

Green Choice Alliance Phase 4 Textile Industry Report

# No excuses:

Taking full responsibility for pollution from manufacturing



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December 2014

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**Acknowledgements:**

Many thanks to the SEE foundation for their support.

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## I. Foreword

In 2012 and 2013, the Institute of Public and Environmental Affairs, Envirofriends, Lvse Jiangnan, Zhaolu Environmental Protection and Commonwealth Service Center, and Envirofriends, jointly published three textile industry reports. The reports looked in detail at pollution problems in the Chinese textile industry, an industrial sector which uses and discharges particularly large quantities of water and chemicals, and provided suggestions to government departments, brands and suppliers. The general public has increasingly been paying attention to the pollution impact from the textile industry and has been asking more questions about the large scale flouting of discharge regulations by the industry as a whole. Faced with this added scrutiny, many stakeholders have gone from denial and resisting change, to finally facing up to some of the problems that exist in the industry, which has resulted in some local governments, industry organizations, textile brands and suppliers really starting to take action. (Please see Appendix I for more details.)

However, there are still conflicting views within the industry as to how to solve these pollution problems. Some actors within the industry feel that the responsibility for pollution caused by dyeing enterprises who discharge into a centralized treatment system should be borne solely by the centralized treatment plant receiving their wastewater, and the responsibility of the enterprise itself should not be questioned. In some cases, factories face very real challenges around finding the land and capital necessary to reach more stringent printing and dyeing wastewater discharge standards, so some companies have been calling for the relaxation of indirect discharge standards and for monitoring of discharge into the centralized treatment systems to be discarded, thus shifting the responsibility onto centralized treatment plants.

From the standpoint of the centralized treatment system, however, it is difficult if not impossible to ensure proper treatment and discharge of contaminants without full cooperation from the industries sending wastewater to them. Size and types of treatment available are inherently limited and cannot be expected to perform correctly to reduce or remove loads of any type and size of pollutant received. As a practical engineering matter, the opinion that discharges from a centralized treatment system should be solely the responsibility of that system cannot deliver the environmental quality that China needs for its waterways. It is thus necessary to develop a shared responsibility model that avoids overload from factories discharging to centralized wastewater and proper operation from the centralized systems so that the wastewater can be treated correctly.

Regretfully, in some cases, we are seeing a different response which will greatly compound the problem of pollution discharge from this industry – relaxing the standards that factories must meet for their discharges into centralized treatment. In response to requests from enterprises and industry associations, in Shaoxing and Huzhou, where there is a high concentration of printing and dyeing enterprises, they have started construction of a centralized pre-treatment facility for printing and dyeing wastewater, which will take wastewater from surrounding enterprises who will discharge at a more relaxed standard. At the same time, on November 5, 2014 the Ministry of Environmental Protection released a proposed amendment to the *Discharge Standards of Water Pollutants for Dyeing and Finishing of Textile Industry (GB 4287-2012)* aimed specifically at relaxing the indirect discharge standard for wastewater discharged to treatment facilities located in industrial parks. It was proposed that the indirect discharge standard for COD would be relaxed to 500mg/L, and the indirect discharge standard for BOD<sub>5</sub> to 150mg/L. The question that must be raised here is whether discharges at these high levels can be effectively treated by centralized wastewater systems, which are often themselves already beyond their capacity to treat influent from various factories. The problem of pollution discharges from textile mills can best be solved looking at both the industrial dischargers and the centralized treatment plant at the same time.

In fact, it appears to us that even without relaxed wastewater standards for textile mills, many centralized treatment systems in China are already severely overloaded or operating in a way that does not sufficiently treat the wastewaters they receive. Our investigations have found that there are serious problems with centralized treatment facilities that treat printing and dyeing wastewater. The technology and capabilities of the facilities are not universally sufficient, and because of unclear responsibilities, there is a lack of effective supervision and management of pre-treatment. This results in the pollution discharge from pre-treatment facilities having a level of pollutants beyond the treatment capacity of the wastewater treatment plants, which ultimately leads to centralized discharge of pollution to the environment.

Based on our findings we recommend that a clear system of accountability be established for centralized wastewater treatment facilities. First of all, based on discharge standards and environmental carrying capacity, the responsibilities of wastewater treatment plants carrying out centralized treatment, and each enterprise discharging into the centralized system, should be clearly defined. Furthermore, supervision and inspection of discharge into the centralized system should be strengthened to clarify the exact level of pre-treatment that each individual printing and dyeing enterprise should carry out and ensure that pretreatment is occurring as needed.

To target new pre-treatment facilities that are being set up we recommend that textile brands include wastewater treatment plants that carry out centralized pre-treatment as part of their supply chains. They should also encourage all parties to clearly define their wastewater treatment responsibilities so that centralized pre-treatment does not become a chronic problem and instead helps to reduce pollution discharge from the textile industry, which will also contribute to improving the state of China's rivers, lakes and coastlines.



## 2. The Predicament of how to deal with the Indirect Discharge of Printing and Dyeing Wastewater

### 2.1 Multiple challenges remain before enterprises that discharge into shared treatment systems will be able to universally meet new discharge standards

On January 1, 2013, the *Discharge Standards of Water Pollutants for Dyeing and Finishing of Textile Industry* (GB 4287-2012) (hereafter referred to as the new standard) came into effect. The new standard was launched to contain pollution from centralized wastewater treatment facilities where discharge from clusters of textile dyeing and finishing mills overwhelm the carrying capacity of the environment. At the same time it was a response to the national requirement to make significant energy savings and emission reduction in the textile industry as a whole.

Two years after the new standard was implemented, many printing and dyeing enterprises are still unable to meet the new indirect discharge standard. According to the printing and dyeing industry this is because a lack of funding, problems with land availability, and the time necessary for carrying out upgrades.

- **Huge cost of upgrading.** Taking Shaoxing as an example, in 2012, when the requirements for COD concentration for wastewater discharged into a shared discharge system was 500mg/L, printing and dyeing mills in Shaoxing City and Keqiao District invested RMB 3.04 billion to set up pre-treatment systems. According to the Shaoxing Environment Protection Bureau, each of the mills needed to invest another RMB 20 million to upgrade their systems so as to meet the new COD limit of 200mg/L (for wastewater discharged into a shared discharge system), adding up to a total of over RMB 5 billion.<sup>1</sup>
- **Shortage of land.** Due to a high concentration of organic compounds and low biodegradability, to meet the new discharge standards using current treatment facilities, wastewater from the textile printing and dyeing industry needs to be treated with more chemical agents and for a longer period of time, or new advanced treatment systems need to be installed. This all requires the construction of new treatment facilities, but as many

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<sup>1</sup> [http://59.108.157.198/html/1/2014-04/10/09B/2014041009B\\_pdf.pdf](http://59.108.157.198/html/1/2014-04/10/09B/2014041009B_pdf.pdf)

printing and dyeing enterprises point out, there is no land available for pre-treatment system upgrade because of restrictions on land acquisition or industrial park planning.

- **Narrow window for upgrades to take place.** The new standard was promulgated on October 19, 2012 and took effect on January 1, 2013. Transitional discharge limits were applied between January 1, 2013 and December 31, 2014 to facilitate upgrading efforts by mills before they had to meet the new standard, which will take effect fully among existing and new mills from January 1, 2015. During this relatively relaxed transitional period, the latest supervisory monitoring data from some provincial and municipal regulators doesn't show optimistic results even in reaching the easier standard for existing mills. The window for upgrading is closing and pressure is building.

More heated discussion lies in whether the mills connected with a central treatment facility should burden themselves with the responsibility for indirect discharge. Some in the textile industry argue that the standard for discharging into shared discharge systems should not be so strict since printing and dyeing enterprises have signed contracts with wastewater treatment facilities, who should bear the full responsibility of treating final discharge to the national standard. So, what is the current state of centralized wastewater treatment and are these facilities able to single-handedly deal with the massive amount of pollution from printing and dyeing?

## 2.2 Centralized Treatment leads to Centralized Pollution

Centralized treatment refers to a model of receiving, transferring and processing wastewater from polluting source (including industrial and domestic pollution sources) within the area of a city or industrial park through a shared discharge system. This treatment model can reduce the costs of environmental protection, can increase treatment effectiveness, can use advanced processes and modernize management practices thus it is beneficial to society, the economy, and the environment and can also help with urban planning and industrial integration.

However, our investigations have shown that many such industrial wastewater treatment facilities turn out to be centralized sources of pollution because they fail to meet discharge standards. Statistics from the China Water Pollution Map show that from 2008 to June 2013, 3,622 wastewater treatment facilities around the country had an incredible 4,961 violation records in total<sup>2</sup>, which is an average of 1.4 records per facility. The problems were particularly concentrated in Jiangsu and Zhejiang.<sup>3</sup>

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<sup>2</sup> [http://www.ipe.org.cn/Upload/IPE\\_Newsletter/Green\\_Stock\\_Industry\\_Newsletter\\_1\\_Sewage\\_treatment\\_Industry.pdf](http://www.ipe.org.cn/Upload/IPE_Newsletter/Green_Stock_Industry_Newsletter_1_Sewage_treatment_Industry.pdf)

<sup>3</sup> [http://www.ipe.org.cn/Upload/IPE\\_Newsletter/Green\\_Stock\\_Industry\\_Newsletter\\_1\\_Sewage\\_treatment\\_Industry.pdf](http://www.ipe.org.cn/Upload/IPE_Newsletter/Green_Stock_Industry_Newsletter_1_Sewage_treatment_Industry.pdf)

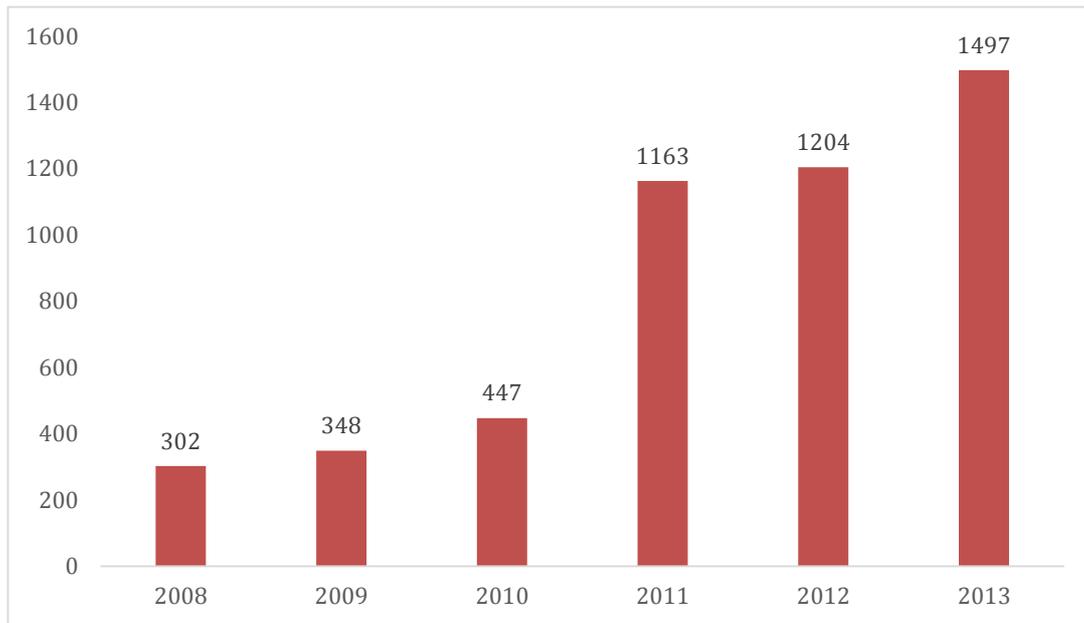


Figure 1: Number of violation records for wastewater treatment facilities in recent years



Figure 2. Distribution of wastewater treatment plants in Jiangsu and Zhejiang

Among those treatment facilities that have records for breaching discharge standards, some receive mainly industrial wastewater from shared discharge systems. Industrial wastewater often has a complex makeup, contains high concentrations of pollutants, and does not biodegrade easily. Furthermore, some areas treat treatment plants as if they are swill buckets and send all different types of water there for treatment. This results in the treatment plants being unable to treat the wastewater and so discharge often breaches discharge standards.



**Zhenxin Wastewater Treatment Plant**

**Hyflux NewSpring (Changshu) Co., Ltd**

**Linjiang Wastewater Treatment Facility**  
**Shaoxing Water Treatment Development Co. Ltd.**

## Case Study 1. Linjiang Wastewater Treatment Facility: Large diameter discharge pipe going deep underwater in the river



The Hangzhou, Xiaoshan Linjiang Wastewater Treatment Facility is located in Xiaoshan's No. 15 eastern section of reclaimed land. As a subsidiary of the Xiaoshan District Water Services Group Wastewater Treatment Facility Co. Ltd., it handles industrial wastewater and domestic wastewater discharged from the Jiangdong and Linjiang industrial parks, and eleven neighborhoods, including Guali, Yipeng, Kanshan, Dangshan, Dangwan, Yinong, Jingjiang, Nanyang, Yaqian, Hezhuang and Xinwan. The overall designed capacity is one million tons wastewater per day and was implemented in phases. Phase I broke ground in November 2004 and the facility started operation in September 2006 with a daily treatment capacity of 300,000 tons wastewater.



Figure 3. Linjiang Wastewater Treatment Facility (downloaded from Brilliant Programs in Focus on [www.xsnet.com](http://www.xsnet.com) from the Xiaoshan local government<sup>4</sup>)

On December 4, 2013, seven NGOs, including IPE and Lvse Jiangnan, jointly released the Green Choice Alliance Phase III Textiles Report, which reported on discharge from the Linjiang Wastewater Treatment Facility breaching discharge standards. Field visits revealed an even more shocking discovery: so much water was being discharged it created a rumbling sound as it came out of the discharge outlet, the water was black-red in color, was so warm that hot steam could be felt when close by, and it was stinking and frothing. The discharge volume was staggering and the froth created carried for several kilometers to form an obvious belt of pollution in the river.

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<sup>4</sup> [http://www.xsnet.cn/2013\\_subject/gjjstq/ldgczs/1839556.shtml](http://www.xsnet.cn/2013_subject/gjjstq/ldgczs/1839556.shtml)



Figure 4. Field visit to the discharge outlet of the Linjiang Wastewater Treatment Facility in November 2013 (Photographed by Lvse Jiangnan)

To date the operating of the Linjiang Wastewater Treatment Facility leaves no room for optimism. According to data released on the self-monitoring information platform for enterprises in Zhejiang Province, the Linjiang Wastewater Treatment Facility recorded an excess hourly average value for COD 58 times in total, 873 times for excess ammonia nitrogen discharge.<sup>5</sup> According to records in the IPE Pollution Map database, government supervisory monitoring reports from 2013 to 2014 showed the same facility was found discharging in breach of the legal standard on many occasions.

Table 1. Violation records in the Pollution Map database for the Linjiang Wastewater Treatment Facility from 2013-2014

Source of data	Pollutant that exceeded discharge standard by a factor of (x)
Monitoring Report of Major Pollution Sources of Hangzhou City Q1 2013	Ammonia Nitrogen (1.03), TN (0.835), Aniline (0.39)
Monitoring Report of Major Pollution Sources of Hangzhou City Q2 2013	Ammonia Nitrogen (1.08), TN (0.47), Aniline (0.95)
Monitoring Report of Major Pollution Sources of Hangzhou City Q3 2013	Aniline (0.96)
Monitoring Report of Major Pollution Sources of Hangzhou City Q4 2013	Aniline (0.42) Color (0.01)
Supervisory Monitoring Report of Major Pollution Sources of Zhejiang Province Q1 2014	TP (0.04), TN (0.08) Aniline (0.19)

<sup>5</sup> <http://app.zjepb.gov.cn:8089/nbjcsj/>

Supervisory Monitoring Report of Major Pollution Sources of Zhejiang Province Q2 2014	Color (0.14), Suspended Solids (0.13), Aniline (1.04)
Supervisory Monitoring Report of Key state Monitored Pollution Source Enterprises in Hangzhou on June 23, 2014	Color (0.1), Aniline (1.0), SS (0.1)

On the Google Earth satellite map below (Figure 5), a colored belt in the river starting from the old discharge outlet used to be visible to the naked eye. By comparing maps, it is clear that the ongoing construction to extend the discharge pipe goes right through that old spot (Figure 6). In September 2014, during a visit to Hangzhou Bay, we discovered that close to the Linjiang Wastewater Treatment Plant discharge outlet, there was large scale construction machinery and equipment, large amounts of construction material, and a temporary bridge into the river.



Figure 5. Satellite photo of the Linjiang Wastewater Treatment Facility discharge outlet (taken by a NASA satellite on November 7, 2013)



Figure 6. Construction site of works to extend discharge pipes from the Linjiang Wastewater Treatment Facility<sup>6</sup>



Figure 7. Field survey on the state of discharge from the Linjiang Wastewater Treatment Facility by environment NGOs (September 24, 2014)

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<sup>6</sup> <http://www.zghxtg.com/article/show.asp?id=20397>

We discovered that the ongoing work was the extension of the discharge pipe project by the Xiaoshan Linjiang Wastewater Treatment Facility, which aimed to move the final outlet underwater to the middle of the Qiantang River. According to the bid awarding result for this project in 2013, the total investment was RMB 134.68 million with an estimated budget of RMB 106 million<sup>7</sup> for the present phase. Upon completion of the off-shore discharge pipe, daily wastewater discharge capacity will be 700,000m<sup>3</sup>. Upon completion of the phase I work, daily discharge capacity will be 300,000m<sup>3</sup> and the discharge pipe will extend 220 meters into the Qiantang River.<sup>8</sup>

August 2013 saw the completion of onshore work to extend the discharge pipe from the Linjiang Wastewater Treatment Facility, offshore work is currently ongoing, after which the discharge outlet will be under water in the river. We can predict that after the offshore construction is complete, the discharge outlet for the treatment plant will be far from shore underwater in the river. After being discharged through this outlet the wastewater will immediately be diluted by the river water so the discharge will be even more concealed, making it harder for the public to supervise and the environmental authorities to collect evidence.

During the field visit on September 24, 2014, we witnessed less volume of steaming and dark purple wastewater flowing into the Qiantang River from the old discharge outlet on the riverside. However, on the upstream side of this outlet, we saw black colored water emerging from within the river. Boarding on the temporary work bridge extended over 100 meters into the middle of the river, where we noticed multiple streams of black and grey color water gushing up to the surface of the river like boiling water, winding and diffusing downstream.

Publicly available information<sup>9</sup> indicates that there is ongoing expansion and upgrading work to the Linjiang Wastewater Treatment Facility taking place.<sup>10</sup> According to the project approval explanation provided to the public, the work includes expanding the existing 200,000 tons of wastewater per day treatment system, upgrading the existing 300,000 tons of wastewater per day system to achieve a treatment system with a 500,000 tons of wastewater per day treatment capacity. Total investment in the project will be RMB 1.7 billion and the finish date is set to be in 2016.<sup>11</sup>

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<sup>7</sup> <http://115.236.5.251:82/Bulletin/BulletinBrowse.aspx?id=1439>

<sup>8</sup> <http://www.xswater.com/viewnews.asp?id=539>

<sup>9</sup> The wastewater treatment facility responded to the situation exposed by the Phase III Textile Report through a newspaper called Youth Times as the following. The said facility processed wastewater from textile factories and other industrial factories and urban sewage water in eastern Xiaoshan District. As a result, the facility combines the Level 2 standards of *Integrated Wastewater Discharge Standard* (GB8978-1996), the Level 2 standards of the *Discharge Standards of Water Pollutants for Dyeing and Finishing of Textile Industry* (GB4287-92) and B category of Level 1 standards of *Discharge standard of pollutants for municipal wastewater treatment plant* (GB18918-2002). Only the COD of wastewater followed the *Discharge Standards of Water Pollutants for Dyeing and Finishing of Textile Industry* (GB4287-92). It was only two months from the promulgation to implementation of the new standards, which was too short a time for technical upgrading. However expansion and upgrading scheme has been developed to apply discharge standard of B category of Level 1 under the *Discharge standard of pollutants for municipal wastewater treatment plant* (GB18918-2002) in 2015 with COD under 60mg/L. [http://www.qnsb.com/fzpaper/site1/qnsb/html/2013-12/06/content\\_467747.htm](http://www.qnsb.com/fzpaper/site1/qnsb/html/2013-12/06/content_467747.htm) Linjiang

<sup>10</sup> [http://www.zjjs.gov.cn/yggh/Ghpqgs\\_New.aspx?id=2066](http://www.zjjs.gov.cn/yggh/Ghpqgs_New.aspx?id=2066)

<sup>11</sup> [http://www.hb.xs.zj.cn/system\\_dntb/upload/钱塘江\(萧山段\)水环境治理2014年工作计划\(征求意见稿\).doc](http://www.hb.xs.zj.cn/system_dntb/upload/钱塘江(萧山段)水环境治理2014年工作计划(征求意见稿).doc)

The Xiaoshan Linjiang Wastewater Treatment Facility needs to not only upgrade and expand their hardware, but also needs to carry out improvements to management practices. They must strengthen the pre-treatment requirements and clearly identify discharge responsibilities through detailed monitoring of influent water quality among dischargers to the central treatment facility. They must also disclose in full, and to the public, the quality of influent and effluent, thus allowing the general public to play a supervisory role. Only by implementing these measures can a centralized wastewater treatment plant avoid becoming a bigger source of pollution.

The problems at the Linjiang Wastewater Treatment Plant are not unique. Our investigations found that it is not only those wastewater treatment facilities closely linked with local governments, like the Linjiang plant, that have problems. Wastewater treatment plants operated by some listed companies and international enterprises also have similar problems.

## Case Study 2. Hyflux NewSpring: an international water treatment company breaching discharge standards time and again



According to the Pollution Map's Green Stocks database, subsidiaries and affiliates of Hyflux NewSpring, which is known as a first-class water treatment enterprise in Asia, were found to have as many as 33 violation records. The company operates several wastewater treatment plants in the Yangtze River Delta. Those located in Wuxi, Changshu and Taizhou had violation records because they exceeded discharge standards many times, and others in Yangzhou and Nantong, were also found to have poor environmental records.

Table 2. Details of Hyflux Group's wastewater treatment plant subsidiaries' violation records

Company	Area	Year	Cause of Penalty
Hyflux NewSpring (Leping) Co., Ltd.	Jindezhen	2014, 2013	Rectification within a time limit, for TP at the final discharge outlet 1.18 times higher than the limit.
Hyflux NewSpring (Wuxi) Co., Ltd.	Wuxi	2014, 2013, 2012, 2011, 2008	On-line data between January and June 2014 shows COD, ammonia nitrogen and TP exceeding discharge limits time and again. Supervisory monitoring results found exceeding limits for multiple quarters between 2011 and 2014.
Hyflux NewSpring (Changshu) Co., Ltd.	Suzhou	2013, 2012, 2009, 2008	In 2013, a fine of RMB 350,000 was imposed for discharging water pollutants above discharge limits. On-line monitoring data shows COD exceeding limit time and again from 2012 to 2013.
Hyflux NewSpring (Taizhou) Co., Ltd.	Taizhou	2013, 2012, 2011, 2010, 2009	Supervisory monitoring results showed discharge exceeded discharge standards in several quarters of 2013.
Hyflux NewSpring (Yangzhou) Co., Ltd.	Yangzhou	2013, 2012, 2009, 2008	Rated as a "Yellow Enterprise" on the Environmental Rating System

<b>Hyflux NewSpring Waste Water Treatment (Mingguang) Co., Ltd.</b>	Chuzhou	2013,2012	Sampled TP at the final wastewater discharge outlet was 1.92mg/L, 2.84 times higher than the limit.
<b>Langfang Hyflux NewSpring Co., Ltd.</b>	Langfang	2012	Penalized and ordered to rectify illegal discharge activities including excessive SS, COD and ammonia nitrogen at the wastewater discharge outlet, as a published case of violation under the provincial supervision in 2012.
<b>Hyflux NewSpring (Tiantai) Co. Ltd.</b>	Taizhou	2012, 2011, 2008	Supervisory monitoring data showed wastewater treatment plant was exceeding discharge limits in 2011 and 2012.
<b>Hyflux NewSpring Sewage Disposal (Rudong) Co., Ltd.</b>	Nantong	2012	Exceeding maximum COD concentration level in 2012.

Hyflux NewSpring (Changshu) Co., Ltd., which is located in Changshu, receives industrial wastewater from several textile printing and dyeing mills, including Formosa Taffeta Co., Ltd. As an integrated wastewater treatment plant, the company serves the whole southeast economic development zone in Changshu, taking in mainly printing and dyeing wastewater, as well as other industrial wastewater and domestic wastewater. It has a treatment capacity of 30,000 tons per day for the phase I plant and a total capacity of 60,000 tons per day.<sup>12</sup> According to records in the IPE Pollution Map database, this company has multiple environmental supervision records for the past few years, as shown in Table 3.

Table 3. Environmental supervision records for Hyflux NewSpring (Changshu) Co., Ltd.

Source	Content of Records
Notice from the Suzhou Municipal People's Government Requiring Rectification by Nine Companies including Hyflux NewSpring (Changshu) Co., Ltd. within a Time Limit	Production wastewater fails to consistently meet discharge standards or exceeds total discharge volume requirements. Require rectification within a set time limit.
2012 Environmental Rating Results for Key state Monitored Enterprises in Jiangsu Province	Rated as black
2013 Environmental Rating Results for Key state Monitored Enterprises in Jiangsu Province	Rated as red
Platform of releasing self-monitoring data by key enterprises under provincial supervision in Jiangsu for 2014	On-line monitored value of COD and ammonia nitrogen exceeding limits time and again

According to the real-time data released on the Jiangsu Province key state monitored enterprise self-monitoring data disclosure platform, Hyflux NewSpring (Changshu) Co., Ltd. was found to breach hourly average COD values 628 times, and hourly average ammonia nitrogen values 138 times.

<sup>12</sup> <http://qy.58.com/46891427/574/pn1?PGTID=14156921191300.9205182243604213&ClickID=1>

### Case Study 3. Shaoxing Water Treatment Development Co. Ltd.: Pollutants Repeatedly Exceed Discharge Standards



Located in the Shaoxing Keqiao Binhai Industrial Zone, to the west of the Cao'e River and south of Qiantang River, about twenty kilometers away from Shaoxing, Shaoxing Water Treatment Development Co. Ltd. (hereafter referred to as the Shaoxing Wastewater Treatment Plant), is majority owned by the Shaoxing Keqiao Water Treatment Group Co. Ltd. (40% is owned by the Shaoxing Municipal Government and 60% by Shaoxing Keqiao).<sup>13</sup> It is the largest centralized wastewater treatment company for printing and dyeing factories in the world, processing industrial and domestic wastewater from both Shaoxing city and county areas and servicing an area of 1,000km<sup>2</sup>.<sup>14</sup>

Currently the printing and dyeing mills discharging into the Shaoxing Wastewater Treatment Plant still use the Level 3 limits in the *Integrated Wastewater Discharge Standard* (GB8978-1996), requiring COD input concentration to be under 500mg/L, ammonia nitrogen to be under 35mg/L, and no specific limits on BOD, TP, aniline and color.

The 2014 Q3 supervisory monitoring report shows that the COD concentration of influent into the Shaoxing Wastewater Treatment Plant was as high as 1200mg/L, much higher than the 200mg/L influent standard, and also higher than the 500mg/L influent requirements in the old standard. This means an added burden on the processing capacity of the wastewater treatment plant.

There was some discussion about whether this plant had a problem with discharge breaching discharge standards or not. Local government responded that, according to the 14 quarterly

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<sup>13</sup> <http://www.shaoxingwater.com/gs.php?p=4>

<sup>14</sup> [http://www.sxepb.gov.cn/art/2010/11/3/art\\_4713\\_200163.html](http://www.sxepb.gov.cn/art/2010/11/3/art_4713_200163.html)

supervisory monitoring reports, the plant met all discharge standards while upgrading its system continuously.<sup>15</sup> The plant’s discharge problem has become more visible because of increased access to environmental information and stricter requirements for some pollutants.

According to monitoring records in the Pollution Map database collected by IPE, Shaoxing Wastewater Treatment Plant had multiple records for color, COD and ammonia nitrogen exceeding discharge standards.

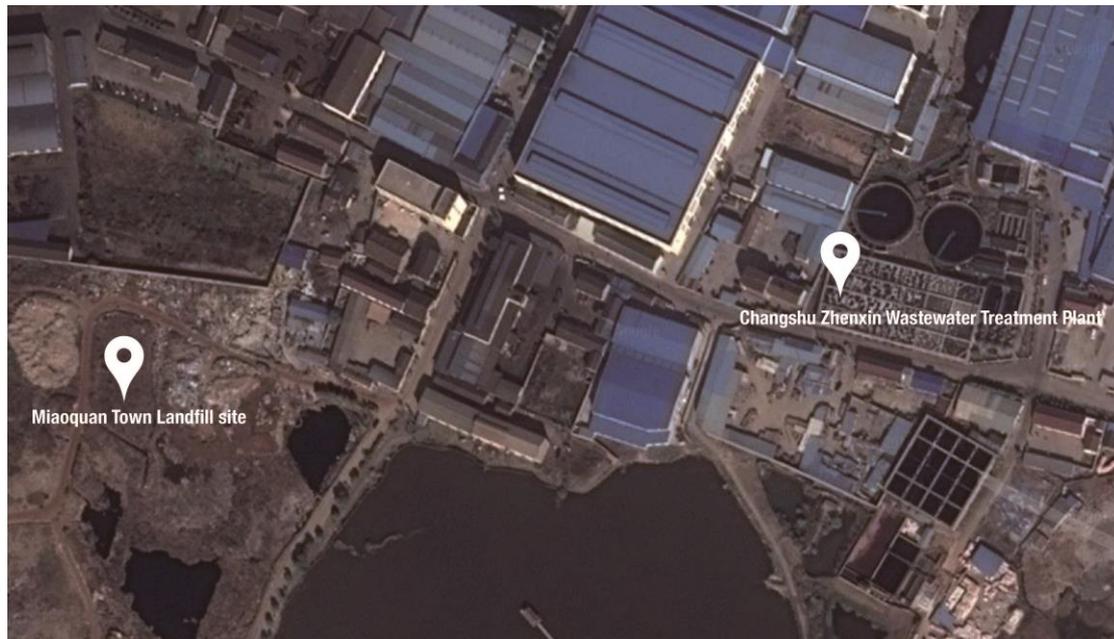
Table 4. Environmental monitoring records for the Shaoxing Wastewater Treatment Plant

Source	Pollutant that exceeded discharge standard by a factor of (x)
Monitoring Report of Major Polluting Sources in Zhejiang Province in Q4 2013	Color (2.2)
Open information of the 4th (the last ten days of June ) supervisory monitoring results of key polluting sources under state supervision in Q2 2014	Color (0.6)
Supervisory Monitoring Report on Major Polluting Sources in Zhejiang in Q2 2014	Color (0.6)
Supervisory Monitoring data for Sewage Plants in Q3 2014	Color (1.22)
Self-monitoring Data Disclosure Platform for Enterprises in Zhejiang Province in 2013	COD, TP, ammonia nitrogen, on-line PH value exceeding limits time and again

Data on pollutants specific to the printing and dyeing sector, like aniline, have never been released in quarterly supervisory reports by Zhejiang Province, even though open access to such information has been called for by environmental NGOs since 2012. According to data on the Zhejiang Province self-monitoring disclosure platform, between January 1, and November 20, 2014, hourly average values for COD exceeded the discharge limit 561 times, ammonia nitrogen 89 times, TP 202 times, and pH 83 times.

<sup>15</sup> Green Peace “Toxic threads – Putting Pollution on Parade. How textile manufacturers are hiding their toxic trail.”

## Case Study 4. Changshu Zhenxin Wastewater Treatment Plant: Blatant Sludge Disposal Problem



The Zhenxin Wastewater Treatment Plant is located in Miaoquan Town, Changshu City, in Jiangsu Province, and processes wastewater for eight printing and dyeing mills nearby.<sup>16</sup> According to search results from the IPE Pollution Map database, the plant was rated as yellow in environmental ratings in 2007, 2011 and 2012. Between January 1, and November 20, 2014, real-time monitoring data showed that COD and ammonia nitrogen levels exceeded discharge standards multiple times. See Figure 8 below for more details.

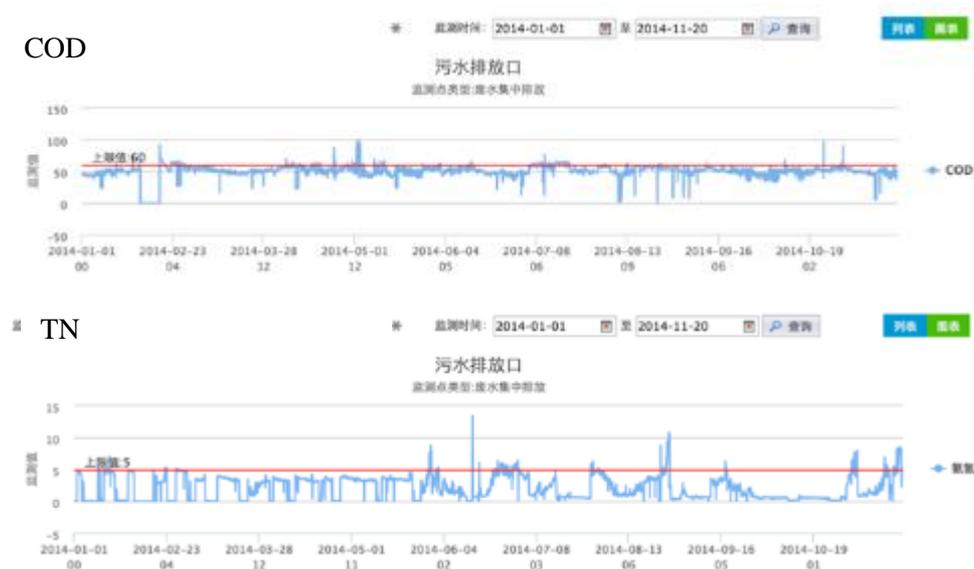


Figure 8. Violation of discharge standards by the Zhenxin Wastewater Treatment Plant in 2014

Sludge disposal by Zhenxin Wastewater Treatment Plant is also highly suspicious. Their self-

<sup>16</sup> <http://www.cssme.gov.cn/Oldweb/Frugalshow.asp?ID=138>

monitoring plan shows that sludge from the plant is sent for landfill at the Miaoquan Town Landfill site. An onsite visit by Lvse Jiangnan found that sludge of all different colors from the plant and many other printing and dyeing mills, was dumped in open ground.



Figure 9. Huge piles of different colored sludge at the landfill site

During the onsite visit, Lvse Jiangnan found that sludge from the wastewater treatment plant and printing and dyeing enterprises was washed-down with high-pressure wastewater. It was difficult to believe this was happening in a region famous for its picturesque scenery.



Figure 10. Sludge being washed-down with high-pressure wastewater

To understand more about the sludge, Lvse Jiangnan sent samples from the landfill site for testing, three of which were found to contain pollutants specific to the textile sector such as aniline, sulfide and chromium. In October 2013, Changshu Municipal government issued an official document requiring that after January 2015, landfills taking printing and dyeing sludge would be closed up to avoid simple disposal of such sludge. The testing results and local government requirements can be found in Appendix II.



## 3. Proposals for Resolving Problems Related to Centralized Treatment of Printing and Dyeing Wastewater

### 3.1 Industrial Discharges to Centralized Wastewater Treatment Works: The United States Approach

In 1972, the United States passed its Clean Water Act to restore and maintain the integrity of its waters – to eliminate excess pollution discharges and to achieve fishable and swimmable water quality. There are two primary targets of the Clean Water Act: those discharging pollution *directly into surface water*, which are regulated under the **National Pollutant Discharge Elimination System** (NPDES) and those discharging pollution into centralized wastewater treatment systems, termed *indirect dischargers*, which are regulated under the **National Pretreatment Program**. The National Pretreatment Program requires indirect dischargers to obtain permits to discharge their wastewater into the treatment works. These permits specify the effluent quality required and usually necessitate that the industrial user pretreat pollutants prior to discharge to the centralized treatment system (known as a **Publicly Owned Treatment Works**, or **POTW**).

From the onset, the Clean Water Act recognized the importance of industrial pretreatment to the performance of centralized wastewater treatment systems. Certain industrial discharge practices were well known to interfere with the operation of the POTWs, leading to the discharge of untreated or inadequately treated wastewater in U.S. waterways. This *interference* could be caused by the discharge of toxic or persistent pollutants not amenable to biological wastewater treatment that would consequently pass through the POTW and cause fish kills or other deleterious effects. Or it could also be caused by *excess loading* of pollutants that could be treated at the POTW at lower levels; even when a POTW has the capability to remove pollutants from wastewater, an excess load of these pollutants results in poor treatment and discharge of excessive pollution into waterways or treatment system sludge.

## Key terms of USEPA Pretreatment Program

Two key terms used in the USEPA National Pretreatment Program are *interference* and *pass through*.

**Interference** is any discharge which, alone or in conjunction with discharges from other sources, inhibits or disrupts the POTW treatment processes or its sludge composition/use/disposal and therefore causes to POTW to be in violation of its permit.

**Pass through** is any discharge that exits the POTW into receiving waters in quantities or concentrations which, alone or in conjunction with discharges from other sources, is a cause of violation of any requirements of the POTW.

To avoid these circumstances from the outset, the United States established a formidable pretreatment program in its Clean Water Act. Focused on large centralized treatment systems that treat more than 5 million gallons per day as well as any smaller systems that accept wastewater from industrial users whose discharges could affect the treatment plant, the National Pretreatment Program is currently in effect at approximately 1600 POTWs across the U.S. and is controlling discharges from approximately 23,000 industrial sources.<sup>17</sup> Although these 1600 POTWs represent only about 10 percent of the total wastewater treatment plants in the U.S. nationwide, those POTWs account for more than 80 percent (approximately 32 billion gallons per day) of the total wastewater flow of the United States.<sup>18</sup> The National Pretreatment Program is regarded in America as a notable success.<sup>19</sup>

### How does the US Pretreatment Program Work?

EPA's pretreatment regulations divide responsibilities among federal, state, and local government, industry and the public. Its regulations have been revised numerous times since originally published in 1978 and now reflect refinements from experience of over 35 years of implementation.

Unlike most other environmental programs that rely primarily on federal and state governments to implement and enforce environmental requirements, the National Pretreatment Program places most of the responsibility on local governments. More specifically, the centralized treatment system ("POTW") itself, acts as the primary control authority in the program. It applies to either the state or to USEPA with the details of its program to receive approval to run it.

The POTW must be prepared to undertake extensive work to receive permission to run its program. It must identify and locate all the industrial users discharging into its system, identify the character and volume of pollutants contributed by such users, notify the users of their pretreatment limits and requirements, receive and analyze reports from the industrial users, sample and analyze their discharges, evaluate the need for emergency control plans, routinely inspect its industrial dischargers, and investigate instances of noncompliance. The POTW must develop and implement an enforcement response plan that contains detailed procedures for

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<sup>17</sup> USEPA 2011. Introduction to the National Pretreatment Program. p iii

<sup>18</sup> Ibid. p 2-4

<sup>19</sup> Ibid. p iii

investigation and response to noncompliance. It must have sufficient resources and qualified personnel to carry out its responsibilities. Finally and significantly, the POTW must adopt public notification and participation requirements to ensure transparency of its operations.<sup>20</sup>

Even once the POTW is approved to run its pretreatment program, the approving state authority or USEPA retains responsibility for overseeing implementation and initiating enforcement of the pretreatment program where needed.

### Division of Responsibilities in the US Pretreatment Program

#### National USEPA

- Oversees program implementation at all levels
- Develops and modifies regulations for the program
- Develops policies and technical guidance for program implementation
- Initiates enforcement actions as appropriate

#### Approval Authorities (may be EPA or authorized states)

- Notifies POTWs of their responsibilities
- Reviews/approves specific POTW pretreatment programs
- Oversees POTW program implementation
- Initiates enforcement actions against noncompliant POTWs or industries

#### Control Authorities (may be POTWs, states, or EPA regional office)

- Develops, implements and maintains approved pretreatment program
- Develops industrial user limits and issues permits as needed
- Develop enforcement response plan
- Evaluates compliance of regulated industrial users
- Initiates enforcement actions
- Submit reports to approval authorities

#### Industrial Users

- Complies with pretreatment standards and reporting requirements

### How are limits established for industrial dischargers in the Pretreatment Program?

All industrial users are subject to prohibitions in the Pretreatment program, with standards that are either *concentration-based* or *production based* (mass limited based on production rates).<sup>21</sup> EPA prefers production-normalized, mass based standards, where feasible, because such limits

<sup>20</sup> Ibid. p 2-6

<sup>21</sup> Mass limits are based on a concentration standard multiplied by a facility's process wastewater flow to determine the total amount of kilograms of pollutant allowed into the treatment system per day, month, or year.

account for flow reduction and reduce the potential for using dilution instead of actual treatment to reduce a concentration value in the effluent.

To set these permit limits, the POTW first conducts a survey to identify all the industrial users discharging into its system and determines the character and volume of all the pollutants contributed by these industries. The POTW then evaluates which pollutants have a reasonable potential for pass through, interference, or sludge contamination. With this information in hand, the POTW conducts a technical evaluation to determine the *maximum allowable load* that the treatment system can accept from all its permitted industrial users and still ensure that it is meeting its own permit, protecting against pass through and interference. Subtracting out contributions from background sources, the available industrial loading is then distributed evenly or on an as-needed basis among the industrial users. EPA provides considerable technical guidance and assistance to POTWs to enable them to undertake this work.

EPA's pretreatment standards distinguish between significant industrial users (SIU's) and ordinary industrial users (IU's) based on potential for negative impact and then regulates these two types of dischargers differently. Significant users, which face the more substantive requirements, have one or more of the following characteristics:

- They are from one of 35 industries recognized to have a particularly difficult waste to treat<sup>22</sup>
- They discharge an average of 25,000 gallons per day or more of process wastewater to the centralized treatment system
- The discharge makes up 5 percent or more of the average capacity of the treatment plant during the dry season, or
- The user has "reasonable potential to adversely affect the centralized system's operation or violate any pretreatment standard/requirement".

## **Inspection and Enforcement**

All significant industrial users must be issued an individual, enforceable permit with effluent limits and requirements for self-monitoring, sampling, reporting, notification, and record-keeping. POTWs are required to inspect all significant industrial users at least once a year and are authorized to sample as necessary to verify compliance with pretreatment standards.

Enforcement of pretreatment requirements is a critical element of the National Pretreatment Program. When a user has violated its permit, the POTW is authorized to issue compliance orders to remedy the problem, and, if the user continues to violate its permit, the POTW is

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<sup>22</sup> These include: aluminum forming, battery manufacturing, carbon black manufacturing, centralized waste treatment, coil coating, concentration animal feeding operations, copper forming, electrical and electronic components, electroplating, fertilizer manufacturing, glass manufacturing, grain mills, ink formulating, inorganic chemicals manufacturing, iron and steel, leather tanning and finishing, metal finishing, metal molding and casting, nonferrous metals forming and metal powders, nonferrous metals manufacturing, oil and gas extraction, organic chemicals/plastics/synthetic fibers, pain formulating, paving and roofing materials, pesticide chemicals, petroleum refining, pharmaceutical manufacturing, porcelain enameling, pulp and paper, rubber manufacturing, soap and detergent manufacturing, steam electric power generating, timber products processing, transportation equipment cleaning, and waste combustors. The detailed standards are provided in the Code of Federal Regulations, 40 CFR Subparts 412-471.

authorized to halt its operations to terminate the discharge through the issuance of a cease and desist order. The POTW is also authorized to immediately suspend a user's discharge under emergency circumstances where the discharge threatens an imminent or substantial endangerment to the health or welfare of the population. It can impose fees and penalties for violations that take into account the extent of harm caused by the violation, its magnitude and duration, and any economic benefit gained through the user's violation as well as its previous compliance history. Finally, the POTW can revoke an industrial wastewater discharge permit and stop accepting the discharge altogether from any user who violates key conditions of his permit, including those who fail to accurately report their wastewater discharge composition or refuse reasonable access to the POTW to premises for the purpose of inspection, monitoring or sampling.

In the early years of the Pretreatment Program, EPA became aware that in certain instances, circumstances were preventing POTWs from taking adequate enforcement steps. For example, political and economic pressures from local officials might keep POTW personnel from taking appropriate actions. After this was identified as a major concern, EPA stepped up its oversight and promulgated new rules that required the POTWs to develop enforcement response plans so that the POTW would enforce against all of its industrial users objectively, consistently, and equitably.

### **Public Participation and Information Disclosure in the Pretreatment Program**

The Pretreatment Program regulations encourage and facilitate public oversight by requiring public notices or hearings for program approval and the development of industrial user discharge limits. The public is invited to comment on specific industrial user discharge levels as well as the overall POTW discharge permit. Subsequently, before the POTW makes any significant changes in its pretreatment program, it must initiate a formal program modification procedure, notify the public, and request public comment again.

The POTW is required to annually publish a list of the industrial users that were in significant non-compliance during any time in the previous 12 months. Furthermore, the POTW itself is required to submit annual reports documenting its status and activities performed during the previous year including a summary of inspection, compliance, and enforcement activities conducted by the POTW during that year.

All information and data on industrial discharges to the POTW is explicitly required to be available to the public without restriction and cannot be claimed as confidential.<sup>23</sup>

Citizen suit authority under Section 505 of the Clean Water Act allows affected citizens to file a lawsuit against a POTW that has failed to implement its pretreatment program as required by its permit. Citizens may also file suit against industrial users that have failed to comply with pre-treatment standards and requirements.<sup>24</sup>

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<sup>23</sup> 40 CFR 403.14(b).

<sup>24</sup> USEPA 2011. Introduction to the National Pretreatment Program. p 4-15.

### 3.2 China's Current System of Accountability for Centralized Treatment Systems

The rights and obligations of those discharging and those treating wastewater in a centralized treatment model are as follows: enterprises generating pollution should send wastewater to the wastewater treatment company that adheres to contractually agreed pre-treatment standards. Centralized wastewater treatment companies should treat wastewater sent to them by the discharging enterprise in accordance with a pre-arranged fee level.

If a pollution generating enterprise sends wastewater to the centralized treatment plant that adheres to the pre-arranged requirements, but there are then environmental problems, the centralized treatment plant should be responsible for them. Under these circumstances, where the centralized treatment company is at fault and has caused the environmental damage, then they should be solely responsible. If the environmental damage is not caused through a direct fault of the centralized treatment company then the polluting enterprise and the centralized treatment company should share the responsibility according to their pre-determined agreement.

Article 15 of the *Rules for the Implementation of the Water Pollution Prevention Law* states that, "Companies that operate urban centralized wastewater treatment plants are responsible for the quality of water that gets discharged from urban centralized wastewater treatment facilities." The *Urban Wastewater Treatment and Pollution Prevention Technologies Policy* states that, "levels of heavy metals and hazardous and harmful substances in industrial wastewater that is discharged into urban wastewater systems must be strictly controlled and pre-treatment within the factory must be carried out so that the discharge can meet the relevant national and industry specific discharge standards." Article 48 of the *Law of the People's Republic of China on the Prevention and Control of Water Pollution* states that, "If discharged wastewater breaches discharge standards because of improper pre-treatment, then it is the responsibility of the discharging enterprise. From these regulations it is possible to see that an enterprise discharging to a centralized treatment company has a responsibility to carry out pre-treatment to a set standard."<sup>25</sup>

On November 5, 2014, the Ministry of Environmental Protection started to solicit feedback on the indirect pre-treatment standards for dyeing and finishing wastewater from industrial parks,<sup>26</sup> namely the discharge limit values for COD and BOD of 500mg/L and 150mg/L respectively that enterprises located in textile dyeing and finishing industrial parks that discharge into centralized treatment facilities would have to adhere to. Even if the limit values are relaxed the monitoring of discharge from enterprises should not be reduced. The proposed amendments stress that, "Enterprises need to carry out pre-treatment of common pollutants and the standard that the pre-treated wastewater should reach is determined by the quality of the wastewater, the capabilities of the industrial park's wastewater treatment plant, the requirements of the final discharge standard, as well as technological, economic, land use, and management factors." Therefore, those enterprises that discharge into centralized pre-treatment facilities need to carry out strict monitoring and supervision to ensure that the pre-treatment model is fair and

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<sup>25</sup> Qian Shuimiao, Sun Qiong. Centralized wastewater treatment models and the apportioning of regulatory responsibilities. A study in Using Market Mechanisms to Establish a System of Environmental Regulations. 2002, China environment and resources law symposia, 2002.

<sup>26</sup> [http://www.zhb.gov.cn/gkml/hbb/bgth/201411/t20141114\\_291430.htm](http://www.zhb.gov.cn/gkml/hbb/bgth/201411/t20141114_291430.htm)

effectively operated.

At present there are a number of places where the supervision of discharging enterprises is being strengthened. To tackle the problems that exist with centralized treatment systems, the Environmental Protection Department of Jiangsu Province is currently revising their “One Enterprise, One Pipe” practices to become “One Enterprise, One Supervision”. “One Enterprise, One Pipe” was meant to ensure that each enterprise that was discharging into the shared sewerage system was actually discharging into a centralized treatment plant. However, often there are no strict requirements for pre-treatment so complex industrial wastewater containing printing and dyeing chemicals is mixed together and discharged into the system, which can easily affect wastewater treatment processes. “One Enterprise, One Supervision” means that each enterprise that discharges into the shared sewerage system is supervised and is strictly required to ensure that wastewater meets all pre-treatment discharge standards, thus reducing the burden on centralized treatment facilities, which in turn increases the rate of compliance.

### 3.3 Exploring a system of apportioning responsibility for treating printing and dyeing wastewater

When faced with the problem of centralized treatment causing centralized pollution a number of people within the industry are still stressing that these problems are the sole responsibility of the wastewater treatment plant. As to whether the cost of violation is too low or whether wastewater treatment plants have the capacity to bear all the responsibility of treatment is a matter for the government to resolve and is not for business to determine.

According to this line of thinking, printing and dyeing enterprises would not have to bear any of the responsibility for the serious pollution from printing and dyeing wastewater, and brands also would not bear any of the responsibility. With these kind of practices it is ultimately the aquatic environment that gets damaged, local people who get harmed, and the textile industry ultimately unable to develop in a sustainable way.

Fortunately, not all stakeholders in the textile industry are coming to the table with nothing to offer. NGOs are actively supervising and the government is strengthening their monitoring, and brands like H&M, Marks & Spencer, Uniqlo, Adidas, Target, GAP, C&A and Nike are using their green purchasing power to encourage their suppliers to control pollution discharge. These actions have pushed a range of important printing and dyeing enterprises to carry out corrective actions and their challenging attempts to establish a responsible centralized treatment mechanism provide an important source of reference.

#### Case Study 5. Saintyear Model: Leasing of an Urban Wastewater Treatment Plant for Pre-Treatment and Public Commitments to ensure that Discharge Standards are met

In our Phase III Textile Industry report we wrote about Jimay Printing & Dyeing, which is a local subsidiary of the large textile manufacturer, Saintyear Holding Group Company. Since the introduction of the new discharge standard, the Zhejiang Province quarterly key pollution source supervision monitoring reports have shown that the concentration of several pollutants at Jimay Printing & Dyeing's discharge outlet exceeded the new standard limit values. We also found that Saintyear Holding's 10 other printing and dyeing subsidiary companies<sup>27</sup> all had similar problems.<sup>28</sup>

10 of Saintyear's printing and dyeing subsidiary companies that are located in Dangwan Town, Xiaoshan District, in Hangzhou, discharge their wastewater into Xiaoshan Wastewater Treatment Co., Ltd. (Dangwan Plant) (hereafter referred to as Dangwan wastewater treatment plant). The treated wastewater is discharged into the Linjiang wastewater treatment plant, then finally discharged into the Qiantang River (see Fig 11).

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<sup>27</sup> Hangzhou Tianyu Printing and Dyeing Co., Ltd., Hangzhou Sanyin Printing and Dyeing Co., Ltd., Hangzhou Tiancheng Printing and Dyeing Co., Ltd., Hangzhou Xinsheng Printing and Dyeing Co., Ltd., Hangzhou Xinyuan Printing and Dyeing Co., Ltd., Hangzhou Hualun Printing and Dyeing Co., Ltd., Hangzhou Jimay Printing and Dyeing Co., Ltd., Hangzhou Jijin Printing and Dyeing Co., Ltd., Hangzhou tianrui Printing and Dyeing CO., Ltd., and Zhejiang Saintyear Textile Co., Ltd.

<sup>28</sup> <http://www.zjepb.gov.cn/hbtmh wz/gzfw/wryjdxjcx/>

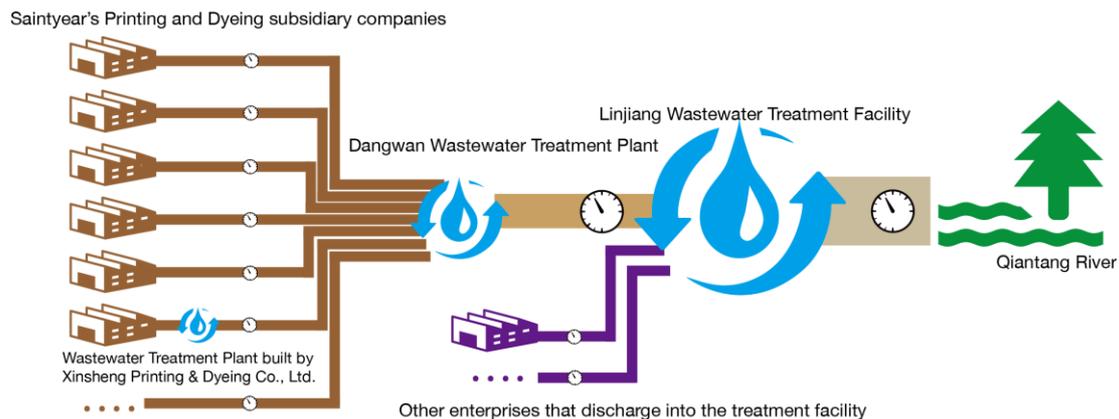


Figure 11 Flow chart showing Saintyear's wastewater discharge

The 3<sup>rd</sup> Zhejiang Province quarterly key pollution source supervision monitoring report<sup>29</sup> shows that on July 15, 2014, the concentration of several key pollutants from Saintyear's 10 subsidiary companies did not meet discharge standards. One of the companies was discharging wastewater with a COD concentration of more than 2000mg/L, which is much higher than the 200mg/L limit set in the new standard. Meanwhile, the wastewater flowing into Dangwan Wastewater Treatment Plant, which includes wastewater from Saintyear's subsidiaries, had a concentration as high as 1540mg/L. It is clear from this that the Dangwan wastewater treatment plant was mostly taking in untreated wastewater, which greatly increased the plant's treatment load. Zhejiang's online monitoring platform shows that from January 1, 2014 to November 20, 2014, the Dangwan Wastewater Treatment Plant's hourly average COD concentration exceeded the discharge standard 52 times, and from 10am to 2pm on July 7, the concentration exceeded the standard five times in succession.

On March 10, 2014, several of Saintyear's subsidiaries participated in the first stakeholder dialogue meeting between NGOs and the China National Textile and Apparel Council (CNTAC). However, at the time, the company emphasized that the wastewater they discharged was discharged indirectly, so the responsibility to treat it should be borne solely by the wastewater treatment plant. Under pressure from GCA brands, Saintyear Holding Group got in touch, and on August 12, 2014, Saintyear and IPE had a face to face meeting and discussed possible solutions. On September 24, Saintyear invited IPE and Lvse Jiangnan to conduct an on-site visit.

<sup>29</sup> [http://www.zjepb.gov.cn/hbtmhwz/hjjg/wryjc/jdxjcjg/201410/t20141020\\_310367.htm](http://www.zjepb.gov.cn/hbtmhwz/hjjg/wryjc/jdxjcjg/201410/t20141020_310367.htm)

Thereafter, owing to the continuous pressure from brands like Uniqlo and GAP using their green purchasing power, Saintyear made the transformation from not taking responsibility to actively bearing responsibility. Given that directly solving all the indirect discharge problems from their subsidiaries is extremely difficult, Saintyear decided to rent the Dangwan wastewater treatment plant, and use it as a pretreatment facility for its subsidiaries. At the same time, Saintyear also made a commitment that actions would be taken to upgrade the Dangwan wastewater treatment plant to improve its performance and ensure that discharge from the plant can meet discharge standards (see Fig 12).

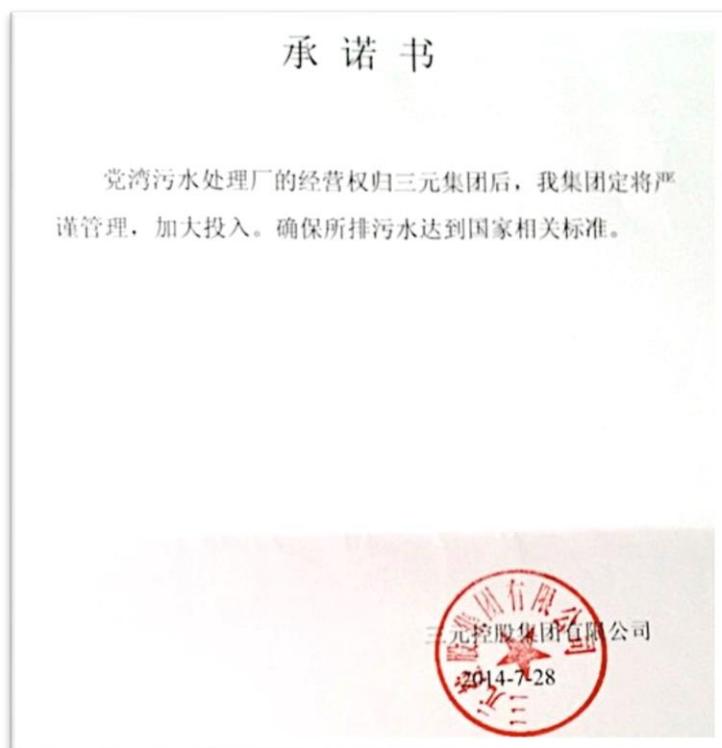


Fig 12 Commitment from Saintyear on the upgrading of the Dangwan wastewater treatment plant

During the on-site visit, we could see that Saintyear had finished the takeover of the Dangwan Wastewater Treatment Plant and they were planning to upgrade and renovate the plant. At the same time, according to an explanation by Saintyear, in order to alleviate the load on the plant, the 10 subsidiary companies are also constructing internal wastewater treatment projects to pretreat wastewater before it is discharged. IPE and Lvse Jiangnan visited several of these large scale projects. For example, Xincheng Printing & Dyeing Co., Ltd. has built and put into use a 5000t/d wastewater treatment and gray water recycling facility; Jimay Printing and Dyeing and Tianyu Printing & Dyeing are constructing a 8500t/d wastewater treatment and gray water recycling facility; Tianrui Printing & Dyeing are constructing a 2500t/d wastewater treatment and gray water recycling facility, and Saintyear Textile are constructing a 6000t/d wastewater treatment and gray water recycling facility.



Fig 13 Treatment plants owned or built by four of Saintyear's subsidiaries



Fig 14 Wastewater influent pipes from each company that discharges into the Dangwan Wastewater Treatment Plant

Faced with the problem of its subsidiaries repeatedly exceeding discharge standards, Saintyear made the big decision to lease the Dangwan Wastewater Treatment Plant. Turning the plant into its centralized pretreatment facility and making a public commitment to shoulder the responsibility of ensuring that wastewater discharge meets the discharge standard is

undoubtedly a useful exploration of creative solutions.

Most of the wastewater flowing into the Dangwan Wastewater Treatment Plant comes from Saintyear's 10 subsidiaries, and so the construction of pretreatment wastewater treatment facilities and their strict management will no doubt help the Dangwan Wastewater Treatment Plant to achieve their commitment to ensure that discharge meets all the relevant standards. Furthermore, as the volume of wastewater discharged from the Dangwan Wastewater Treatment Plant accounts for 1/7 of the total amount of wastewater flowing into the Linjiang wastewater treatment plant, the reduction of Dangwan's discharge will be undoubtedly relieve the load on the Linjiang wastewater treatment facilities and help to reduce the pressure that the printing and dyeing industry puts on the environment of the Qiantang River.

Saintyear's leasing of the Dangwan plant, and public commitment to ensure that discharge standards are met, is an important step in establishing clearly defined responsibilities in the centralized treatment of dyeing and finishing wastewater. Because of the quarterly monitoring reports from the Dangwan Wastewater Treatment Plant, and the disclosure of real-time online monitoring data, there is proof available to show whether Dangwan's discharge can meet the relevant discharge standards. This can also help to determine whether the Dangwan treatment plant and those Saintyear subsidiaries that discharge into it should bear any responsibility when the Linjiang wastewater treatment plant discharges wastewater that exceeds wastewater discharge standards.

However, the current system of apportioning responsibility at the Dangwan Wastewater Treatment Plant is not perfect and the tracking of the responsibilities of those dye houses discharging into the shared system need to be more clearly defined. We recommend that firstly, based on the Dangwan treatment plant's treatment processes and capabilities, Saintyear Group should immediately clarify the requirements of the discharge standard that each of the dye houses discharging into the shared discharge system should adhere to, and should publish these. Secondly, they should disclose in full the online monitoring data for all of their 10 subsidiaries so that the general public can supervise their performance.<sup>30</sup> Thirdly, if influent from any of the enterprises that discharge into the Dangwan treatment plant has a problem, then Saintyear should actively publish response measures and corrective actions taken to address the problem.

As the Dangwan Wastewater Treatment Plant has become the centralized pretreatment facility for Saintyear's subsidiaries, we recommend that brands that purchase from them, or who plan to purchase from them, like H&M, Marks & Spencer (M&S), GAP, Uniqlo, and Target, should regard Dangwan Wastewater Treatment Plant as one of their suppliers, and so should regularly screen them for compliance issues and follow up on any problems.

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<sup>30</sup> Data from the Zhejiang Provincial Enterprise Self-monitoring Disclosure Platform shows that the COD average hourly value for the nine Saintyear subsidiaries disclosing information on the platform is the same as the data for the Dangwan Wastewater Treatment Plant, and there is no information for each individual dye house. As each dye house is set up as a separate commercial entity, if they do not monitor and disclose separate water quality information for each dye house then they are not fulfilling their responsibilities.

## Case Study 6. Formosa Taffeta: Include wastewater treatment plants in their supply chain management

The *Detailed List of Abnormal Operations of Automatic Monitoring Systems for all Key Provincially Monitored Pollution Sources* released by the Environmental Protection Department of Jiangsu Province in 2013, showed that in March 2013, COD discharge from Formosa Taffeta (Changshu) Co., Ltd.'s wastewater discharge outlet breached discharge standards on a number of occasions.<sup>31</sup>

On August 5, 2013, Formosa Taffeta (Changshu) Co., Ltd. (hereafter referred to as Formosa Taffeta) contacted the GCA after being encouraged to do so by one of its customers. They then submitted a number of documents for publication. On August 5, 2014 Formosa Taffeta also invited a representative from the NGO, Lvse Jiangnan, to conduct an on-site visit and to carry out face-to-face talks. A member of staff from the Jiangsu Province Changshu New and Hi-tech Industrial Development Zone Economic Development Bureau was also on site.

The documents that Formosa Taffeta submitted and the research results from Lvse Jiangnan showed that:

The enterprise did not have its own wastewater treatment plant and all production wastewater was being discharged into a shared discharge system which flowed into the *Hyflux NewSpring (Changshu) Co., Ltd.* wastewater treatment plant for treatment, where it should be treated to meet the Taihu Basin discharge limit values (the limit value for COD is  $\cong 60\text{mg/L}$ ), and then discharged to the environment. However, according to evidence from the local government, Formosa Taffeta's indirect discharge standard value for COD was 1500 mg/L, which is much higher than the requirements for indirect discharge in the new standard (for COD it is 200mg/L), which means that water entering into the shared discharge system cannot meet the requirements of the relevant national standard.

Over the past few years, the wastewater treatment plant that the enterprise discharges into, *Hyflux NewSpring (Changshu) Co., Ltd.* (hereafter referred to as Hyflux Newspring), has breached discharge standards on several occasions.<sup>32</sup> As a response to these discharge violations, *Hyflux NewSpring*, after being ordered to implement corrective actions within a certain time frame by the Changshu Environmental Protection Bureau, in 2013, invested RMB 18 million in a comprehensive upgrade and in March 2014 passed the EPB verification. However, considering that this wastewater treatment company has repeatedly violated discharge standards in Changshu and other localities, and the requirements for pre-treatment are incredibly relaxed, so a risk still exists. With the current treatment processes set out the way they are, if *Hyflux NewSpring* discharges in breach of the standard it is impossible to track back and determine which enterprise was responsible for the exceedance, the cause of the exceedance, and how to implement corrective actions.

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<sup>31</sup> [http://www.ipe.org.cn/pollution/com\\_detail.aspx?id=120958](http://www.ipe.org.cn/pollution/com_detail.aspx?id=120958)

<sup>32</sup> [http://www.ipe.org.cn/pollution/com\\_detail.aspx?id=120919](http://www.ipe.org.cn/pollution/com_detail.aspx?id=120919), [http://www.ipe.org.cn/pollution/com\\_detail.aspx?id=139763](http://www.ipe.org.cn/pollution/com_detail.aspx?id=139763), [http://www.ipe.org.cn/pollution/com\\_detail.aspx?id=42224](http://www.ipe.org.cn/pollution/com_detail.aspx?id=42224), [http://www.ipe.org.cn/pollution/com\\_detail.aspx?id=5599](http://www.ipe.org.cn/pollution/com_detail.aspx?id=5599)

**To address the problem of how to ensure that wastewater that is finally discharged into water bodies meets discharge standards, enterprises are in a difficult position**

On the one hand, considering local policies, the Jiangsu Province Changshu New and Hi-tech Industrial Development Zone was an early adopter of centralized treatment for printing and dyeing wastewater in Changshu. In cases where a centralized treatment plant already exists, government departments can be indifferent to enterprises constructing their own wastewater treatment facilities. This caused a certain amount of deadlock when Formosa Taffeta wanted to quickly construct their own wastewater treatment facilities so that they could meet discharge standards.

On the other hand, another difficult question is how, in cases where enterprises do not construct their own wastewater treatment facilities, can we ensure that the final discharge from the wastewater treatment plant meets discharge standards, and if the final discharge from the wastewater treatment plant does not meet discharge standards then how is it possible to track the wastewater back to determine which enterprise breached discharge standards. In these circumstances it is also not possible to analyze the root cause of the violation or formulate corresponding rectification measures.

Formosa Taffeta has agreed to undergo a third-party Green Choice Alliance audit, but because the *Hyflux NewSpring* wastewater treatment plant does pre-treatment for Formosa Taffeta, we feel that they should also be brought into the scope of the audit. Formosa Taffeta is currently trying to arrange this so that it can go ahead.

We recommend that Formosa Taffeta's customers, such as Adidas and Nike, should add the *Hyflux NewSpring* wastewater treatment plant to their list of suppliers, and should regularly screen them for violation records and follow up on findings.

We feel that the GCA audit should not only assess the equipment, facilities and treatment processes at Formosa Taffeta and the *Hyflux New Spring* wastewater treatment plant, but should also assess the division of responsibilities between the two companies. Under the system as it is now, if *Hyflux NewSpring* breaches discharge standards it is difficult to clearly determine what responsibility should be borne by enterprises discharging into the shared discharge system.

To avoid this dilemma, we recommend that Formosa Taffeta immediately encourage *Hyflux NewSpring* to discuss and set up an agreed standard with enterprises that discharge wastewater into the shared system. The standard should be based on total volumes of discharge and their treatment capacity. They should then publish the agreed upon standard for wastewater discharged into a shared system and also disclose the online monitoring data for discharging enterprises so that the general public can play a supervisory role. To fundamentally solve this issue we recommend that Formosa Taffeta, either on their own, or with another company, build and properly operate a pre-treatment facility, so that they can take full responsibility for the pre-treatment of their wastewater.

## Case Study 7. Shaoxing Pilot: Centralized pretreatment of dyeing wastewater based on the principles of wastewater separation and the upgrading of discharge standards<sup>33</sup>

In order to deal with the universal implementation of the new discharge standard, in the area of Shaoxing, which has a high concentration of printing and dyeing enterprises and a relatively well developed wastewater collection system in place, they piloted a new course of action – carrying out centralized pre-treatment according to the principles of wastewater separation and the upgrading of discharge standards. According to a report in China Environmental News, Shaoxing applied to the Ministry of Environmental Protection (MEP) to start a pilot for implementing the new discharge standards for textile dyeing mills located in the industrial zone. All the pilot dyeing mills in the industrial park have to make sure that their wastewater COD discharge concentration is less than 500mg/L as it enters the centralized wastewater pretreatment plant. The COD concentration of the wastewater after it has gone through centralized pre-treatment should be less than 200mg/L, after which it is discharged to another treatment plant for deep treatment.

Shaoxing is currently implementing a tiered discharge policy, which means that the discharge standard for enterprises in the industrial zone has been relaxed to 500mg/L, but pollutant concentration is reduced by centralized wastewater pretreatment. Enterprises outside the industrial zone must strictly abide by the indirect discharge standard for COD, which stipulates a concentration of 200mg/L or less. Jiangbin Wastewater Treatment Corporation Limited was built as a centralized wastewater pre-treatment plant in the Binhai printing and dyeing industrial area.<sup>34</sup> The current capacity of the plant is 200,000 tons of wastewater per day and is in the first phase of operation, but this will be expanded to 400,000 tons of wastewater per day in the long run.<sup>35</sup> According to a report in China Environment News, the head of Jiangbin Wastewater Treatment Corporation Limited has stated that the centralized plant can treat printing and dyeing wastewater which will adhere to a COD standard of 500mg/L. The pretreated printing and dyeing wastewater will then be transferred through the sewerage network to undergo deeper treatment at another wastewater treatment plant.<sup>36</sup>

It should be noted that this COD concentration (500mg/L) certainly does not meet the requirements of the indirect discharge standard stated in the relevant laws and regulations, and so the environmental protection bureau should add this corporation to the list of enterprises that discharge pollutants in levels exceeding the discharge standards, and disclose this to the public. However, we have still not seen any information about online monitoring and supervisory monitoring of the pre-treatment projects in the Shaoxing Binhai area and have also not seen any information being published on the state of discharge being discharged by dye houses into

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<sup>33</sup> Referred to as ‘fenzhi’ and ‘tibiao’ in Chinese meaning the separating of dyeing wastewater and domestic wastewater by the improvement of sewerage networks & making the discharge from wastewater treatment plants reach the Level 1A Discharge standard and Discharge standard of water pollutant for dyeing and finishing of textile industry (GB4287—2012).

<sup>34</sup> [http://www.sx.gov.cn/art/2013/3/19/art\\_126\\_378911.html](http://www.sx.gov.cn/art/2013/3/19/art_126_378911.html)

<sup>35</sup> <http://www.shaoxingwater.com/gs.php?p=5>

<sup>36</sup> The head of the plant has stated that, “The corporation will build an advanced wastewater treatment facility with the capacity to treat 200,000 tons/days and satisfy even beyond the requirements of the new standard”.

the centralized pre-treatment facilities.

Centralized pre-treatment of wastewater reduces costs, but it can help dyeing mills avoid proper monitoring and disclosure of their own discharge levels. When centralized pre-treatment of wastewater takes place, holding specific dye houses accountable for pollution is very difficult, which in turn makes green supply chain work much more difficult. Furthermore, only by identifying the treatment responsibilities of individual dye houses will it be possible to create a level playing field for those dyeing mills that do their own pre-treatment.<sup>37</sup> The problem of apportioning responsibilities for centralized pre-treatment facilities has also been noticed by the environmental authorities. Talking about the new model of centralized pre-treatment, a member of staff from the Department of Science, Technology and Standards at the MEP has stated that:

“It should be stressed that a prerequisite for this model of centralized pre-treatment is the clear definition of the responsibilities to be fulfilled by textile printing and dyeing enterprises and the companies operating centralized treatment facilities, so that total COD discharge does not increase and targets to implement the new standard and improve environmental quality are not affected. Furthermore, there should be a requirement that there is no hexavalent chromium or aniline detected in the influent from enterprises discharging wastewater into centralized treatment plants, as this can increase the overall difficulty in treating enterprise wastewater.”<sup>38</sup>

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<sup>37</sup> For example, Zhejiang Qingmao, which has, under pressure from several textile brands been undertaking corrective actions to ensure they can meet the new discharge standards. The company keeps communicating with environmental NGOs and is currently improving its wastewater treatment facilities and building a grey-water reuse system. The head of the company has committed that they will undergo a GCA audit after the improvements are finished.

<sup>38</sup> [http://www.cenews.com.cn/sylm/hjyw/201404/t20140410\\_772631.htm](http://www.cenews.com.cn/sylm/hjyw/201404/t20140410_772631.htm)

### 3.4 Best Practices for Minimizing Loading of Centralized Wastewater Treatment

The goal of a centralized wastewater treatment facility is to remove and reduce contaminants from water prior discharge into the environment. To achieve these goals, the treatment facility must be designed correctly, must have adequate capacity, must be operated carefully and professionally, and must be closely monitored to ensure that treatment is underway as needed. Very importantly, industrial wastewater *inputs to the system* must be carefully monitored and assessed to ensure that there is no excessive loading of water or contaminants into the system – otherwise the industrial pollutants will not be adequately reduced even if the wastewater plant is operating perfectly well.

Most centralized wastewater systems, which sometimes receive both municipal and industrial wastewaters, are biological treatment systems – activated sludge systems that use microorganisms to remove the pollutants from the wastewater. Activated sludge systems are considered by many professionals to be the most difficult of any type of wastewater treatment system to operate. The amount of time that the micro-organisms reside in the treatment system, the amount of water flow, the diffusion of oxygen, and the function of the secondary clarifier downstream must all be carefully assessed and monitored to ensure good results. Perhaps even more importantly, *the hydraulic and contaminant loading into the system cannot exceed design criteria for the system.*

It is a common problem to discover that centralized wastewater systems are overloaded, however, and are failing to meet their permitted discharge levels. Although one very good response to this problem can be to increase the size of the facility and build additional capacity, that is not the only – or even necessarily the best – solution to the problem of poor treatment performance in all circumstances. Instead, there are a set of best practices that should be tried first that can substantially improve process performance and reduce the concentration of pollutants in the treated discharge without the major capital costs associated with a major facility expansion or upgrade.

#### **Best Practices for Optimizing Biological Wastewater Treatment Systems**

**Reduce water flow and hydraulic loading.** Wastewater treatment plants are designed to handle a certain design flow. When higher flow rates enter the systems, either because of excess influent loading from factories or from rain, the organisms responsible for treatment wash out, severely reducing the treatment system's capacity until new bacteria are grown. Best practices strictly review industrial water use practices and control in-plant water use and flow rates to minimize them. For example, NRDC's Ten Best Practices for Textile mills provide some well-proven ways to reduce water use and discharge at textile mills by up to 40% through such changes as recycling process water and reusing cooling water as well as reducing leaks.

**Reduce organic loading.** Wastewater treatment plants are similarly designed to hand a certain concentration of COD and BOD, and increases in the influent load creates similar problems as increases in influent flow rate. As the load increases, a higher concentration of bacteria is needed to effectively treat the discharge to permitted levels. As with reducing water flow/hydraulic load, best practices to reduce BOD/COD loading through clean production

process improvements can be a very effective way to help centralized treatment plants reach their own treatment goals. For example, a large source of BOD/COD from textile mills comes from the de-sizing operations, where starch is removed from woven fibers in a scouring process, prior to dyeing to add color. This starch sizing can be collected and recycled and reused, which both reduces the organic load in the wastewater discharge and saves considerable money in chemical purchases. The Redbud Company in Jiangsu Province successfully undertook this best practice several years ago with great success (Note that Redbud also reduced its hydraulic load as well)<sup>39</sup>.

**Install equalization tanks/basins.** Equalization tanks/basins are useful to attenuate peaks of water flow and allow systems to buffer arriving loads of pollutants from industries and feed them into the treatment system when flows are otherwise low. For example, during a rain event when the flow rate may exceed the highest acceptable, some influent flow is diverted to the tank, protecting the biology of the treatment system. As the influent flow rate decreases, the water in the tank can be diverted into the biological treatment system. Also if a toxin is measured upstream, some of the influent water may be collected in the tank or bypassed.

**Increase monitoring to detect chemical disturbances.** There are certain compositional changes in influents to wastewater treatment plants that are very important to detect right away, since they may have a substantial impact on the treatment process. Such changes may be the result of a toxic substance such as a heavy metal or toxic pesticide in the influent wastewater which can cause sudden death of the microbes key to the function of the system. Best practices in monitoring allow centralized systems struggling to meet their permitted discharge levels to more quickly identify problem chemicals in the influent coming in for treatment, before they build up and disturb the performance of the whole system.

**Improve feedback control systems.** On-line feedback control systems are used to quickly return the wastewater treatment process to the desired state; feedback control can significantly reduce the amount of chemical, energy, and water use of a system while at the same time improving performance. An example of feedback control is when pH is measured, and the alkali dosage is metered to respond to changes in inputs. Best practices in feedback control enable immediate response and require sensors for each controlled variable.

**Optimize oxygen concentration in the system.** Aeration is one of the most fundamental processes in biological wastewater treatment, and one of the most costly, representing as much as 75 percent of the total plant energy use. Inadequate oxygen transfer may negatively affect the microorganisms responsible for proper treatment, while high DO concentrations result in higher energy costs and the promotion of unwanted microorganisms. Therefore, it is a best practice to continuously monitor of DO to ensure the proper levels of oxygenation in the wastewater treatment and to upgrade the oxygen delivery system used in the treatment plant if DO concentrations are frequently found to be inadequate.

**Increase monitoring to better track operations.** Wastewater treatment plants should monitor their operations routinely by conducting sampling and analysis on a regular schedule so that

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<sup>39</sup> <http://www.nrdc.org/international/files/redbud.pdf>

operators can respond rapidly to upset conditions; by providing process measurements, the operator has the information he needs to make judgments and implement control decisions. Best practices are to conduct on-line monitoring of important parameters with rapid fluctuations, such as dissolved oxygen concentrations and process flows, hourly. Grab samples should be obtained to monitor variations throughout the day. For parameters that do not change rapidly, sampling can be performed weekly. Microscopic examination of the biological mass should be performed routinely to determine the general state of the system and identify potential problem organisms such as filamentous algae.

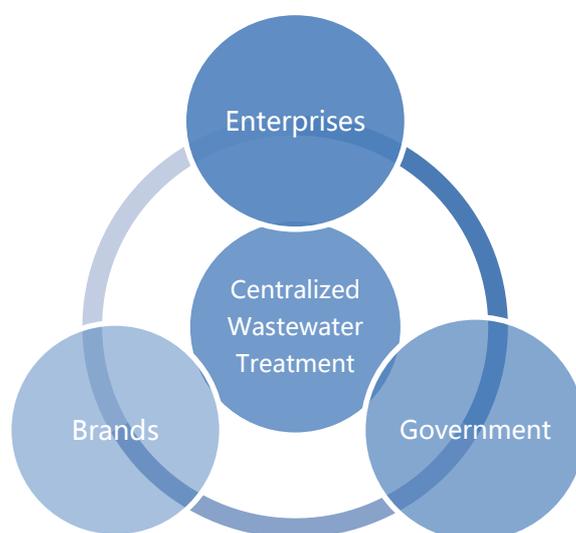


## 4. Cooperation between Stakeholders to Establish a System of Responsibility for Centralized Treatment

### 4.1 Policy Recommendations

From this report we can see that centralized treatment is resulting in centralized discharge. To resolve the problem of centralized treatment causing centralized pollution we must first resolve the problem of unclear responsibilities. This relies on all parties carrying out their respective duties and using all their abilities to the full, to jointly establish a system of apportioned responsibility for centralized wastewater treatment.

**In light of this we make the following recommendations:**



**The government** should: strengthen supervision of centralized wastewater treatment facilities to guard the final outlet for centralized discharge; clarify the indirect discharge standard for enterprises discharging into centralized treatment facilities and strengthen the normal and automatic monitoring systems for enterprises discharging into shared discharge systems; and disclose in full supervision information and automatic monitoring data for centralized wastewater treatment plants and those enterprises that discharge into shared discharge systems. This can help clarify who is responsible for pollution discharge, and also allows the general public to play a greater role in supervising the strict enforcement of regulations.

**The textile industry** should: strictly abide by direct and indirect discharge standards and clarify divisions of responsibility with wastewater treatment plants; properly carry out self-monitoring and data recording to have a clear understanding of their discharge levels, and from this information develop more targeted emission reduction plans; and ensure the proper publication of self-monitoring data to in effect drive the clarification of centralized treatment responsibilities, win the trust of all parties, and improve cooperation.

**Brands** should: pay attention to pollution problems caused during centralized treatment processes and incorporate centralized pre-treatment facilities into their supply chain; regularly

screen supervision records and online monitoring data and if they discover instances of discharges breaching discharge standards should hold suppliers who discharge into the shared discharge system accountable; encourage suppliers and wastewater treatment plants to clarify their responsibilities and push suppliers that discharge into shared discharge systems to disclose their self-monitoring data so that the general public can play a role in supervising the control of pollution through the supply chain.

## **4.2 Proposed Actions for Each Party**

### **4.2.1 Government and the Textile Industry – Full Disclosure of Supervision Information and Discharge Data**

In response to the new trend of constructing centralized pre-treatment facilities in areas where the printing and dyeing industry is very concentrated, a clear system of accountability needs to be established. Environmental protection bureaus need to assess maximum loading values for centralized systems and strictly enforce the standard for wastewater discharged to centralized pre-treatment facilities through shared discharge systems, and they should ensure the proper monitoring of enterprises that discharge into these shared systems.

Information disclosure is the base that a system of accountability for centralized treatment can be built on. We're now seeing in some areas that they are just releasing supervision information and online monitoring data for wastewater treatment plants, which very much undermines the potential effectiveness of the system; it doesn't help identify big local polluters and doesn't help with ascertaining the reasons for treatment plants discharging in breach of discharge standards, making it unclear who is responsible when wastewater treatment plants exceed discharge standards.

Information disclosure should include government supervision information and enterprise discharge data. The government should release all supervisory monitoring data comprehensively, in full, and in a timely fashion. This should not only include data for wastewater treatment plants and centralized pre-treatment facilities, but should also include supervisory monitoring data for those enterprises that discharge into the shared discharge system. The government supervisory monitoring data is a necessity for the following two reasons:

1. The main focus for online monitoring has so far been key state monitored enterprises, but many printing and dyeing enterprises are small and medium sized and so do not fall into this category, thus sparing them from releasing online monitoring data. In these cases, supervisory monitoring data provides a way of understanding their discharge situation.
2. Because of the limitations of online monitoring equipment, online monitoring data is only available for flow volume, pH, COD, and ammonia nitrogen, whereas supervisory monitoring data includes color, BOD, aniline, suspended solids, sulphides, hexavalent chromium, total nitrogen, total phosphates, total copper and chlorine dioxide, which can provide a fuller picture of pollutants being discharged in wastewater.

Printing and dyeing enterprises should carry out proper self-monitoring and information disclosure. The government should assist printing and dyeing enterprises by allowing them to disclose data on currently available platforms. In areas such as Zhejiang, Shandong, Jiangsu and Fujian, where many printing and dyeing enterprises are located, they already have fairly well established disclosure platforms, so more enterprises could disclose their direct and indirect discharge data through them.

The timely disclosure of government supervisory information and enterprise self-monitoring data will help to more clearly define the discharge responsibilities for centralized treatment systems, and will also make supervision by the general public far easier.

Government and enterprise information disclosure should:

- ◆ Include regular disclosure of standard monitoring information
  - Be expanded from state monitored, to provincial monitored and municipally monitored
  - Include the full disclosure of instances where enterprises have breached pollutant concentration and total volume discharge standards, as well as documents showing administrative penalties
  - Include the full disclosure of indirect discharge standards for enterprises discharging into shared discharge systems and records of instances where these enterprises have breached discharge standards (for discharge into shared systems) as well as administrative penalty information
- ◆ Real-time disclosure of online monitoring information
  - Should be expanded from key state monitored enterprises to those provincially monitored and municipally monitored enterprises that have online monitoring equipment installed
  - And it should not only be centralized wastewater treatment plants that disclose real-time online monitoring data, but enterprises that indirectly discharge into shared discharge systems should also disclose their online monitoring data in real-time.
- ◆ A pollutant release and transfer register system should be established
  - A universal disclosure platform should be established and enterprises and wastewater treatment plants should be required to regularly publish pollutants discharged and discharge volumes, particularly hazardous and harmful substances that are either discharged or transferred.

#### **4.2.2 Brands – Need to extend supply chain management to include centralized wastewater pre-treatment facilities**

Over the past few years, by setting up a screening mechanism to regularly compare their list of suppliers with IPE's database of environmental supervision records, a range of textile brands have used green procurement practices to successfully push hundreds of suppliers to resolve their excessive pollution problems.

The establishment and proliferation of centralized pre-treatment poses a new problem for

brands that carry out green manufacturing and procurement. If they are unable to effectively tackle this problem it will create a huge hole in their management practices. We therefore strongly urge brands to extend their environmental management to the wastewater pre-treatment facilities that their suppliers discharge into, as these pre-treatment facilities are an integral part of the system which determines if their suppliers are able to meet wastewater discharge standards.

We urge brands to bring both centralized pre-treatment facilities and those enterprises that discharge into shared discharge systems into their regular screenings. If a supplier violates the standard for discharging into a shared discharge system then they should be pushed to provide a public statement explaining what happened and also carry out corrective actions. If a centralized pre-treatment facility is found to regularly breach discharge standards then it should be investigated to see if it has the necessary processing capacity.

For these measures to be properly implemented there must be sufficient information disclosure. We urge brands to push those suppliers that discharge into shared discharge systems to publish their self-monitoring data so that it's possible to clearly identify pollution sources and develop an effective system of accountability.



## 5. Evaluation of how well Textile Brands Perform in Terms of Environmental Management in the Supply Chain

To help address some of the challenges brought about by globalized production and procurement, IPE and NRDC jointly developed the Corporate Information transparency Index (CITI) and in July 2014, released the first CITI evaluation results.<sup>40</sup> As one of the first quantitative evaluations looking at how well brands manage their Chinese supply chains, the CITI was not just meant as an evaluation, but also as a roadmap and set of tools for brands to help green their Chinese supply chains.

Since the release of the first CITI evaluation results, many more brands have started active communications and established screening mechanisms to regularly screen suppliers against the Pollution Map database, thus allowing them to understand pollution problems within their supply chains and encourage problem suppliers to carry out corrective actions. A number of brands with particularly outstanding performance are able to screen and push all direct suppliers and have started to push material suppliers further up their supply chains. As of November 2014, out of the 52 textile brands that IPE has tried to contact, 38 have already had some communication with IPE, 23 have set up a mechanism to screen suppliers, 19 have started to push suppliers to contact IPE and resolve their pollution issues, and seven are currently trying to push suppliers to disclose their discharge data.

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<sup>40</sup> [http://www.ipe.org.cn/about/notice\\_de\\_1.aspx?id=11649](http://www.ipe.org.cn/about/notice_de_1.aspx?id=11649)

Table 5 – Textile Industry Brand CITI Evaluation Rankings<sup>41</sup>

No.	Brand	Total	No.	Brand	Total
1	H&M	63.5	27	Lafuma	12.5
2	Esquel	63	27	Tommy Hilfiger	12.5
3	GAP	55.5	27	CK	12.5
3	C&A	55.5	30	Primark	10
5	M&S	52.5	30	Tesco	10
6	Burberry	51.5	30	Benetton	10
7	Target	51	30	Carrefour	10
7	Walmart	51	34	Sears	5
9	Puma	50.5	34	Kmart	5
9	Nike	50.5	36	Armani	2.5
11	Adidas	49	36	Fifth and Pacific	2.5
12	Uniqlo	47.5	36	Next	2.5
13	Esprit	40	39	HUGO BOSS	0
13	ZARA	40	39	Abercrombie & Fitch	0
15	Li-Ning	37.5	39	361°	0
15	Levi's	37.5	39	Kappa	0
17	IKEA	36	39	Guess	0
18	Mizuno	32.5	39	Anta	0
19	Ann Taylor	32	39	Cortefiel	0
20	The North Face	28.5	39	DKNY	0
20	Timberland	28.5	39	Victoria's Secrets	0
20	Lee Jeans	28.5	39	Macy's	0
23	Youngor	26	39	J.C. Penney	0
24	Jack & Jones	24.5	39	Giordano	0
25	Disney	20.5	39	Meters/bonwe	0
26	Toread	19	39	Polo Ralph Lauren	0

Out of the 52 textile brands that have been evaluated, H&M, Esquel, GAP, C&A, M&S, Burberry, Walmart, Target, Nike, Puma, Adidas, and Uniqlo have been ranked green for their supply chain management performance, and are relatively proactive. Esprit, Zara, Li-Ning, Levi's, Youngor, and Toread have been ranked as orange and have neutral performance. Ranked last in the evaluation are those brands that have not responded at all, including Hugo Boss, Abercrombie and Fitch, 361°, Kappa, Guess, ANTA, Cortefiel, DKNY, Victoria's Secret, Macy's, J.C. Penney, Giordano, Meters/Bonwe, and Polo Ralph Lauren.

<sup>41</sup> As of November 2014, 50 textile brands had been evaluated in the CITI

In the three years since we started the evaluation of textile brands' supply chain management, there have been changes in the top ten ranked brands. H&M and Esquel, who were some of the first to engage with us, have consistently been in the lead. Walmart have been consistently moving forward, and C&A and Target have made very good progress.

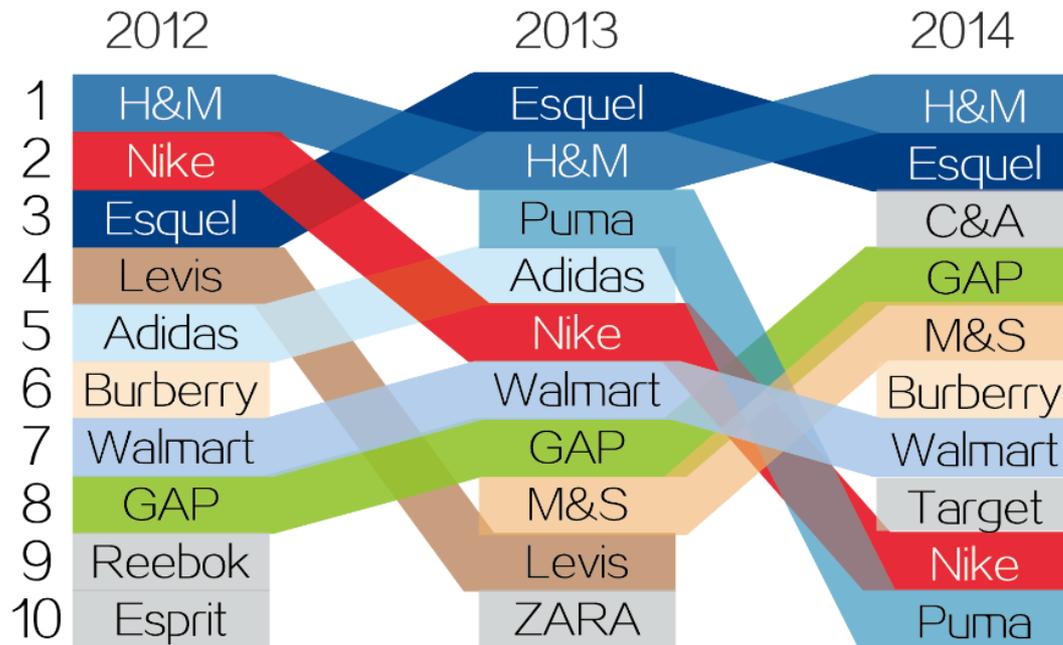
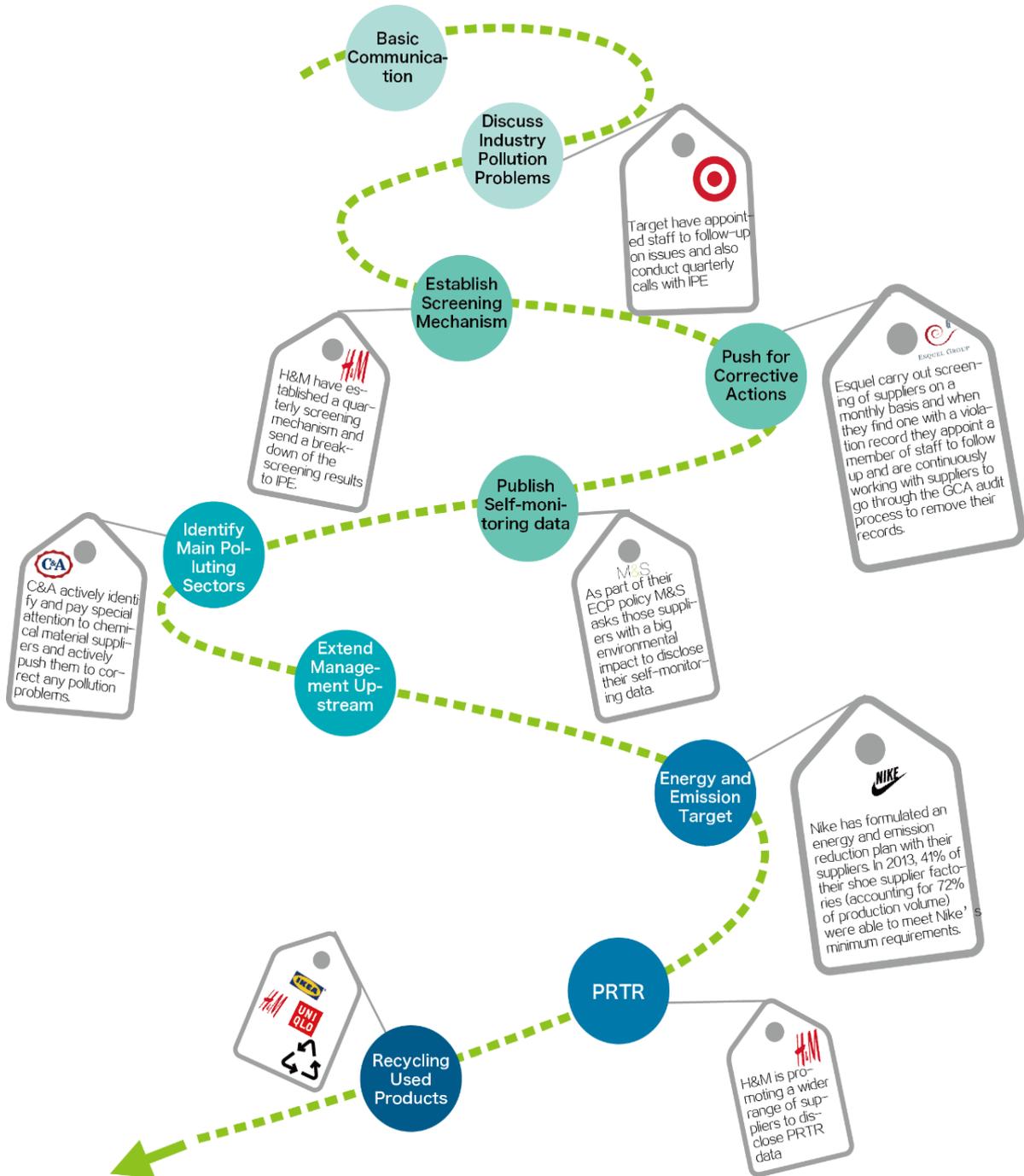


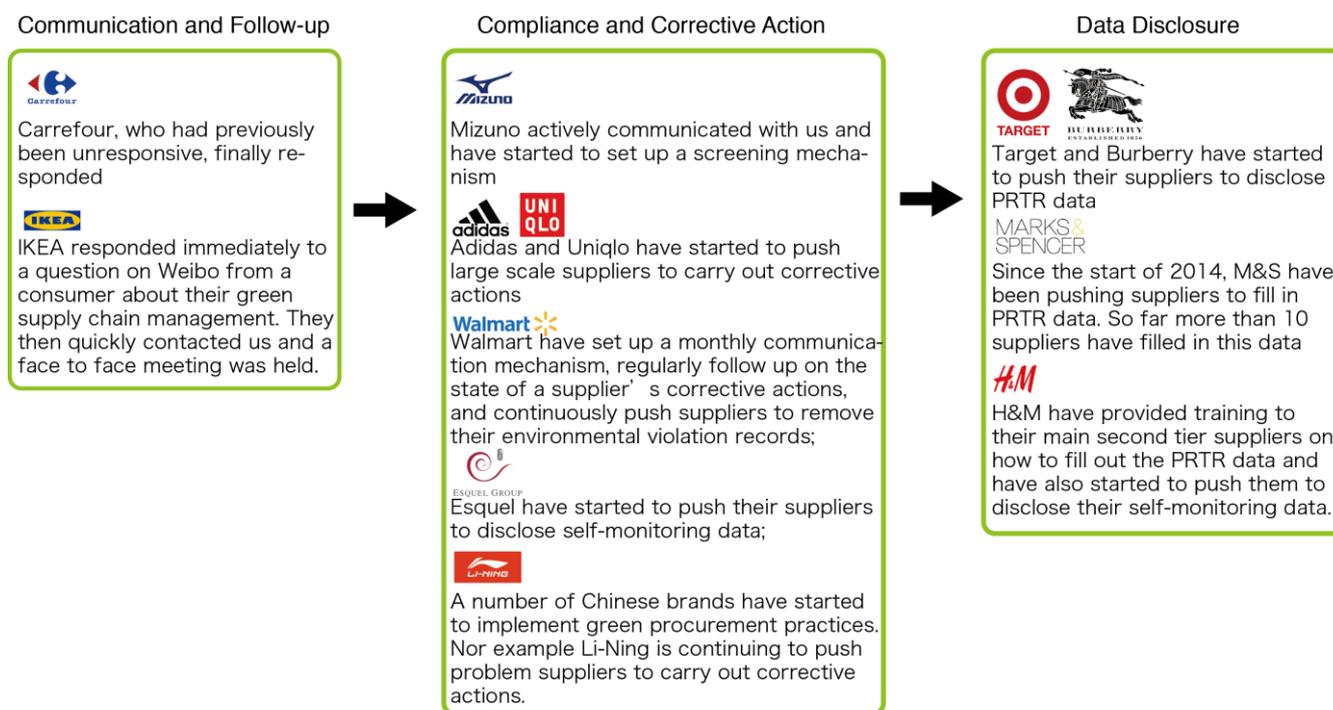
Figure 15. Top 10 textile brands over the past three years

## Brand Best Practice

The CITI is split into 10 different criteria under several different headings: Communication and follow-up, Compliance and Corrective Action, Extend Green Supply Chain Practices, Data Disclosure, and Responsible Recycling. Each step of the evaluation is designed to get progressively harder and delve deeper into the issues, and so the evaluation criteria can be seen as a green supply chain roadmap.



## Notable Progress



## Critical Gap

The green supply chain project has been making steady progress and many brands have become proactive. However, there are a number of brands such as Polo Ralph Lauren, Guess, ANTA, Giordano, and Meters/Bonwe who are still yet to take any kind of action. As far as the proactive brands are concerned the key issue in their green choice supply chain management program has gone from actively identifying problems using a supplier screening mechanism to actually pushing problem suppliers to implement corrective actions.

From the results of the brand evaluations in the CITI (see Appendix III) we can see that a whole range of brands have scored well in the first three sub-criteria. However, there are far fewer able to score highly in the “Corrective Actions” sub-criteria. These scores show that these relatively pro-active brands are already able to communicate effectively with stakeholders, and are aware of the major pollution problems their industry faces. They are not only able to respond to questions about possible problem suppliers but can also actively identify problems using a screening mechanism. However, the fact that they score low in the “Corrective Actions” sub-criteria means that some of these pro-active suppliers need to strengthen their efforts in pushing suppliers to implement corrective actions.

During on-site research in Changshu in Jiangsu Province, Lvse Jiangnan discovered that even though Changshu Tonghe Textile Printing and Dyeing Co., Ltd. (hereafter referred to as Tonghe Textile) had been pushed by brands to provide feedback on their pollution problems, they had still not carried out any corrective actions. Tonghe Textile is located in Miaoquan Town, Changshu, is surrounded by residential housing making up Guduan Village, and could be

classed as a medium sized village enterprise. Outside the western wall of the factory runs the Zhipu River, which is about 20 meters wide. On the opposite bank to the factory sits Guduan Village, which is made up of residences typical of the south of China with white-washed walls and black tiled roofs. Sitting next to the river the houses look like a scene from a traditional scroll painting. Only one thing in the scene is out of place: the water in the river, which is a deep brown color.



Figure 16 - Suspected location of Tonghe Textile's discharge outlet

Guduan Village residents have reported that wastewater discharged from the factory into the waterway has polluted it and also darkened the water in their wells. The wastewater discharge outlet from the factory is located underwater in the river at the south west corner of the factory compound but there was no sign to indicate that it is there. To compensate for the pollution caused to their wells, the factory gives each person from Guduan Village's No. 4 team compensation of 60 RMB per year.

In 2013, under pressure from brands like Levi's, Tongren Textile got in touch to provide feedback on their 2006 record for being rated as "Black".<sup>42</sup> However, the enterprise did not provide any feedback on the reasons for their "Black" rating or corrective actions taken and only provided their 2011 and 2012 environmental rating result in which they were ranked as "Blue". In 2013, the company once again received a poor rating, and was rated as "Yellow".<sup>43</sup>

Brands ranked in the top 10 for the "Corrective Action" criteria in the CITI, such as Esquel, Walmart and Adidas, do not only require suppliers to provide simple statements, but they continue to push suppliers, and ask them to go through the third-party GCA audit to remove their violation record from the IPE database, so as to reduce their environmental risks.

Under pressure from all the different textile brands, as of November 20, 2014, a total of 639 textile suppliers have so far started some form of communication with IPE. A portion of these suppliers have carried out some form of information disclosure and gone through third part audits. Since the release of the Phase III Textile Report, 186 new suppliers have got in touch with IPE, which shows that the implementation of the new discharge standards has had an impact on the compliance status of textile suppliers, and that some brands are actively

<sup>42</sup> [http://www.ipe.org.cn/pollution/com\\_detail.aspx?id=8387](http://www.ipe.org.cn/pollution/com_detail.aspx?id=8387)

<sup>43</sup> [http://www.ipe.org.cn/pollution/com\\_detail.aspx?id=181850](http://www.ipe.org.cn/pollution/com_detail.aspx?id=181850)

identifying and pushing suppliers in the highest environmental risk areas of their supply chains.

We've started to see some action from a number of large scale suppliers. They've now started to get in touch with us and have provided feedback on the corrective actions that they will be implementing. A number of listed companies, including Pacific Textiles Ltd., Huafu, Hangmin Group, and Dali Group, have started to push their subsidiaries to carry out corrective actions and provide public statements on work undertaken. They have also been pushing their suppliers to disclose PRTR data. Under pressure from brands, Shanxi Sanwei Group Co., Ltd., Saintyear Holding, and Winnitex Group have also started to act and have begun carrying out corrective actions and audits.

# Appendix I

In response to the newly revised *Discharge standards of water pollutants for dyeing and finishing of textile industry* (GB 4287-2012), local governments have already formulated measures and have actively promoted their implementation. The “Midnight Action” and “Close Down, Stop, and Limit Production” activities carried out in Zhejiang and Jiangsu respectively clearly show the government’s determination to declare war on pollution. They also clearly show that corrective punishments aimed at pollution problems pose a risk to the supply chains of major brands. Currently, in Zhejiang and Fujian provinces, where a lot of textile manufacturing takes place, they have universally implemented the new standard. However, in Jiangsu, Shandong and Guangdong they have still not been universally implemented. In provinces other than Zhejiang, the rate of compliance with supervisory monitoring and discharge standards is quite high. Textile and dyeing industry association organizations have also began to participate in stakeholder dialogue and have communicated with industry enterprises to actively promote the healthy development of the textile and dyeing industry.

## 1. Government Strengthens Control Measures

The transitional grace period for existing enterprises before they have to abide by the new standard will end on January 1, 2015. After this date all textile and dyeing enterprises will have to abide by the new standard. So, compared to the state of progress in the last report, what has been done by the government to enforce the new standard since then?

Zhejiang Province was one of the first to implement the new standard, but current compliance rates are disappointing. The 2014 first quarter key pollution source supervisory monitoring results showed that most of the key pollution source enterprises that were exceeding the discharge standards were located in Shaoxing, Hangzhou, Ningbo, and Jiaxing. The 2014 third quarter supervisory monitoring report for Shaoxing showed that 87.2% of all the enterprises that exceeded discharge standards were printing and dyeing enterprises.<sup>44</sup> The second quarter supervisory monitoring report for Hangzhou showed that printing and dyeing enterprises accounted for 78.4% of all companies that exceeded wastewater discharge standards.<sup>45</sup>

Jiangsu province has still not universally implemented the new standard<sup>46</sup>, but a new stricter standard has been comprehensively implemented across the Lake Tai region.<sup>47</sup> This stricter standard is a combination of the new textile standard and the wastewater discharge limits for the printing and dyeing industry stipulated in the *Taihu Region Urban and Rural Wastewater Treatment and Key Industrial Wastewater Pollutant Discharge Limits*. The 2014 third quarter supervisory monitoring report showed that 85.1% of textile industry enterprises met the

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<sup>44</sup> [http://www.sxepb.gov.cn/art/2014/9/26/art\\_14631\\_522717.html](http://www.sxepb.gov.cn/art/2014/9/26/art_14631_522717.html)

<sup>45</sup> [http://www.hzepb.gov.cn/wryhjjkxxgk/wryjc/jcjc/201407/t20140730\\_30495.htm](http://www.hzepb.gov.cn/wryhjjkxxgk/wryjc/jcjc/201407/t20140730_30495.htm)

<sup>46</sup> [http://www.jshb.gov.cn:8080/pub/root14/xxgkcs/201409/t20140930\\_282971.html](http://www.jshb.gov.cn:8080/pub/root14/xxgkcs/201409/t20140930_282971.html)

<sup>47</sup> Wuxi, Changzhou, Suzhou Municipal District, Nanjing Lishui County and Gaochun County, Zhenjiang Danyang City and Jurong City

discharge standards.<sup>48</sup>

Out of Fujian, Shandong, and Guangdong, only Fujian has universally implemented the new standard. The wastewater discharge compliance rate for the three provinces is relatively high but the specific circumstances need to be further looked into.

At the same time, real-time disclosure of online monitoring data, which is being promoted by the MEP, continues to be rolled out. From January 1, 2014, the MEP has required key state monitored enterprises to carry out self-monitoring and release their data on a government disclosure platform set up by the environmental authorities. Many provinces have already established these platforms in line with requirements and have also started to disclose data through them. Most of the platforms already show concentration values for conventional pollutants and in Jiangsu, most enterprises disclose real-time data for pH, COD, ammonia nitrogen and total phosphorus.<sup>49</sup> However, in Fujian the platform only discloses real-time data on COD and ammonia nitrogen levels<sup>50</sup>, and the Zhejiang platform discloses information on pH, COD and ammonia nitrogen. The Shandong and Zhejiang platforms, as well as some cities in Guangdong, also publish information on flow rates.

Corrective punishment campaigns targeted at the textile industry have also been carried out in a number of areas.

In Zhejiang, pollution discharge from the textile industry is a serious problem, but the government is taking some strong actions. At the end of 2013, Zhejiang Province launched the “Five Forms of Water Control” project, which included control of wastewater as one of its main aims. One of the key points from the project included stopping enterprises from polluting directly by making them discharge into a shared discharge system. On July 1, 2014 they also launched the “Midnight Action”, which targeted the textile industry and required enterprises, based on the requirements of the new industry standard, to carry out rectifications, and within a certain time period, undergo a comprehensive verification of all their air emissions, and wastewater and solid waste discharge. All those companies that failed the verification process had to stop production and carry out rectifications or close down. Just in Shaoxing, 18 companies seriously exceeded discharge standards and were ordered to stop production and carry out rectifications. In Keqiao District 80 companies had to limit production because of excessive discharge. In Xiaoshan, 12 companies were ordered to close and 63 were ordered to stop production and carry out rectifications.<sup>51</sup> The “Midnight Action” shows the resolve that the Zhejiang Government has in implementing the new discharge standard and pushing companies to improve.

On July 18, 2014, Shanghai’s water source was found to have excessive levels of antimony. Upstream from the water source in Wujiang District in Suzhou, Jiangsu Province, the government issued a notice to all printing and dyeing enterprises to temporarily suspend production, and then from July 24 they were allowed to operate with production limited to 50%. One of the potential causes of the incident was that there was no requirement for monitoring

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<sup>48</sup> [http://www.jshb.gov.cn:8080/pub/root14/xxgkcs/201410/t20141030\\_285254.html](http://www.jshb.gov.cn:8080/pub/root14/xxgkcs/201410/t20141030_285254.html)

<sup>49</sup> <http://218.94.78.61:8080/newPub/web/home.htm>

<sup>50</sup> <http://218.66.59.96:8083/peams/points.shtml>

<sup>51</sup> [http://www.tteb.com/newscenter/shownewsinfo.php?Class\\_ID=B00000&Info\\_ID=2014072300202](http://www.tteb.com/newscenter/shownewsinfo.php?Class_ID=B00000&Info_ID=2014072300202)

antimony levels in the supervision and monitoring of the textile dyeing industry discharge. When there were problems with water quality, it was not possible to tell from monitoring reports the source of the antimony, so the only option was to stop production at all enterprises in related industries. This kind of blanket response poses a risk to textile industry supply chains when serious water pollution problems arise.

From 2012 to 2014, the government has made significant progress in eliminating backward production capacity from enterprises in the textile printing and dyeing industry. According to information released by the Ministry of Industry and Information Technology, in 2012, 184 enterprises with a backward production capacity of 3,106,770,000 meters were eliminated. In 2013, 145 enterprises with a backward production capacity of 2,505,360,000 meters were eliminated. In 2014, 116 enterprises with a backward production capacity of 1,868,020,000 meters were eliminated.

## **2. Actions of Textile Printing & Dyeing Industry Associations**

After the publication of the Phase I Textile Report, the China Textile News carried a story in which the president of the China Dyeing and Printing Association questioned the scientific validity and professionalism of the Phase I report. They also emphasized the efforts that the textile printing and dyeing industry had made, but failed to respond to the questions over the textile industry's pollution problems. Since these comments were made though, the China Dyeing and Printing Association has started to engage with wider stakeholders and fruitful progress has been made.

On August 29, 2013, China National Textile & Apparel Council (CNTAC) and the Zero Discharge of Hazardous Chemicals (ZDHC) group of brands jointly held a special side meeting - Stakeholders Seminar on Hazardous Chemicals in the Textile Industry - at the 2013, Annual Conference on Social Responsibility in the Chinese Textile and Apparel Industry. At the meeting, the banning of the use of 11 hazardous chemicals from the printing and dyeing industry was discussed. Current Chinese pollution control policies, laws, regulations, and trends, were also discussed, and a consensus was reached to promote multi-stakeholder participation and cooperation.

On March 10, 2014, at the Printing and Dyeing Industry Environmental Protection Stakeholder Dialogue Day, CNTAC and the China Dyeing and Printing Association arranged for nearly 10 representative companies to participate, and for the first time also invited several environmental NGOs, like IPE, NRDC, and Envirofriends, to participate in face to face meetings. During the meeting the printing and dyeing enterprises made passionate speeches and the environmental groups gave frank responses. There were differences of opinion between the different parties but some common ground was found and the discussions were very constructive.

On March 11, 2014, the *2013-2014 Annual Report on Social Responsibility of the Chinese Textile and Apparel Industry* was published. The report stated that in order to achieve a wider scope of supply chain social responsibility, CNTAC would build wider contact with various different stakeholders.

On October 23<sup>rd</sup>, 2014, CNTAC and the CNTAC-ZDHC group co-hosted the second Stakeholders Seminar on Hazardous Chemicals in the Textile Industry. At the meeting, the MRSL to be used by ZDHC members, as well as the Textile Industry Environmental Impact Information Exchange System, which CNTAC is establishing, were introduced. During the meeting, different parties made it clear that they wanted to continue good levels of communication and cooperation to promote environmental health and safety.

## Appendix II

Sample testing results for sludge disposed of in landfill in Miaoquan Town, Changshu City

Classification of analyte	unit	detection limit	1	2	3	Soil pollutants intervention value in Dutch(2009)
ED/EK: inorganic nonmetal parameter						
Anilines	mg/kg	1.0	8.3	10.1	21.0	
Anilines(after reduction)	mg/kg	1.0	9.0	10.5	21.6	
Inorganic-nonmetal component analysis						
Sulfide(count by sulfur)	mg/kg	5.00	528	<5.00	211	
Inorganic-physic and composite parameter test						
Water content(oven drying @70°C)	%	0.10	68.4	68.8	56.3	
Metal-metal and main cationic						
	mg/kg	0.30	<0.30	2.00	<0.30	13
	mg/kg	0.5	332	361	358	78(Cr6+); 180(Cr3+)
	mg/kg	0.5	18.6	94.6	44.6	530
	mg/kg	0.05	0.05	<0.05	0.30	4

Local government is already paying attention to the problem of sludge from the printing and dyeing industry, and have made several requirements for its treatment. On October 12, 2013, the government office of Changshu, in a notice on the release of the *Standardization, Minimization, Reclamation Work Plan for Printing and Dyeing Sludge in Changshu City*,<sup>52</sup> clearly stated that, “Combined with the comprehensive improvement plan for the printing and dyeing industry, from October 2013 to June 2014, improvements to sludge reduction facilities for the whole city should be finished and the sludge’s water content should be controlled to

<sup>52</sup> [http://www.zfxxgk.suzhou.gov.cn/sxqzf/css/201310/t20131028\\_298229.html](http://www.zfxxgk.suzhou.gov.cn/sxqzf/css/201310/t20131028_298229.html)

under 50% before it leaves the factory. From October 2013 to December 2014, a number of printing and dyeing industry centralized sludge incinerators or standard treatment points should be set up as a trial. From January 2015, all printing and dyeing sludge landfill sites will be sealed up and the practice will be stopped.” Covered by this notice are:

1. Printing and dyeing enterprises with their own wastewater treatment or pre-treatment facility;
2. Centralized wastewater treatment plants that mainly treat printing and dyeing wastewater (where printing and dyeing wastewater accounts for more than 50%);
3. Paper manufacturers and other companies that generate sludge.

Zhenxin wastewater treatment plant falls under these criteria but has still not implemented any corrective actions.

## Appendix III

### Textile Industry Brands CITI evaluation result<sup>53</sup>

CITI Criteria		Communication and Follow-up		Compliance and Corrective Action			Extend Green Supply Chain		Data Disclosure and Target Setting		Responsible Recycling	Total
		Basic Communication	Discuss Industry Pollution Problems	Establish Screening Mechanism	Corrective Actions	Self-Monitoring Data	Identify Main Polluting Sectors	Extend Management Upstream	Energy and Emission Target	PRTR	Recycling Used Products	
No.	Brand	10	10	12	12	8	10	10	10	12	6	100
1	H&M	10	10	12	9	2	5	5	0	9	1.5	63.5
2	Esquel	10	10	12	12	2	7.5	2.5	2.5	3	1.5	63
3	GAP	10	10	12	9	2	5	5	2.5	0	0	55.5
3	C&A	10	10	12	6	0	10	5	2.5	0	0	55.5
5	M&S	10	10	12	6	2	5	0	0	6	1.5	52.5
6	Burberry	10	10	9	9	0	2.5	2.5	2.5	6	0	51.5
7	Target	10	10	12	3	0	5	5	0	6	0	51
7	Walmart	10	10	12	9	0	2.5	5	2.5	0	0	51
9	Puma	10	10	9	6	0	7.5	0	5	3	0	50.5
9	Nike	10	10	9	9	0	5	2.5	5	0	0	50.5
11	Adidas	10	10	9	9	0	5	0	0	6	0	49
12	Uniqlo	10	10	12	9	0	5	0	0	0	1.5	47.5
13	Esprit	10	10	9	6	0	5	0	0	0	0	40
13	ZARA	10	10	9	6	0	2.5	2.5	0	0	0	40
15	Li-Ning	10	7.5	9	6	0	5	0	0	0	0	37.5
15	Levi's	10	10	9	6	0	2.5	0	0	0	0	37.5
17	IKEA	10	7.5	9	3	0	2.5	0	2.5	0	1.5	36
18	Mizuno	10	7.5	9	6	0	0	0	0	0	0	32.5
19	Ann Taylor	7.5	7.5	6	6	0	2.5	0	2.5	0	0	32
20	The North Face	10	10	6	0	0	2.5	0	0	0	0	28.5
20	Timberland	10	10	6	0	0	2.5	0	0	0	0	28.5
20	Lee Jeans	10	10	6	0	0	2.5	0	0	0	0	28.5
23	Youngor	10	10	3	3	0	0	0	0	0	0	26
24	Jack & Jones	7.5	5	6	6	0	0	0	0	0	0	24.5
25	Disney	10	7.5	3	0	0	0	0	0	0	0	20.5

<sup>53</sup> As of November 2014

CITI Criteria		Communication and Follow-up		Compliance and Corrective Action			Extend Green Supply Chain		Data Disclosure and Target Setting		Responsible Recycling	Total
		Basic Communication	Discuss Industry Pollution Problems	Establish Screening Mechanism	Corrective Actions	Self-Monitoring Data	Identify Main Polluting Sectors	Extend Management Upstream	Energy and Emission Target	PRTR	Recycling Used Products	
No.	Brand	10	10	12	12	8	10	10	10	12	6	100
26	Toread	7.5	2.5	3	6	0	0	0	0	0	0	19
27	Lafuma	7.5	5	0	0	0	0	0	0	0	0	12.5
27	Tommy Hilfiger	5	7.5	0	0	0	0	0	0	0	0	12.5
27	CK	5	7.5	0	0	0	0	0	0	0	0	12.5
30	Primark	5	5	0	0	0	0	0	0	0	0	10
30	Tesco	5	5	0	0	0	0	0	0	0	0	10
30	Benetton	5	5	0	0	0	0	0	0	0	0	10
30	Carrefour	5	5	0	0	0	0	0	0	0	0	10
34	Sears	2.5	2.5	0	0	0	0	0	0	0	0	5
34	Kmart	2.5	2.5	0	0	0	0	0	0	0	0	5
36	Armani	2.5	0	0	0	0	0	0	0	0	0	2.5
36	Fifth and Pacific	2.5	0	0	0	0	0	0	0	0	0	2.5
36	Next	2.5	0	0	0	0	0	0	0	0	0	2.5
39	HUGO BOSS	0	0	0	0	0	0	0	0	0	0	0
39	Abercrombie & Fitch	0	0	0	0	0	0	0	0	0	0	0
39	361°	0	0	0	0	0	0	0	0	0	0	0
39	Kappa	0	0	0	0	0	0	0	0	0	0	0
39	Guess	0	0	0	0	0	0	0	0	0	0	0
39	Anta	0	0	0	0	0	0	0	0	0	0	0
39	Cortefiel	0	0	0	0	0	0	0	0	0	0	0
39	DKNY	0	0	0	0	0	0	0	0	0	0	0
39	Victoria's Secret	0	0	0	0	0	0	0	0	0	0	0
39	Macy's	0	0	0	0	0	0	0	0	0	0	0
39	J.C. Penney	0	0	0	0	0	0	0	0	0	0	0
39	Giordano	0	0	0	0	0	0	0	0	0	0	0
39	Meters/bonwe	0	0	0	0	0	0	0	0	0	0	0
39	Polo Ralph Lauren	0	0	0	0	0	0	0	0	0	0	0