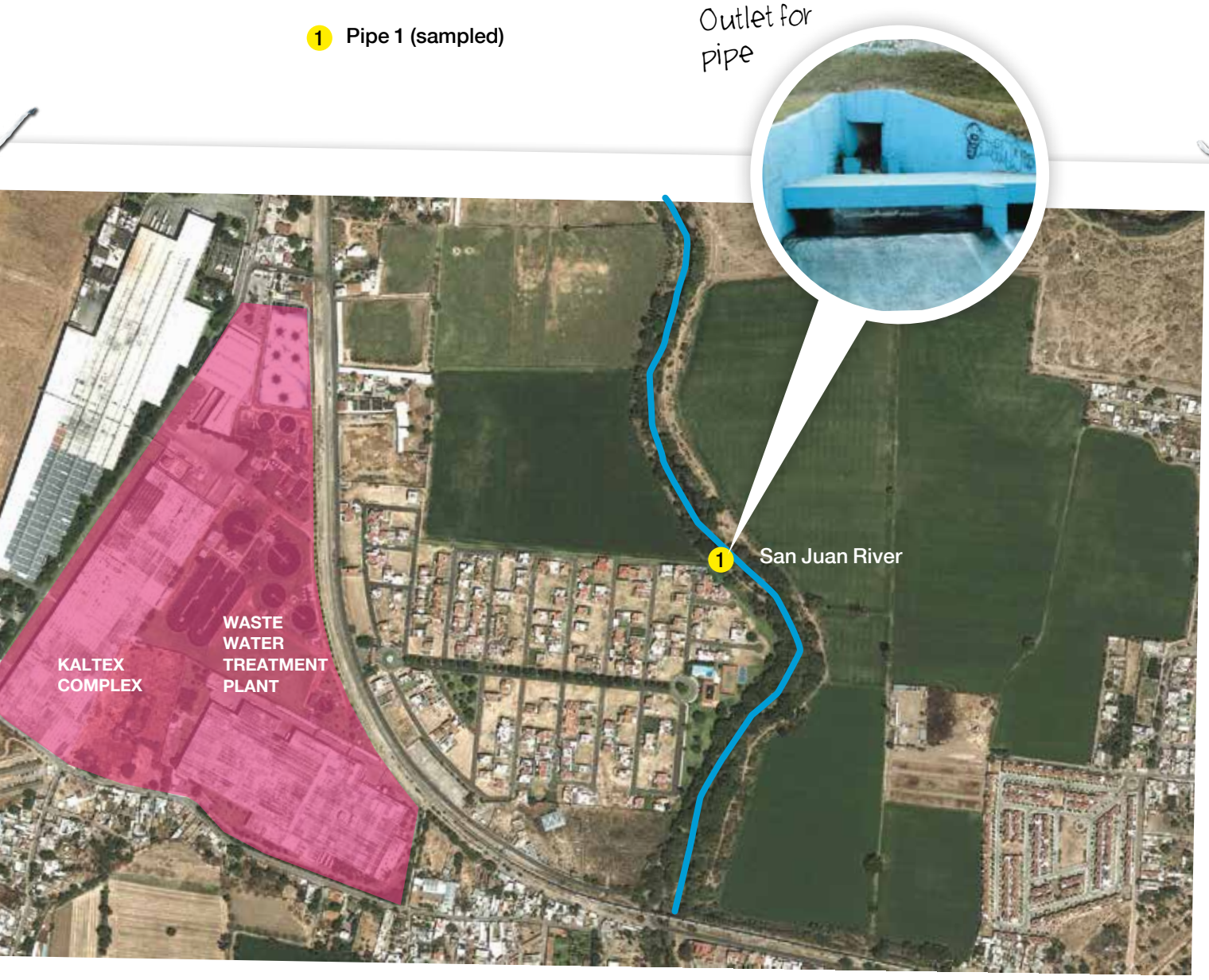
- **TMDD,** the same surfactant identified at the Lavamex facility, and which is persistent and moderately toxic in the aquatic environment, was also found here (see Box 4).
- **HMMM**, used to produce resins, which has some toxicity to aquatic organisms.
- Traces of two **trichlorinatedbenzenes**, also identified at the Lavamex facility, which are widely recognised persistent toxic chemicals and are used as solvents and dye carriers. They may have originated from washing of textiles containing residues of these chemicals (see Box 4).
- Two phthalate esters (**DEHP** and **DiBP**) as minor components. These chemicals are reproductive toxins. They have numerous industrial uses including uses in the manufacture of textiles. For these chemicals, sources other than textile manufacture cannot be excluded (see Box 5).

The chemicals that were identified as major components in the samples are not known to be currently regulated in either Mexico or elsewhere, as far as their manufacture and use is concerned. Nonetheless, their release to the environment in wastewaters discharged from this facility is a cause for concern, particularly in light of the very large volumes of wastewater that are reported to be discharged from this facility on an ongoing basis.

image © 2012 Google, 2012 GeoEye, 2012 INEGI

Figure 2: Kaltex complex San Juan del Rio

1 Pipe 1 (sampled)



Kaltex pollution scandals

According to a study by Conagua and the UN meteorological agency from 2004 and revised in 2008, the Kaltex Facility in San Juan del Río is discharging 18 million litres of waste a day.[39] The study suggests that Kaltex should invest in wastewater treatment (for high levels of heavy metals such as chrome, cadmium and lead).[40]

In 2003 there was a legal dispute between Conagua and Kaltex concerning water pollution via its pipe in San Juan del Río,[41] although the authorities have recently reported that this has since been resolved. In 2007 and 2009 there was a proposal by a federal representative in the Congress to investigate the pollution from Kaltex, as well as the paper company Kimberly Clark (2007), which was denied.[42,43] Despite the alarming pollution described in the proposal, and the lack of action from local and national regulatory authorities, the Congressman concluded that: "unfortunately, these companies have been untouchable, despite the risk to the environment".[44] There have been numerous complaints from local inhabitants about pollution of the river and of bad management of hazardous materials, which were stored in fields.[45]

image © Marizilda Cruppe / Greenpeace

Box 2: Kaltex Corporate and Social Responsibility

Kaltex presents itself as a very responsible company that is "committed with the preservation and improvement of the environment. Therefore, our plants operate under the watchword of protecting the environment, our people's health and the one of the public in general."[46] On its website it states that one of its most important achievements is its Water Treatment Plant in San Juan Del Río (referred to in this report), which is "one of the world's biggest of its kind, with high technology and fully computer-controlled equipment for its control and operation".[47] Kaltex also states that: "We have implemented a permanent program to replace the chemicals and colorings which do not comply with environment regulations."[48]

However, there are intrinsic problems associated with the pollution control approach and its emphasis on wastewater treatment plants. While these are effective at cleaning up certain types of pollution – such as sewage or other biological wastes and certain readily degraded chemicals – they cannot cope with many hazardous chemicals. **Some hazardous chemicals will pass through the treatment process unchanged and be discharged to surface waters where they can enter the food chain and build up in downstream sediments.** Others can be converted into other more hazardous substances which are also discharged and/or can accumulate in other wastes generated during the treatment process. Hazardous wastes in the form of treatment plant sludge are therefore created which in turn are disposed of, into landfills or through incineration, releasing the hazardous substances or their by-products into the environment.[49,50]

Box 3: Nonylphenol (NP) and Nonylphenolethoxylates (NPEs)[51]

Nonylphenolethoxylates (NPEs): NPEs are a group of manmade chemicals that do not occur in nature other than as a result of human activity. They are most widely used as detergents and surfactants, including in formulations used by textile manufacturers. Once released to wastewater treatment plants, or directly into the environment, NPEs degrade to nonylphenol.

Nonylphenol (NP): NP is used to manufacture NPEs, among other things. Following use, NPEs can break back down into the NP from which they were produced. NP is known to be persistent, bioaccumulative and toxic, and is able to act as a hormone disruptor. NP is known to accumulate in the tissues of fish, among other organisms. NP has also recently been detected in human tissue.

In some regions, the manufacture, use and release of NP and NPEs have been regulated for many years. NP and NPEs were included on the first list of chemicals for priority action towards achieving the OSPAR Convention target of ending discharges, emissions and losses of all hazardous substances to the marine environment of the northeast Atlantic by 2020. NP has also been included as a "priority hazardous substance" under the EU Water Framework Directive. Furthermore, within the EU, since January 2005 products (formulations used by industry) containing greater than 0.1% of NP or NPEs may no longer be placed on the market, with some minor exceptions.

Box 4: Other hazardous substances[52]

TMDD: TMDD (a decynediol derivative, 2,4,7,9-tetramethyl-5-decyne-4,7-diol, also known as Surfynol 104) is produced and used in large quantities, mainly as an industrial surfactant, including in dye and printing ink formulations. Once discharged to surface waters, TMDD is not readily degraded and persists in the aquatic environment. TMDD has been found to be moderately toxic to aquatic organisms in laboratory experiments on fish and has been classified as harmful to aquatic life with long-lasting effects.

Anilines: Halogenated anilines (also called halogenated benzenamines), along with other substituted anilines, are used in many applications including in manufacture of dyes (including azo dyes), rubbers and plastics, pesticides, herbicides and pharmaceuticals. Aniline and many of its chlorinated derivatives, including the one identified in this study, are readily soluble in water and are toxic to aquatic organisms. Some anilines are carcinogenic and as a result are listed in regulations in various countries, including China and EU member states, which prohibit the use in textiles of azo dyes that can degrade to form unacceptable concentrations of certain carcinogenic amines, though this does not apply to the aniline identified in this study

Trichlorobenzenes (TCBs): The TCBs found at the Kaltex facility[53] are used as dye carriers and also in the production of pigments and dyes. Given the trace levels of TCBs in the samples, their presence may be due to having been washed out from fabric containing residues of TCBs brought to this facility, rather than the direct use of TCBs within the facility. TCBs are widely recognised hazardous chemicals. They are not readily biodegradable and are, therefore, persistent pollutants that can remain in the environment for a prolonged time, primarily in soils and sediments. TCBs also have the potential to bioaccumulate in aquatic organisms, and are toxic to many aquatic organisms, while studies on mammals indicate that all TCBs have effects on the liver and the blood system. Within the EU, TCBs have been included as priority substances under the Water Framework Directive, a regulation designed to improve the quality of water within the EU.

Box 5: Phthalates[54]

Phthalates are mainly used as plasticisers (or softeners) in plastics, especially PVC, and as ingredients in inks, adhesives, sealants and surface coatings. Specifically related to textiles, phthalates were recently reported within plastisol prints on textile products manufactured and sold around the world, with very high levels of certain phthalates in some products, including DEHP.[55] They are widely found in the environment, primarily due to their presence in many consumer products. They are also commonly found in human tissues, with reports of significantly higher levels of intake in children. There are substantial concerns about the toxicity of phthalates to wildlife and humans. For example, DEHP, one of the most widely used to date, is known to be toxic to reproductive development in mammals.

Despite their toxicity, there are relatively few controls on the marketing and use of phthalates. Of the controls that do exist, the best known is the EU-wide ban on the use of certain phthalates in children's toys and childcare articles. Within the EU, certain phthalates including DEHP, have been included on the list of candidates as "substances of very high concern" under the REACH Regulation. Within the EU DEHP is also listed as a priority substance under the Water Framework directive, a regulation designed to improve the quality of water within the EU.

image © Marizilda Cruppe / Greenpeace

images:

(top) Greenpeace took samples of wastewater discharges from the Kaltex facility. These samples showed the presence of toxic chemicals.
© Diego Uriarte Quezada / Greenpeace,

(bottom) Strange foam from the polluted San Pedro River totally changes the landscape.
© Guadalupe Szymanski / Greenpeace

image Some hazardous chemicals have been detected in samples of river water from the River Santiago.

#3

Water pollution in Mexico

More than 70% of freshwater resources in Mexico are affected as a result of pollution from all sources, with 31% described as contaminated or grossly contaminated, which reduces the amount available for providing clean water. Over the last 55 years, water availability per inhabitant has reduced dramatically, from 11,500 m^3 in 1955 to 4,263m^3 in 2010, for a number of reasons, including water pollution.[56] About 84% of Mexicans are "extremely concerned" about water pollution.[57]

The pollution of freshwater from both municipal and industrial effluent is evident throughout Mexico, with some of the worst examples being the Lerma-Chapala-Santiago, the Balsas, Valle de México and Papaloapan river basins.[58]

Box 6: Limited regulation – limited enforcement

National regulations in Mexico for the discharge of effluent (known as NOM-001 and NOM-002)[59] are based on allowable levels of eight general water quality indicators, established by the National Water Commission (Conagua), such as Biochemical and Chemical Oxygen Demand (BOD & COD),[60] as well as the concentrations of nine heavy metals. Apart from the heavy metals, these limited standards do not measure hazardous substances or their impacts on freshwater systems, therefore much of the assessment and reporting on river water quality is based on these general indicators.

Conagua and the municipal authorities are responsible for issuing discharge permits and monitoring compliance with these standards.[61] The authorities are also responsible for inspection and for punishing those who breach the standards. However, based on information obtained by Greenpeace Mexico[62] it is clear that little is done to ensure compliance with the regulations.

Inspections are sporadic, often without sampling what is actually being discharged, and economic sanctions for polluters are minimal or non-existent. Resources are grossly inadequate. In one river basin – Lerma-Santiago-Pacifico – there are only five inspectors to enforce standards, covering hundreds of industries.[63] It is therefore easy for dirty industries to benefit from the complacency of the authorities that permit these practices, at the expense of the environment, water quality and impacted communities.

For example, a study that looked at discharges into the Atoyac River analysed 23 industrial discharges and found that 78% were in breach of the limited parameters of the effluent standard NOM 001. The textile industry makes up 24% of all industrial sectors in the basin and is also described as the industrial sector that breached the limits most frequently (for the discharges investigated).[64]

image: The San Pedro River, located near Aguascalientes city, receives discharges from different types of industries, including the textiles industry. © Guadalupe Szymanski / Greenpeace

In Mexico, neither the government nor the industry is required to inform the public about wastewater discharges. Although there is a Pollutant Release and Transfer Register (PRTR)[65] where industries can report their emissions of certain hazardous substances, this system is not mandatory. It covers a limited number of substances and has a number of inconsistencies,[66] with no designated authority to monitor compliance. A number of textile facilities report their emissions on this Register, including the two facilities in this report.

There is evidence that industry is also responsible for discharging hazardous pollutants that are a cause for concern. For example, substances that can be found in Mexican rivers include highly toxic heavy metals such as mercury, lead, chromium, cadmium, which are regulated, and other harmful compounds such as toluene or benzene, which are not included in any regulation regarding discharges to water.[67] Industry is likely to be a significant source of these substances. However, until recently, very little was known about the extent of the problem of hazardous chemicals discharges in Mexico.

Hazardous chemicals – a little known problem exposed

In May 2012, Greenpeace Mexico succeeded in getting the government to disclose a study done by the Environment Ministry's Water Investigation Center (IMTA),[68] which shows a wide range of chemical substances present in the Santiago River basin (part of the Lerma-Chapala-Santiago river basin).[69] The investigation, which took place between 2009 and 2011, found 1,090 chemical substances in the river, including some hazardous substances such as nonylphenol, octylphenolethoxylate and tetrachloroethylene.[70] The study analysed hundreds of river water samples, as well as municipal and industrial discharges, and highlights the discharge of phenols, the phthalate DEHP, and chloroform. In many of the places sampled, the concentrations of the phthalate DEHP, and of heavy metals in river water such as cadmium, copper and mercury, were also above the limits set for the protection of aquatic life in Mexico.[71]

For wastewaters, the majority of breaches of the regulations are found to be industrial discharges: "In general, we conclude that industrial discharges are more polluting than municipal discharges since between 87% and 94% of these discharges were in breach of at least one of the parameters of the NOM 001 law."[72,73]

The attitude of the Mexican government towards industrial pollution is evident in its response to Greenpeace Mexico, when IMTA stated that disclosing this document would "create a competitive advantage for certain industries, because the non-polluters would be in a position of knowing their own toxic discharges as well as their competitors'. Moreover, this information would allow them to report the other polluting industries and at the same time to modify the content of their own discharges."[74]

Box 7: Examples of water pollution in two river basins

1) Chemical pollutants and concerns about damage to the health of local populations in the Balsas river basin

The Atoyac and Xochiac rivers, near Texmelucan, Puebla, have suffered water pollution for many decades. Originally this was from municipal sewage discharges, but it has been reported that pollution became more severe when industrial discharges began in the 1990s.[75]

University researchers have investigated genotoxic damage in populations living near these rivers.[76] Communities where leukaemia and cases of skin haemorrhages have been reported were included in the study, as well as other communities where such cases have not been described. The study found that populations closer to the Atoyac and Xochiac rivers had greater genotoxic damage. The authors conclude that the results indicate damage due to toxic agents, and they feel that the environment is the most probable source of exposure, though other unrelated factors may also contribute. They also recommend future studies to determine whether exposure to volatile toxic chemicals in the air is contributing to the effects seen. Certain volatile chemicals have been found in the rivers, including chloroform, methylene chloride and toluene, which may be due in part to discharges from the petrochemical and textiles industries. Whether and if so to what extent, the use and release of hazardous chemicals by the textile sector is contributing to the reported effects is not clear.

The researchers conclude that: "Given the fact that México is a country with very limited resources of freshwater, the situation encountered in Tlaxcala should be a warning of what might happen in other areas where the same transformations are taking place".[77]

2) Public protests about health concerns due to water pollution in the Lerma-Chapala-Santiago river basin

The case of the Santiago River is symptomatic of the type of problems faced in many of Mexico's river basins. In 2007, public concerns about the deterioration and contamination of the river and the risk that it posed to the health of local residents were presented to the Latin American Water Tribunal. The following year, there was a confrontation between local inhabitants and the State government, after the death – allegedly due to arsenic poisoning – of a boy who fell into the river.[78] As a result, the Jalisco State government and the Federal Human Rights Commission recommended further pollution control measures, and a wastewater treatment plant was installed.[79] However, concerns about the health of local people still persist. A recent study by Greenpeace Mexico and the Union of Concerned Scientists also raises questions about the links between reports of ill health and the pollution of the river.[80]

image © Marizilda Cruppe / Greenpeace

image: Kaltex produces and washes clothes for many international brands, including Levi's and Calvin Klein.
© Guadalupe Szymanski / Greenpeace

There are currently some 30 mills producing yarns and knitted and woven fabrics in Mexico, with US-based firms producing significant amounts of denim within the country.

image Industries established in the area around El Salto, Jalisco, pour industrial effluent likely to contain hazardous chemicals into the Santiago River every day.

TOXIC THREADS

#4

Mexican textiles industry and global fashion brands

The textile and apparel industry constitutes the fourth largest manufacturing activity in Mexico and is vital to its economy. With more than 500,000 Mexicans working in textiles and apparel, the sector is the number one creator of jobs. Furthermore, Mexico is the fourth largest supplier of textiles and apparel to the US market.[81]

The textiles sector grew rapidly in the 1990s, much of it taking place in Maquiladoras, following the NAFTA trade agreement with the US.[82] This began to decline in 2004 when taxes and tariffs on imports were dropped for all countries. Many companies had to shut down, with the loss of numerous jobs.[83] It is estimated that 32,000 jobs were lost in less than a decade in the Tehuacan region, Puebla, a major centre for jeans production.[84] China has now replaced Mexico as the top supplier of textiles and apparel to the US. Mexican manufacturers are struggling to compete with the low cost of denim, women's underwear and sportswear from China and the rest of Asia.[85]

However, the Mexican textile and garment sector began to grow again in 2010,[86] and is benefitting from the "fast fashion" phenomenon, where its proximity to the US gives it an advantage over China. International brands are now seeing Mexico as a permanent provider: "Many big brand transnational companies that used to be based in Mexico are returning because they are now looking to produce where the products are later sold (...) Big quantities aren't being produced any more, we are now talking of small quantities that add more value to fashion."[87]

The brands highlighted in this study that have connections to either the Lavamex or the Kaltex facilities (see Box 8), include some "fast fashion" brands, which deliver new fashion trends in increasingly short cycles in response to customer preferences. It is now the norm to have six to eight fashion seasons compared to the traditional two to four collections a year for many high street brands.[88]

There are currently some 30 mills producing yarns and knitted and woven fabrics in Mexico, with US-based firms producing significant amounts of denim within the country. Mexico's apparel industry relies almost entirely on the US market for exports. Its cut and assembly operations often use US-made fabrics to produce basic garments such as denim jeans and t-shirts, which are then exported to the US.[89]

Global fashion brands play a crucial part in the Mexican textile industry. For example, the Maquila Solidarity Network reports that recent brands sourcing from the Tehuacan region are Guess, Tommy Hilfiger, Express, Calvin Klein, Paris Blues and American Eagle Outfitters (AEO). Workers also reported production for Walmart, including in small and clandestine facilities, although it is not clear whether that production is for the international or national market.[90] The Tehuacan region, formerly known as one of "Mexico's jeans capitals", became infamous at the beginning of the 2000s for environmental pollution caused by the industry, as well as human rights issues, such as low wages, which were widely denounced in the press. As a result of these scandals, many international fashion brands, for example Levi's and GAP, stopped sourcing their products in the region by the mid-2000s.[91]

Connections to multinational and domestic brands

In November 2012, Greenpeace requested comments[92] from the Mexico-based suppliers, Kaltex and Lavamex. We also contacted the head offices of international apparel brands Levi Strauss & Co, PVH (Calvin Klein), Walmart, Gap, and Guess, regarding the testing of samples from the aforementioned suppliers, and asking what business relationships these apparel brands had with those suppliers.

In its response to Greenpeace on 20 November 2012, **Kaltex** claimed that: "Kaltex Manufacturing Inc is serving beyond required environmental regulations established in Mexico, so Kaltex is not the polluter of Río San Juan…".

Levi Strauss & Co acknowledged that it has a sourcing relationship with both Kaltex and Lavamex (i.e. Industrias del Interior S.R.L .de C.V.) facilities, "…As we shared in our September 28, 2012 letter, Levi Strauss & Co can confirm that we have a sourcing relationship with suppliers with Grupo Kaltex S.A. de C.V. and Industrias del Interior S.R.L .de C.V.…". Further, Levi Strauss & Co is publicly linked to both the **INISA Lavamex** facility and the **Kaltex** facility in San Juan del Río[93], as both facilities appear on its supplier list, after and before the sampling date in June 2012.[94]

In September 2012, Greenpeace sent letters to the following international apparel brands, requesting comment on any business relationship they each had with Kaltex and/or Lavamex: C&A, Nike, LVMH, H&M, Walmart, Gap, Levi Strauss & Co, Guess, Benetton, PVH, Inditex, Uniqlo, Mango, Adidas, Limited Brands (Victoria's Secret), VFC, M&S, Abercrombie & Fitch, Bestseller, PPR, G Star Raw, Metersbonwe, Esprit, Migros, Coop, and Li Ning.

On 28 September 2012, **C&A** responded that Kaltex is a supplier, and **Nike** responded that Kaltex is "...an indirect supplier to an affiliated Nike brand".

LVMH responded on 29 September 2012, saying that Kaltex is a supplier to the LVMH brand DKNY.

In their responses, **Adidas**, **Walmart**, **Puma**, **Esprit**, **Li Ning**, **Uniqlo**, **Mango**, **Limited Brands**, **G Star Raw**, and **Migros** either stated that no business relationships exist, or failed to indicate whatsoever whether or not they have business relationships with Kaltex or Lavamex.

By the publication deadline, **H&M**, **Gap**, **Guess**, **Benetton**, **PVH (Calvin Klein)**, **VFC**, **M&S**, **A&F**, **Bestseller**, **PPR**, and **Metersbonwe** had not responded to Greenpeace. However, Greenpeace investigations have revealed that **Calvin Klein** and **Guess** have had a business relationship with the Kaltex facility in the recent past.[95,96]

Inditex (Zara) confirmed that Kaltex and Lavamex are on its supplier list, but did not indicate associated orders.[97,98] The Kaltex facility also supplies its own brand, **Caprini**.[99]

Regarding the **Lavamex** facility, Greenpeace investigations have revealed that both **Gap** and **Walmart**[100] have had a business relationship with Lavamex in the recent past. Gap had not responded by Greenpeace's publication deadline, but Walmart's response, however, did not mention its business relationship with Lavamex.[101]

Many of these companies have made public statements about the need to avoid environmental pollution. According to their respective websites, some of these companies seem to be concerned about the environmental impact from the manufacture of their products. However, this investigation found that toxic chemicals are being released into surrounding water and local river systems by their past or current suppliers.

Levi's (Levi Strauss & Co): "From the way we make our products to how we run the company, we're committed to restoring the environment. Consumers expect this from us, employees demand it, and the planet requires it."[102]

Calvin Klein (PVH): "We are committed to incorporating sustainability into all aspects of our operations and have a fundamental responsibility to minimise our impact on the environment. We acknowledge that we depend on the Earth's limited natural resources for our business and that it is imperative that we operate in a manner that supports conservation and responsibly addresses environmental challenges around the world."[103]

GAP has a Clean Water mark that is stamped on denim, acknowledging Gap Inc's denim wastewater treatment programme.[104]

Walmart: "Environmental sustainability has become an essential ingredient to doing business responsibly and successfully. As the world's largest retailer, our actions have the potential to save our customers money and help ensure a better world for generations to come."[105]

image © Marizilda Cruppe / Greenpeace

image The San Pedro River flows through El Sabinal State Park, where visitors are warned: "Do not swim, dirty water". Due to water pollution, including that from industrial discharges, tourism has decreased and affected the income of the community.
© Guadalupe Szymanski / Greenpeace

Major brands are in a unique position to have a positive influence in reducing the environmental impacts of textile manufacturing.

image Industrial pollution of the River Santiago, one of the most important watersheds in the state of Jalisco, Mexico. Some hazardous chemicals have been detected in samples of river water.

5. Time to Detox Mexico's waterways

This investigation provides a snapshot of the discharge of hazardous chemicals into Mexico's rivers. Given the scale of textile manufacturing in Mexico, such discharges are likely to be the tip of the iceberg.

The discharge of some hazardous, persistent chemicals is taking place despite the use of modern wastewater treatment plants. A new strategy needs to be adopted to stop such chemicals being released into water – one that ensures the rapid and transparent elimination of the use of hazardous chemicals at source and their replacement with non-hazardous alternatives.

The textile industry has an important role in the industrialisation and development of many countries in the Global South. Major brands with supply chains in these countries are in a unique position to have a positive influence in reducing the environmental impacts of textile manufacturing – and in the process to help bring about the shift away from hazardous and environmentally damaging chemicals across all industries.

Transparency of information, between suppliers and brands, as well as full supplier engagement through hazardous substance use inventories and black lists, is needed to enforce policies to eliminate the use of hazardous substances and their substitution with safer alternatives.

However full facility level public disclosure of hazardous chemicals use and releases, in line with the right-to-know principle, is vital to create wider and deeper awareness for local populations, provide information for civil society organisations, and build societal awareness and pressure for the need for comprehensive chemical management laws.

Transparency of this kind would improve the situation in Mexico dramatically. **This report shows that regulation of wastewater discharges in Mexico does not currently provide adequate protection, the regulatory standards are not comprehensive or stringent and there is little enforcement of the standards that do exist.** Therefore, companies and global brands need to go beyond laws, while encouraging the government to improve its regulation of hazardous substances.

Brands can also help to change the current culture of secrecy, where government authorities – under the pretext of "confidentiality" – do not disclose basic information on industrial discharges. By ensuring that information on the release of hazardous substances by their suppliers is made available to the public, which results in discharge reductions, global brands can demonstrate the benefits of a new and more open system.

Following Greenpeace's Detox campaign, which started in 2011, a number of sportswear and fashion brands took up the Greenpeace Detox challenge[106] and made individual commitments[107] to zero discharge of all hazardous substances by 2020.[108]

As the deadline for achieving zero discharges draws nearer, the need for comprehensive elimination plans grows increasingly urgent. As a priority, these need to address as a minimum the use of hazardous substances highlighted by Greenpeace, and work swiftly to screen all chemicals used by the industry to set up a dynamic black list with short-term elimination deadlines for specific chemicals.[109]

Commitments with the necessary integrity should have a credible approach (a clear shift from the end-of-pipe and risk management approach) and concrete steps to follow-through (see Box 8).

Box 8: Key steps to Detox the textile chain

To effectively resolve the pollution of our waters with hazardous chemicals, all brands should:

- Adopt a credible commitment to phase out the use, from their global supply chain and all products, of all toxic chemicals by 1 January 2020 .
  Credible means based on the unambiguous adoption of three fundamental principles – precaution, complete elimination (zero discharges), and right-to-know.
- Walk the talk by committing to disclose the discharge of hazardous chemicals by their global supply chains. The data should clearly identify the location of facilities and their respective discharges – chemical by chemical, facility by facility, at least year by year, but preferably more frequently (quarterly, for example). The data should be made public – on the internet or equivalent easily-accessible formats in the local language (for example, by using credible public information platforms[110])

Six of the brands that took up the Greenpeace Detox Challenge – the sportswear brands Puma, Nike, Adidas and Li Ning, and the fashion brands H&M and C&A – are now collaborating on the further development and implementation of both their individual and collective implementation plans towards zero discharge of hazardous chemicals,[111] which set out the steps that they intend to take to achieve their commitments. Through their collective "draft joint roadmap" others are invited to partner in this endeavour. Unfortunately, the roadmap has so far failed to set clear dates and timelines to achieve full **elimination** of all uses of widely used hazardous chemicals. It also does not make a clear commitment to concrete deliverables such as the **disclosure** of hazardous chemical discharges at the manufacturing factories locally and online.

Marks & Spencer and **Inditex**, owners of the **Zara** brand, also recently committed to "Detox" their supply chain and products. Together with **H&M** and **C&A**, they also have firm plans to **start disclosing discharges** from their supply chains, as well as **short-term elimination timelines** for some of the worst chemicals, such as **APEOs** and **PFCs**.[112] They set a clear example for other brands on concrete action towards Zero discharge.

The steps taken on the ground to eliminate the discharge of hazardous chemicals from textile facilities must also be taken by all industrial sectors that contribute to water pollution in Mexico. This will also require the Mexican government to implement comprehensive chemical management policies so that chemicals of concern can be regulated and ultimately eliminated.

image Mexican celebrities, including model Gala Koksharova, showed their support for the Detox campaign in a Greenpeace "cat walk" action. They wore clothes from various brands tested and featured in the Greenpeace report *Toxic Threads: The Big Fashion Stitch-Up*. © Ivan Castaneira / Greenpeace

Greenpeace calls on the Mexican government to adopt:

1) A **political commitment to "zero discharge"**[113] of all hazardous chemicals within one generation,[114] based on the precautionary principle and a preventative approach to chemical management. This commitment must have the substitution principle at its core, and include producer responsibility[115] in order to drive innovation and toxics-use elimination.

2) An **implementation plan** to:

- establish a **dynamic priority hazardous chemical list**, for immediate action.[116] The current discharge permits (NOM 001 and 002) need to be broadened to include more hazardous substances, the limits for heavy metals should be lowered and their focus should be re-directed towards the progressive reduction of the discharge of all hazardous chemicals, in line with the "zero discharge" goal above;
- establish **intermediate targets** to meet the generation goal above; and
- establish a **publicly available register of data about discharge, emissions and losses of hazardous chemicals**. Mexico already has a PRTR system, however it is only voluntary and covers a limited number of substances. PRTRs can achieve significant reductions in emissions of hazardous substances.[117] To achieve similar reductions in the release of hazardous substances, the government must make its PRTR reporting requirements mandatory through a binding norm[118] that would include a wider range of chemicals, full transparency on the controls and inspections that are undertaken, and sanctions for factories that do not report correctly.

3) Measures to **ensure infrastructure and policies are in place** to support implementation, including:

- identifying priority chemical restrictions;
- policies and regulations that require mandatory audits and planning;
- the provision of technical help and appropriate financial incentives; and
- research and support for innovation in green chemistry.

Finally, it will be crucial to **ensure the enforcement of existing and future more stringent regulations** (NOM 001) via a higher number of controls and inspectors and greater transparency concerning inspections and sanctions. All government permits, research and information on discharges and releases of hazardous chemicals by industry should be immediately and easily accessible to the public.

www.greenpeace.org/detox

Endnotes

1 For further technical information, see: Labunska I, Brigden K, Santillo D & Johnston P (2012). Organic chemical and heavy metal contaminants in wastewater discharged from three textile manufacturing and washing facilities in Mexico. Greenpeace Research Laboratories Technical Report 08-2012.
http://www.greenpeace.org/international/putting-pollution-on-parade

2 For Lavamex: Conagua (2009). Inspection Act, documents for Lavamex, obtained by Greenpeace.
For Kaltex: Secretaria de Trabajo y Prevision Social (2008). Dirección General de Fomento de la Empleabilidad Unidad de Enlace. See p.59 & 60.
http://www.sisi.org.mx/jspsi/documentos/2008/seguimiento/00014/0001400082108_065.pdf

3 WWD (2010). China extends grip on global denim production, 20 May 2010.
http://www.wwd.com/business-news/government-trade/china-extends-grip-on-global-denim-production-3080897

4 For information on protests about water pollution in Mexico see: ANAA website: Asamblea Nacional de Afectados Ambientales (National Assembly for those affected by environmental problems).
http://www.afectadosambientales.org/devastacion-y-afectacion-ambiental/agua/
Also see Section 3, Box 6

5 Right-to-know is defined as practices that allow members of the public access to information – in this case, specifically about the use and releases of hazardous chemicals. Implementing right-to-know requires full facility-level public disclosure, i.e. reporting, to the public – for example, on the internet or an equivalent, easily-accessible format. The data should clearly identify each facility, its location and its respective discharges, chemical by chemical, facility by facility, at least year by year, but preferably more frequently (e.g. quarterly).

6 See, for example, the recent report Sustainable Apparel's Critical Blind Spot, IPE (2012) - pp 18.
http://www.ipe.org.cn/about/report.aspx

7 Greenpeace International (2011a). Dirty Laundry: Unravelling the corporate connections to toxic water pollution in China. July 2011
http://www.greenpeace.org/international/en/campaigns/toxics/water/Dirty-Laundry-report/

Greenpeace International (2011b). Dirty Laundry 2: Hung Out to Dry: Unravelling the toxic trail from pipes to products. August 2011.
http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry-2/

Greenpeace International (2012a). Dirty Laundry: Reloaded. How big brands are making consumers unwitting accomplices in the toxic water cycle. 20 March 2012.
http://www.greenpeace.org/international/en/publications/Campaign-reports/Toxics-reports/Dirty-Laundry-Reloaded/

Greenpeace International (2012b). Toxic Threads: The Big Fashion Stitch-Up. November 2012.
http://www.greenpeace.org/international/big-fashion-stitch-up

Greenpeace International (2012c). Toxic Threads: Putting Pollution on Parade. December 2012.
http://www.greenpeace.org/international/putting-pollution-on-parade

8 Greenpeace (2011a), op cit. Previous research also found that persistent hazardous chemicals such as perfluorinated chemicals and alkylphenols, which Greenpeace detected in wastewaters discharged from textile manufacturing sites, are widely present in the environment, including within the Yangtze River ecosystem.
A Greenpeace study found bioaccumulation of these chemicals in two fish species. The two species sampled are on the daily menu of local communities. Brigden K, Allsopp M & Santillo D (2010). Swimming in chemicals: Perfluorinated chemicals, alkylphenols and metals in fish from the upper, middle and lower sections of the Yangtze River, China, Amsterdam. Greenpeace International.
http://www.greenpeace.to/publications/swimming-in-chemicals.pdf

9 Greenpeace International (2012c) op cit.

10 Greenpeace International (2012a). The study found that NPE residues in clothes are readily washed out when laundered.

11 Based on Greenpeace field information and public documents. Conagua (2009) op cit and Secretaria de Trabajo y Prevision Social (2008) op cit.

12 Industrias del Interior S. DE R. L. DE. C.V.

13 http://www.boletinindustrial.com/empresa.aspx?cid=94144

14 http://www.tuugo.com.mx/Companies/planta-georgina/0200003141056

15 Governor of Aguacalientes, video footage of Lavamex company tour.
http://www.facebook.com/video/video.php?v=392071189591

16 Levi Strauss International Company supplier list on their international website. Page 12.
http://www.levistrauss.com/sites/default/files/librarydocument/2012/9/levi-strauss-factory-list-september-2012a.pdf
Accessed 5 November 2012.

17 Las 50 exportadoras más importantes de Aguascalientes.
http://www.liderempresarial.com/num145/12.php

18 Portal de Gobiernodel Estadode Aguascalientes, Boletín No. 0001 Aguascalientes, Ags., 1 December 2010.
http://www.aguascalientes.gob.mx/gobierno/boletines/boletin_detalle.asp?num=0001

19 Conagua (2009) op cit.

20 La Jornada Aguascalientes, "Tresempresasponen en peligro a El Sabinal", 29 November 2011 http://issuu.com/jornadags/docs/lja29112011?mode=window&pageNumber=1

21 Discharge permits that specify a limited number of parameters are issued by Conagua under the regulations NOM001 and NOM002. For full details about the regulatory system in Mexico see Section 3, Box 6.

22 Santos-Medrano GE, Ramírez-López EM, Hernández-Flores S, Azuara-Medina PM & Rico-Martínez R (2007). Determination of Toxicity Levels in the San Pedro River Watershed, Aguascalientes, Mexico.
http://lib.bioinfo.pl/pmid/journal/J%20Environ%20Sci%20Health%20a%20Tox%20Hazard%20Subst%20Environ%20Eng

23 Conagua (2009) op cit. Designated Pipe 1 by Conagua.

24 Ibid.

25 Ibid. Pipe references (E50276P)(E50281P) (E50290P).

26 Kaltex website, about GrupoKaltex:
http://www.kaltex.com.mx/english/index.shtml Accessed 7 November 2011.

27 Panjiva website, Manufacturas Kaltex:
http://panjiva.com/Manufacturas-Kaltex-S-A-De-C-V/1175674
Accessed 12 November 2012.

28 Kaltex website:
http://www.kaltex.com.mx/english/compras.html
Accessed 18 July 2012.

29 Vanguardia Industrial (2011). Kaltex teje negocios con el Ejército de Colombia. 2 June 2011.
http://www.vanguardiaindustrial.net/index.php?option=com_2&view=item&id=517:kaltex%E2%80%90teje%E2%80%90negocios%E2%80%90con%E2%80%90el%E2%80%90ej%C3%A9rcito%E2%80%90de%E2%80%90colombia

30 Grupo Kaltex website:
http://www.kaltex.com.mx/english/kaltex/acerca.html
Accessed 18 July 2012.

31 Vanguardia Industrial (2011) op cit.

32 Fashion News (2012). Trista, 29 January 2012.
http://www.fashionnews.com.mx/periodico/trista/

33 Secretaria de Trabajo y Prevision Social (2008) op cit.

34 Information obtained by Greenpeace, and based on: Vanguardia Industrial (2011) op cit and Kaltex website: Kaltex Apparel http://www.kaltex.com.mx/english/kaltexapparel/productos.html Accessed 17 November 2011.

35 The company name on the official permit is Manufacturas Kaltex.

36 See Section 3, box 6 for further details on the regulatory system in Mexico.

37 Conagua (2010). Inspection document. Direccion Local de Queretaro, Acta de Visita No: PN-2010-QRO-064, ManufacturasKaltex S.A. de C.V. de San Juan del Río. 25 November 2010.

38 Conagua (2010) op cit.

39 Calculated in the Greenpeace Research Laboratories Technical Note: see Labunska et al (2012) op cit.

40 Conagua (2004). Estimacionpara el costossaneamiento de los rios San Juan del Rio, Nado y Aculco, Informe Final OMM/PROMMA No. (GCSA01-2004E) , p. 12, 40.
http://www.cofemermir.gob.mx/mir/uploadtests/16025.66.59.1.Estimaci%C3%B3n%20Costos%20Saneamiento%20Cuenca%20r%C3%ADo%20San%20Juan%20del%20R%C3%ADo.pdf

41 Conagua National Registry for Water, Manufacturas Kaltex.
http://www.cna.gob.mx/TituloRepda.aspx?Id=09QRO104515/26FMDL11|0|5|A

42 http://gaceta.diputados.gob.mx/Gaceta/60/2007/nov/20071127-IV.html

43 http://gaceta.diputados.gob.mx/Gaceta/60/2009/feb/20090205-V.html

44 http://www.mensajeroqueretaro.com/2007/12/impunidad-de-empresas-contaminantes-en-san-juan-del-rio/

45 See for example: http://www.mensajeroqueretaro.com/2007/12/impunidad-de-empresas-contaminantes-en-san-juan-del-rio/ which quotes José Luis Aguilera, Queretaro congressman, who acted on behalf of many people who had spoken out about the illegal dumping of waste from Kimberley Clark and Kaltex, and:
http://plazadearmas.com.mx/archivo-anterior/articulo-old-17242/

46 Grupo Kaltex website: Our commitment with the Environment.http://www.kaltex.com.mx/english/kaltex_ambiente.html
Accessed 15 November 2012.

47 Grupo Kaltex website, op cit.

48 Grupo Kaltex website, op cit.

49 Allsopp M, Costner P & Johnston P (2001). Incineration and human health: State of knowledge of the impacts of waste incinerators on human health.
http://www.greenpeace.to/publications/euincin.pdf

50 Labunska I, Brigden K, Santillo D, Kiselev A & Johnston P (2010). Russian Refuse 2: An update on PBDEs and other contaminants detected in St-Petersburg area, Russia, Technical Note 04/2010,Exeter: Greenpeace Research Laboratories.
http://www.greenpeace.to/publications/russian-refuse-2-english%5B1%5D.pdf

51 For more detailed information and references see Labunska et al (2012) op cit.

52 Ibid.

53 1,2,3-TCB and 1,2,4-TCB

54 For more detailed information and references see Labunska et al (2012) op cit.

55 Greenpeace International (2012b) op cit.

56 Conagua (2011). InformeEstadísticasdelagua en México, edición 2011, ComisiónNacionaldel Agua (Conagua), Secretaría de MedioAmbiente y RecursosNaturales (Semarnat), p 38, p.117: http://www.conagua.gob.mx/CONAGUA07/Publicaciones/Publicaciones/SGP-1-11-EAM2011.PDF
Also see: http://puebla.gob.mx/index.php/temas/item/159-el-agua-en-cifras for data on 1955

57 Circle of Blue, Water View (2009). Human Perspectives on the Global Water Crisis, p. 12. The findings are based on a survey of 500 people.
http://www.globescan.com/pdf/WaterViews_GlobalWaterPoll_GlobeScan.pdf

58 Conagua (2011) op cit. Pollution expressed as Chemical Oxygen Demand, p. 38.

59 Norma Oficial Mexicana, NOM-001 ECOL (1996). Que establece los limites maximos permisibles contaminantes en las descargas de aguas residuales enaguas y bienes nacionales.
http://www.hgm.salud.gob.mx/descargas/pdf/noticias/programa_mercurio/marco/norma_001.pdf
NOM-001 is administered by CONAGUA and NOM-002 is the standard for municipal WWTPs, administered by local municipal authorities; discharges from these WWTPs are also subject to limits specified in NOM-001 .

60 Biochemical Oxygen Demand (BOD) measures readily biodegradable chemicals only, Chemical Oxygen Demand (COD) provides an indirect measure of the quantity of organic compounds in wastewater or surface water without providing information on the identity of individual chemicals present.

61 Any person/public entity or company that discharges into national waters must have a discharge permit in the National Register (REPDA), which indicates the location, the owner, the quantity of effluent discharged and the receiving body of water.

62 Conagua (2010), re. Kaltex, op.cit. and Conagua (2009), re. Lavamex, op cit. Government inspection documents declassified for Greenpeace.

63 Conagua (2011), op cit, p 48.

64 Fabela P & Balandra AG (2006). Caracterización de Fuentes Puntuales de Contaminacíon en el Río Atoyac, México. Association Interamericana de inginieriasanitaria y ambiental (AIDIS), p1, 5, 6.
http://www.bvsde.paho.org/bvsaidis/uruguay30/MX08163_Saldana_Fabela.pdf

65 Registro de Emisiones y Transferencias de Contaminantes, Semarnat, 16 March 2012. http://app1.semarnat.gob.mx/retc/tema/anteced.html
Accessed 30 October 2012.

66 For example, companies do not report consistently every year, even when there has been no change in the processes used, data on new substances is reported while data on previously reported substances is missing, with no explanation, data on substances changes a lot from year to year and some GPS data is inaccurate.

67 Conagua (2011) op cit, p. 37, 38, 39, 40.

68 Greenpeace accessed the study through the Federal Institute for Access to Information (IFAI).

69 Greenpeace Mexico (2012a). Actualizacióndelestudio de Calidaddelaguadel Río Santiago (desde su nacimiento en el lago de Chapala hasta la presa Santa Rosa) tercera etapa. http://www.greenpeace.org/mexico/es/Footer/Descargas/reports/Toxicos/estudio-de-Calidad-del-agua-del-Rio-Santiago/

70 CEA Jalisco/IMTA (2012b). Actualizacióndelestudio de calidaddelaguadel río Santiago (desdesunacimiento en el lago de Chapala, hasta la presa Santa Rosa), Table 1 & Table 3. p. 10-14, 18. http://www.greenpeace.org/mexico/Global/mexico/Docs/2012/tóxicos/Anexo%20V.5.pdf

71 CEA Jalisco/IMTA (2012c). Análisis de Riesgo Sanitario Ambiental, p. 12, p. 21. http://www.greenpeace.org/mexico/Global/mexico/Docs/2012/tóxicos/8%20Analisis%20de%20riesgo%20sanitario%20ambiental.pdf

72 CEA Jalisco/IMTA (2012d). Analisis y Evaluacíon de Resultados, p. 459. http://www.greenpeace.org/mexico/Global/mexico/Docs/2012/tóxicos/5%20Analisis%20y%20evaluacion%20de%20resultados.pdf

73 Norma Oficial Mexicana, NOM-001 ECOL (1996) op cit.

74 Instituto Federal de Acceso a la Información y Protección de Datos, Dependencia o Entidad ante la cual se presentó la solicitud: InstitutoMexicano de Tecnologíadel Agua, Folio de la solicitud: 1611100006011 Número de expediente: 5700/11, p.16. http://www.greenpeace.org/mexico/Global/mexico/Docs/2012/IFAI%20IMTA%20RECURSO%20GANADO.pdf

75 UNAM (2012). River Pollution Atoyac, Environmental and Health Problem, Department of Genomic Medicine, the Institute of Biomedical Research (IIBm) of UNAM. Bulletin DGCS-507-UNAM, Ciudad Universitaria. 11:00 hrs. 18 August 18, 2012. http://www.dgcs.unam.mx/boletin/bdboletin/2012_507.html

76 Montero R, Serrano L, Araujo A, Da'vila V, Ponce J, Camacho R, Morales E & Méndez A (2006). Increased cytogenetic damage in a zone in transition from agricultural to industrial use: comprehensive analysis of the micronucleus test in peripheral blood lymphocytes, Instituto de Investigaciones Biomédicas, Universidad Nacional Autónoma de México, México City, DF, México and 1Centro Fray Julia'n Garcés, Derechos Humanos y Desarrollo Local AC, Tlaxcala, México, Mutagenesis vol. 21 no. 5 pp. 335–342, 2006. http://mutage.oxfordjournals.org/content/21/5/335.short

77 Montero et al (2006) op cit, p.7

78 La Jornada (2008). Muereniñointoxicado en Jalisco; el gobernadordefiende presa, 14 February 2008. http://www.jornada.unam.mx/2008/02/14/index.php?section=estados&article=028n2est
Proceso (2012). Un elefanteblanco en el río Santiago. 10 November 2012 http://www.proceso.com.mx/?p=324829
For information on protests about water pollution in Mexico see ANAA website: Asamblea Nacional de Afectados Ambientales (National Assembly for those affected by environmental problems). http://www.afectadosambientales.org/devastacion-y-afectacion-ambiental/agua/

79 Arellano-Aguilar O, Ortega Elorza L & Gesundheit Montero P (2012). Estudio de la Contaminacíon en la Cuenca del Río Santiago y la Salud Pública en la Región. Study for: Agrucpacion, Greenpeace, UCCS. p. 3. http://www.greenpeace.org/mexico/Global/mexico/report/2012/9/INFORME_TOXICOS_rio_santiago.pdf

80 Ibid.

81 Mexico Today (2011). Mexican Textile Industry: A Fit for Your Business http://mexicotoday.org/article/mexican-textile-industry-fit-your-business

82 Maquila Solidarity Network and The Human and Labour Rights Commission of the Tehuacan Valley Tehuacan (2003). Blue jeans, blue waters and worker rights, February 2003, p 9. http://en.maquilasolidarity.org/sites/maquilasolidarity.org/files/MSN-Tehuacan-ENG-2003.pdf

83 Fibre2Fashion.com, Mexican Textile Industry: a report. http://www.fibre2fashion.com/industry-article/29/2818/mexican-textile-industry-a-report2.asp

84 Maquila Solidarity Network and Rodrigo Santiago Hernandez (2010). Tehuacan's garment industry in times of crisis. p.4. http://en.maquilasolidarity.org/node/979

85 Pakistan Textile Journal (2012). http://ptj.com.pk/Web-2012/02-2012/Around-the-World-Mexico.htm

86 Yarns and Fibers Exchange (2010), Mexico - Textile and Garment Industry, 10 November 2010. http://www.yarnsandfibers.com/preferredsupplier/reports_fullstory.php?id=545

87 Georgina Chávez Díaz de León, director of the National Chamber of the Clothing Industry, in Promexico Trade & Investment, New Patterns in the Textile and Clothing Industries (2009). http://negocios.promexico.gob.mx/english/08-2009/art01.html

88 Oxfam (2004). Trading away our rights: women working in global supply chains. Oxfam International. p.51. http://www.offsetwarehouse.com/data/files/resources/taor.pdf Accessed 4 September 2012.

89 Congressional Research Service (2012) US Textile Manufacturing and the Trans-Pacific Partnership Negotiations, p.10, Michaela D Platzer, Specialist in Industrial Organization and Business, US CRS Report for Congress,October 5, 2012, p 10. http://www.fas.org/sgp/crs/row/R42772.pdf

90 Maquila Solidarity Network and Rodrigo Santiago Hernandez (2010) op cit.

91 Maquila Solidarity Network and The Human and Labour Rights Commission of the Tehuacan Valley Tehuacan (2003) op cit, and update: Maquila Solidarity Network and Rodrigo Santiago Hernandez (2010) op cit.

92 On 13 November 2012, Fedex confirmed delivery of letters Greenpeace sent to the head offices of Mexico based suppliers, Kaltex, Lavamex, Lavaexport, as well as the head offices of international apparel brands, Levi Strauss & Co, PVH (Calvin Klein), Walmart, Gap and Guess. These letters requested comment, re: the testing of samples from the aforementioned suppliers, and what business relationship the aforementioned apparel brands had with these suppliers.

93 Levi Strauss International Company supplier list on their international name website. http://www.levistrauss.com/sites/default/files/librarydocument/2012/9/levi-strauss-factory-list-september-2012a.pdf Accessed 5 November 2012.

94 Levi Strauss International Company supplier list on their international name website.
http://www.levistrauss.com/sites/default/files/librarydocument/2012/3/factory-list-march-2012.pdf
Accessed 12 April 2012.

95 Greenpeace investigations.

96 By 25 September 2012, Calvin Klein and Guess received a couriered letter, addressed to their senior management teams via their indicated head offices, informing them that an investigation was underway at these locations. The letter requested their comments on whether they had a current or past business relationship with any companies at these textile/apparel manufacturing locations in Mexico.

97 Just-Style.com (2004). Inditex signs an agreement with Kaltex.
http://www.just-style.com/news/spains-inditex-signs-manufacturing-agreements_id69288.aspx

98 By 25 September 2012, Inditex received a couriered letter, addressed to its senior management team via its indicated head office, informing it that an investigation was underway at these locations. The letter requested its comments on whether it had a current or past business relationship with any companies at these textile/apparel manufacturing locations in Mexico.

99 Kaltex official webpage.
http://www.kaltexcomercial.com/#!nuestros-productos/vstc3=moda

100 Greenpeace investigations.

101 By 25 September 2012, Walmart and Gap Inc. received a couriered letter, addressed to their senior management teams via their indicated head offices, informing them that an investigation was underway at these locations. The letters requested their comments on whether they had a current or past business relationship with any companies at these textile/apparel manufacturing locations in Mexico.

102 Chip Bergh, President and CEO, Levi Strauss & Co.
http://www.levistrauss.com/sustainability/planet
Accessed 11 September 2012.

103 http://www.pvhcsr.com/csr2011/Environment.aspx
Accessed 11 September 2012.

104 Gap Inc (2011). Annual Report 2011, p.10 & 12.
http://www.gapinc.com/content/attachments/gapinc/GapInc_AR_11.pdf

105 Walmart website, Environmental Sustainability.
http://corporate.walmart.com/global-responsibility/environment-sustainability Accessed 12 November 2012.

106 http://www.greenpeace.org/international/en/campaigns/toxics/water/detox/

107 See:
Puma: http://about.puma.com/?page_id=10
Nike: http://nikeinc.com/news/nike-roadmap-toward-zero-discharge-of-hazardous-chemicals
Adidas: http://www.adidas-group.com/en/sustainability/assets/statements/aG_Individual%20Roadmap_November%2018_2011.pdf
H&M: http://about.hm.com/gb/corporateresponsibility/environment/hmengageswithgreenpeace__Greenpeace.nhtml

C&A will publish its individual action plan on 20 January 2012. Li Ning will first focus on implementing the joint roadmap and is committed to publishing its individual action plan, but a deadline has not yet been defined.

108 See http://www.roadmaptozero.com/pdf/Joint_Roadmap_November_2011.pdf: (1) page 5: '… in a span of only 8 years…" and (2) point 3.1 :"The first year of the roadmap, 2012,… The 2020 timeline is incredibly ambitious given the scope and global nature of what has to be achieved, in a span of only 8 years…"

109 Greenpeace has identified a preliminary list of well recognised hazardous chemicals for the textile industry as follows: 1. Alkylphenols 2. Phthalates 3. Brominated and chlorinated flame retardants 4. Azo dyes 5. Organotin compounds 6. Perfluorinated chemicals 7.Chlorobenzenes 8.Chlorinated solvents 9.Chlorophenols 10. Short chain chlorinated paraffins 11. Heavy metals, cadmium, lead, mercury and chromium (VI).

110 For example, IPE in China.
http://www.ipe.org.cn/En/pollution/index.aspx

111 The Joint Roadmap is available on the companies' websites:
Puma: http://about.puma.com/?page_id=10
Nike: http://nikeinc.com/news/adidas-group-ca-hm-li-ning-nike-and-puma-partner-to-reach-zero-discharge-by-2020
Adidas: http://www.adidas-group.com/en/sustainability/News/2012/Second_update_implementing_joint_roadmap_July_2012.aspx
H&M: http://about.hm.com/content/dam/hm/about/documents/en/CSR/reports/Conscious%20Actions%20Sustainability%20Report%202011_en.pdf
C&A: http://www.c-and-a.com/uk/en/corporate/fileadmin/templates/master/img/fashion_updates/International_Press_Releases/111118_StatementJointRoadmap-EN.pdf
Li Ning: http://www.lining.com/eng/csr/csr_reports/csr_report_2011a.pdf

112 See:
Inditex: http://www.inditex.com/en/corporate_responsibility/environmental/zero_discharge
Marks & Spencer: http://corporate.marksandspencer.com/howwedobusiness/our_policies/climate_change_2
H&M: http://about.hm.com/content/dam/hm/about/documents/en/CSR/reports/Conscious%20Actions%20Sustainability%20Report%202011_en.pdf
and
http://about.hm.com/content/hm/NewsroomSection/en/NewsRoom/NewsroomDetails/HM-bans-Perflourinated-Compounds.html
C&A: http://www.c-and-a.com/uk/en/corporate/fileadmin/templates/master/img/fashion_updates/International_Press_Releases/C-and-A_Commitment_to_Zero_Discharge.pdf

Li-Ning will first focus on implementing the joint roadmap and is committed to publishing its individual action plan but a deadline has not yet been defined

113 "Discharge" means all discharges, emissions and losses. In other words, all pathways of releases.

114 Typically, one generation is understood to be 20 to 25 years.

115 For example, "no data, no market" provisions.

116 Based on the eight basic intrinsic properties of hazardousness – persistence; bioaccumulation; toxicity; carcinogenic, mutagenic and reprotoxic; endocrine disruption; and equivalent concern.

117 PRTRs have been shown to be effective in reducing the release of hazardous substances. For example, the Japanese PRTR, which was introduced in 2001 and covers 462 designated chemical substances (Class I) in 23 sectors and 34,830 facilities, shows a reduction of 24.5% in total annual releases (and waste transfers) of hazardous substances between 2001 and 2008. However, there was no significant reduction for facilities releasing smaller quantities of designated chemical substances (Class II), which are not required to disclose their releases publicly, see: Nakachi S (2010). The Pollutant Release and Transfer Register (PRTR) in Japan and Korean Toxic Releases Inventory (TRI)– an evaluation of their operation, Tokyo: Toxic Watch Network, p.13
http://toxwatch.net/en/news/sep2010-prtr-in-japan-and-korean-tri-an-evaluation-of-their-operation%e3%80%80/

118 Norma RETC

GREENPEACE

Greenpeace International
Ottho Heldringstraat 5
1066 AZ Amsterdam
The Netherlands

Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace.

greenpeace.org