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Who is Polluting the Taihu Basin?

—Green Choice Alliance IT Industry Supply Chain
Investigative Report – Phase VII



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Foreword

Since 2010, a number of environmental NGOs in the Green Choice Alliance have been pushing IT companies to practice green production and green procurement. So far six reports have been released and over 200 IT supplier companies have been pushed to provide explanations for environmental problems and also what they have done to correct those problems.

In this report five member organizations of the Green Choice Alliance look at an important location for the global IT industry, the Taihu Basin, and look into the long term affects that industrial discharge has had on the aquatic environment in a number of areas.

Lake Taihu is China's third largest freshwater lake and the Taihu Basin supports more than 30 million people and is also home to one of China's most vibrant economic centers. However, the water in the Taihu Basin has become increasingly polluted and the IT industry's contribution to this pollution cannot be ignored. Through this investigation, the environmental NGOs discovered that some enterprises in the Taihu Basin are discharging large volumes of wastewater and are causing the sediment in a number of tributaries and rivers around Lake Taihu to be contaminated with heavy metals in amounts that seriously exceed regulatory standards.

During investigations at the Huangcangjing River the local NGO, Lv Se Jiang Nan, discovered that a large amount of wastewater was being discharged into a small river between two of Foxconn's factories. This water was then being pumped and discharged into the Huangcangjing River. All the water being discharged smelt foul, was black in color and formed thick foam on the surface of the river. Results from site sampling at the river showed that the concentration of nickel was 2060 mg/kg, almost 40 times over the limit value.

In the previous Green Choice investigations into IT Industry pollution, pollution discharge from two factories on the banks of the Louxia River had already been looked, as well as the health effects on local residents from this pollution. In order to clarify the state of pollution discharge in to the Louxia River as well as its source, Lv Se Jiang Nan visited the river a total of 22 times and eventually discovered a secret discharge pipe at the bottom of the river.

Results from samples taken at the river showed that the concentration of copper was 21,600mg/kg, and the concentration of nickel was 797mg/kg, 80 and 15 times the NOAA Sediment Quality ERM value respectively.

On July 15th and 16th, 2013, Lv Se Jiang Nan sent letters to Foxconn Technology Group and Unimicron asking them about pollution problems in the water bodies surrounding their factories and about complaints lodged by local communities. The NGOs hoped that the companies could provide some sort of explanation but there was no response. Even after emailing and faxing there was still no response.

According to publically available information, the NGOs discovered that Unimicron and Catcher

Technology, which both have poor environmental records, were suspected of supplying to HTC. For these reasons a notification letter was sent to HTC from the environmental NGOs. After receiving the letter HTC did not respond and is the only brand out of 33 IT brands that has so far failed to respond when questions have been asked about polluting suppliers suspected of supplying to them.

The environmental NGOs make a special appeal, and ask that in order to stop the poisoning of the Taihu Basin, which is a precious water source, consumers make purchasing choices to express their dissatisfaction with IT manufacturers like Foxconn, Unimicron, and HTC!

1. Background

Located in the Yangtze River Delta, Lake Tai, with an area of 2,425 km², is the third largest freshwater lake in China. The Taihu Basin stretches across Suzhou, Wuxi, Changzhou and Zhenjiang in Jiangsu Province, Jiaxing and Huzhou in Zhejiang Province, and also Shanghai. It is said that, "The charm of Lake Taihu lies in its water", because it is Lake Taihu's rich and clean water that has nourished the beautiful scenery of streams flowing underneath little bridges in Suzhou and cultivated a "land of fish and rice" of a thousand years of prosperity. Nowadays, the Taihu Basin supports a population of over 30 million and is home to China's most dynamic economic center.



Figure 1. Map of the Taihu Basin¹

¹ <http://www.geonet.cn/GeoPopular/SourceofLife/12379.shtml>

Over the past 30 years the economy of the Taihu Basin has developed extremely fast but the environment of the area has paid a heavy cost and the water in Taihu Lake has become heavily polluted. In spite of pollution control, an enormous outbreak of blue-green algae occurred in the waters in the Wuxi area of Lake Taihu in 2007, resulting in the breakdown of Wuxi's water supply and foul smelling tap water.



Figure 2. Lake Taihu's former beauty



Figure 3. Blue-green algae outbreak on Lake Taihu

The water supply being cut off to millions of people, for more than two days in Wuxi, shocked the nation, and Lake Taihu's blue-green algae problems became known throughout the country. After the incident, cities and provinces in the Taihu Basin resolved to construct a large-scale water diversion project from the Yangtze River to the Taihu Basin and improve emission standards. They also began to implement a series of projects including dredging of contaminated sediment, wetland restoration and protection, and comprehensive pollution control for the river network.

However, the excessive discharge of nutrients such as phosphorus and nitrogen is not the only problem in the Taihu Basin. Advanced agricultural production in the Lake Taihu area has led to a huge amount of pesticides and aquaculture wastewater also being discharged. Meanwhile, local industries producing steel, textiles, communication equipment, electronics, paper, chemicals, metal products, cement, and pharmaceuticals also generate large amounts of wastewater and pollutants.² This raises the questions: is pollution control effective? And does the emission of pollutants from these industries affect the environmental quality of the Taihu Basin?

To answer these questions, Lv Se Jiang Nan, the Institute of Public and Environmental Affairs, Friends of Nature, Envirofriends and Nature University began a joint project to investigate the state of sewage discharge at the enterprises within the Taihu Basin. As the IT industry is of great importance in areas such as Suzhou, the two environmental organizations decided to continue the Green Choice Alliance investigation into the IT industry. Through on-site visits, Lv Se Jiang Nan found that, despite the serious environmental situation, some of the enterprises in the Taihu Basin were still discharging massive amounts of polluted wastewater. This has resulted in excessive levels of heavy metal pollutants in the river sediment of some of Lake Taihu’s tributaries, which has ultimately affected environmental and public health within the Taihu Basin.

2. The State of the Environment in the Taihu Basin

As the economy of the Taihu Basin has developed, pollution problems have also become much more apparent. According to the “2011 Bulletin on River Water Sources in the Taihu Basin and the South East,” the number of water function areas in compliance was 39 and the annual water quality compliance rate for water function areas was just 14.2%. The length of waterways within the basin that were in compliance was 455.9 Km, a compliance rate of just 15.3%. The area of lakes in compliance was 42.55 Km², a compliance rate of just 1.1%. Volume of water in compliance in reservoirs was 15 million m³, a compliance rate of just 5.33%.³

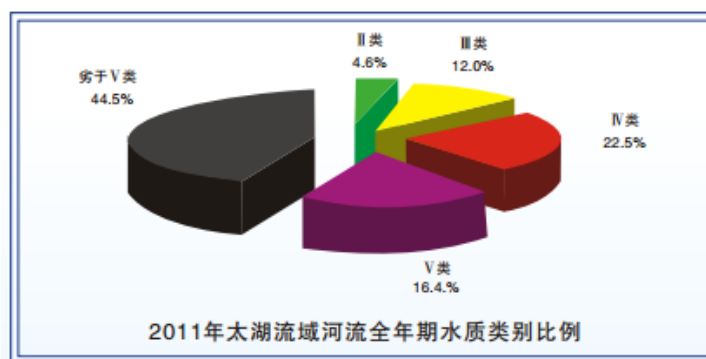
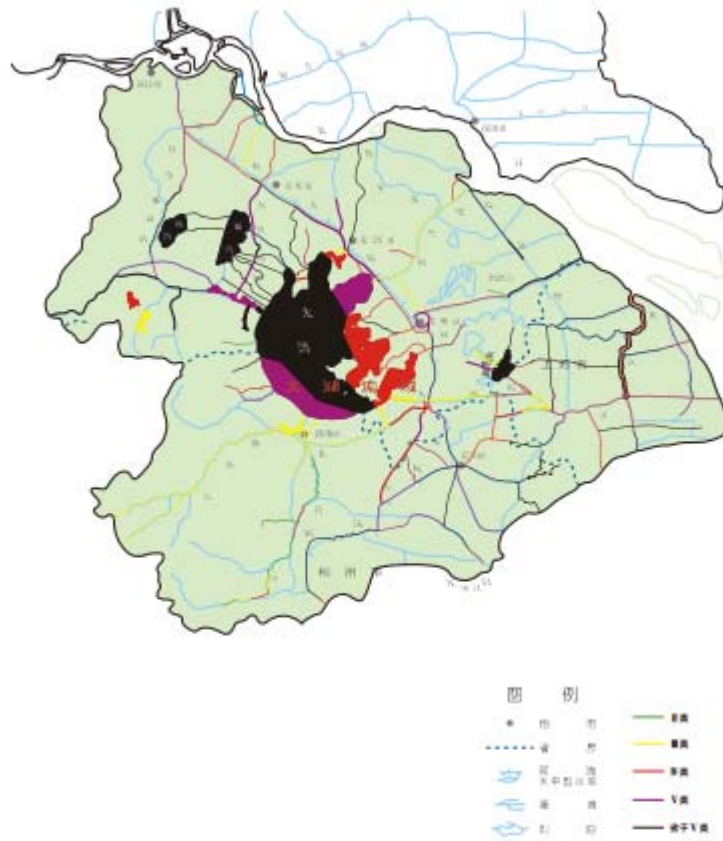


Figure 4. Comparison of annual water quality classifications in the Taihu Basin

² http://www.cnemc.cn/publish/totalWebSite/news/news_35773.html

³ <http://www.tba.gov.cn//tba/content/TBA/lygb/szygb/JCMS00000051415.html>

The water villages in the south of China used to be surrounded by bridges and clear rivers, but now the rivers are losing their clean water.



2011年太湖流域水质类别分布图

Figure 5. 2011 water quality classification in the Taihu basin

The discharge effects from highly developed industries in the Taihu Basin should not be ignored.

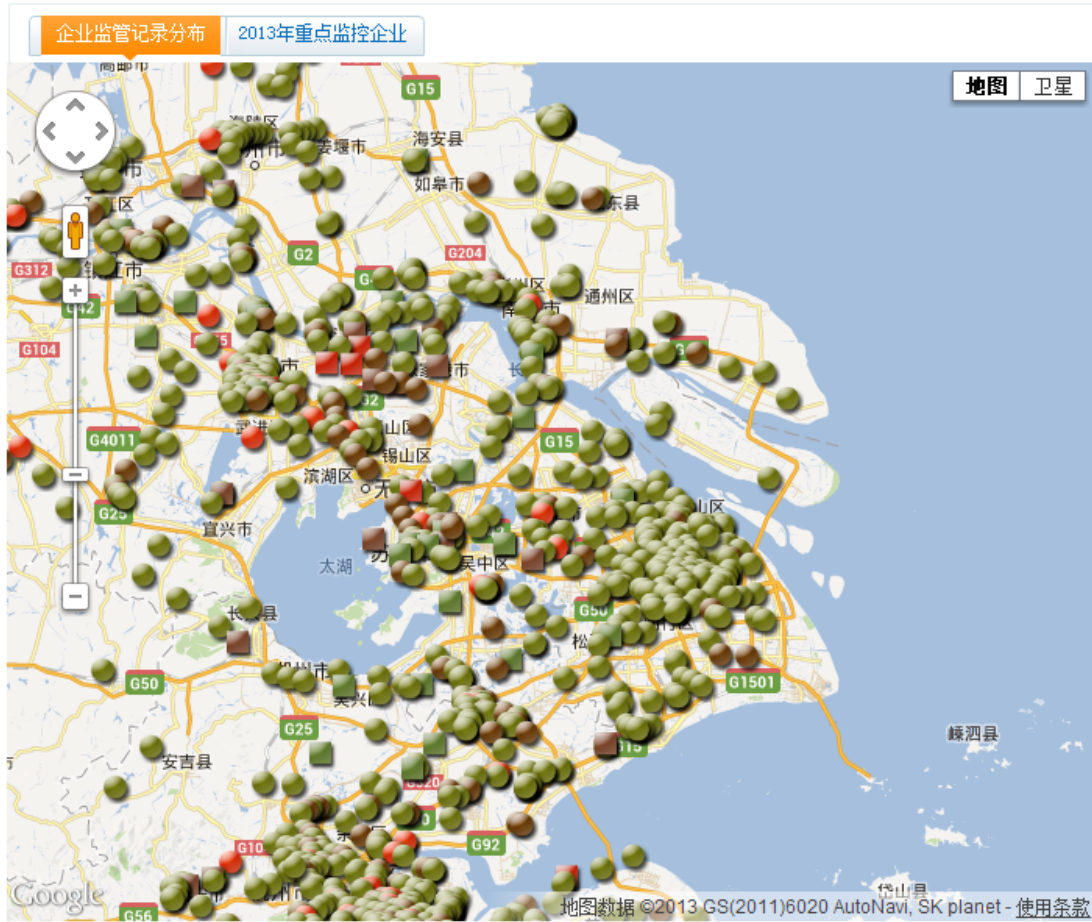


Figure 6. Map showing enterprises in the Taihu Basin and surrounding area that have supervision records (<http://www.ipe.org.cn/pollution/sources.aspx>)

The IT industry is thought of as a high-tech industry and one in which there is fierce competition in the Taihu Basin to develop. However, the manufacturing processes for IT products can be resource intensive and can also result in the discharge of large amounts of pollutants. For instance, the electroplating and etching processes in the manufacture of Printed Circuit Boards (PCBs), which are necessary for most IT products, can require large volumes of water and can produce discharge containing heavy metals like copper and nickel. These heavy metals can seriously pollute the environment in the following ways:

Copper

There are many biological effects from copper toxicity. A copper concentration of 0.01 mg/L can inhibit water self-purification; at a concentration of 0.0002 mg/L, water starts to become toxic for fish. Copper can remain in soil, so sewage irrigation or sludge fertilizer could easily lead to soil pollution, hinder root development, and inhibit nutrient absorption and growth. Copper toxicity also affects aquatic organisms; in coastal and harbor areas the presence of copper once caused green oyster events.

An epidemiological survey found that areas where drinking water contains high level of copper are correlated with high rates of deaths from cardiovascular problems. Symptoms of acute

copper poisoning include: low blood pressure, vomiting, melena, jaundice, hemolytic anemia, and coma to death.⁴

Nickel and Nickel Compounds

Nickel is recognized as a human carcinogen. Those who get exposed to nickel dust or nickel steam will have respiratory inflammation, dermatitis, leukocytosis, nasal cancer, lung cancer and other illnesses. According to field investigation, most scholars believe that the high incidence of cancer is correlated with nickel sulfide, nickel oxide and nickel carbonyl content.⁵

Chromium

Chromium is a poisonous carcinogen. There are two major valence states of chromium: trivalent chromium (Cr III) and hexavalent chromium (Cr VI). Chromium VI is far more toxic than chromium III, which unlike chromium VI, occurs naturally in the environment. Chromium VI chiefly affects the respiratory tract from inhalation and acute exposure causes coughing and wheezing. In cases of chronic exposure, chromium VI can cause perforations of the septum, bronchitis, pneumonia, decreased pulmonary function, and risk of lung cancer. Epidemiological studies have shown that chromium VI is a carcinogen when inhaled. Non-cancerous effects include dermatitis and ulceration of the skin from skin exposure, and gastrointestinal problems. Chromium can kill microorganisms in water and restrain the self-purification process of the water.⁶

3. Main Case Studies from the On-site Investigation

As part of the on-site investigations this case study looked at pollution from IT product manufacturing sites in the Kunshan area. Kunshan is located in the Lake Tai plain of the Yangtze River Delta. A network of rivers crisscrosses the area which is also scattered with lakes. The main water sources in the west are Lake Tai, Yangcheng Lake and Cheng Lake. The Wusong River, Lou River, Miaoqing River, Qipu River, Yanglin River and Jishuigang River cross into the Kunshan area. The Jishuigang River, the Wusong River and the Lou River are the major rivers used to discharge storm water. The main rivers that the investigation focused on were the Huangcangjing River, the Hanpu River, the Louxia River and the Tongxin Creek.⁷

⁴ Shi Biqing, Zhaoyu, Lu Zhenhua, Environmental Pollution and Human Health, China Environmental Press, August 2008.

⁵ Shi Biqing, Zhaoyu, Lu Zhenhua, Environmental Pollution and Human Health, China Environmental Press, August 2008.

⁶ Shi Biqing, Zhaoyu, Lu Zhenhua, Environmental Pollution and Human Health, China Environmental Press, August 2008.

⁷ <http://www.docin.com/p-444806303.html>

3.1. Sewage from Foxconn is Pumped into the Huangcangjing River

Deepening of the Huangcangjing River was started in 1441 (the sixth year of the reign of the Ming Dynasty Emperor, Zhengtong). The Huangcangjing starts from the Xintang River in the north and flows to the Yue River in the south. It passes through Kunshan from north to south and has a total length of 6.7km. In 1958 it was widened and deepened and now has an average surface width of 35m and acts as one of the water courses used to discharge storm water.⁸



Figure 7. Location of the Huangcangjing River

A number of Foxconn Technology Group's factories in the Suzhou area located on the two banks of the Huangcangjing River. Between the two Foxconn factories lies an internal river. On the westernmost end of this river is the Foxconn pumping station which pumps water into the Huangcangjing River.

On May 5th, 2013, staff from Lv Se Jiang Nan located the polluting factory on a satellite map using an address from the internet and information from resident complaints. An on-site investigation was then launched.

⁸ <http://www.dfbz.suzhou.gov.cn/zsbl/1183027.htm>

Sewage being discharged

On the morning of July 9th, 2013, a staff member from Lv Se Jiang Nan arrived at the Foxconn pumping station. They discovered the pumping station had marks showing that pumping had taken place but there were no staff present at the station.

On the morning of July 10th 2013, they once again went to the Foxconn pumping station. There were workers there who explained that the pumping station discharges water to the Huangcangjing River everyday from 6-7:00 am and 6-7:00 pm. When asked whose water the pumping station pumps the workers replied that they pump water from the river inside the Foxconn factory area.

On the morning of July 11th, 2013, Lv Se Jiang Nan staff went to the pumping station and waited for one and a half hours. At 7:00 am the pumping station started to discharge water and the smell was terrible, the water was very dark and there was dense foam which formed to height of up to 50cm as the water passed through a grate across the river. The water then went under a small bridge, and after several dozen meters, into the Huangcangjing River where it made the surface of the river look like two separate rivers. After an hour, the discharge finally stopped at 8:00 am.



Figure 8. Water being discharged from the Foxconn pumping station



Figure 9. Dense foam being formed

According to the staff at the pumping station the two pumps pump water every day for 30-40 minutes. If the water in the river inside the Foxconn factory is high then they pump an additional time in the evening. If they don't discharge then Foxconn requires them to immediately start discharging.

On July 14th, 2013, the proprietor of a business located next to Huangcangjing River revealed that the Foxconn factory located on the opposite bank has several underwater pipes discharging water into the Huangcangjing River and when discharging creates foam in the river. On the opposite bank, under a shrub, was a very obvious and large wastewater discharge pipe with a diameter of around 50 cm. The volume of wastewater being discharged from the Foxconn factory into the river inside their compound that day was very large and was causing foam to form on the surface.

Sampling of sediment from the river bottom

One of Foxconn's factory workshops is located at the north west corner of one section of the site, with Zizhu Road to the west and the internal river that runs through the Foxconn site to the south (see picture below for details). Located next to the bridge by the workshop is a discharge outlet about 50cm in diameter discharging wastewater which turns the water a whitish color. Under the bridge, about 100m away from Foxconn's discharge outlet, a sample of the sediment from the river bottom was taken and sent for testing at ALS Analytical Testing (Shanghai) Co., Ltd.

The results of the testing were as follows: nickel – 2060mg/kg, copper – 532mg/kg, and chromium – 175mg/kg.

	Nickel mg/Kg	Copper mg/Kg	Chromium mg/kg
Sediment from under the bridge on Zizhu Road	2060	532	175
NOAA Sediment Quality Standard ERL Values ⁹	20.9	34	81
NOAA Sediment Quality Standards ERM Values	51.6	270	370
Yangtze River Sediment Quality Standards Level I ¹⁰	35	35	65
Yangtze River Sediment Quality Standards Level II	55	65	115
Yangtze River Sediment Quality Standards Level III	75	150	250
Yangtze River Sediment Quality Standards Level IV	100	250	600

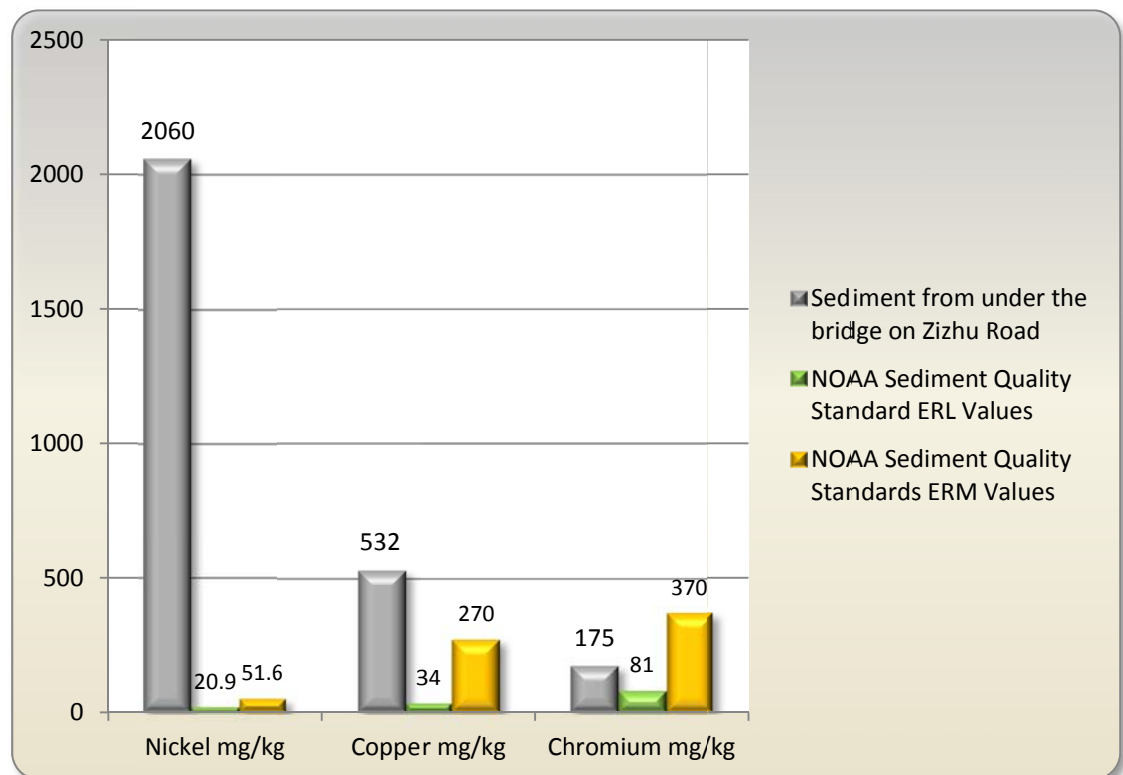


Figure 10. Results from the sediment sample taken from the river in the Foxconn site

Table 2. Sediment quality levels (NOAA standard)

Standard Indicator	<ERL	ERL-ERM	>ERM
Quality Level	I	II	III
Quality status	Good	Average	Poor
Quality Description	Low likelihood of toxicity effects	Some toxicity effects likely	Toxicity effects highly likely

⁹ Sediment Quality Guidelines developed for the National Status and Trends Program

¹⁰ Liu Cheng, Wang Zhaoyin, He Yun, Investigation into Water quality Standards of Sediment Deposition, Sediment Research, 2005.

Table 3. Sediment Quality levels (background value standards)

Quality Level	I	II	III	IV	V
Quality status	Excellent	Good	Average	Poor	Very poor
Quality Description	No pollution	Some accumulation of heavy metals possible	Slightly polluted	Moderately polluted	Severely polluted

The NOAA Sediment Quality Standards are set to two limit values, ERL (Effects Range-Low) and ERM (Effects Range-Median) where the ERL value represents a “low” toxicity effect and the ERM value represents a “medium” toxicity effect. When the content of heavy metals in the sediment is less than the ERL value then the probability of producing negative effects (toxicity impact) is less than 10%. If the content of heavy metals in the sediment exceeds the ERL value but is below the ERM value then the probability of producing toxicity effect increases to 20-30%. If the heavy metals content in the sediment exceeds the ERM value then the chances of producing toxic effect increases to between 60-90%.¹¹

According to the results of the testing carried out by ALS Analytical Testing (Shanghai) Co., Ltd., (as clearly shown in Figure 10) the amount of nickel in the sediment exceeded the NOAA Sediment Quality Standard ERM Values by over 40 times and the amount of copper exceeded the value by two times, meaning that the possibility of producing harmful toxicity effects is very large. Furthermore, both nickel and copper levels were well in excess of the background level IV standard and show serious contamination. The chromium level was in excess of the background level II standard and so contained some accumulation of heavy metals.

¹¹ Yu Guo'an, Wang Zhaoyin, Liu Cheng, Huang Wendian, Investigation on Sediment Quality in the Middle Yangtze River, Sediment Research, 2007.

Cultivation Area Sample



Figure 11. Picture showing the location of Foxconn, the pumping station, the sampling point, Xinbei Village (New North Village) and Huangcangjing River

Xinbei Village sits on a narrow strip of land squeezed between Foxconn to the east and the Tongxin Creek to the west. Another section of Xinbei Village is also located on the west bank of the Huangcangjing River to the south east of the Foxconn factory building there. During a visit to Xinbei Village on May 21st, 2013, residents explained to a staff member from Lv Se Jiang Nan that several years ago, Foxconn's workshop started to discharge wastewater into the Tongxin Creek through their fields. The volume of water being discharged was very large and at times the wastewater turned red and or white and all the fish in the Tongxin River died. The local residents eventually blocked up Foxconn's wastewater discharge outlet.

However, according to testimonies from local residents, the surface of the land that they use for cultivation has turned yellow and red and they worry that it has been contaminated by the wastewater discharge from the Foxconn factory. They worry that there will be problems with the vegetables they grow and that the vegetables they eat will damage the health of their families.

During the on-site visit it was noted that the water seeping into the channels dug between the vegetables was black or yellow in color and they used the water from the ditch to water their vegetables.

The residents responded to questions about air emissions by saying that when Foxconn discharges waste gases the noise disturbs them and the smell is terrible. None of the residents dare hang clothes to dry outside during these times and the gas discharged from Foxconn is like rain drops that float onto the clothes making them very slightly white. This used to happen a lot

more but happens less these days.

The residents went on to explain that the vegetables that they plant grow and grow but then just die. Even after maturing for a long time they just die, or sometimes they flower but will not fruit.

Results from the surface soil sample taken at the Xinbei Village No. 5 cultivation area showed copper levels at 211mg/kg, nickel at 45.5mg/kg and cadmium at 48.7mg/kg.

Table 4. Xinbei Village No.5 cultivation area surface soil sampling results

	Copper mg/kg	Nickel mg/kg	Chromium mg/kg
Surface soil taken from the Xinbei Village No. 5 cultivation area	211	45.5	48.7
Level II environmental standard value for inorganic pollutants in soil ¹²	100	90	250

The standard values are split into three categories according to protection targets:

Soil Environmental Quality Level I Standard Value (Environmental background level)

Soil should basically be at environmental background levels. This is considered the optimum level of soil quality. It is applicable to soil at nationally recognized nature reserves (excluding those that had previously high levels of background heavy metals), sources of drinking water, pastureland and other areas where special protection is necessary.

Soil Environmental Quality Level II Standard Value (Screening level)

Initial screening of soil to judge the level of contamination risk. If levels of pollutants in the soil are lower than the screening value in general the soil can be thought of as having no contamination risk. Anything over the screening value shows that there is probably a contamination risk. However, to judge whether there is real contamination risk there needs to be further investigations and confirmation. Applies to all categories of soil.

Soil Environmental Quality Level III Standard (Restoration level)

A real and critical level of soil contamination has occurred. Applies to contaminated soil in every category.

¹² Soil Environmental Quality Standards (Revised)(GB15618-2008)

Heavy metals and inorganic are categorized in the soil environmental quality Level II standard (screening level). According to the monitoring results, the surface soil sample from the cultivating land had levels of copper in excess of the screening level and so are probably at levels that cause toxicity.

Foxconn

Foxconn Technology Group is a high-tech company involved in the development and manufacture of computers, communications and consumer electronics products which are extensively used in digital content, automobiles, access, cloud computing and new energy and new materials.

The company was established in Taiwan in 1974, and in 1988 made its first investment in mainland China. It has over 1 million employees, has the world's top customers, and is the biggest electronics industry technology service supplier in the world. In 2012, imports and exports to and from the company totaled USD 244.6 billion. According to customs statistics this is 4.1% of mainland china's total imports and exports. In 2012, Foxconn's 15 subsidiaries in China entered into China's top 200 exporters and collectively made it to No. 1. In 2013, the company jumped to No. 30 in the Fortune 500 list of global companies.

Foxconn has steadily turned mainland China into its center while extending into many other parts of the world.

In the Pearl River Delta, they are based in Shenzhen, Foshan, Zhongshan, Dongguan and Huizhou. The Shenzhen technology park is their specialist "Five Centers, One Base" area for technology research and e-commerce development.

In the Yangtze River Delta they have factories in Kunshan, Shanghai, Nanjing, Huai'an, Funing, Hangzhou, Ningbo and Jiashan. These form an industry chain making precision connectors, wireless communication modules, liquid crystal displays, network equipment parts, semiconductor equipment and software technology development.

In the Bohai Economic Rim they have factories in Beijing, Tianjin, Yantai, Langfang, Qinhuangdao, Yingkou. At these factories they forge wireless communications, consumer electronics, cloud computing, nano technology, computer assembly, servo motor, precision machine tools, and environmental technology.¹³

A number of Foxconn factories can be found on the pollution map because of their poor environmental record.¹⁴

¹³ <http://www.foxconn.com.cn/GroupProfile.html>

¹⁴ <http://www.ipe.org.cn/alliance/supplier.aspx>

3.2 Seriously Polluted Sediment in the Louxia River

Louxia River

The Louxia River runs from east to west for about 1000m. In the west it runs to Bailu Road (where it is now blocked), where it is enclosed, making it difficult to closely inspecting it. At the eastern most point, where it meets the Hanpu River, there is a sluice gate and also the Tongxin North pumping station (irrigation water discharge station). From its appearance it looks like when the sluice gate is closed, there is no flow of water in the Louxia River from the east or west. The two banks of the river have residential buildings on them and a village awaiting resettlement. The residents explained that in the eighties there were no factories there and the river was full of fish and shrimp and the water was clear enough that you could use it to wash rice and vegetables in.

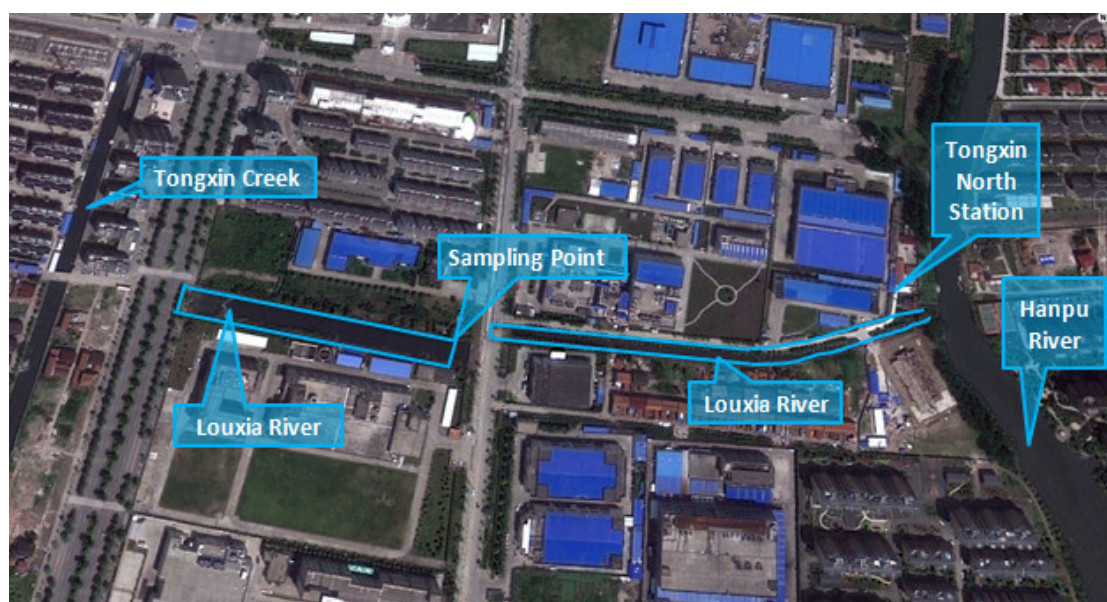


Figure 12. Tongxin Creek, Louxia River, Tongxin north station and the Hanpu River

Tongxin Creek

The Tongxin Creek runs from north to south. Long and straight, it is a manmade river constructed half a century ago and intersects many small rivers in the city to form part of the Taihu Basin network of waterways.

Hanpu River

The northern most point starts at Jishan Bridge in Zhoushi Town and at the southern most point it flows into the Lou River at Gechaotang Bridge. The river is 15-20 meters wide and mostly acts to take away flood water.¹⁵

¹⁵ <http://www.dfzb.suzhou.gov.cn/zsbl/1127727.htm>

3.2.1 Secret Discharge of Pollution

In the previous Green Choice investigations into IT Industry pollution, two factories on the banks of the Louxia River have already been looked at: Kaida Electronics and Unimicron. According to information provided by the residents of Tongxin village on cancer rates of residents, since 2007, in just Tongxin village No. 8 section, nine people have died or suffered from cancer. The total population of this section of the village is no more than 50.¹⁶

The media has repeatedly reported on the serious pollution from nearby factories, which has now led to a local government decision to demolish the village and relocate the villagers. At the moment there are only six households remaining in the village, but because they have been unable to come to a unanimous decision on compensation the demolition and relocation has not yet gone ahead.

The previous investigations found that the water in the Louxia River was seriously polluted, but the specific pollution concentrations had not been measured. In order to confirm the state of pollution in the Louxia River, a staff member of from Lv Se Jiang Nan went to the Louxia River discharge point a total of 22 times.

Suspected of Secretly Discharging Sewage

On the morning of May 10th, 2013, during an on-site inspection of the Louxia River, the level of the water in the river could be seen to be relatively high, was black in color and had a foul smell. Small bubbles kept on forming on the surface of the river and the reeds and trees on both banks had withered and died.

On the afternoon of May 15th, 2013 another visit was made to the Louxia River. The water level was relatively low and the river bank was exposed. A mark on the bank showed the water level had been about 35cm higher. The water was black, had a terrible smell and bubbles kept on rising to the surface of the water. Looking east along the river there were four discharge pipes at the bottom of the river, with water constantly being discharged from them. The water being discharged to the north of Complex Interconnector's wall had a foul smell, was red in color and there was a clear dividing line on the surface of the water showing the two different water bodies.

On the morning of June 5th, 2013 another visit was made to Louxia River. Whilst conducting a pH test on the discharge outlet the staff member unexpectedly discovered that under Hantong bridge there was ripples on the surface. Looking carefully there seemed to be sewage being secretly discharged.

¹⁶ The Other Side of Apple II – Pollution Spreads Through apple's Supply Chain - <http://www.ipe.org.cn/Upload/Report-IT-V-Apple-II-EN.pdf>

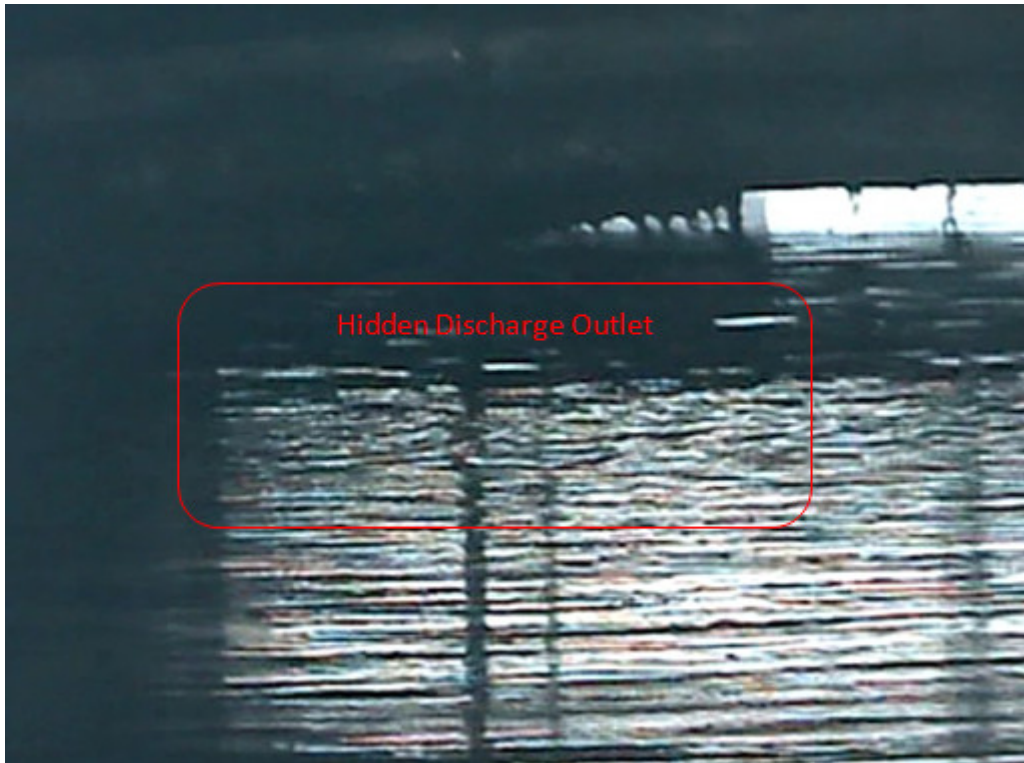


Figure 13. Hidden discharge outlet under the Hanpu Road bridge over the Louxia River

Sewage being pumped and discharged

On the morning of June 11th, 2013, on the 15th visit to Louxia River, the water level was very high and the discharge outlets were practically underwater. Waves of foul smelling air came wafting off the surface and the water appeared black. Walking from the Louxia River Bridge on Hanpu Road to the end of Louxia River (the Hanpu River) there was a terrible stench the whole way. As far as the eye could see the Hanpu River was much higher than it had been in the past and had inundated the grass on the bank. The water was relatively clear and there were fish playing in the river. There was a fisherman sitting on one of the banks and a fishing boat in the middle of the river pulling in a net. Greenish blue willows on the banks swayed in the breeze.

All of a sudden a rumbling sound started. It was coming from a pumping station that was discharging wastewater very quickly through a discharge pipe with a diameter of around 50cm. The foul smelling black colored wastewater was flowing down a 10 meter long channel before entering the Hanpu River. In a flash part of the Hanpu River turned into black stinking sewage water and after 15 minutes the whole surface of the Hanpu River was jet black and smelled foul. The water upstream from the Hanpu River outlet was completely different, so different in fact that it looked like a different river.



Figure 14. Tongxin North pumping station discharge channel. Dark colored water is pumped from the Louxia River into the Hanpu River

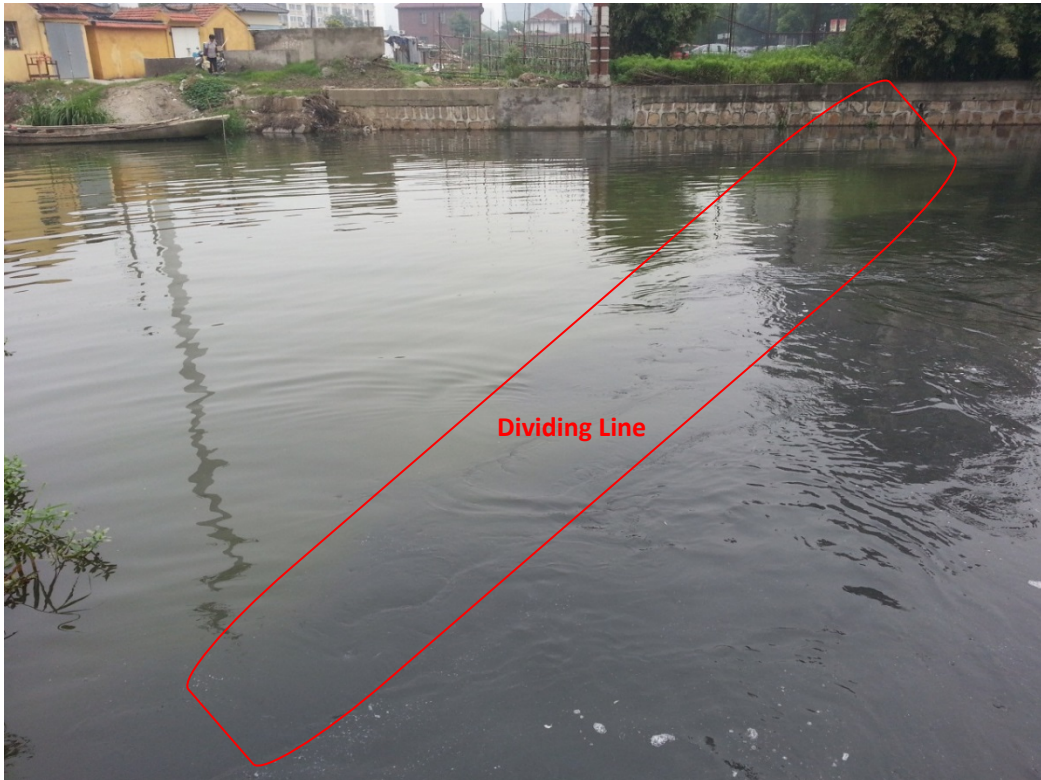


Figure 15. A clear dividing line in the Hanpu River



Figure 16. Dead fish in the Hanpu River

By looking past the pumping station it was possible to see that water in the Louxia River was flowing towards the pumping station. The flow of water was very great and it was possible to tell that the foul smelling water being discharged into the Hanpu River came from the Louxia River.

Outside the pumping station a worker there confirmed that the foul smelling water being pumped into the Hanpu River was sewage from the Louxia River. The worker stated that the pumping station had a permit to discharge water into the Hanpu River. At 12 o'clock sharp, after one hour of discharging the water, the pumping station closed the sluice gates. After the discharge finished, the water level in the Louxia River dropped by about 35 cm.

At 8:30 On the morning of June 12th, 2013, on a visit to Louxia River, water was discovered slowly flowing to the east and was suspected of being discharged into the Hanpu River. Even before arriving at the Hanpu River a rumbling sound could be heard, and layer of black foul smelling water could be seen on the surface of the river. Tongxin north station (pumping station) was at that moment discharging sewage from the Louxia River into the Hanpu River.

In the middle of the river was a small fishing boat. An old man on the boat revealed that the pumping station pumped sewage into the Hanpu River every day, each time for several hours and sometimes twice a day. The old man went on to reveal that not far upstream from the Tongxin pumping station were four more pumping stations discharging water into the Hanpu River. Sometimes they discharge water once a day and sometimes several times a day, the frequency can be determined by looking at Tongxin north pumping station's electricity usage. The old man also said that there used to be lots of fish in the Hanpu River but now the only thing they can catch are some small crayfish.

After listening to the explanations from the residents living around the Louxia River, by 10:30 am the pumping had stopped at the Tongxin pumping station outlet to the Hanpu River and the water level had dropped by about 40 cm.

At 12:30 pm, the water level in the Louxia River had returned to its previous height. However, the volume of water being discharged by the discharge outlets by the side of the river was very small which led to some new questions being asked, such as: How much water is being discharged through the hidden pipes underwater in the Louxia River and which factories are discharging into the river?

At 11:25 am on June 13th, 2013, the water level of the Louxia River was very high and the water was black and foul smelling.

At 8:50 am on June 15th, 2013, the water in the river smelt so foul that it stung the nostrils and the water level was down about 40 cm. The surface of the water was flowing quickly from west to east and the Tongxin North pumping station was pumping water out of the Louxia River. On arriving at the Hanpu River a layer of black foul smelling liquid could be seen on. Workers from Tongxin North Pumping Station saw that Lv Se Jiang Nan staff were filming and at 9:02 Tongxin North pumping station stopped discharging wastewater. Turning back, under the Hanpu Road Bridge, a discharge pipe could be seen discharging and by 10:25 am the water level in the Louxia River had returned to its original level.

Sediment Sampling

On the morning of June 23rd, 2013, the water in the river was foul smelling and was flowing slowly to the east. On arriving at the Tongxin north pumping station the north pumping station was discharging wastewater into the Hanpu River. A worker in the Tongxin north station said that there were a number of enterprises on the banks of the Louxia River that discharge into it, including Unimicron.

At 4:15 pm Tongxin north station unexpectedly started working and the water level dropped by about 50 cm. Staff from Lv Se Jiang Nan rowed a small dinghy out to under Hanpu Bridge where they took a sediment sample. The sediment in the river was inky black and smelt so bad it stung the nostrils.

The level of pollution was staggering

The sediment sample was sent to ALS Analytical Testing Co., Ltd. for testing and Lv Se Jiang Nan received the results eight days later.

The results showed that the level of copper in the sediment was over 21600 mg/kg, nickel was 797 mg/kg and chromium was 223 mg/kg.

Table 5. Sediment sample from Louxia River

Sample	Copper mg/Kg	Nickel mg/Kg	Chromium mg/kg
Sediment from the Louxia River	21600	797	223
NOAA Sediment Quality Standard ERL Values ¹⁷	34	20.9	81
NOAA Sediment Quality Standards ERM Values	270	51.6	370
Yangtze River Sediment Quality Standards Level I ¹⁸	35	35	65
Yangtze River Sediment Quality Standards Level II	65	55	115
Yangtze River Sediment Quality Standards Level III	150	75	250
Yangtze River Sediment Quality Standards Level IV	250	100	600

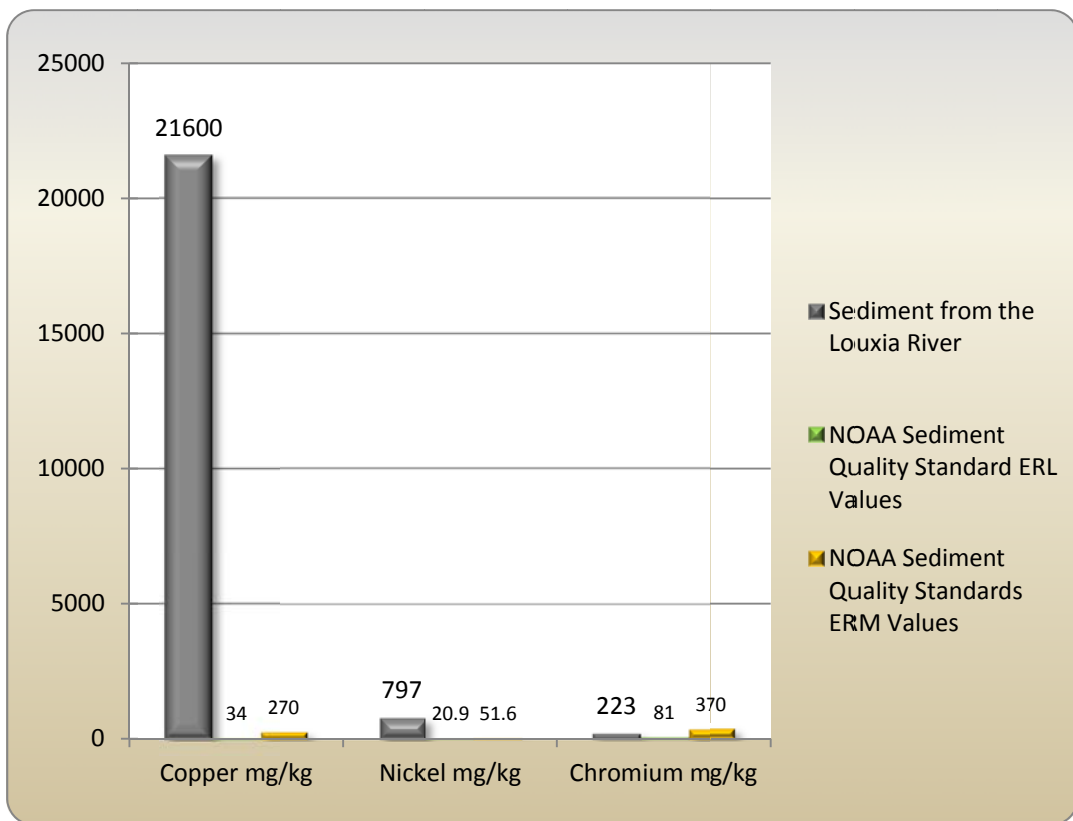


Figure 17. Results of sediment samples taken from the Louxia River

According to the results of the testing done by ALS, the level of copper in the sediment was 80 times over the NOAA sediment quality ERM value and nickel was over the NOAA sediment

¹⁷ Sediment Quality Guidelines developed for the National Status and Trends Program

¹⁸ Liu Cheng, Wang Zhaoyin, He Yun, Investigation into Water quality Standards of Sediment Deposition, Sediment Research, 2005.

quality ERM value by 15 times, meaning that the probability of toxicity effects was very high. Furthermore, both copper and nickel values were well in excess of the Level IV background value, which shows that the sediment is severely contaminated. The level of chromium in the sediment was also above the background Level II value which means there has been an accumulation of heavy metals in the sediment.

3.2.2 Finding the source of the discharge

There are four enterprises on the banks of the Louxia River and the Hanpu River. They are Unimicron, Complex Interconnector Electronics, Sino Silicon and Kaida Electronics. For their locations please see the picture below.



Figure 18. Factories and communities on the banks of the Louxia and Hanpu Rivers

Sino Silicon is engaged in the refining of silicon and the manufacture of silicone chips and silicon crystals, as well as other ancillary products. Kaida Electronics mainly produces enclosures for electronics products. There is no way that the discharge from these two factories would produce high concentration copper and nickel pollution. Both Complex Micro Interconnection and Unimicron manufacture printed circuit boards, the main pollutants from which are copper and nickel.

Unimicron is operating on a much larger scale to Complex Micro Interconnection Co., Ltd. with a factory area around 2.5 times greater than Complex Micro Interconnection and five times more staff. In 2010 Unimicron had the second biggest production volume of hazardous waste in the whole of Kunshan. For these reasons investigations were focused on Unimicron.

Unimicron was established in 1998 and is located at No. 168 Xiaolin Road, Kunshan, Jiangsu Province. The initial investment in the factory was USD82 million and total investment has now reached more than USD200 million. The surface area of the factory site is 100,000m² and there are over 4500 people working there. The PCBs and HDI products manufactured at the factory are used in a wide range of products including network communication devices, personal communication devices, mobile phones and automobiles.

Location

From satellite pictures it is possible to see that Unimicron and Complex Interconnector are located in the same area together with a kindergarten, and community and residential areas. The only thing separating Unimicron from the Huayuan Residential Community on the river bank to the east, and about 100m away, is the Hanpu River. The back wall of the factory separates it from Complex Interconnector and to the south is an up market residential community across the road at a distance of no more than 100m. To the west of Unimicron lies the Tongxin Creek, to the north is the Louxia River, and to the east is the Hanpu River.

Poor Record

During the report we saw that Unimicron had a very poor record and had been the subject of complaints from local communities. For details of the records and visits made to the area please see appendix 1.

4. Polluting Enterprises Refuse to Respond

4.1. Letters sent to Foxconn, Unimicron and other enterprises

On July 15th and 16th 2013, Lv Se Jiang Nan wrote to Foxconn, Unimicron, Complex Micro Interconnection, and Sino Silicon to address issues such as surrounding water body pollution and community complaints.

In the letters to Foxconn and Unimicron, Lv Se Jiang Nan mentioned that, through their investigations, the water bodies around the factories had been found to be severely contaminated. Meanwhile, there were poor environmental records associated with the two enterprises. Lv Se Jiang Nan hoped that the companies would provide public statements explaining their problems with wastewater discharge and how they had corrected their poor environmental records. They also hoped that the companies would publish their emissions data.

4.2 Lv Se Jiang Nan recorded the process

July 15th, 2013

At 5:00 pm, Lv Se Jiang Nan's went to Foxconn (Kunshan) Computer Connector Co. located on Kunshan Beimen Road with the letter. However, they were turned away by security who said that they were not responsible for receiving mail and suggested they deliver it to their Huanqing Road location.

At 5:10 pm, Lv Se Jiang Nan went to Foxconn Group's Honhai Precision Mould (Kunshan) Co., Ltd. on Huanqing Road and were also turned away.

At 5:25 pm, Lv Se Jiang Nan went to Kunshan Sino Silicon Technology Co., Ltd. on Hanpu Road, where the doorman indifferently rejected their letter.

At 5:35 pm, Lv Se Jiang Nan arrived at Complex Micro Interconnection (Kunshan) on Hanpu Road. The doorman reluctantly signed to show receipt of the letter.

At 5:50 pm, Lv Se Jiang Nan arrived at Unimicron (Kunshan) Electronics and were turned away by security.

July 16th, 2013

At 10:40 am, Lv Se Jiang Nan emailed Foxconn Technology Group. The email was successfully delivered.

As of the time of publication Lv Se Jiang Nan had not received any response from the enterprises.

5. Who is buying from these enterprises?

According to public information, Unimicron and Catcher Technology both have supervision records and are both suspected of supplying to HTC.

5.1 HTC Profile

HTC, High Tech Computer Corporation, was founded on May 15th, 1996 in Taoyuan County, Taiwan. The company's registering capital was 8.177 billion NTD. The company's revenue in 2009 was 144.881 billion NTD, approximately 4.7 billion USD and on April 7th, 2011, the total

market value of HTC reached 33.8 billion USD.

5.2 More local HTC suppliers with poor records

Through further investigation environmental organizations found out that in addition to Unimicron, some other suspected suppliers to HTC, such as Silitech Technology (Suzhou) and Catcher Technology and Catcher Topo also had pollution problems which have affected the lives of local communities (for more information please see appendix 2). Lv Se Jiang Nan also wrote to Silitech Technology (Suzhou), Catcher Technology (Suzhou) and Catcher Topo but have not received any response.

5.3 HTC refuses to respond

On November 3rd, 2011, environmental organizations initiated a conversation with HTC to address the environmental problems associated with HTC's suspected suppliers and requested HTC acknowledge that they understand these problems and what they have done to resolve them.

On November 7th, 2011, environmental organizations received a series of auto replies, but no detailed response from HTC.

On April 18th, 2012, environmental organizations reached out to HTC again to request that they explain the environmental problems in their supply chain and how they are going to resolve those problems. HTC has still not responded.

On July 16th, 2013, for the third time, environmental organizations sent out a letter to HTC but received nothing but auto replies.

5.4 32 brands have already responded, pushing hundreds of suppliers to make rectifications

Companies such as Apple, Samsung and Canon have made improvements since the publication of the Phase VI IT Industry Report. Many companies have made efforts to push forward the rectification process of hundreds of their suppliers. (Detailed information can be found at IPE's Brand Assessment Chart for 33 IT brands.¹⁹)

¹⁹ http://www.ipe.org.cn/En/alliance/new_sc.aspx?pid=004

Table 6. IT Industry Brand Assessment Chart

Buyer Name	Replied to NGO Letter and Checked the Purpose of the Study	Checks on Supplier Violation Cases	Use Public Information to Enhance Supply Chain Management	Push Suppliers to Make Corrective Action and Disclose Information		Further Extension of Environmental Management into the Supply Chain	
				Corrective Action and Explanation	Regular Disclosure of Discharge Data	Directly Extended Management to Main Materials Suppliers	Pushing Level 1 Suppliers to Manage Level 2 Suppliers
Apple Inc.	√	√	√	√	x	√	x
Siemens	√	√	√	√	√	x	x
Hewlett-Packard	√	√	√	√	x	√	√
Microsoft	√	√	√	√	x	x	x
Panasonic	√	√	√	√	x	x	x
Nokia	√	√	√	√	x	√	x
Vodafone	√	√	√	√	x	x	√
Philips	√	√	√	√	x	√	x
Alcatel-Lucent	√	√	√	√	x	x	x
Sony	√	√	√	√	x	x	x
Samsung	√	√	√	√	x	x	x
BT	√	√	√	x	x	x	√
Sanyo	√	√	√	√	x	x	x
Dell	√	√	√	√	x	x	x
Cisco	√	√	√	√	x	x	x
Foxconn	√	√	√	√	x	x	x
Hitachi	√	√	√	√	x	x	x
Lenovo	√	√	√	x	x	x	x
Motorola	√	√	√	x	x	x	x
Toshiba	√	√	√	x	x	x	x
Canon	√	√	√	x	x	x	x
Sharp	√	√	√	x	x	x	x
Intel	√	√	√	x	x	x	x
Seiko Epson	√	√	√	x	x	x	x
Haier	√	√	x	x	x	x	x
BYD	√	√	x	x	x	x	x
TCL	√	√	x	x	x	x	x
Sing Tel	√	√	x	x	x	x	x
IBM	√	√	x	x	x	x	x
LG	√	√	x	x	x	x	x
Ericsson	√	√	x	x	x	x	x
RIM-BlackBerry	√	√	x	x	x	x	x
HTC	x	x	x	x	x	x	x

It is worth mentioning that in addition to HTC, other brands suspected of buying products from Unimicron include Panasonic²⁰, Nokia, Sony, Apple and Samsung. Out of these brands, Apple and Samsung have been pushing their suppliers and making progress; Panasonic, Nokia and Sony have also started to communicate some of the problems in their supply chains.

As one of the buyers of products made at Unimicron, the Environmental Safety Department of Samsung China's headquarters sent them information such as the report, "Notice on Improvements to Environmental Violations".²¹

Out of the 33 IT brands that the Green Choice Alliance made contact with, HTC is the only one that has failed to respond.

6. Consumers need to make Green Choices to help us protect the Taihu Basin

The investigation has shown that the willful discharge from some IT enterprises has caused serious pollution in parts of the Taihu Basin. We hereby appeal to government, corporations, and the public for cooperation in pushing polluting enterprises to save energy, reduce their emissions, and clean up their pollution.

● Supervision Authorities

We appeal to local environmental authorities to strengthen their control over the electronics industry in the Taihu Basin, contain corporations' excessive discharge volumes, and push polluters to clean up heavily polluted water bodies.

We appeal to local environmental authorities to expand the disclosure of pollutant source monitoring information, according to the State Council's newly issued, "Current Focus of Government Information Disclosure Work" and the Bureau of Environmental Protection's "Notice Regarding Strengthening of Information Disclosure of Pollutant Sources and Environmental Monitoring Data", to realize the full disclosure of supervision information, online monitoring data, emission data, and Environmental Impact Assessment data.

● Corporations

²⁰ Panasonic sent IPE a statement in August 2013, stating that they had terminated their contract with Unimicron on February 19th, 2011.

²¹ In May 2013, the Environmental Safety Department of Samsung China's headquarters provided the report, "Notice on Improvements to Environmental Violations" from 40 suppliers in Guangdong, Jiangsu, Zhejiang, Hebei, Shanxi and Shanghai. They provided the report as well as supporting pictures. All the information can be found on IPE website.

We appeal to the world's major IT brands who purchase large volumes from the Taihu Basin to pay attention to the serious impact that the manufacturing processes in their supply chain brings to the local environment and communities. We hope that through cooperating with stakeholders they will push for emissions reduction in their supply chains and make use of increasing opportunities provided by China's ever expanding environmental information disclosure.

We appeal to IT industry suppliers to strictly comply with environmental regulations, improve their environmental management practices, and respond in a timely fashion to community complaints and queries from environmental organizations. We also call on them to reduce their emissions, clean up any pollution that they have caused, and fulfill their corporate environmental responsibilities.

- **Consumers**

HTC is a major cell phone brand which sells to a large group of consumers. Corporations such as Foxconn and Unimicron provide production outsourcing for many global IT brands. We believe consumers of HTC products, and products from other brands, do not want to see their fashionable electronic devices be the reason for pollution in the Taihu Basin.

We propose that consumers who buy HTC products express their demands to the HTC brand. As HTC's most important stakeholders, consumers can, if they clearly express their wishes, provide motivation for HTC to improve environmental management practices in its supply chain.

The objective of revealing Foxconn and HTC's disregard for environmental pollution is not to destroy these brands. We hope to encourage Foxconn and HTC to strengthen their environmental management, and change from a brand polluting the Taihu Basin, to a positive force in promoting emissions reduction.

For the preservation of the precious water resources in the Taihu Basin, for the health of the environment and the public, please appeal to Foxconn and Unimicron! Please appeal to HTC!

Appendix

Other Problems in HTC's Supply Chain

Case Study 1

Suspected Supplier – Catcher Technology

Catcher Topo (Suzhou) Co., Ltd.

Catcher Technology (Suzhou) Co., Ltd.

Case Study 2

Silitech Electronic (Suzhou) Co., Ltd.

To see the full appendix please refer to the Chinese report which can be found here:

http://www.ipe.org.cn/Upload/ipe_报告/IT_7_20131112.pdf