

Dirty Laundry: Reloaded

How big brands are making consumers unwitting accomplices in the toxic water cycle



GREENPEACE

Contents

Executive summary	5
1. Background	13
2. Research results	15
3. Release of NP/NPEs to surface waters	23
4. The need for adequate regulations	27
5. Public policy	33
6. Corporate practices	37
7. Conclusion and recommendations	41

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Greenpeace takes samples from the River Elbe as part of Greenpeace Czech Republic's tour to raise awareness of toxic pollution in September 2011

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Wash Testing

Dirty Laundry: Reloaded is a landmark research investigation exploring the amount of the hazardous chemicals nonylphenol ethoxylates (NPEs) that are released as a result of washing clothing items found to contain these chemicals. Throughout the report we refer to the 'washed out' value for each item, which is the difference between the concentration of NPEs in fabric that had been washed compared to the concentration in an unwashed portion of identical fabric from the same item, with the assumption that the unwashed and washed portions from each item initially contained the same concentration of NPEs. For more information on the scientific process and sampling methods and rationale please refer to the Technical Report, available at: http://www.greenpeace.to/greenpeace/wp-content/uploads/2012/03/Dirty_Laundry_Product_Testing_Technical_Report_01-2012.pdf

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*.

*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

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

Plastisol: A suspension of plastic particles, commonly PVC or EVA, in a plasticiser. Used as ink for screen-printing images and logos onto textiles.

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.

Note to the reader

Global North and Global South

Throughout this report we refer to the terms 'Global North' and 'Global South' to describe two distinct groups of countries. The term 'Global South' is used to describe developing and emerging countries, including those facing the challenges of often-rapid industrial development or industrial restructuring, such as Russia. Most of the Global South is located in South and Central America, Asia and Africa. The term 'Global North' is used for developed countries, predominantly located in North America and Europe, with high human development, according to the United Nations Human Development Index.* Most, but not all, of these countries are located in the northern hemisphere.

* United Nations Development Programme (UNDP). (2005). *Human Development Report 2005. International cooperation at a crossroads. Aid, trade and security in an unequal world*. Available at: http://hdr.undp.org/en/media/HDR05_complete.pdf



**“Water is essential for life,
but it is also the world’s most
threatened essential resource.
It is imperative that solutions
are found to stop poisoning the
precious resources we have left
with hazardous chemicals.”**



WARNING
Always use the correct amount of detergent.
- The amount of detergent
- The amount of detergent
- The amount of detergent

WASH	WASH

WARNING!
In case of plastic containers,
to avoid possible damage
to the machine, do not use them.

Executive summary

The toxic cycle continues

New research commissioned by Greenpeace International shows that residues of the hazardous chemicals nonylphenol ethoxylates (NPEs)¹ – used in textile manufacturing – remain in many clothing items sold by major international clothing brands and, when washed, a significant percentage of the chemicals in these clothes is released and subsequently discharged into rivers, lakes and seas, where they turn into the even more toxic and hormone-disrupting chemical nonylphenol (NPs).

This can happen wherever in the world clothing items are sold and washed, and means that brands are making their consumers unwitting accomplices in the release of these hazardous substances into public water supplies.

Two previous Greenpeace International reports investigated the discharge of hazardous substances from textiles manufacturing in China (*Dirty Laundry*)² and the presence of NPEs in clothing and footwear bearing the logos of 15 leading clothing brands (*Dirty Laundry 2: Hung Out to Dry*)³.

Of the 78 items of clothing tested in *Dirty Laundry 2*, NPEs were found in exactly two-thirds of the samples, with the presence of these hazardous substance indicating that NPEs were used during the manufacture of the clothing items and released into waterways in the country of production. For this latest report, the effect of washing a subset of 14 of the samples, consisting of 12 samples of plain fabric and two samples of fabric bearing a plastisol print, was investigated under simulated standard domestic laundering conditions⁴. **This is the first ever study to investigate differences in the amounts of NPEs in fabric products before and after washing**, as far as we are aware, and the results have major implications for brands and governments – demonstrating that the direct pollution impacts of the textile sector extend far beyond the country of manufacture and are creating a **global cycle of toxic pollution**.

Results

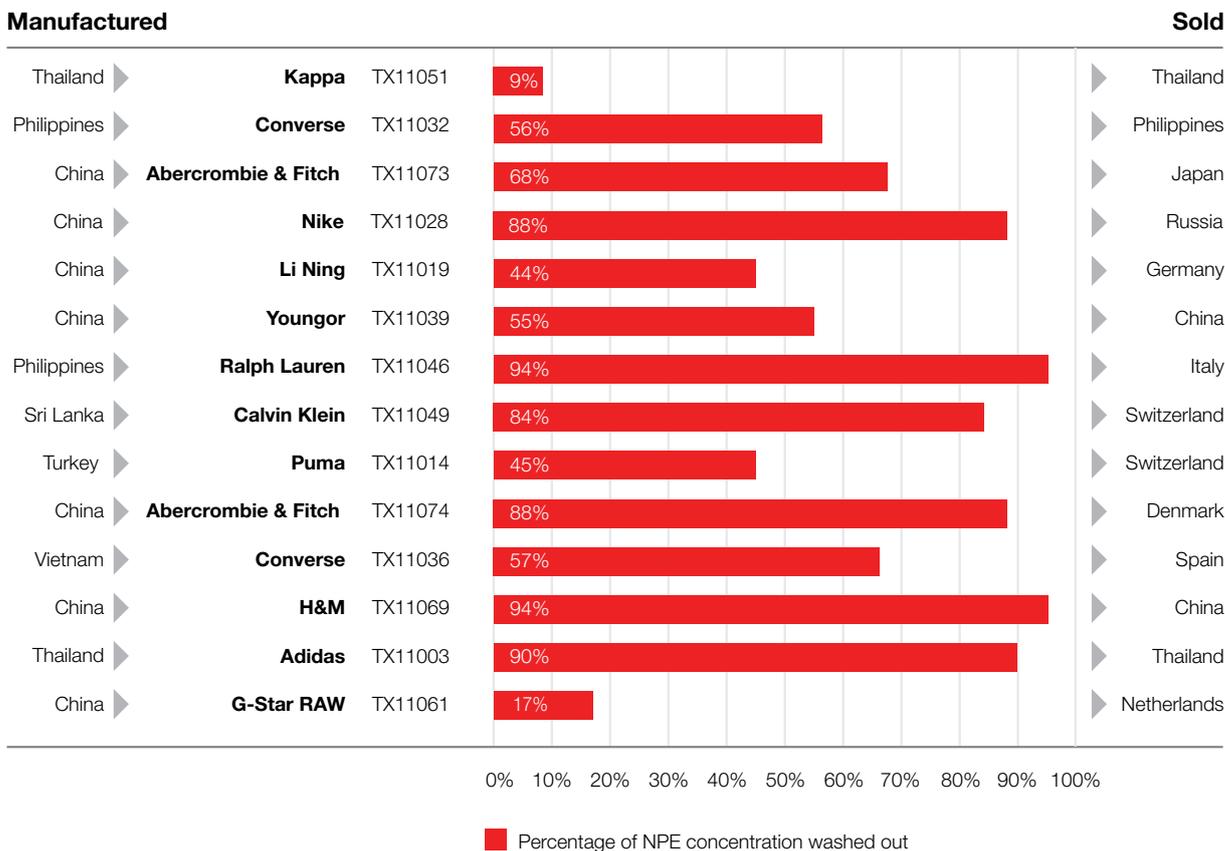
In all 14 samples, lower concentrations of NPEs were found in the fabric that had been washed, compared to an unwashed portion of identical fabric from the same item, with a lower concentration of between 17% and 94% NPEs found in the washed fabric versus the identical unwashed fabric, and between 9% and 56% lower concentration of NPEs in the washed plastisol-printed samples versus the identical unwashed samples.

These results indicate that a single wash, using conditions that simulate standard domestic laundering, can wash out a substantial fraction of NPE residues present within textile products, with more than 80% being washed out⁵ for half of the plain fabric samples tested. This study suggests that all residues of NPEs within textile products will be washed out over their lifetime and that in many cases this will have occurred after just the first few washes.

These NPEs are then discharged to wastewater treatment plants, which do not effectively treat or prevent the release of these hazardous substances into the environment; in fact, they break down NPEs to form toxic and hormone-disrupting NPs that are then released within the treated water.

Whereas discharges from the manufacturing of these products take place in textile manufacturing hubs, commonly located in the 'Global South' – in this case China, Vietnam, the Philippines, Thailand, Sri Lanka and Turkey – the washing of the finished articles can take place anywhere in the world, wherever the products are sold, and even in countries where legislation restricting the use of NPEs is in place.

Figure 1. Percentage of NPEs washed out of tested items in one wash





The answer is for brands to urgently require the elimination of the use of APEs throughout their supply chains. This will effectively address emissions of these hazardous substances in both the country of manufacture and the country where the product is sold, contributing to the transformational change needed to create a toxic-free future.

APEs are still entering our environment – despite restrictions

The use of NP and NPEs in clothing manufacture has effectively been banned within the EU and similar restrictions are also in place in the US and Canada. In the EU, releases of NP/NPEs due to the washing of textile products imported from outside the EU has been estimated to constitute by far the largest source of these chemicals entering wastewater treatment facilities in some instances. It is likely that the washing of textile products containing NPEs contributes a considerable fraction of the total releases in many other countries, especially where industrial uses of NPEs are prohibited. Data collected by Greenpeace Russia shows that the discharge of NP/NPEs by urban wastewater treatment systems is not exclusively a problem in the EU, but that similar discharges are happening in other countries.

Some major clothing brands set limits on the presence of certain hazardous substances in their products, as part of their programmes to ensure product safety. The limits typically set by these brands for the presence of alkylphenols/alkylphenol ethoxylates (APs/APEs)⁶ in their products (the respective groups of chemicals that NP/NPEs fall under), as well as limits set by other product standards such as Oeko-tex⁷, are far too high and therefore still allow for the continued use of these chemicals during manufacturing – and therefore their discharge both in the country of manufacture and the country of sale.

These limits allow for the products sold in countries around the world to contain many tonnes of APEs that would ultimately end up contaminating our waterways. For example, it is estimated that up to **15 to 20 tonnes** of NPEs would be permitted within the textile products sold globally by H&M each year, based on its current limit of 100 ppm⁸, and a similar picture is likely for other clothing brands. Similarly, if the EU were to adopt a 100 ppm limit, it would also permit up to **88.1 tonnes** of NPEs within textile products from outside the EU to be imported into Germany each year and up to **103.2 tonnes** within such products imported into Spain, for example⁹.

Brands must make immediate changes to their supply chains

Setting a lower limit for the concentration of APEs in finished products is an important step to take – both for brands and for regulators. However, such a step, taken in isolation, would not necessarily prevent emissions of APEs in the country of manufacture. Instead of eliminating its use, suppliers could attempt to achieve a lower level of APEs in the final product by additional rinsing, thereby increasing the discharge of these substances into rivers, lakes and seas in the manufacturing countries.

The answer is therefore for brands to urgently require the elimination of the use of APEs throughout their supply chains. This will effectively address emissions of these hazardous substances in both the country of manufacture and the country where the product is sold, contributing to the transformational change needed to create a toxic-free future. **Given their significant economic influence, major clothing brands are in a unique position to lead on this phase-out and to take immediate action to achieve this.**

Six of these brands – 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 the ‘draft joint roadmap towards zero discharge of hazardous chemicals’¹⁰ launched in November 2011. This roadmap sets out the steps that the brands commit to take to achieve zero discharge of hazardous chemicals, and invites others to partner in this endeavour.¹¹ However, the draft joint roadmap does not yet include a specific commitment or a date to eliminate all uses of APEs.

The need for an adequately protective regulatory limit on products – and other precautionary measures

In the EU, **NP is identified as a priority hazardous substance under existing legislation and releases of NPs are required to cease.** An EU restriction on the marketing of products with NPEs above a specified level is under development – and necessary to close the loophole that allows clothing to contain NPEs. An adequately protective limit would also send a strong signal to brands and manufacturers that APEs should not be used.

Parallel measures to restrict the use of APEs in manufacture must also be taken in countries where the majority of manufacturing takes place, such as in East Asia and Southeast Asia, to avoid the washing out of APEs from finished articles by manufacturers before export in order to meet these restrictions.

It should also be noted that APEs are just one example of the many hazardous substances used in the production of textiles and that political commitments need to be made to achieve ‘zero discharge’¹² of all hazardous chemicals within one generation¹³.

Governments in these countries need to ensure that their regulations implement a precautionary approach to hazardous chemicals elimination, based on their intrinsic properties. As part of this, specific restrictions on the manufacture and use of APEs are needed. However, it is the multinational brands that have an immediate **opportunity and responsibility** to act on this issue by requiring the elimination of the use of APEs in their supply chain in all countries where their products are manufactured; by doing so they will be acting ahead of the regulatory curve in China and other manufacturing hub regions.

What needs to be done?

This report confirms that NPEs present in textile products are released during washing by consumers. These NPEs are either released directly or collected by the urban waste water treatment system before being converted into toxic and persistent NPs, which are then released into our rivers and waterways worldwide. **Urgent and real measures are needed to stop NPEs and NPs entering our environment.**

Given the fact that textile manufacturing in North America (to a large extent) and the EU does not use APEs, it should be possible for the major brands collaborating on the draft joint roadmap to make a commitment to **eliminate at least the major uses (scouring, degreasing and detergents) of APEs by the end of 2012, in their manufacturing supply chains**, with the complete elimination of all uses of APEs to follow swiftly, for example by the end of 2013. To allow for implementation, brands need to request (and verify) **quantitative information from their suppliers in relation to the use of APEs** in the manufacturing processes, with the intention of disclosing this to the public.

Furthermore:

- Greenpeace is calling on all brands, including those identified in the three *Dirty Laundry* reports¹⁴, to become champions for a toxic-free future by **eliminating all releases of all hazardous chemicals from their supply chains and products.**
- As part of this, brands should do everything possible to completely eliminate the use of APEs during production in their supply chains, irrespective of adequate regulation in the countries of manufacture restricting the use of APEs during manufacturing.
- Limits that the brands and regulators set for the APEs both in production processes and the final products **need to be set at the lowest possible level¹⁵ and must include a sufficiently wide range of NPEs¹⁶**, to ensure full elimination of the use of these substances and prevent their re-distribution to aquatic ecosystems throughout the world.
- Within the EU, a restriction on the marketing of textile products containing APEs needs to be implemented as soon as possible. Ultimately, regulations banning the use of APEs in manufacturing also need to be enforced globally; with the countries where textile manufacturing takes place implementing regulations which take a precautionary approach to restricting **ALL hazardous chemicals.**

As global citizens – who brands are currently making unwitting accomplices in the release of hazardous substances into rivers, lakes and seas – we also have a role to play. We can choose to reduce the impact of the clothes we purchase by reducing our consumption, re-using and re-purposing existing items, and buying second-hand or vintage clothes where possible. We can also use our influence to call on global brands to act responsibly on behalf of the planet and its people, so that they set a date for the elimination of the use of APEs and other hazardous chemicals in their supply chains and products, and stop using our global waterways as their private sewers.

A future free from toxic chemicals is possible. Together we can help create it.

To find out more or get involved visit:
greenpeace.org/detox

Clothing and the global toxic water cycle



1) Formulations containing nonylphenol ethoxylates (NPEs) and other chemicals are delivered to textile manufacturers for use as surfactants.



2) Lax regulation and the lack of policies by global clothing brands to eliminate the use of NPEs (and other hazardous chemicals) results in wastewater discharges containing these hazardous chemicals to enter public waterways, such as rivers and lakes.



3) Following release in wastewaters, NPEs break down to form the persistent, toxic and hormone-disrupting nonylphenol (NP), which accumulates in sediments and builds up in the food chain, in fish and other wildlife.

4) The global textile industry then delivers clothes containing residues of NPEs to markets around the world (including those where these chemicals are banned in clothing manufacture).

5) The brands' inadequate policies then force consumers to become unwitting accomplices in the cycle of toxic water pollution when they wash their clothes, as this releases hazardous NPEs into their domestic waste water.

6) Wastewater treatment plants (in those markets that even have them) are generally ineffective in dealing with NPEs, essentially only speeding up their breakdown into toxic NPs.

7) Hormone-disrupting NPs end up in rivers, lakes and other public waterways (including those in countries and regions where the use of the parent compounds (NPEs) are banned).



The problem and the solution are not only a cause for local concern. This is a truly global issue.



adidas

01

Background

1

Two recent Greenpeace International reports – *Dirty Laundry and Dirty Laundry 2: Hung Out to Dry*¹⁷ – investigated the discharge of hazardous substances such as nonylphenol (NP) from textile manufacturing, and the presence of nonylphenol ethoxylates (NPEs) in clothing and footwear. NPEs – which are used in textile production, particularly as detergents and other surfactants – subsequently break down to form the toxic chemical nonylphenol.¹⁸

Research published in *Dirty Laundry* found a range of hazardous substances, including NP, being discharged into rivers from two textile manufacturers in China,¹⁹ with commercial links to many major clothing brands. NP is a chemical with hormone-disrupting properties that is persistent (does not readily break down in the environment), bioaccumulative (builds up in the food chain), and hazardous to aquatic life even at very low levels.

The second study, *Dirty Laundry 2: Hung Out to Dry*, revealed that certain items of clothing and fabric-based shoes sold internationally by major clothing brands are manufactured using NPEs and still contain residues of these chemicals in the fabric of the final product. The investigation involved the analysis of 78 articles of sports and recreational clothing and shoes bearing the logos of 15 leading clothing brands²⁰. Of the 78 articles analysed, 52 (two-thirds) tested positive for the presence of NPEs.²¹ Detection of NPEs in fabrics is an indicator that NPEs were used during the production process, resulting in increased levels of NP reaching the environment, such as in waterways or rivers, in the country of manufacture.

Dirty Laundry 2: Hung Out to Dry clearly demonstrated the use of NPEs during the manufacture of clothing for a number of major international clothing brands, which would have consequently led to releases of NPEs and NP in the country of production. This report – *Dirty Laundry Reloaded* – investigates whether, after their manufacture, clothes also continue to pollute the environment and waterways around the world, wherever a product is sold to a customer who subsequently washes it.

Nonylphenol (NP) and Nonylphenol ethoxylates (NPEs)

Nonylphenol ethoxylates (NPEs) are a group of man-made chemicals which do not occur in nature other than as a result of human activity. These compounds belong to a broader group of chemicals known as alkylphenol ethoxylates (APEs), chemicals most widely used as surfactants, including in formulations used by textile manufacturers. Once released to wastewater treatment plants, or directly into the environment, NPEs degrade to nonylphenol.²² Due to concerns about their hazardous properties, there have been restrictions on the use of NPEs in some regions for almost 20 years.²³

Nonylphenol (NP) is manufactured for a variety of specialised industrialised uses, including the manufacture of NPEs. Following use, NPEs can break down into NP, from which they were produced.²⁴ NP is known to be persistent, bioaccumulative and toxic, being able to act as a hormone disruptor.²⁵ NP is known to accumulate in the tissues of fish and other organisms. NP has also recently been detected in human tissue.²⁶ The most widely recognised hazard of nonylphenol is its ability to mimic natural oestrogen hormones. This can lead to altered sexual development in some organisms, most notably the feminisation of fish²⁷.

NPEs degrading into NP: NPEs are biodegraded into NP by bacteria used in sewage treatment plants to treat municipal wastewaters, and also in similar biological treatment plants that are commonly employed to treat industrial wastewaters. This biodegradation of NPEs to NP is inherent to the use of biological wastewater treatment. Similarly, where NPEs are released into surface waters they are biodegraded into NP by bacteria in surface water environments²⁸.

02



Research results

2

The effect of washing under simulated standard domestic laundering conditions²⁹ was investigated for some of the textile products in which NPEs were identified in Dirty Laundry 2: Hung Out to Dry. This aspect was tested for a subset of 14 of the samples tested for Dirty Laundry 2, consisting of 12 samples of plain fabric (with NPE concentrations in the unwashed fabric ranging from 11 mg/kg to 1100 mg/kg), and two samples of fabric bearing a plastisol print (with unwashed fabric concentrations of 470 mg/kg and 27000 mg/kg respectively). The results presented in this report represent the key findings; while full data on the samples and a technical discussion are provided in the Greenpeace Research Laboratories Technical Note.³⁰

Key findings:

- In all samples, lower concentrations of NPEs were found in fabric that had been washed, compared to an unwashed portion of identical fabric from the same item; the NPE concentrations after washing were between 6% and 83% of the unwashed plain fabric portions, and were 44% and 91% respectively of the unwashed plastisol-printed samples.
- The results equate to between 17% and 94% of NPE residues being washed out from the plain fabrics during a single wash, and between 9% and 56% from plastisol-printed samples, assuming that the unwashed and washed portions from each item initially contained the same concentration of NPEs.
- The reductions in NPE concentrations due to washing were largely independent of the initial concentration in the unwashed products. In other words, the fabrics yielding the greatest difference between NPE concentrations in washed and unwashed portions were not necessarily those with the highest NPE concentrations in the unwashed portions.
- The type of fabric that a product is made from does not appear to influence the extent to which concentrations are lower in the washed portion compared to the unwashed portion.

These results indicate that a single wash, using conditions that simulate standard domestic laundering, can wash out a substantial fraction of NPE residues present within textile products, with more than 80% being washed out for half of the plain fabric samples.

Table 2.1 shows the concentration of NPE in the unwashed and washed samples, the fraction of NPE that was washed out and the brand names, the countries of manufacture and of purchase for the products tested.

Table 2.1. Concentrations of NPEs in washed fabric samples, and comparison with concentrations determined in an identical portion of unwashed fabric from the same product

Sample Code	Country of manufacture	Country of purchase	Brands	NPEs concentration (mg/kg)		NPEs Conc. in washed (as % conc. in unwashed)	Fraction of NPE washed out (%) (a)	Type of Product
				unwashed	washed			
Plain Fabric samples								
TX11061	China	Netherlands	G-Star RAW	11	9.1	83	17	Underwear
TX11003	Thailand	Thailand	Adidas	18	1.8	10	90	Polo shirt
TX11069	China	China	H&M	19	1.2	6	94	Polo shirt
TX11036 (b)	Vietnam	Spain	Converse	30	13	43	57	Sneakers
TX11074	China	Denmark	Abercrombie & Fitch	39	4.6	12	88	T-shirt
TX11014	Turkey	Switzerland	Puma	47	26	55	45	Football shirt
TX11049	Sri Lanka	Switzerland	Calvin Klein (c)	160	25	16	84	Pyjama trousers
TX11046	Philippines	Italy	Ralph Lauren	220	14	6	94	T-shirt
TX11039	China	China	Youngor (d)	530	240	45	55	Polo shirt
TX11019	China	Germany	Li Ning	680	380	56	44	Sport shirt
TX11028	China	Russia	Nike	810	100	12	88	T-shirt
TX11073	China	Japan	Abercrombie & Fitch	1,100	350	32	68	Jeans shorts
Plastisol-printed samples								
TX11032	Philippines	Philippines	Converse	27,000	12,000	44	56	T-shirt
TX11051	Thailand	Thailand	Kappa (e)	470	430	91	9	T-shirt

Limit of quantification = 1 mg/kg.

(a) Assuming that the unwashed and washed portions from each item initially contained the same concentration of NPEs. Quoted values are the differences between concentrations in the washed and unwashed portions of each item, as a percentage of the concentration in the unwashed portion.

(b) Only the fabric portion of the sneaker was washed.

(c) All communications concerning Calvin Klein products for the publication of Dirty Laundry 2: Hung Out to Dry were conducted with Philips van Heusen Corporation (PVH), the owners of the Calvin Klein brand. The Calvin Klein product washed and tested in this report is licenced by PVH to Warnaco.

(d) Before the publication of Dirty Laundry 2: Hung Out to Dry, Greenpeace requested information from each of the respective brands named in that report as to whether the branded product tested was purchased via a legitimate distributor. Youngor did not respond to our letter. However, Greenpeace has substantial information that the store where we bought the Youngor products from is an authorised dealer.

(e) Before the publication of Dirty Laundry 2: Hung Out to Dry, Greenpeace requested information from each of the respective brands named in that report as to whether the branded product tested was purchased via a legitimate distributor. All stores were confirmed as legitimate distributors of the 78 branded products that we purchased with the exception of three stores, one of them being the Kappa store in Thailand where this Kappa t-shirt was purchased. The store in Thailand represented itself as an authorised Kappa retailer. To further ensure that we had purchased and tested legitimate Kappa branded products, Greenpeace made repeated communications to Kappa's head office in Turin, Italy. However, over several weeks, Kappa neither confirmed nor denied the authenticity of this store with regard to the Kappa branded product.

Figure 2.1. NPE concentrations in fabric samples – unwashed and washed

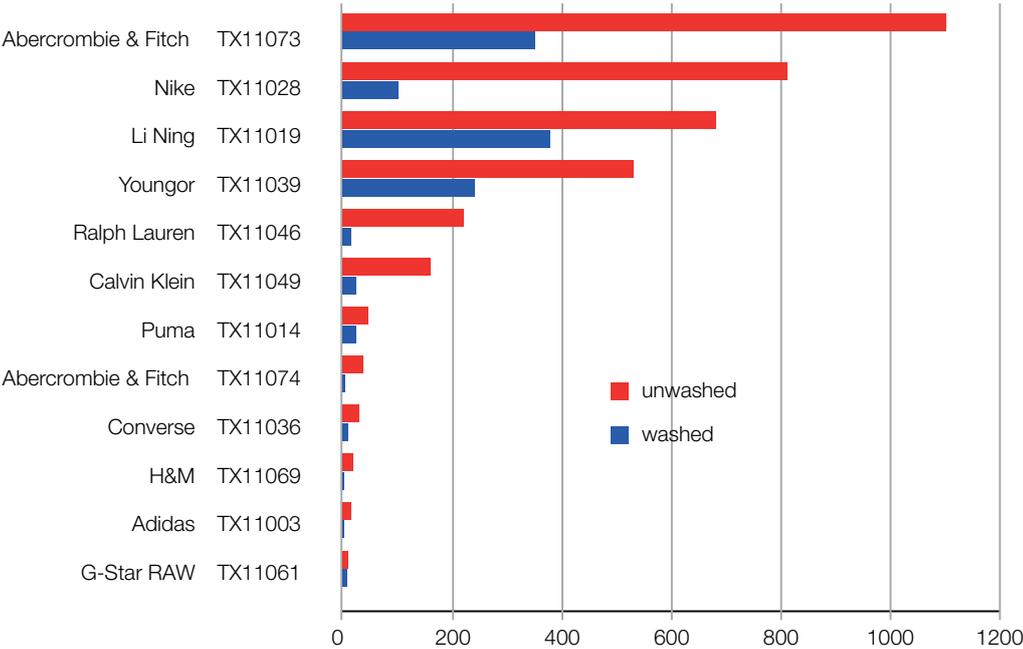
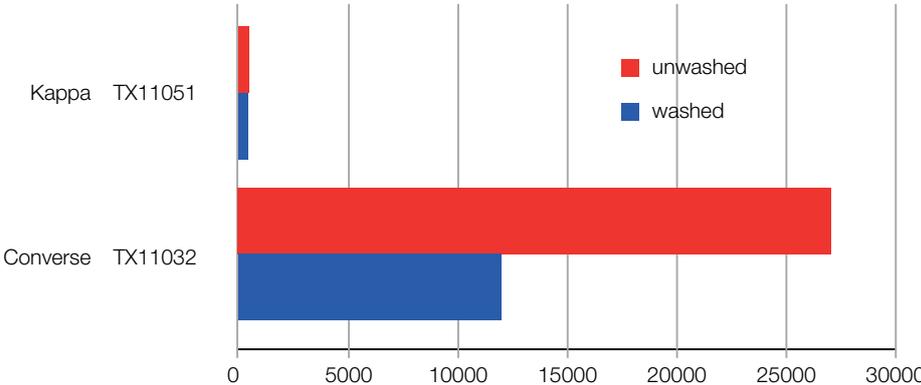


Figure 2.2. NPE concentrations in plastisol print samples – unwashed and washed



The following diagram shows the geographic distribution of the countries of manufacture as well as the countries of where the products were sold, for the subset of samples analysed for this report. It shows that pollution from the use of hazardous chemicals in textile manufacture is not limited to the countries of production but continues once many of these products are exported, sold and subsequently washed.

Figure 2.3. Where the products containing NPEs were manufactured, and sold and washed.

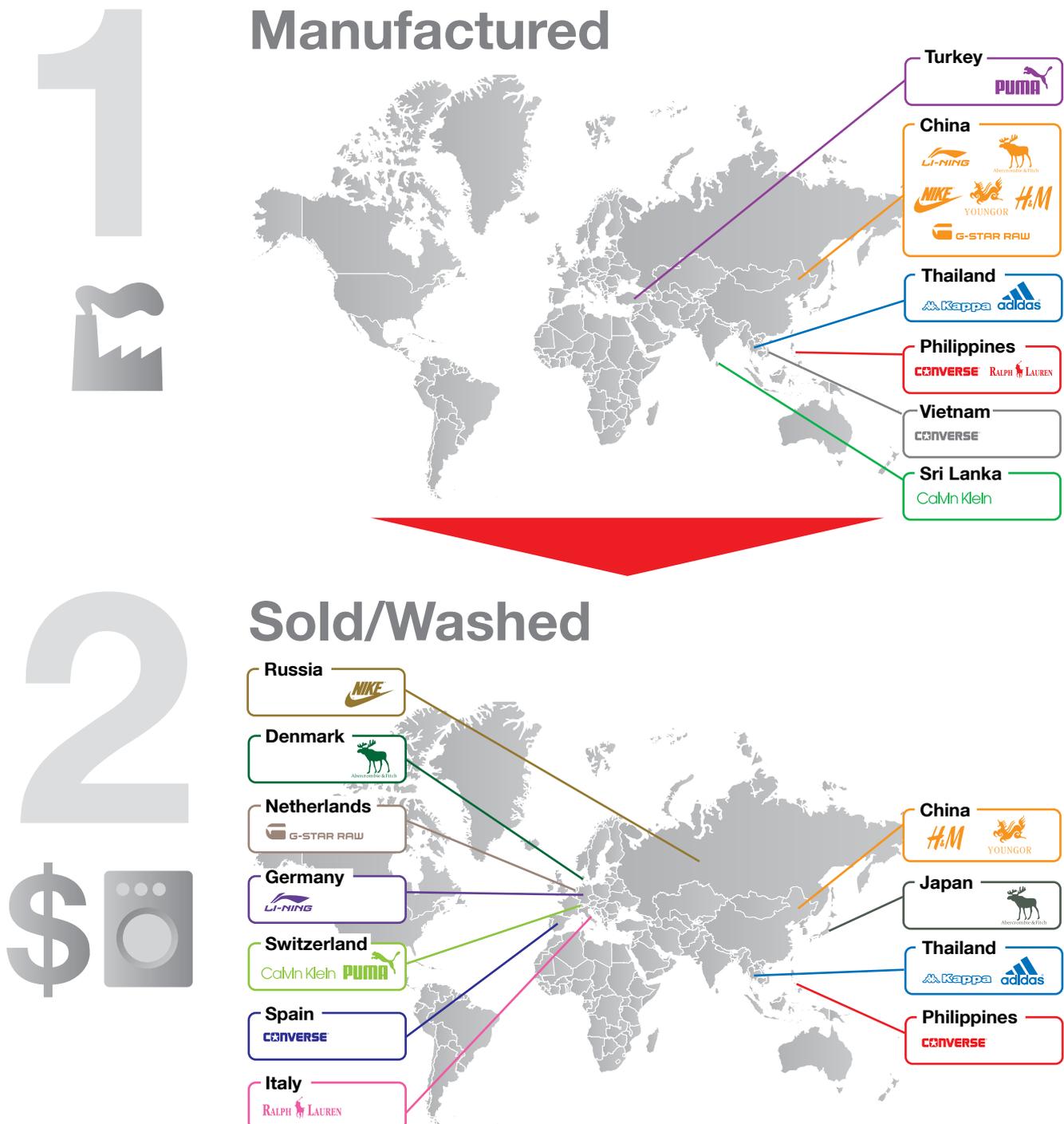
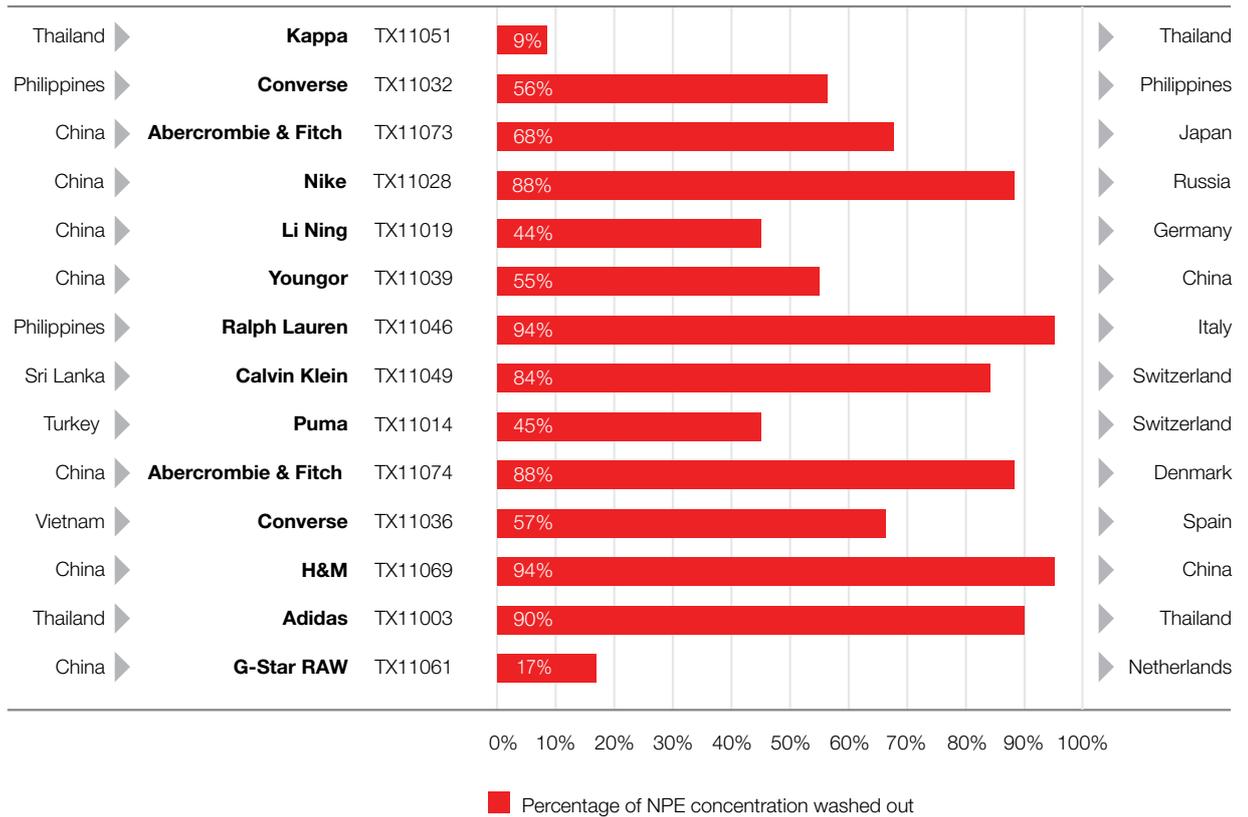


Figure 2.4. Percentage of NPEs washed out of tested items in one wash



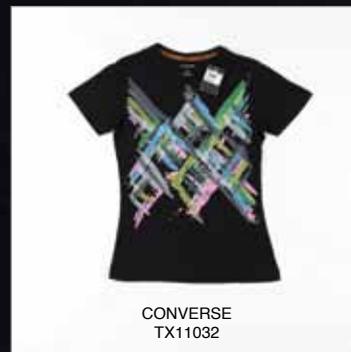
Though limited in scope compared to the broad range of textile products on the market, the results also indicate that **the extent to which NPEs are washed out during laundering is largely independent of the level of NPE in the product when it is sold, and of the type of fabric that a product is made from.**

Given the number of times that a textile product is likely to be washed during its lifetime, this study suggests that **all residues of NPEs within textile products will be released over their lifetime and that in many cases this will have occurred after just the first few washes.**

As far as we are aware, this is the first study to report differences in the amounts of NPEs in fabric products before and after washing using simulated domestic laundering conditions. Given that NPEs are readily water soluble, however, it is not surprising that residues are washed out from fabrics to this extent, even after a single wash.

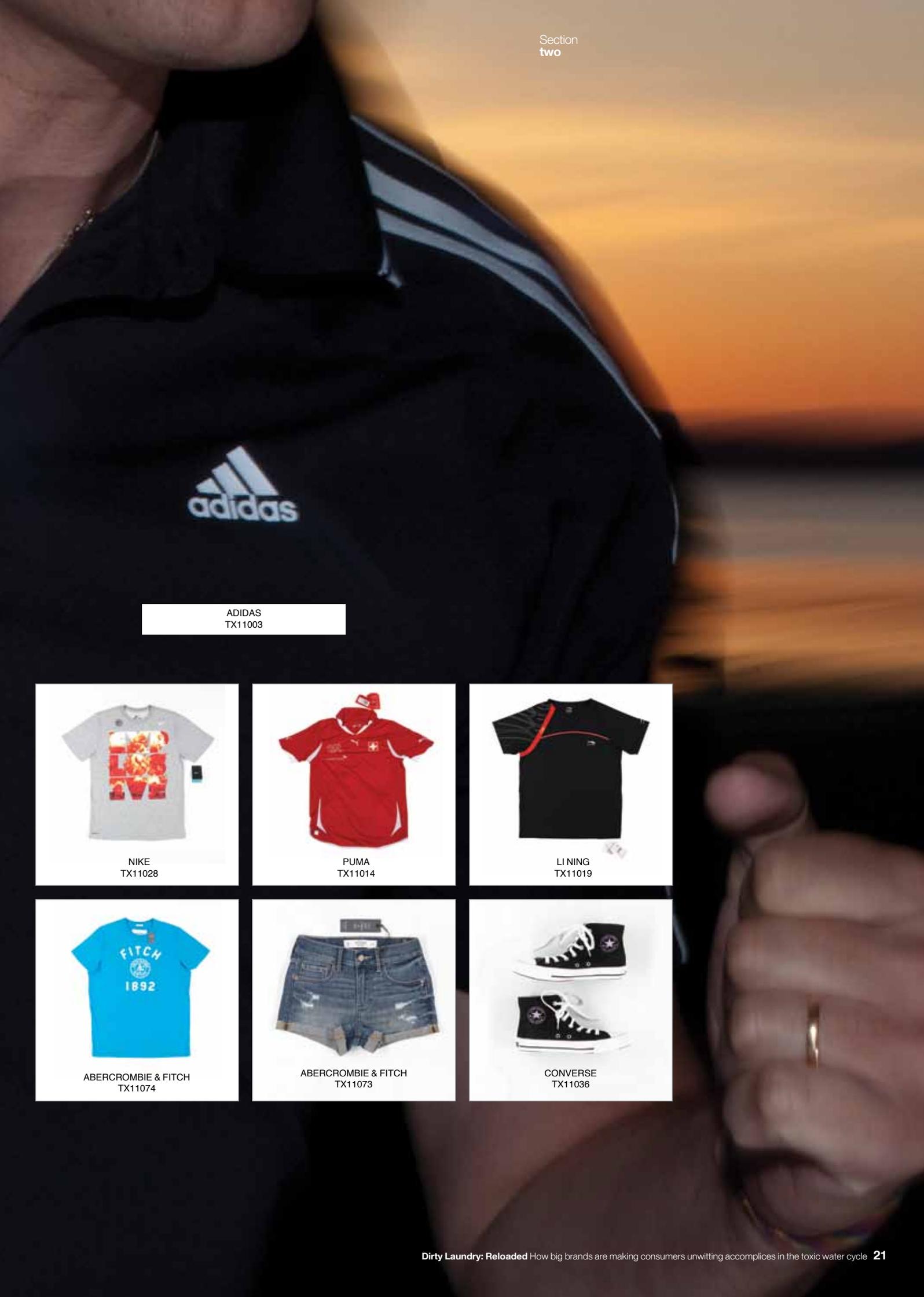
The results have major implications for brands and governments – demonstrating that the direct pollution impacts of the textile sector extend far beyond the country of manufacture and are creating a global cycle of toxic pollution in which consumers are being forced to become unwitting accomplices.

Branded products analysed for this report



Implications for wearers

The levels of NPEs detected in all articles are not known to constitute any direct health risk to the wearers of the clothing (for more information about NPEs and NP please see page 13).



adidas

ADIDAS
TX11003



NIKE
TX11028



PUMA
TX11014



LI NING
TX11019



ABERCROMBIE & FITCH
TX11074



ABERCROMBIE & FITCH
TX11073



CONVERSE
TX11036

03

Release of NP/NPEs to surface waters

3

Releases of NP/NPEs within the EU

The releases of NPEs from the washing of clothes and other fabric products contributes to ongoing inputs of NP to rivers, lakes and seas in the EU, predominantly via urban wastewater and sewage treatment plants that do not treat or prevent the release of these hazardous substances to the environment; at best, they break down NPEs to form NP which are released within treated water. Within the EU, where the use of NP and NPEs in clothing manufacturing has effectively been banned, inputs of NP to surface waters due to the washing of such products imported from outside the EU are still occurring, despite requirements made in 2000 under the Water Framework Directive (WFD) that all emissions, discharges and losses of 'priority hazardous substances' be phased out in the EU within 20 years, including NP³¹. Furthermore, it has been estimated in some instances that this source constitutes by far the largest source of these chemicals entering wastewater treatment facilities. For example, it has been estimated that residues of NPEs and NP in textile and leather goods in parts of Sweden were by far the largest source of these chemicals entering wastewater treatment facilities in 2004.³²

Greenpeace surveyed data on discharges of NP/NPE to surface waters in certain EU countries in a 2010 report³³, which assessed publicly available information in the Czech Republic, Germany, Slovakia, Spain and the UK, namely monitoring data published within River Basin Management Plans and the European Pollutant Emission Registers as required under EU environmental laws. In relation to reported discharges data, we found the following information from national and EU Pollutant Release and Transfer Registers (PRTRs):

- The UK dataset on NP/NPE emissions in the EU PRTR allows a breakdown to river basin level. For the Thames River Basin District, 16 tonnes were released in 2007 from 22 sewage treatment plants. UK-wide, 66 tonnes are reported to have been released in 2007 from 112 sewage treatment plants.
- The Spanish national PRTR reports some 1.19 tonnes of NP/NPE discharges in 2008, of which 1.18 tonnes were released from 12 Urban WasteWater Treatment Plants (UWWTPs). Nine out of these 12 are located in Catalonia, which contributed 1.09 tonnes;
- The German PRTR reports one tonne of emissions in 2007, of which 0.35 tonnes were released from seven UWWTPs;
- The Czech programme provides monitoring from 30 UWWTPs. The average NP concentration was 0.49 µg/l, although data on annual amounts released are not available; and
- No emission data was made available in Slovakia.

Although not all sewage/UWWTPs are included for these countries and therefore total releases may be greater than the data indicate, these figures suggest that urban waste water and sewage treatment plants are the biggest sources of NP emissions within some of these countries. This finding is consistent with the limited scope of the 2003 EU emission controls³⁴, which largely prohibits the marketing of NP/NPE containing products and their use in industrial processes, but allows imported textiles and other consumer articles containing NP/NPEs to be sold.

Further monitoring data

In addition to the data published in our 2010 report:³⁵

- **Czech Republic.** There is additional recent information showing ongoing releases of NP, from a number of UWWTPs within the Czech Republic, as reported in 2009³⁶. After Greenpeace Czech Republic pointed out that WWTPs were failing to meet their obligation to report releases of NP/NPE, some data recently began to be reported on the Czech PRTR for releases in 2009 and 2010, although for only a very limited number of facilities.
- **Spain.** More recent data from the national Spanish PRTR shows some 0.99 tonnes of NP/NPE discharges from 24 facilities in 2010, of which 0.837 tonnes were released from 19 UWWTPs.³⁷ Seventeen out of the 19 UWWTPs are located in Catalonia and the other two in the Basque Country; however, this does not include data from all 140 large UWWTPs in Spain.³⁸ The 24 facilities that reported discharges of NP/NPE to water were those that exceeded the regulatory limit of 1 kilogram a year, which requires them to publicly report the data.

Releases of NPE and NP to surface waters outside the EU - Russia

Nonylphenol discharges from domestic WWTPs are not just a problem in the EU; such releases are also likely to be taking place in other countries. For example, Greenpeace Russia recently collected samples of treated wastewaters released by WWTPs in two locations in Russia. Based on NP/NPE concentrations in these samples the estimated combined NP/NPE annual releases from the Yaroslavl WWTP are 1.266 tonnes/year and 0.123 tonnes/year from the St Petersburg WWTP.³⁹

These data show that the discharge of NP/NPEs by urban wastewater treatment systems is not exclusively a problem in the EU, but that similar releases are occurring in Russia, and almost certainly in many other countries. It is likely that the washing of textile products containing NPEs contributes a considerable fraction of the total releases in many countries, especially where industrial uses of NPEs are prohibited. **Discharges of NP via this route will continue in countries where the sale of products containing NPE residues has yet to be regulated, unless global action is taken by brands to eliminate the use of these substances during the manufacture of their products.**





The need for adequate regulations

4

Clearly there is a need for countries to regulate the sale of products containing residues of NPEs. In addition, textile brands need to address this aspect for their products. However, if country regulations or brand policies are based on allowable limits for NPEs in products that permit unacceptably high levels of NPEs, or if they cover too narrow a range of NPEs (NPEs are a group of substances), they will not prevent much, if not most, of the ongoing releases of NPEs from the washing of textile products.

Current limits are typically set too high

The policies of some brands currently rely on allowable limits of APEs in products. The limits typically set for the presence of alkylphenols (APs) and alkylphenol ethoxylates (APEs) – the chemical groups which include NP and NPEs respectively, as well as the closely related octylphenols/octylphenol ethoxylates (OPs/OPEs) – in their products are currently too high and still allow for their continued use during manufacturing. This results in the discharge of these chemicals both in the country of manufacture (from production facilities) and the country of sale (from subsequent washing of products). An approach that eliminates the use of APEs during production, alongside limits to ensure the absence of NPEs in products as one of the control mechanisms, is therefore necessary.

Typical examples of the limits currently set by brands in their Restricted Substances Lists (RSLs) are:

- Adidas allows 1000 ppm⁴⁰ for the sum of NP, OP and APEs (and separately, 100 ppm for NP as a single parameter)⁴¹
- Puma allows 1000 ppm for the sum of NP, NPEs, APEs and OP⁴²
- Nike sets a limit of 100 ppm for the sum of NP and OP or the sum of NPEs or OPEs⁴³ in products (as well as a limit of 1000 mg/kg in preparations (as required by EU legislation).⁴⁴
- H&M sets a limit of 100ppm for both NPEs and OPEs. For NP and OP the limit is 'not detected'.⁴⁵

These limits are comparable to the current Oek-tex standard⁴⁶ (a European product label designed for consumers who specifically aim to buy textiles which are harmless to health, among other requirements⁴⁷), which sets a limit of 100ppm for NP and OP individually and a limit for total NPEs/OPEs of 1000 ppm.

Furthermore, it should also be noted that these brands are among the leaders within the textile sector, for their approach to corporate and social responsibility, which includes programmes for chemicals management and the publication of their RSLs. The same cannot be said for the many other brands in this sector that do not publish their detailed RSLs or provide information on whether they restrict APs/APEs – including some of the brands highlighted in this study, such as Abercrombie & Fitch⁴⁸, Ralph Lauren⁴⁹, Kappa⁵⁰ and Youngor⁵¹.

What these limits mean

Information on the tonnage of products sold individually by the brands is not easy to obtain. However, based on H&M's own reports that cotton accounts for at least 60% of the fibres used in H&M clothes⁵², and that an estimated 120,000 tonnes of cotton was used in 2010⁵³, the following estimate can be made:

- Based on estimated total sales in 2010 of between 150,000 and 200,000 tonnes of textile products, a limit of 100 ppm for NPEs by H&M would permit up to 15 to 20 tonnes of NPEs to be contained within the textile products sold globally by the fast-fashion retailer each year. These NPEs would be released wherever these products are sold and washed, resulting in inputs of toxic and hormone-disrupting NP to rivers, lakes and seas via WWTPs.

This example is for one brand based on publicly available information; but a similar picture could be painted for any brand, using information on the yearly tonnes of textile products sold.

This estimate, together with the evidence that NPEs continue to be discharged into the aquatic environment as a result of the washing of products that could be purchased anywhere in the world, shows that the **current approach taken by the brands is not effective**. Restrictions on the levels of APEs in final products are insufficiently protective and, crucially, there are not yet any requirements to eliminate the use of APEs when these products are manufactured by any of these brands.

Setting a lower limit for the allowable concentration of APEs in finished products is an important step, however, such a step, taken in isolation, would not necessarily prevent emissions of APEs in the country of manufacture. Instead of eliminating its use, suppliers could attempt to achieve a lower level of APEs in their final products by additional rinsing prior to sale, thereby increasing the discharge of these substances at manufacturing facilities into rivers, lakes and seas.

The answer is therefore for brands to require the elimination of the use of APEs throughout their supply chains; checking the levels of APEs in finished products could be part of verifying that the ban on use is being implemented. This will effectively address emissions of these hazardous substances in both the country of manufacture and the country of purchase, resulting in the transformational change needed to create a toxic-free future. **Given their significant economic influence, major clothing brands are in a unique position to lead on this phase-out and to take immediate action to achieve this.**



An adequately protective regulatory limit for NPEs in textile products is needed

In addition to action taken by brands and the need for legislative restrictions on use in manufacturing, countries need to regulate the presence of APEs in textile products placed on the market. Such a regulation is currently under development within the EU.⁵⁴

Setting a maximum allowable limit in the EU for the concentration of NPEs in textile products placed on the common market would prohibit the marketing of products with levels above that limit. However, in order to offer adequate protection, such a limit would need to be set as low as possible, therefore sending a strong signal to brands and manufacturers that APEs should not be used in production.

Dirty Laundry 2: Hung Out to Dry demonstrated that it is technically possible for the concentration of NPEs to be accurately determined in textiles with a detection limit of 1 mg/kg (1 ppm = 0.0001%).

Setting a limit that is insufficiently protective would allow the continued sale of a large volume of such products containing detectable residues of NPEs, which, taken together, could make a considerable contribution to releases of NPEs and NP into the aquatic environment.

The accumulative effect could allow substantial quantities of NPEs to be released to WWTPs from textile products produced and traded between countries, with resulting ongoing releases of substantial quantities of NP to surface waters. For example, within the EU, the quantities of NPEs that would be allowed within just the imported textile products⁵⁵ are estimated as follows:

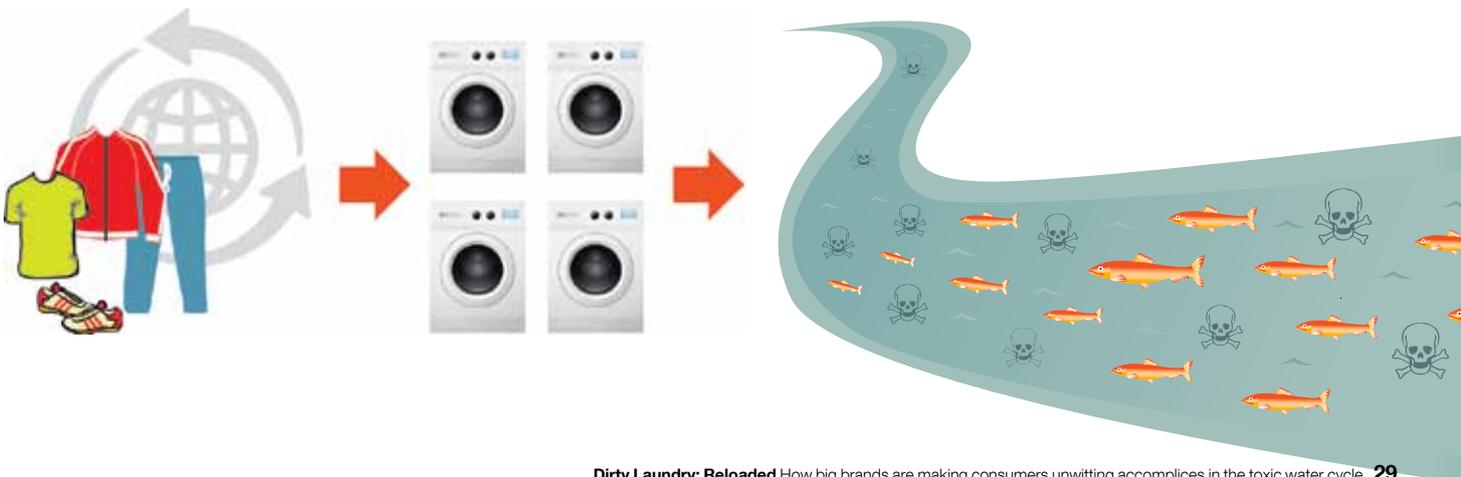
- **Germany:** Based on the 2010 imports of 880,619.4 tonnes of textile products from outside the EU for Germany⁵⁶, a limit of 100 ppm would permit up to **88.1 tonnes** of NPEs within textile products imported each year.

- **Spain:** Based on the 2010 imports of 1,031,996 tonnes of textile products from outside the EU for Spain⁵⁷, a limit of 100 ppm would permit up to **103.2 tonnes** of NPEs within textile products imported each year.

Until adequate restrictions on the sale of textile products containing residues of NPEs are in place that effectively require manufacturers to completely eliminate all uses of APEs in their supply chains (to avoid unintentional contamination), substantial releases of NPEs from textiles and the resulting inputs of NP to surface waters will continue within the EU and elsewhere.

As shown above, any regulation intended to protect surface waters by prohibiting the sale of textile products containing residues of NPEs that is based on an allowable limit that is not as low as possible, would continue to allow substantial quantities of NPEs to be present within textile products and result in releases of NP to surface waters.

Similarly, releases of these hazardous substances will continue in countries outside the EU where few or no effective controls on their manufacture, use and release are currently in place, both from the manufacturing of products and their subsequent washing. This further reinforces the need for brands to eliminate the use of these chemicals globally.



Covering only a limited range of NPEs will limit the effectiveness of any policy or regulation

As well as regulating residues of NPEs in textile products to the lowest possible limit, it is also necessary to ensure that a sufficiently wide range of NPEs is encapsulated in any governmental regulation, brand restriction or other standard. For example, as well as permitting significant quantities of NPEs in products, the current Oeko-tex standard⁵⁸ only assesses a limited range of NPEs⁵⁹ and would allow further quantities of those substances not included in this range to be present in products, undetected. The Oeko-tex standard regulates NPEs (and OPEs) in textile products. For NPEs, this standard covers only a limited number of substances in this group (only those NPEs with ethoxylate chains of 1 to 9 units).

However, in the samples investigated in *Dirty Laundry 2: Hung Out to Dry* and this study, a significant proportion of the NPEs were found with ethoxylate chains of 10-20 units, and would therefore not be covered by the Oeko-tex tests to ensure compliance with these standards. The graph opposite shows the proportion of NPEs found in the samples investigated in *Dirty Laundry 2* and this report.

Closing the loophole

- (a) Oeko tex standard for NPEs includes those with ethoxylate chains of 1-9 units
- (b) The Greenpeace International study investigated NPEs with ethoxylate chains of 4-20 units

The data published in *Dirty Laundry 2* and presented here in Figure 4.1 shows the number of samples where the levels of NPEs were above limits of 10ppm and 100ppm, based either;

- on NPEs with ethoxylate chains of 4-20 units, or
- on NPEs with ethoxylate chains of only 4-9 units

Figure 4.1 The number of samples (of the 78 items tested in *Dirty Laundry 2*) with total NPE concentrations in various concentrations ranges, based on the sum of NPEs with ethoxylate chains of 4 to 20 units, and also based on the sum of NPEs with ethoxylate chains of only 4 to 9 units.

Total NPE concentration range (mg/kg)	Number of samples: NPEs with ethoxylate chains of 4-20 units			Number of samples: NPEs with ethoxylate chains of 4-9 units		
	Number of samples	Percentage	Total (4-20 units)	Number of samples	Percentage	Total (4-9 units)
<1	26 samples	33%		52 (67%)	31 samples	
1-10	17 samples	22%	18 samples		23%	
10-100	21 samples	27%	19 samples		24%	
>100	14 samples	18%	10 samples		13%	
	35 (45%)			29 (37%)		

Figure 4.2. The amounts of NPEs that would have been missed (in blue) had the *Dirty Laundry 2* testing not included such a broad range of NPEs, many of which the Oeko-Tex standard does not take into account.



Figures 4.1 and 4.2 show how measuring only a restricted number of NPEs would miss a lot of the NPEs present in textile products, making it appear that the amount of NPEs is considerably lower than the amount a product actually contains. To close this loophole, limits on the amounts of NPEs in textile products should cover a sufficiently wide range of NPEs.

This is because all of the NPEs present in any given product will ultimately be washed out or lost to the environment during the product's lifetime, where they will degrade to nonylphenols, regardless of what range of ethoxylate chains are present. Therefore standards and regulations need to cover NPEs with a broad range of ethoxylate chain units, including **at least** those with up to 20 units.



Public policy

5

History of restrictions on APs/ APEs - EU

Certain aspects of the manufacturing, use and release of NP/NPEs are already regulated within the EU. In 1998, the ministerial meeting of the Convention for the Protection of the North-East Atlantic (OSPAR Convention)⁶⁰ agreed to cease all emissions of NP/NPE by 2020.⁶¹

Subsequently the EU introduced this commitment into the EU Water Framework Directive in 2000 (WFD), which establishes that all emissions, discharges and losses of 'priority hazardous substances' have to be phased out within 20 years with the ultimate aim of achieving close to zero concentrations in the aquatic environment. NP was identified as a priority hazardous substance in 2001.⁶²

The phase-out obligation is shared between member states and the European Union. Member states are responsible for taking all the necessary measures to achieve WFD objectives. The EU should step in when common approaches are more effective, for example if national standards set are not sufficient (for example on discharges of hazardous chemicals from WWTPs) or other end-of-pipe measures are not technically feasible or too expensive and product controls based on the EU internal market rules would be required.

In 2005, the EU prohibited most uses and the marketing of NP and NPEs for applications in processes, as well as their presence in preparations at concentrations over 0.1%⁶³ for the majority of known applications. Industrial uses that could guarantee no intentional release into the environment were excluded from the ban. However, the presence of NP or NPEs in products – for example imported textiles from countries without such restrictions – is not controlled by this prohibition.

In 2006, a new EU chemical safety policy reform was adopted – REACH.⁶⁴ It puts in place a general requirement for business to substitute substances of very high concern (SVHC) with safer alternatives. SVHC are chemicals that are hazardous due to their intrinsic properties, i.e. they can accumulate in the environment or cause irreversible damage. NP is recognised by the EU as a Priority Hazardous Substance (under the Water Framework Directive), and as a banned substance under REACH (already banned pursuant to restrictions). The pollution resulting from products contaminated with NPEs placed on the market is required to cease pursuant to both REACH and WFD legislation.

Residue in products not included in current EU restrictions

The need for the elimination of the use (substitution) of hazardous chemicals has been recognised by the EU in its chemical management law REACH. However, it is partly due to the fact that REACH has not been fully implemented and that it is yet to fully cover imported products that there are still loopholes that allow NP to be released into environment in the EU, for example via items containing residues of NPEs, such as clothing.

Regulation of APs/APEs in the US, Canada and China

Other countries are also restricting the use of NPEs in textile manufacturing. In 2004 Environment Canada (the federal environmental agency) placed all wet processing textile mills on notice that they were required to prepare and implement pollution prevention plans for reducing the use of NPEs by 97% relative to the annual use for 1998 by 2009, and **in 2006 they reported that the mills had already surpassed this reduction target.**⁶⁵

NP and NPEs are subject to an Environmental Protection Agency (EPA) action plan in the US, which foresees both voluntary (ongoing voluntary phase-out of NPEs in industrial laundry detergents) and regulatory actions.⁶⁶

The manufacture, use and release of NP and NPEs are not currently regulated in China. However, **NP and NPEs have very recently been included on the 'List of toxic chemicals severely restricted for import and export in China' and their import or export now requires prior permission.**⁶⁷

The need for broader policy changes

Restrictions on the levels of APEs in products placed on the market are expected to be implemented in the EU⁶⁸ and could follow elsewhere. Consequently, parallel measures should also be taken in countries where the majority of manufacturing takes place, such as in Asia, to avoid the washing out of APs from finished articles by manufacturers before export in order to meet the detection limits.

Multinational brands have an immediate **opportunity and responsibility** to act on this issue by requiring the elimination of the use of AP and APEs in their supply chain and by doing so they will be acting ahead of the regulatory curve in China and other manufacturing hub regions. Governments in these countries need to ensure that their regulations catch up with the requirements set by the EU in its REACH regulation, by implementing a precautionary approach to chemicals elimination, based on the intrinsic properties of hazardous chemicals. Although no controls on the use of APs and APEs currently exist in most countries where textiles are manufactured, recent developments in China (such as the consultation on the first steps towards a new chemicals management policy⁶⁹) show that **things could change rapidly in the near future.**

It should also be noted that APEs are just one example of the many hazardous substances that are used in the production of textiles and that chemical policies need to address the need to eliminate all hazardous substances, based on the precautionary principle.

Greenpeace is calling for all governments to adopt:

- 1) A political commitment to ‘**zero discharge**’⁷⁰ of all hazardous chemicals within one generation,⁷¹ based on the **precautionary principle** and a **preventative approach** to chemicals management. This commitment must have the substitution principle at its core, and include producer responsibility⁷² in order to drive innovation and toxics-use elimination.
- 2) An implementation plan to:
 - establish a **dynamic priority hazardous chemical list**, for immediate action;⁷³
 - 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.
- 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.

For more details on why Greenpeace is supporting these principles and policies please refer to our accompanying Policy Questions and Answer document – available at:

<http://www.greenpeace.org/international/Global/international/publications/toxics/Water%202011/HCPolicy.pdf>



Corporate practices

6

NPEs are used commonly in supply chains outside of EU

The findings presented in *Dirty Laundry 2: Hung Out to Dry* clearly indicate that the use of NPEs is widespread throughout the international textile industry and during the production of items in many manufacturing countries for a host of major international clothing brands.

Given the recognition⁷⁴ of the need for cessation of releases of NP in the EU, and the different restrictions that have been imposed on NP and NPEs both within the EU and elsewhere, **it is surprising that, prior to Greenpeace's Detox campaign⁷⁵, none of the major clothing brands required their suppliers to eliminate the use of these chemicals in production processes**, particularly as the use of these substances is ubiquitous (they are – according to the brands themselves - widely used in detergents and scouring agents). This is despite the fact that many of the brands have recognised the hazards of NPEs/NP, and many other dangerous chemicals, and some have placed restrictions on their presence in their products.

'Zero discharge' commitments by some industry leaders and the Joint Roadmap

The evidence in *Dirty Laundry* and *Dirty Laundry 2* formed the basis of the Greenpeace Detox challenge⁷⁶ to global sportswear and fashion brands. A number of brands took up this challenge and made individual commitments⁷⁷ to zero discharge of hazardous substances within one generation, taking responsibility for eliminating the use and release of such persistent, toxic chemicals into the environment and thereby aiming to prevent the further impacts on people, water and wildlife resulting from their release. Six of these brands – 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 the 'draft joint roadmap towards zero discharge of hazardous chemicals'⁷⁸ launched by the brands in November 2011, which sets out the steps that they mean to take to achieve their commitments and invites others to partner in this endeavour.⁷⁹

These commitments include specific actions on the use of NPEs, for example H&M⁸⁰ states it will:

“ Request information from our suppliers in relation to the use (e.g. for other brands) of Nonylphenol ethoxylates (NPEs) in the manufacturing processes and request that they require from their sub-supplier to not intentionally use and release NPEs. At the same time, we will re-emphasise to our suppliers that they are contractually bound to comply with the strict standards of our Restricted Substances List. As part of this request for information we will immediately provide Greenpeace the identity⁸¹ of the suppliers responsible for the products tested in the Greenpeace Report, and the quantities of all alkylphenol ethoxylates (APE) discharges, and work with urgency to reinforce the controls on all possible releases of APE from their production.”

The emphasis on the use and release in production processes is a significant step forward – recognising the need not just for controlling the contamination of the final product but also for tackling the manufacturing emissions. It also recognises that the problem is not limited to NP/ NPEs requiring that the entire AP/APE family – many members of which show similar properties⁸² – should be addressed (in line with the precautionary principle). However, the draft joint roadmap does not yet include a specific commitment or a date to eliminate all uses of APEs. **Given the fact that textile manufacturing within the EU does not use APEs, it should be possible for major brands to eliminate at least the major uses (scouring, degreasing and detergents) of APEs throughout the manufacturing supply chain by the end of 2012.**

In the joint roadmap, the brands identify that ‘conversion for detergents/ scouring/ degreasing could yield a reduction of up to 50% of APEO⁸³/ NPE in Apparel/ Footwear supply chains’. The identification of a ‘positive list’ of APE/NPE-free detergents and the remaining sources (including ‘non-intentional uses’) of APEs uses in 2012 are recognised by the joint roadmap as necessary additional steps to allow for a shift to 100% elimination of APEOS.

Brands can make immediate direct changes in supply chains

Many of the countries where the supply chains for international textile brands are located are known for inadequate controls on the manufacturing, use and release of hazardous substances. The example of China, where a large proportion of the textile supply chain is located, is given in *Dirty Laundry* (p.29), which details intrinsic problems with regulations that do not adequately address hazardous pollutants and poor enforcement of standards that do exist. Legislation to eliminate the use and release of substances such as APEs in many of the countries where manufacturing takes place is not an immediate prospect.

However, whether legislation is imminent or not, all brands have a responsibility to act and to ensure that there are no differences in the practices of suppliers in countries with differences in legislation, leading to double standards. Brand owners are in the best position to immediately and directly influence the environmental impacts resulting from the manufacturing of their products, not only through the suppliers that they choose but through product design and the control they can exert over the use of hazardous chemicals in processing and their presence in the final products. Larger brands – individually and jointly (as seen in the joint roadmap) can **exert an enormous amount of pressure on their suppliers to achieve high standards and provide adequate information.**

It is therefore vital that brands make a commitment to eliminate major uses of APEs by the end of 2012 with the complete elimination of all uses of APEs to follow swiftly, for example by the end of 2013. **Limits that the brands set for the absence⁸⁴ of APEs both in preparations and products need to be set at the lowest possible level,** to ensure full elimination of the use of these substances and prevent their re-distribution to aquatic ecosystems throughout the world.



Given the fact that textile manufacturing within the EU does not use APEs, it should be possible for major brands to eliminate at least the major uses (scouring, degreasing and detergents) of APEs throughout the manufacturing supply chain by the end of 2012.



image Coils and bundles of cloth in a production chamber of the Well Dyeing Factory Ltd, in Zhongshan, China



Conclusions and recommendations

7

NPEs were present in most of the products that were tested for *Dirty Laundry 2: Hung Out to Dry*, and for those products that were further investigated in this latest study we found that NPEs readily wash out of all products in a single wash. **In the majority of cases most of the NPEs that were present were washed out in a single wash, with the amount washed out being over 80% for half of the plain fabric samples.**

The fraction that was released was largely independent of the initial level of NPEs in the unwashed product and of the type of fabric that a product is made from. However, more extensive analysis of a wider range of products would be required in order to confirm the lack of such relationships.

This report therefore confirms that NPEs are released during the daily use of such clothing items, and that these NPEs are being collected by the urban waste water treatment systems before being converted into toxic and persistent nonylphenols that are then released into surface waters. Evidence from within the EU – and beyond – demonstrates that these releases are happening and also shows that waste water treatment plants are unable to effectively treat or prevent the release of these hazardous substances to the environment. There are no ‘safe levels’ of these substances in the environment, a fact that is confirmed by the identification of nonylphenols as a ‘priority hazardous substance’ by the EU.

Indeed, it is inevitable that there will be limits on the levels of NPEs in textile products marketed in the EU and that other countries are sure to follow in time. In the countries of manufacture outside the EU, however, this may mean that some suppliers would try to meet the restrictions of selling their products within the EU simply by washing out NPEs from their products before sale, thereby increasing emissions of NPEs in these countries. Therefore, chemical management regulations in these countries – such as China, and others in Southeast Asia and East Asia – need to catch up with REACH by taking a precautionary approach to restricting the manufacture and use of hazardous chemicals to avoid such practices.

Consequently, the textile brands should require the elimination of the use of APEs in the manufacture of their products as soon as possible, wherever that may be; firstly, to prevent pollution of the aquatic environment in countries around the world and secondly, to avoid disruption in their processes when laws inevitably ban uses of APEs in those countries. Brands need to ensure that the use of APEs is eliminated in the supply chain and not simply require the levels of APEs in final products to be below a certain limit before sale.

Until adequate restrictions on the marketing of textile products containing residues of NPEs into the EU are in place and brands completely eliminate the use of APEs in their supply chain, releases of NPEs from textiles and the resulting inputs of the toxic and hormone-disrupting nonylphenols to surface waters will continue, wherever these products are manufactured, sold and washed.

Recommendations – brands

Greenpeace is calling on all the brands, including those identified in the *Dirty Laundry* reports, to become champions for a toxic-free future by eliminating all releases of all hazardous chemicals from their supply chains and products. This means that:

- Irrespective of adequate regulation in the countries of manufacture restricting the use of APEs during production, brands should do everything possible to completely eliminate the use of APEs throughout their supply chains. In order to respond to the urgency of the situation, brands need to give **a clear deadline** for when they will have eliminated all uses and releases of AP/APEs throughout their entire supply chains.
- The presence of APEs in products should not be allowed and restrictions should be based on the lowest possible limit, which covers a sufficiently wide range of APEs. This will send a strong signal to suppliers to phase out and eliminate the use of all APEs in manufacturing.
- Brands need to recognise that mechanisms for disclosure and transparency about the hazardous chemicals (e.g. APEs) used in their global supply chains are important and necessary, in line with the **Right to Know** principle. As an example, brands need ensure the immediate public disclosure of current and on-going discharges of AP/APEs in their supply chains at facility level. Therefore, brands need to request (and verify) quantitative information from their suppliers in relation to the use of APEs in the manufacturing processes, with the intention of disclosing this to the public.

Recommendations – regulators

- A restriction on the sale of textile products containing APEs needs to be implemented as soon as possible within the EU. It is essential that restrictions use the lowest possible limit and cover a sufficiently wide range of NPEs (see Box 1), in order to ensure that imported textiles are no longer a source of nonylphenol to the aquatic environment.
- Ultimately, regulations banning the use of APEs in manufacturing and products also need to be enforced globally; with the countries where textile manufacturing takes place implementing regulations that emulate REACH and which take a precautionary approach to restricting hazardous chemicals.

The role of global citizens

The role of consumers in the chain of pollution that begins with the use of APEs in textile production has also been highlighted by this report. It is inevitable that clothing products manufactured using NPEs will release these substances when they are bought and washed by consumers – wherever they are in the world.

As global citizens we can act collectively and:

- Choose to buy fewer new clothing products and instead buy second hand clothes where possible. This can also involve repurposing and reusing older items to create ‘new’ pieces for our wardrobes, or taking part in clothes swaps with friends.
- Influence brands to act responsibly on behalf of the planet and its people. The need for companies to make the right choices and protect future generations has never been greater than it is today and brands need to be challenged on whether they have set a date for the elimination of the use of APEs and other hazardous chemicals in their supply chains.
- Demand that governments act to restrict the sale of products containing APEs and its use by industry.

Together we can demand that governments and brands act NOW to detox our water, detox our clothing and ultimately, detox our futures. A post-toxic world is not only desirable, it’s possible. Together we can create it.

To stay up-to-date with the latest developments within the **Detox campaign** and find out about opportunities to take part in collective activities to create a toxic-free future, you can sign up to the Greenpeace newsletter at [greenpeace.org/detox](https://www.greenpeace.org/detox)



image Greenpeace activists and volunteers in Bangkok join the world's largest coordinated striptease. On the same day at the same time in 29 cities in 10 countries, more than 600 people whipped off their clothes outside Adidas and Nike stores to challenge the global sportswear giants to eliminate hazardous chemical releases from their supply chains and products, and become champions for a toxic-free future. The activities followed the launch of the first of Greenpeace's *Dirty Laundry* reports.

Endnotes

- 1** Nonylphenol ethoxylates (NPEs) belong to a chemical group known as alkylphenol ethoxylates (APEs) – this group includes NPEs and octylphenol ethoxylates (OPEs). APEs break down in wastewater treatment plants, or in the environment, to form the more toxic alkylphenols (APs), which are persistent (do not readily break down in the environment) and bioaccumulative (build up in the food chain). This study examined the presence of NPEs in textile products, and their release through laundering; however, government regulations and company policies need to address the entire group of APEs.
- 2** <http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry/>
- 3** <http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry-2/>
- 4** Each product was washed separately according to the standard method SS-EN 6330 (domestic washing and drying procedures for textile testing), at 40°C using an eco-labelled washing powder for coloured garments. No subsequent tumble-drying was employed. 40°C cotton and easy-care programmes are the most commonly used by the general public. <http://www.which.co.uk/home-and-garden/laundry-and-cleaning/reviews/washing-machines/page/faqs/>
- 5** The 'washed out' value for each item is the difference between the concentration of NPEs in fabric that had been washed compared to the concentration in an unwashed portion of identical fabric from the same item, with the assumption that the unwashed and washed portions from each item initially contained the same concentration of NPEs
- 6** The chemical groups which includes NP and NPEs respectively, as well as the closely related octylphenols/octylphenol ethoxylates (OPs/OPEs).
- 7** A European product label designed for consumers who specifically aim to buy textiles which are harmless to health, amongst other requirements, http://www.oeko-tex.com/OekoTex100_PUBLIC/content4.asp?area=haup&tmeneue&site=ziele&cls=02, accessed 29 December 2011.
- 8** Parts per million – ppm – is equivalent to milligrams/kilograms – mg/kg
- 9** Based on import data for Germany and Spain from 2010
- 10** The Joint Roadmap is available on the companies' websites, see for example: Puma: http://about.puma.com/?page_id=10
- 11** Greenpeace's response to the joint roadmap is available here: <http://www.greenpeace.org/international/en/campaigns/toxics/water/Detox-campaign/#a3>
- 12** 'Discharge' in this context means all discharges, emissions and losses; in other words, all pathways of releases.
- 13** Typically, one generation is understood to be 20 to 25 years.
- 14** The 15 brands were: Abercrombie & Fitch, Adidas, Calvin Klein (Philips van Heusen), Converse, GAP, G-Star RAW, H&M, Kappa, Lacoste, LiNing, Nike, Puma, Ralph Lauren, Uniqlo and Youngor.
- 15** *Dirty Laundry 2: Hung Out to Dry* demonstrated that it is technically possible for the concentration of NPEs to be accurately determined in textiles with a detection limit of 1 mg/kg (1 ppm = 0.0001%). Many textile products contain a wide range of NPEs, while some standards, such as the Oeko-tex standard are based on a more limited range of chemicals.
- 16** *Dirty Laundry*: <http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry/>
Dirty Laundry 2: Hung Out to Dry: <http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry-2/>
- 17** Brigden K, Santillo P & Johnston P (2012). Nonylphenol ethoxylates (NPEs) in textile products, and their release through laundering. Greenpeace Research Laboratories Technical Report 01/2012 http://www.greenpeace.to/greenpeace/wp-content/uploads/2012/02/Dirty-Laundry_Product_Testing_Technical_Report_01-2012.pdf
- 18** NP and NPE, together with octylphenol (OP) and octylphenol ethoxylates (OPEs) form part of a group of chemicals known as alkylphenols and their ethoxylates (AP/APEs).
- 19** Alkylphenols, along with other persistent hazardous chemicals, are widely present in the environment, including within the Yangtze River ecosystem. A recent Greenpeace study found bioaccumulation of alkyl phenols in two fish species. This has potential consequences for humans, given that 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. <http://www.greenpeace.to/publications/swimming-in-chemicals.pdf>
- 20** The 15 brands were: Abercrombie & Fitch, Adidas, Calvin Klein (Philips van Heusen), Converse, GAP, G-Star RAW, H&M, Kappa, Lacoste, LiNing, Nike, Puma, Ralph Lauren, Uniqlo and Youngor.
- 21** Above the limit of detection of 1 milligram NPEs/kilogram material (mg/kg) or part per million (ppm).
- 22** OSPAR (2004). Nonylphenol/nonylphenol ethoxylates, OSPAR Priority Substances Series 2001, updated 2004, OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, OSPAR Commission, London, ISBN 0-946956-79-0: 20 pp. http://www.ospar.org/documents/dbase/publications/p00136_BD%20on%20nonylphenol.pdf
- 23** PARCOM (1992). PARCOM Recommendation 92/8 on nonylphenol-ethoxylates, OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, OSPAR Commission, London: 1 p. OSPAR (1998). OSPAR Strategy with Regard to Hazardous Substances, OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, OSPAR 98/14/1 Annex 34 EU (2001). Decision No 2455/2001/EC Of The European Parliament And Of The Council Of 20 November 2001 Establishing The List Of Priority Substances In The Field Of Water Policy And Amending Directive 2000/60/EC, Official Journal L 249 , 17/09/2002: 27-30
- 24** OSPAR (2004) op cit.
- 25** Jobling et al (1995) op cit.; Jobling et al (1996) op cit.
- 26** Lopez-Espinosa MJ, Freire C, Arrebola JP, Navea N, Taoufik J, Fernandez MF, Ballesteros O, Prada R & Olea N (2009). Nonylphenol and octylphenol in adipose tissue of women in Southern Spain. *Chemosphere* 76(6): 847-852
- 27** 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
- 28** Ahel M, Giger W, Koch M (1994). Behaviour of alkylphenol polyethoxylate surfactants in the aquatic environment – I. Occurrence and transformation in sewage treatment. *Water Research* 28(5): 1131-1142

- 29** Each product was washed separately according to the standard method SS-EN 6330 (domestic washing and drying procedures for textile testing), at 40°C using an eco-labelled washing powder for coloured garments. No subsequent tumble-drying was employed. 40°C cotton and easy-care programmes are the most commonly used by the general public. <http://www.which.co.uk/home-and-garden/laundry-and-cleaning/reviews/washing-machines/page/faqs/>
- 30** Brigden et al (2012).
- 31** EU (2001) Decision No 2455/2001/EC of the European Parliament and of the Council of 20 November 2001 Establishing the List of Priority Substances in the Field of Water Policy and Amending Directive 2000/60/EC, Official Journal L 249, 17/09/2002: 27-30.
- 32** Månsson N, Sörme L, Wahlberg C & Bergbäck B (2008). Sources of Alkylphenols and Alkylphenol Ethoxylates in Wastewater—A Substance Flow Analysis in Stockholm, Sweden. *Water Air Soil Pollution: Focus* 8: 445–456
- 33** Greenpeace EU Unit (2010). Heads in the sand over Europe's most dangerous chemicals, Governments ignoring legal obligations in the phasing out of Nonylphenol water pollution. 12 May 2010 <http://www.greenpeace.org/eu-unit/en/Publications/2010/NP-pollution-12-05-10/> Accessed 20 January 2012.
- 34** EU (2003) Directive 2003/53/EC of the European Parliament and of the Council of 18 June 2003 Amending for the 26th Time Council Directive 76/769/EEC Relating to restrictions on the marketing and use of certain dangerous substances and preparations (nonylphenol, nonylphenol ethoxylate and cement) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:178:0024:0027:en:PDF> accessed 20 January 2012.
- 35** Greenpeace EU Unit (2010), op cit.
- 36** Lochovsky P & Pospichalova D (2009). Alkylphenols, their derivatives and bisphenol-A in surface waters and in effluents of waste water treatment plants. *Water Management magazine*, 2009.
- 37** PRTR Espana (2012). <http://www.prtr-es.es/informes/pollutant.aspx>, accessed 20 January 2012
- 38** There are 140 entries for urban waste-water treatment plants (code 5(f)) with an equivalent capacity of 100,000 population in the Spanish PRTR.
- 39** Estimated annual releases, based on the assumption that the concentrations in the single samples are representative of the annual average discharge concentrations at these locations.
- 40** ppm (parts per million) is equivalent to mg/kg.
- 41** Adidas Group Policy for the Control and Monitoring of Hazardous Substances, A-01, September 2011, see p.25 http://www.adidas-group.com/en/sustainability/assets/Guidelines/A01_Sept_2011.pdf Accessed 20 January 2012.
- 42** Puma Handbook of Environmental Standards 2011, p.40 http://safe.puma.com/us/en/wp-content/uploads/2011-01-Handbook_environmental_final.pdf accessed 20 January 2012.
- 43** Nike uses the terms NPEO and OPEO, which are other names for NPE and OPE.
- 44** See RSL and Sustainable Chemistry Guidance Update Highlights <http://nikeinc.com/pages/restricted-substances> accessed 20 January 2012.
- 45** H&M Restricted Substances List 2009. http://about.hm.com/filearea/corporate/fileobjects/pdf/en/RM_DOWNLOAD_RESPONSIBILITY_CHEMICAL_LIST_PDF_ENGLISH_GB_1317807076831.pdf accessed 20 January 2012.
- 46** Oeko-Tex (2011) Oeko-Tex® Standard 100 expands to include testing for nonylphenol ethoxylates (NPEOs), nonylphenol (NP), and related chemicals, 14 October 2011. http://www.oeko-tex.com/xdesk/ximages/470/18502_oekotex100.pdf. Access from: http://www.oeko-tex.com/OekoTex100_PUBLIC/content.asp?area=neb_enmenue&site=presseinformationen&cls=02&group=oetzgmedien. Accessed 20 January 2012.
- 47** Oeko-tex (2011a), Objectives: http://www.oeko-tex.com/OekoTex100_PUBLIC/content4.asp?area=hauptmenue&site=ziele&cls=02. Accessed 29 December 2011.
- 48** Abercrombie & Fitch has no information about CSR on its webpages, see: <http://www.abercrombie.co.uk/anf/investors/investorrelations.html> and <http://www.Abercrombie.com>, accessed 20 January 2012.
- 49** Ralph Lauren has no information on sustainability, CSR or the environment on its website: <http://global.ralphlauren.com/en-us/about/Pages/default.aspx> accessed 29 December 2011.
- 50** Kappa is one of several brands owned by the BasicNet Group, there is minimal information on the environment in its annual report. <http://www.basicnet.com/contenuti/reports/bilanci/English%20bilancio%20esercizio%20e%20consolidato%2031-12-2010.pdf> accessed 29 December 2011.
- 51** Youngor has a webpage on environmental protection but there is no information about its use of hazardous substances or a Restricted Substances List. <http://en.youngor.com/responsibility.do?action=display&cid=200811190221474000> accessed 29 December 2011.
- 52** Presentation given by H&M CSR production manager Henrik Lampa at World Water Week, September 2010, page 11. http://www.worldwaterweek.org/documents/WWW_PDF/2010/thursday/K11/Lampa_Better_cotton_HM.pdf accessed 20 January 2012.
- 53** 100,000 tonnes of cotton were used in 2007 - H&M Sustainability Report 2007, page 20. http://www.hm.com/filearea/corporate/fileobjects/pdf/en/CSR_REPORT_2007_PDF_1212066741715.pdf accessed 20 January 2012. H&M global sales, excluding VAT, have increased by 27.8% between 2007 and 2010; Five year summary: http://about.hm.com/gb/investorrelations/fiveyearssummary__fiveyearssummary.nhtml (accessed 20/1/2012). It is assumed that the increase in sales would roughly translate to a similar increase in purchased volumes of cotton.
- 54** ECHA (2011). Registry of intentions for Annex XV dossiers. Notification of intention to propose restriction on the placing of the market of textile and leather articles containing nonylphenol (NP) or nonylphenol ethoxylates (NPEO), submitted by Sweden on 2 September 2011 to the European Chemicals Agency (ECHA). <http://echa.europa.eu/web/guest/registry-of-current-restriction-proposal-intentions> accessed 20 January 2012.
- 55** While there is a restriction on the use of NPEs in manufacturing in the EU, imported materials that may contain these chemicals can be used to manufacture apparel products in the EU and therefore may not be represented as imports.
- 56** Bundesamt für Wirtschaft und Ausfuhrkontrolle, Einfuhr Textilien der Bundesrepublik Deutschland nach Ursprungsregionen, Güterklasse (GP 2009) Nr. 13 1), Berichtszeitraum: Januar bis Dezember 2009 / 2010.

- 57** Cambres, Spanish Foreign Trade Statistics, <http://customs.camaras.org> accessed 20 January 2012.
- 58** Oeko-Tex 2011), op cit.
- 59** NPEs are a group of closely related substances with ethoxylate chains of varying length, usually referred to in terms on the number of units in the chain
- 60** The Contracting Parties to the Oslo and Paris Conventions are Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden, and the UK.
- 61** OSPAR (1998). Ministerial meeting of the OSPAR Commission, Sintra Statement, 23 July 1998.
- 62** EU (2001). Decision 2455/2001/EC of the European Parliament and of the Council of 20 November 2001, establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC [Official Journal L331 of 15.12.2001]. http://europa.eu/legislation_summaries/other/l28108_en.htm accessed 20/1/2012..
- 63** EU (2003). Directive 2003/53/EC of the European Parliament and of the Council of 18 June 2003, amending for the 26th time Council Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations (nonylphenol, nonylphenol ethoxylate and cement), now entry number 46 of annex 17 of Commission Regulation (EC) No 552/2009 of 22 June 2009 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards Annex XVII. Official Journal L 164. 26.6.2009: 7-31.
- 64** EU (2006). Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006R1907:en:NOT> accessed 20 January 2012.
- 65** Progress Report - P2 Planning and Textile Mills that use Wet Processing. Last updated: October 2007. <http://www.ec.gc.ca/planp2-p2plan/default.asp?lang=En&n=3944D8AC-1>
- 66** <http://www.epa.gov/oppt/existingchemicals/pubs/actionplans/np-npe.html> accessed 20 January 2012. Regulatory actions include requiring submission of a significant new use notice, adding NP and NPEs to the Concern List of chemicals and adding NP and NPEs to the Toxics Release Inventory (TRI), which would require facilities to report releases of these chemicals to the environment.
- 67** Ministry of Environmental Protection (2011). List of Toxic Chemicals Severely Restricted on the Import and Export in China. http://www.crc-mep.org.cn/news/NEWS_DP.aspx?TitID=267&T0=10000&LanguageType=CH&Sub=125 (in Chinese) accessed 20 January 2012.
- 68** ECHA (2011), op cit.
- 69** See: http://www.mep.gov.cn/gkml/hbb/bgth/201110/t20111021_218628.htm (in Chinese) accessed 20 January 2012.
- 70** 'Discharge' means all discharges, emissions and losses. In other words, all pathways of releases.
- 71** Typically, one generation is understood to be 20 to 25 years.
- 72** For example, 'no data, no market' provisions.
- 73** Based on the eight basic intrinsic properties of hazardousness – persistence; bioaccumulation; toxicity; carcinogenic, mutagenic and reprotoxic; endocrine disruption; and equivalent concern.
- 74** EU (2001), OSPAR (1998), op cit.
- 75** <http://www.greenpeace.org/detox>
- 76** <http://www.greenpeace.org/international/en/campaigns/toxics/water/detox/>
- 77** Puma: http://about.puma.com/?page_id=10 accessed 20/1/2012. Nike: <http://nikeinc.com/news/nike-roadmap-toward-zero-discharge-of-hazardous-chemicals> accessed 20 January 2012. Adidas: http://www.adidas-group.com/en/sustainability/assets/statements/aG_Individual%20Roadmap_November%2018_2011.pdf accessed 20 January 2012. H&M: http://about.hm.com/gb/corporateresponsibility/environment/hmengageswithgreenpeace__Greenpeace.nhtml accessed 20 January 2012. C&A will publish its individual action plan on 20 January 2012. LiNing 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.
- 78** The Joint Roadmap is available on the companies' websites: Puma: http://about.puma.com/?page_id=10 accessed 20 January 2012. Nike: <http://nikeinc.com/news/adidas-group-ca-hm-li-ning-nike-and-puma-partner-to-reach-zero-discharge-by-2020> accessed 20 January 2012. Adidas: http://www.adidas-group.com/en/sustainability/statements/2011/Joint_Roadmap_Zero_Discharge_Nov_2011.aspx accessed 20 January 2012. H&M: http://about.hm.com/gb/corporateresponsibility/environment/actionplantotheleadourindustrytozerodischarge__Action_plan_zero_discharge.nhtml accessed 20 January 2012. C&A: http://www.c-and-a.com/uk/en/corporate/fileadmin/templates/master/img/fashion_updates/International_Press_Releases/111118_StatementJointRoadmap-EN.pdf accessed 20 January 2012. Li Ning: <http://www.li-ning.com/info/info.html?swf=news.swf> (in Chinese, only accessible from China), for the commitment and the company's statement, accessed 20 January 2012.
- 79** Greenpeace's response to the joint roadmap is available here: <http://www.greenpeace.org/international/en/campaigns/toxics/water/Detox-campaign/#a3>
- 80** In their individual commitments, H&M and C&A agreed to disclose the first discharge data – facility by facility – by the end of 2012. This needs to be accepted by other brands with a clear scope (chemicals and numbers of facilities e.g. starting with APs) in order to provide a credible first step to greater transparency.
- 81** H&M states in a footnote: 'Our intent is to reveal this information under a non-disclosure agreement based on discussion with suppliers and the result of this investigation.'
- 82** ECHA (2011a), SVHC support document 4-(1,1,3,3-tetramethylbutyl) phenol, 4-tert-octylphenol, adopted by European Chemicals Agency (ECHA) on 9 December 2011. <http://echa.europa.eu/documents/10162/17157361-4016-40ff-bc90-ae8e58e9f12b> accessed 20 January 2012.
- 83** The roadmap uses the term APEO – alkylphenol ethoxylate, an alternative way to describe APE.
- 84** Brands use a 'specification document' for suppliers, with details such as the price, quality, colour and delivery; this must be expanded to include a requirement that 'XX hazardous substances e.g. APs' are not to be used by the supplier (and not limited to that specific order). This should be added as a legally binding attachment to suppliers' contracts. It can set the requirements regarding the use of APEs for all materials and products required to comply with the specification. These contracts must make it clear that eliminating all uses of APEs applies to all facilities of a contracted supplier and to all processes located at any contracted facility.
- 46 Dirty Laundry: Reloaded** How big brands are making consumers unwitting accomplices in the toxic water cycle





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

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