SHANGHAIED?
HOW THE COMMERCIAL VALUE OF ELECTRONIC WASTE HAS DETERRED EFFORTS TO REGULATE ITS MOVEMENT FROM THE UNITED STATES TO CHINA
THE RESULTING IMPACT ON THE CHINESE ECONOMY AND ENVIRONMENT*
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ABSTRACT

This article explores the legal and economic issues complicating the transboundary regulation of electronic waste (eWaste) generated in the United States, exported extraterritorially under the guise of commerce, and disposed of improperly in China. The economic issues stem from the commercial value of used electronic products on the Chinese market; notably the practical value of reusable electronic equipment and the material value of reclaimable resources found within used electronic products (e.g., copper, aluminum, iron, plastics, and steel). The legal issues stem from international and national policies designed to facilitate the transboundary movement of commerce between nations of the world: trade policies favorable to industrialized countries such as the United States and China. Federal, international, and Chinese laws regulating hazardous materials exportation from the U.S. to China provide exemptions for the legal exportation of used electronic products intended for recycling, reclamation, and/or reuse. When these legitimately exported “products” are mishandled during

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transport or disposal, however, they are transformed – both physically and
statutorily – into a hazardous waste. The substantive environmental and human
health impacts resulting from the mismanagement of eWaste on Chinese soil have
manifested in financial losses, prompting the Central Chinese Government to take
legislative action. In 2007, China passed a law designed to fully regulate the
importation and management of eWaste and electronic products; part of a
nationwide effort to minimize the fiscal repercussions contributable to
environmental and human health deterioration. As U.S. Congress continues to
discuss our duties to other nations currently accepting our hazardous wastes,
China hopes its domestic regulations and policies are enough to control the
mounting threats posed by the mismanagement of imported electronic waste.

I. INTRODUCTION

A 10-year-old girl in the southern province of Guangdong, China,¹ is
warned by her parents to stay away from the polluted rivers in which her family
once played, their shores now covered with electronic debris. Her parents work
diligently at the local electronics dismantling shop – disassembling televisions,
computers, fax machines, cell phones, and other electronic equipment – exposing
themselves to high levels of known carcinogens while contributing to the
destruction of their local ecology, yet willing to endure both for some degree of

¹ The region of Guiyu, in the southern province of Guangdong, China, is located approximately
150 miles northeast of Hong Kong. A Google search of the town and province (“Guangdong
Guiyu”), without any reference to electronic waste, found 39 of the top 40 results pertain to
electronic waste recycling, demonstrating the significant local area impact of the industry. Guiyu
serves as a model for other regions in China impacted by the electronic waste industry. Google
financial health. Meanwhile, the girl’s American counterpart splashes in the waters of a beautiful coastline, watching large cargo ships drift off harmlessly into the distance. Like most Americans, she is unaware these ships carry electronic waste; unwanted on domestic soil, yet coveted by developing countries working to transform our waste into their products.

In 2005 and 2006, the United States Environmental Protection Agency (EPA) adopted rules designed to facilitate proper domestic management of electronic waste (eWaste) and to protect developing countries from environmental damages caused by the mismanagement of eWaste materials generated in the United States and disposed of abroad. Despite this, factions within the domestic and foreign waste management industry continue to abuse still valid exceptions to U.S. standards governing eWaste handling and exportation. Certain types of electronic waste are granted specified exceptions to

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6 Electronic waste materials excluded from some Resource Conservation and Recovery Act (RCRA) requirements include cathode-ray tubes (CRT) found in computer and television
federal hazardous waste regulations in order to facilitate legitimate recycling and encourage reuse – partly de-regulating them – allowing industrious eWaste ‘recyclers’ tremendous opportunity to take advantage of an insatiable global market for electronic materials unwanted in the United States.7 Such demand has allowed the raw material value of electronic waste as a commodity to eclipse the environmental and epidemiological costs attached to the mishandling of its toxic components on foreign soil. Most distressing to international human rights advocates and concerned Non-Government Organizations (NGOs);8 the environmental and occupational health rules that control eWaste disposal domestically are absent once these materials exit United States jurisdiction, leaving regulation to receiving countries often lacking adequate administrative structure and sanctioning powers.


7 The prolific international market for “second hand” products from developed to undeveloped countries, notably used computers from the United States to China, is valued in the billions of dollars. DAVID HUNTER, JAMES SALZMAN, & DURWOOD ZAELKE, INTERNATIONAL ENVIRONMENTAL LAW AND POLICY, p. 947 (2007).
10 Archibald, supra.
part of the government to centralize its rule—has established itself as a willing and able receiver of eWaste generated in North America, despite Chinese national and international laws prohibiting electronic waste material importation into the country. Many Chinese officials recognize the black market trade of eWaste exportation from U.S. to China does not benefit the U.S. alone; reusable ‘production’ materials – steel, other ferrous metals, precious metals, non-ferrous metals, and plastics – are reclaimed, remanufactured, and employed towards China’s industrial development. This growth, however, is also a source of decay.

Materials discarded after the reclamation process are often mishandled and left to decompose improperly, leading to debilitating local area pollution and documented human illness. Occurring in scattered provinces and villages throughout China, the haphazard nature of the electronics disassembly industry has further frustrated effective central government regulation; resulting in

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13 Electronic waste is also imported into China from Japan, South Korea, and Europe. Udani Samarasekera, Electrical Recycling Exposes Workers to Toxic Chemicals, SCIENCEDIRECT - THE LANCET, VOL. 366, ISSUE 9501, p. 1913-1914 (Dec. 9, 2005).
15 “Shantou University in Guangdong Province conducted research at an electronics dismantling site in Guiyu Town and found that all 165 children surveyed between the ages of 1 and 6 years had high lead content in their blood, while 135 of them suffered from lead poisoning, contributing to varying degrees of brain damage [emphasis added].” Feng, supra.
unfettered dispersion of leftover plastics, metals, and other toxic elements into the environment.¹⁶

Due to Chinese laws banning its importation, foreign eWaste must be smuggled into China, generally through the following channels: shipping containers mislabeled as ‘reusable electronic products’,¹⁷ mixed with legitimate scrap metal imports;¹⁸ or, trafficked through bought customs officers in Hong Kong, Taiwan, and mainland China.¹⁹ The evolution of domestic Chinese environmental law, however, indicates that the practice of clandestinely accepting dangerous waste materials from foreign states may itself soon be disposed.

In response to new laws regulating eWaste management,²⁰ exorbitant costs of environmental degeneration,²¹ growing public exposure to appalling industry harms,²² and enhanced state environmental protection powers,²³ Chinese officials

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²² Embarrassed Chinese officials rushed to Guiyu this year to try to clean up the mess and place it out of sight. Authorities effectively made Guiyu off limits to foreign reporters and Western diplomats without an official invitation and a guided tour that did not permit sightseeing along the toxic river. Goodman, supra, at A01.
are sensing national and international pressures to enforce eWaste importation bans currently in place. As China looks to develop its domestic eWaste recycling infrastructure\(^\text{24}\) and install the practicable eWaste management models established and implemented by the European Union (EU),\(^\text{25}\) administrators hope to gain the economic, environmental, and human health benefits attached to effective transboundary eWaste regulation.\(^\text{26}\)

Compounding the domestic inabilities of the United States and China to successfully police illegal U.S.-China electronic waste movement is limited compliance with the leading international treaty governing hazardous waste movement between nations; the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention).\(^\text{27}\) The Basel Convention establishes a notification and consent process among member countries that transport hazardous wastes to other states and requires member countries to manage and dispose hazardous wastes in an


\(^{26}\) ChinaTechNews.com, supra.

“environmentally sound manner”. It also precludes Non-Party Nations (i.e., the United States) and Party Nations (i.e., China) from transporting regulated wastes (i.e., eWaste) between one another without express agreement otherwise. As a Party Nation, China’s inability to comply with the Basel Convention lies primarily with its failed duty to effectively police eWaste importation, whereas U.S. failures to comply begin with irreconcilable domestic laws thus far preventing its ratification.

This paper investigates why current United States, Chinese, and international laws are not adequately preventing the unsanctioned transboundary movement of eWaste from the U.S. to China, and what changes must be made to impede the continued – and often illegal – overseas transport of electronic waste. The analysis focuses on how the commercial, material value of electronic waste has thus far permitted eWaste trade to circumvent otherwise binding environmental and transboundary movement regulations. This paper illuminates the health concerns stemming from unauthorized eWaste importation and disposal, and how Chinese regulatory agencies are addressing them without impeding the country’s primary directive: to build upon its role as an emerging force in world-wide commerce. Finally, it provides some examples of hitherto successful electronics management programs in the United States and the

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28 Hunter, Salzman, & Zaelke, supra, at 952.
European Union, and how these programs may transition effectively if and when implemented in China.

II. ELECTRONIC WASTE: THE ENVIRONMENTAL, CULTURAL, AND ECONOMIC PRICE OF IMPROPER ELECTRONIC WASTE MANAGEMENT IN CHINA

‘Electronic waste’ can be defined as discarded: large household appliances; small household appliances; IT (information technology) and telecommunications equipment; consumer equipment; lighting equipment; electrical and electronic tools (with the exception of large-scale stationary industrial tools); toys, leisure and sports equipment; medical devices (with the exception of all implanted and infected products); monitoring and control instruments; and, automatic dispensers.  

Initially distributed into mainstream commerce as product, discarded electronic materials are generally harmless to humans and our environment. Unwanted electronics can be reused or recycled without exhibiting any characteristics of a “hazardous waste”, thereby avoiding classification as such. During dismantling and reclamation, however, processes employed to segregate valuable components from their protective casings release toxic characteristics or create chemical by-products scientifically proven to adversely impact eWaste handlers, their environment, and those who depend upon contaminated natural

resources. At this point during the disposal process the electronic materials are physically, and statutorily, transformed from reusable products to hazardous waste.

A. The Adverse Environmental Impacts of eWaste Mismanagement and the Resulting Affect on the Chinese Economy

Without environmentally sound management disposal practices, many hazardous components, coolants, lubricants, and metals (e.g., lead, mercury, cadmium, iron, barium, and copper) found in eWaste are readily released into landfill soils and local waterways. Once discharged, these toxic materials travel through affected ecosystems – absorbed by their surroundings or consumed by microorganisms – until settling in river sediments and soils. Demonstrating the ease of this release; one EPA study concluded approximately 70 percent of the heavy metals in U.S. landfills are estimated to come from decaying or destroyed electronics discards. In Guiyu, China, wastes generated by the electronics reclamation and recycling industry have been identified as a point source of

35 The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), Exporting Harm: The High-Tech Trashing of Asia, p. 22 (2002).
persistent toxic substances in the soil, air, and water. 37 Methods utilized throughout the industry – such as stripping of metals in open acid and cyanide baths, and wire burning – generate a substantial volume of hazardous waste intentionally discharged or passively released into the nearest field or stream. 38 These rudimentary processes, while inexpensive, pose the greatest environmental and human threats due to the extreme toxicity inherent to theses processes and their inadequate regulation. 39

A major factor contributing to the contamination of local resources is the lack of administrative control over hazardous waste storage, disposal, and landfill practices throughout China. 40 Chinese laws governing landfill management of hazardous wastes have been ineffective in policing illegal land disposal of discarded electronic waste. The liners, leachate collection mechanisms, and other safeguards installed to contain leaking toxins within legitimate landfills are absent in most rural Chinese dumps, 41 facilitating the release and spread of hazardous mixtures. 42 The great volume of hazardous waste generated in China, inadequate disposal technologies, and shortage of sound facilities have contributed to a paltry

38 Cai, Leung, & Wong, supra, at 22.
41 Some high-volume industrial landfills are equipped with liners, caps, and leachate collection devices to reduce pollution, however, such facilities are not commonplace. Rose Niemi, The Economist, A Great Wall of Waste: China's Environment (Aug. 19, 2004).
21.5% landfill disposal rate for industrial hazardous wastes. Without firm administrative sanctions, a large quantity of industrial hazardous waste that should be disposed of in regulated landfills is discarded elsewhere. Substandard storage and disposal of eWaste is so well documented in China that provincial Chinese officials now restrict access to affected areas for fear of central government admonishment and public outcry.

While improperly managed eWaste threatens China’s environment on many fronts, Chinese officials, NGOs, and Chinese citizens agree that water pollution is the paramount concern. An estimated 75% of water flowing through urban areas of China is unsuitable for drinking and fishing, forcing approximately 700 million Chinese to drink contaminated water on a daily basis. Much of this contamination is attributed to unregulated township enterprises (e.g., electronics reclamation businesses, agriculture) and industrial wastewater discharges (e.g., pulp mills, dye factories, chemical plants).

Clear and present evidence of ecological destruction caused by the eWaste industry in the Guiyu Region of China is the contamination of the local drinking

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43 Compared to the 57% of industrial hazardous wastes disposed of in U.S. landfills. (As landfills are the ultimate destination for most eWaste, this analysis does not account for other methods of disposal, such as incineration, deep well disposal, or surface impoundment.) Wang, supra; and, U.S. Envtl. Prot. Agency, Summary of the EPA Municipal Waste Program (Apr. 2007), available at http://www.epa.gov/reg3wcmd/solid wastesummary.htm.
44 “Enforcement of environmental regulations is weak at the local level; companies often find it's cheaper to pay the occasional fine and keep polluting rather than clean up.” Bryan Walsh, The Middle Landfill (Nov. 17, 2003), available at http://www.time.com/time/magazine/article/0,9171,54383,00.html.
46 China's Environmental Challenges: Congressional Testimony for the Council on Foreign Relations Subcommittee on Asia and the Pacific House International Affairs Committee (Sep. 22, 2004) (statement of Elizabeth C. Economy, C.V. Starr Senior Fellow, and Director, Asia Studies).
47 Id.
and agricultural water supply.48 After only one year of eWaste industry operation, potable water is now imported from a town 30 kilometers away due to severe lead (Pb) contamination of local water sources.49 In 2005, lead in this region’s water tables was recorded to be 400 to 600 times the threshold level established by World Healh Organization (WHO) Drinking Water Guidelines.50 River sediment levels of other heavy metals commonly found in electronic waste – barium, chromium, copper, and tin – also exceeded United States’ EPA threshold standards by substantive margins.51

China is within a region of Asia comprising of naturally low-metal soils particularly sensitive to unnatural metal additions – as indicated by the effects on plant growth, soil microbial functions,52 and marine life contamination.53 One report concluded that metal pollution in Chinese rivers and lakes poisoned aquatic organisms and accumulated in fish at levels sufficient to pose a serious threat to human health.54

49 The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), supra, at 16.
50 Grossman, supra.
53 "Industrial effluents also impact coral reefs and their associated fauna and habitats. Discharge of heavy metals may give rise to elevated levels of lead, mercury or copper in bivalves and fish, or elevated levels of cadmium, vanadium and zinc in sediments. Larval stages of crustaceans and fish are particularly affected, and effluents often inhibit the growth of phytoplankton, resulting in a lack of zooplankton, a major food source for corals.” Nicolas J. Pilcher, Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak, Corals and Human Disturbance (Date Not Specified), available at http://www.unep.ch/regionalseas/main/persga/pilcher.html.
High concentrations of heavy metals in agricultural soils have noticeably retarded the growth of several significant crops in China. As a 2000 study concluded, “Rice, mung bean, and alfalfa were significantly influenced by the combined pollution of the heavy metals.”\textsuperscript{55} Anthropogenic soil pollution is evidently contributing to the contamination of arable lands, negatively impacting the nation’s cornerstone agricultural industry.\textsuperscript{56}

The agribusinesses that once dominated Guiyu – and the renewable natural resources it utilizes and supports – have been cannibalized by more profitable electronic waste recycling activities, both in the form of workforce and resources.\textsuperscript{57} The Chinese media estimates tens of thousands of migrant and local laborers are now employed by the electronic recycling industry in Guiyu, most coming from rural farming areas.\textsuperscript{58} To these workers, the humble income from farming operations does not compare to the daily wages of $2 to $4 earned dismantling discarded electronics.\textsuperscript{59}

Central Chinese officials, however, are recognizing that profits made at the expense of environmental health are not as lucrative as once thought. The environmental damages inadvertently created by the ongoing Chinese economic and industrial ‘miracle’ are beginning to manifest themselves in the form of


\textsuperscript{56} Desertification, logging, and other natural phenomena contribute significantly. Y. Cui, Wang Qingren Y. Dong, & X. Liu, \textit{Instances of Soil and Crop Heavy Metal Contamination in China}, \textit{SOIL AND SEDIMENT CONTAMINATION}, VOL. 10, ISSUE 5, P. 497-510 (Sep. 2001).

\textsuperscript{57} The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), \textit{supra}, at 15.

\textsuperscript{58} Id. at 16.

financial costs. Water pollution from improper electronic waste disposal has contributed to resource crises in many affected areas, forcing provincial officials to implement costly methods to mitigate area water shortages.\textsuperscript{60} The unit cost for resources and energy in blighted Chinese areas has been estimated to be four times the global average.\textsuperscript{61} Pan Yue, Vice Minister of China’s State Environmental Protection Administration (SEPA), characterizes water pollution as, “the bottleneck constraining economic growth in China”.\textsuperscript{62}

In 2005, China lost approximately 50\% (2.5 hectares) of its arable land nationwide.\textsuperscript{63} Despite only 10\% of its land remaining suitable for cultivation, China remains a foremost producer of agricultural goods world-wide – with agribusinesses contributing a shrinking 13\% of China’s gross domestic product (GDP).\textsuperscript{64} As the nonagricultural economy continues to grow, competition over lands, labor, and water will intensify. The fight over natural resources has forced the Central Chinese government to consider federal agricultural subsidization programs, including investment of public monies into rural infrastructure (i.e., roadways, irrigation), high-yield/high-quality seed technologies, and farm tax credits.\textsuperscript{65} The necessity of subsidizing the farming industry is converse to past

\textsuperscript{60} Natural environmental conditions (i.e., drought, weather patterns) also contribute to this problem. China Kaiser Consultancy, \textit{supra}.  
\textsuperscript{61} Id.  
\textsuperscript{62} Rose Niemi, \textit{supra}.  
\textsuperscript{63} China Kaiser Consultancy, \textit{supra}.  
governmental regimes that relied upon it to generate the majority of China’s national revenue.66

These indicators – and other contributory factors such as population increase, urban growth, drought, and weather – have lead some analysts to conclude a staggering 8-12% of China’s GDP must be reinvested towards the remediation of environmental damages.67 In 2006, an estimated $8.16 billion was spent on remedial measures such as water treatment and transfer systems, desertification and contaminated soil remediation, and waste management technologies.68 National expenses are needed to mitigate the fiscal losses attached to crop damage from acid rain, disaster relief efforts due to flooding, and costs of resource depletion; all impacted by eWaste mismanagement.69

The cloaked nature of eWaste importation enterprises, unreliable government figures, and the substantial volume of eWaste generated by China domestically70 make it difficult to calculate what proportion of these figures is directly attributable to foreign eWaste.71 Regardless, the economic price to mitigate the environmental damages stemming from unregulated sectors of the electronics reclamation industry will continue to rise as China’s natural resources continue to deteriorate.

66 Id.
67 Approximately $54 billion per year. China Kaiser Consultancy, supra; and, Rose Niemi, supra.
68 Id.
69 Id.
70 Many sources indicate China generates approximately 1.5 tons of eWaste annually.
B. The Adverse Human Health Impacts of eWaste Mismanagement and the Resulting Affect on the Chinese Economy

The human maladies associated with electronic waste components are numerous and severe, including:

- Central nervous system, circulatory system, and kidney damage – caused by lead, found in glass video display panels or cathode ray tubes (CRTs), batteries, and circuit boards; kidney and gastrointestinal (GI) tract damage – caused by cadmium, found in chip resistors and semiconductors; brain damage – caused by mercury (MCE), found in thermostats, circuit boards, batteries, and mobile phones; probable DNA damage and links to asthmatic bronchitis – caused by hexavalent chromium, used to protect against corrosion of untreated steel; probable endocrine disrupter, and cancer risk to the digestive and lymph systems – caused by brominated flame retardants, found in circuit boards and plastic covers; skin poisoning, kidney and central nervous system complications – caused by arsenic, found in many processors and monitors; and dioxins, which have been shown to facilitate cell mutation and cause cancer – created by plastics or polyvinyl chloride (PVC), found in most electronic equipment today and posing a significant recycling challenge due to the variety of types used in most products.

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72 Portions of this epidemiologic analysis are derived from previous, unpublished work conducted by the author on the health effects of eWaste exposure.


74 Plastic components average 13.8 pounds per computer. Silicon Valley Toxics Coalition, supra.
Humans are exposed to these toxins directly via personal handling, and indirectly via steady absorption and dissemination from their surrounding environment.

The “primitive” workplace conditions rampant throughout the electronics dismantling industry in China are the principle factor leading to direct human exposure to hazardous internal eWaste components. The clandestine and decentralized nature of the industry has enabled much of the dismantling to take place in homes or private workshops ill-equipped for industrial work. This lack of administrative oversight has lead to documented contamination within the homes of those – men, women (pregnant or otherwise), and children – involved in the eWaste disassembly and recycling trade.

In addition, the design of contemporary electronics makes disassembly particularly manual labor-intensive, requiring workers to spend extended periods of time without respiratory, eye, or skin protection; inhaling and absorbing toxic materials in order to retrieve valuable components. The removal of electronic components from printed circuit boards by heating over a grill, chipping and melting plastics, and recovering metals by burning cables and parts – all without proper ventilation or respiratory protection – are common practices. In most eWaste industry-dominated towns, inhabitants are so accustomed to the smell of burning plastics they are able to distinguish which

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76 The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), supra, at 16.
77 Id.
78 “Almost every piece of equipment is different,” says Greg Sampson of Earth Protection Services, a national electronics recycler. Elizabeth Grossman, supra.
80 Id.
type of plastics are burned at any given time. According to recent reports by the state-controlled Guangdong Radio and the Beijing Youth newspaper, residents of the region are suffering high incidences of birth defects, infant mortality, tuberculosis, and blood diseases. Inhalation, absorption, and ingestion of heavy metal dusts, acid bath and concentrated solution vapors, and smoke from burnt plastics and other toxins, have caused noted medical problems in children, such as breathing ailments, skin infections, and stomach diseases. Cases of leukemia, a blood and bone marrow cancer, are also on the rise in Guangdong.

Compounding the environmental and human concerns is the lack of occupational controls protecting Chinese workers from exposure to hazardous eWaste constituents at the workplace. This is not due to lack of information. The Chinese Labour Bulletin (CLB), a strong advocate for the occupational protection of high-tech industry employees, has sent numerous letters to Chinese government departments, including the Ministry of Health, the Beijing Department of Labour and Social Security, and the State Administration of Work Safety, as well as to the All-China Federation of Trades Unions (ACFTU – China’s sole legally permitted labor organization) and its Beijing municipal affiliate, attempting to bring attention to the inhumane working conditions

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82 Goodman, *supra*, at A01.
83 Zong Wei Cai, Anna Leung, & Ming Hung Wong, *supra*, at 31.
84 Id.
85 "It's because of the recognized dangers of handling these components that E-recycling is more costly in the first world, and this is why the bulk of electronic waste is shipped to the developing world.” Terence Chea, Associated Press, *American Electronic Waste Contaminates China and India*, MINES AND COMMUNITIES WEBSITE (Aug. 17, 2005), available at http://www.minesandcommunities.org/ Action/press708.htm.
endured by eWaste disassembly workers.\textsuperscript{86} Despite a Medical Sciences College of Shantou University study revealing that 88 percent of eWaste reclamation employees suffered from skin diseases or had developed neurological, respiratory or digestive ailments, and Greenpeace China reports that the majority of workers they spoke to in Guiyu complained of these and other illnesses, much of the industry continues without proper occupational health controls.\textsuperscript{87}

While the direct exposures to eWaste toxins are alarming, indirect environmental exposure may pose more long-term health risks. After heavy metals are released from disposed and deteriorating electronics, they are ingested by microorganisms or absorbed into the environment, ultimately accumulating in larger predatory species. This ‘bioaccumulation affect’ occurs when toxins accumulate more rapidly than they are expelled from an organism, causing heavy metals – particularly mercury – to increase in concentration levels as the food chain ascends towards the top.\textsuperscript{88} A 2005 study found carnivorous fish species in South China carried the highest concentration of anthropogenic contaminants.\textsuperscript{89}

Humans can be particularly subject to high mercury concentrations and exposure. U.S. Food & Drug Administration (FDA) studies indicate that levels of mercury may reach maximum concentrations allowed by the FDA by the time

\textsuperscript{86} Id.
\textsuperscript{87} Id.
they reach our bodies. Bioaccumulation of toxic pollutants has been observed in human breast milk as a result of eating contaminated fish from Chinese waterways polluted by the electronic waste industry.

Human absorption of heavy metals found in soils can occur through ingestion of crops grown on contaminated lands. Some crops are able to dissipate or expunge soil contaminants; however, rice seems to transmit absorbed pollutants readily. A 2003 Chinese soil study reported that “rice grown in paddy soils contaminated with cadmium, chromium, or zinc may pose a serious risk to human health, because from 24 to 22% of the total metal content in the rice biomass was concentrated in the rice grain.” Another Chinese study concluded that lead absorption in rice paddies contributed to daily lead intakes by local residents at levels much higher than allowable, posing a potential health risk to the local population.

With these concerns in mind, local Chinese officials are beginning to take some measures to properly protect their local economy, environment, and citizens. Similar to the promulgation of more controlling environmental regulations in order to off-set fiscal losses, the economic impact from human absorption of metals is a significant concern for local authorities.

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91 Cai, Leung, & Wong, supra, at 22 (citing China SEPA, Building the Capacity of the People’s Republic of China to Implement the Stockholm Convention on POPs and Develop a National Implementation Plan, GEF Project Brief (GF/CPR/02/010) (2003)).
92 Qing-Ren Wang, Peter Christie, Yan-Shan Cui, Yi-Ting Dong, Xiu-Mei Liu, Soil Contamination and Plant Uptake of Heavy Metals at Polluted Sites in China, JOURNAL OF ENVTL. SCIENCE AND HEALTH, PART A, VOL. 38, ISSUE 5, P. 823-838 (May 2003).
injuries attributed to eWaste mismanagement has helped prompt government action. Throughout the Chinese workforce, escalating health care costs and work hours lost to employee illnesses have initiated efforts to enforce environmental and occupational health and safety standards.\textsuperscript{95} As part of a provincial effort to regulate the electronics reclamation industry, local government officials in Guangdong urged private eWaste workshops to relocate into a subsidized industrial park.\textsuperscript{96}

Though some of the eWaste labor force is benefiting from a cleaner working environment, this regulation also appears to be driven primarily by economics. Taxes on eWaste businesses provide eWaste region officials with a large percentage of regional commercial and industrial taxes.\textsuperscript{97} In Guiyu, eWaste businesses generate millions in revenue every year,\textsuperscript{98} with the import of every 10,000 tons of eWaste providing 1,000 jobs in China, saving 1.2 million tons of raw materials, and creating 10 million watts of electricity.\textsuperscript{99}

Another benefit to regulation: by enforcing uniform standards, consolidating operations, and attempting to restrict the number of independent workshops, regional officials are now eliminating competition and tightening their control on the industry.\textsuperscript{100}

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\textsuperscript{95} Significantly contributing to the respiratory problems of Chinese workers; about 80% of Chinese households and nearly all rural homes depend on solid fuels such as coal, wood, and crop residues for cooking and heating. Rose Niemi, supra.

\textsuperscript{96} Zhan Lisheng, supra.


\textsuperscript{98} Id.

\textsuperscript{99} Wang, supra.

\textsuperscript{100} Zhan Lisheng, supra.
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The lower labor costs,101 lack of proper occupational health and safety enforcement in China,102 and tremendous revenue generated by the eWaste industry in China103 continue to attract foreign eWaste dealers. Even with the costs of improving infrastructure and refurbishing workplace conditions, electronic waste recycling in China remains much more profitable than in the U.S. The gap in recycling costs between the United States and China is the primary reason why electronic waste recycling operations seek to export their eWaste to China. The Chinese, international, and U.S. laws governing this enterprise are the primary reasons they can.

III. ELECTRONIC WASTE EXPORT REGULATION IN THE UNITED STATES

“All individuals we interviewed believed that the United States is lagging behind international efforts in eWaste regulation.”104 This excerpt, from a 2004 U.S. EPA audit, reveals a primary cause of China’s eWaste ‘problem’: incomplete eWaste export regulation in the United States. Tags and labels on illegally disposed eWaste in China identify American corporations, retailers, universities,

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101 Workers in Guangdong Province earn on average $65 per month. Chinese workers also accomplish the same tasks as American workers, yet without the costs of proper personal protective equipment, overtime pay, health insurance, and other employment benefits provided in the United States. Associated Press, *TAIPEI TIMES, Poor Working Conditions Plague Guangdong* (Feb. 5, 2005).


103 “According to the International Association of Electronics Recyclers, the eWaste exportation business now generates about $700 million annually in the U.S. and is increasing steadily, with profits coming from the sale of materials recovered or by selling equipment or components to those who will do so. There’s also a speculative aspect to the business, especially when the scrap metal market is booming and the value of recyclable circuit boards increasing -- it reached an all-time high in January 2006 at $5,640 a ton.” Grossman, *supra*.

school systems, and government agencies as previous owners. At some point during the export, transport, recycling, and disposal process, a significant portion of electronic materials classified as viable product leaving the U.S. end up as hazardous waste in China.

Federal regulation and judicial oversight of eWaste management and exportation are governed by three main authorities: (1) Resource Conservation and Recovery Act of 1976 (RCRA); (2) Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); and, (3) the Commerce Clause of the United States Constitution. These authorities – successful in protecting domestic environmental and commercial interests – do not adequately protect foreign states lacking their own effective eWaste industry regulation. U.S. jurisdiction over electronic waste is designed to ensure environmentally sound management of wastes from “cradle-to-grave”. As evidenced by the mishandled American eWaste in China, U.S. laws often stop at “cradle-to-border”.

A. Electronic Waste Regulation Under RCRA: An Exempted Hazardous Waste

Congress enacted RCRA in 1976 to establish comprehensive federal regulations that would govern the entire hazardous waste arena, limit generation,

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105 Hewlett-Packard, IBM, K-Mart, Xerox Corp., San Francisco State University, Los Angeles Unified School District, and U.S. Defense Intelligence Agency identification markings were found on improperly disposed eWaste in China. Karl Schoenberger, supra.
106 42 U.S.C.A. §§ 6901, 6921-6939 (b) (2006) (requires proper hazardous waste management from generation (i.e., “cradle”) through transport to storage, treatment, or disposal (i.e., “grave”)).
and facilitate the environmentally sound handling of hazardous wastes.109 There is currently no federal electronic waste program in the traditional sense of eWaste-specific proscriptive laws, enforcement resources, and offices,110 however, eWaste falls under RCRA jurisdiction because of its intrinsic hazardous components. Due to their toxicity and leaching capabilities, lead, mercury, chromium, and cadmium – all integral components of electronic materials – are listed under the RCRA hazardous waste identification system,111 triggering RCRA regulation of waste electronics.

1. Electronic Waste Exemptions Under RCRA

Notwithstanding the legitimate environmental bases for strict federal oversight of all sectors involved in eWaste management, electronic waste generated by households and qualified small generators is exempted from full regulation. In addition, two types of eWaste are granted exceptions under the RCRA regulatory umbrella to streamline and promote recycling: cathode ray tubes (CRTs) that comprise most computer and television monitors; and, mercury-containing equipment (MCE) found in many switchboards and circuit boards.112

109 EPA is delegated a variety of research, monitoring, standard setting, and enforcement activities related to pollution abatement and control to provide for the treatment of the environment as a single interrelated system. 40 C.F.R. § 1.3 (1997).
110 Electronic waste is not explicitly regulated as hazardous waste at the national level. However, RCRA Subtitle C was established to ensure that all hazardous waste is managed in a manner that is protective of human health and the environment. U.S. Envtl. Prot. Agency, Office of Inspector Gen., Evaluation Report, Multiple Actions Taken to Address Electronic Waste, But EPA Needs to Provide Clear National Direction, REPORT NO. 2004-P-00028 (Sept. 2004).
a. Household and Small Generator Exemptions for Electronic Waste

Under RCRA, household\textsuperscript{113} and small generators\textsuperscript{114} of electronic waste are exempted from complying with many hazardous waste storage, export, and disposal regulations. Although wastes generated by these entities could technically classify as hazardous, they are granted exemption due to the impracticability of EPA to regulate the output from every household and small business in the United States.\textsuperscript{115} This exemption has allowed generators to lawfully manage eWaste as municipal solid waste, or garbage, instead of a hazardous waste.\textsuperscript{116}

In 2000, an estimated 2,341,750 tons of eWaste – 16.16 pounds per capita – was generated by U.S. consumers.\textsuperscript{117} Very rough calculations conclude households and small businesses generate approximately 1,170,875 tons of eWaste per year.\textsuperscript{118} These figures indicate over 1,000,000 tons of eWaste could be managed domestically as garbage, without federal government oversight. This

\textsuperscript{113} 40 C.F.R. § 261.4 (b)(1) (1980).
\textsuperscript{114} A generator is considered “conditionally exempt” from otherwise applicable RCRA hazardous waste laws if it generates less that 220 pounds of hazardous waste in a calendar month; provided that prescribed generation, storage, and handling requirements are satisfied. 40 C.F.R. § 261.5 (a)(b) (2003).

Electronic waste generated by non-exempted entities (i.e., those that generate more than 220 pounds of hazardous waste per calendar month, see Footnote 114) cannot be classified as “municipal waste”, and is therefore not calculated into municipal solid waste percentages. If eWaste from non-exempted generators was included into these percentages, household and small quantity generation percentages would be lower. \textit{Author’s Note}. 

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realization, coupled with prolific volumes of eWaste clogging and polluting landfills, has forced individual states to take action.

Seven states have banned eWaste disposal in landfills, including eWaste generated by households and small businesses. Such state action may have only worsened the eWaste problem in China. Along with the high fees charged by legitimate eWaste recyclers, these bans have forced eWaste generators and dealers to look elsewhere for their eWaste disposal needs. Recyclers charge these fees because their costs to recycle exceed the revenue generated by selling recycled commodities or refurbishing units in the United States. Professional eWaste handlers are passed the costs of these financial and statutory disposal restrictions, forcing them to explore alternative methods of eWaste disposal, such as transboundary exportation.122

b. Exemptions for Specified Electronic Waste Materials

Regardless of who generated it, CRT and MCE that textually fall under RCRA are granted regulatory exception by EPA for the following reasons: to promote authorized recycling;123 to combat the alarming rate of generation124 and

120 Legitimate eWaste recyclers in the United States may charge generators up to $30 to take their unwanted eWaste. The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), supra, at 8.
121 “It was further underscored by our interviews with eight electronics recyclers, who were unanimous in emphasizing that they could not cover costs without charging fees.” U. S. GOV’T ACCOUNTABILITY OFFICE (GAO) REPORT TO CONG. REQUESTERS, ELECTRONIC WASTE: Strengthening the Role of the Federal Government in Encouraging Recycling and Reuse, GAO REPORT GAO-06-47, P. 3 (Nov. 2005).
massive volume;\textsuperscript{125} the (debated) improbability of toxics release into the environment;\textsuperscript{126} and, its valuable reclamation properties – both as reusable electronics and recoverable raw components.\textsuperscript{127} The objective of such exception is to facilitate productive management of prevalent waste streams by ensuring they are handled properly without any release into the environment.\textsuperscript{128} As outlined in the Federal Registrar, the primary condition for exemption requires handlers to ensure eligible eWaste materials are properly handled and recycled from cradle to grave.\textsuperscript{129} For example, to contain the release of any hazardous constituents, broken monitors must be labeled,\textsuperscript{130} stored,\textsuperscript{131} and transported in sealed containers\textsuperscript{132} according to EPA guidelines.

CRT and MCE, because of their different characteristics and hazards, are granted two different exemptions under RCRA.\textsuperscript{133} In response to concerns that


\textsuperscript{126}Though large quantities of lead in landfills have been directly traced to CRTs, it has been argued that the lead is not readily released from glass monitors without pulverization or high heat. Because of their high value, copper and other valuable metals are usually removed completely before disposal of the remaining electronic materials. Electronic Mail Interview with Zac Appleton, Project Officer, E-Waste Point of Contact, U.S. Envtl. Prot. Agency, Region 9 (Mar. 26, 2007).


\textsuperscript{128}Id.


\textsuperscript{130}40 C.F.R. § 261.39(a)(2) (2007).


\textsuperscript{133}CRT fall under the Conditional Exempt Model, whereas MCE are governed under the Universal Waste Rule. Both programs are regulated under RCRA. Hazardous Waste Management System; Modification of the Hazardous Waste Program; Cathode Ray Tubes and Mercury-
the existing CRT rule was insufficient in protecting receiving (developing) countries, \textsuperscript{134} EPA activated new rules in January, 2007, governing CRT exportation by requiring: detailed exporter information; \textsuperscript{135} notification to the EPA; \textsuperscript{136} mode of transport; \textsuperscript{137} name of receiving recycler; \textsuperscript{138} points of entry into importing countries; \textsuperscript{139} manner in which the eWaste will be recycled; \textsuperscript{140} and, most importantly for the purposes of this paper, consent from the receiving country to import CRT. \textsuperscript{141} Without written consent to the EPA from the receiving country’s proper authorities, the required “Acknowledgement of Consent to Export CRTs” will not be issued to the applicant eWaste exporter, and the exportation is precluded under RCRA. \textsuperscript{142}

The rules governing MCE disposal also provide modified storage, transport, and collection standards than would otherwise be applicable under RCRA. \textsuperscript{143} MCE exports require much of the same exporter/importer mandates applicable to CRT, \textsuperscript{144} including EPA “Acknowledgement of Consent to

\begin{itemize}
\item [\textsuperscript{134}] “These commenters argued that our proposed rule would exacerbate the effects of market dynamics, lack of existing regulatory controls, and the absence of a domestic recycling infrastructure and would increase the amount of electronic waste that is shipped abroad and managed inappropriately.” Hazardous Waste Management System; Modification of the Hazardous Waste Program; Cathode Ray Tubes, 71 Fed. Reg. 145, 42927-42949, 42938 (July 28, 2006) (to be codified at 40 C.F.R. pts. 9, 260, 261, and 271).
\item [\textsuperscript{135}] 40 C.F.R. §§ 261.39(a)(5)(i)(A) & (F) (2007).
\item [\textsuperscript{139}] 40 C.F.R. § 261.39(a)(5)(i)(D) (2007).
\item [\textsuperscript{141}] 40 C.F.R. § 261.39(a)(5)(v) (2007).
\item [\textsuperscript{142}] In addition to these conditions, CRT exporters must also comply with the packaging, labeling, and speculative accumulation requirements, and a one-time notification requirement for used CRTs exported for reuse (citing 40 C.F.R. § 261.41 (2007)). 40 C.F.R. § 261.39(a)(5)(v) (2007).
\item [\textsuperscript{144}] 40 C.F.R. § 273.20(a) (2007).
\end{itemize}
Export”, and consent from the receiving country of acknowledgement to receive eWaste. Under the written rules, transboundary eWaste exportation requirements should be clear to both eWaste exporters and the administrative agencies charged with their enforcement. As stated by one EPA officer, “If a business exports for recycling or reuse eWaste and follows through with its compliance requirements for the EPA and others, it technically isn’t ‘illegal’.”

Compliance issues arise when potential loopholes are opened by allowing some electronic waste materials to be exempt from some regulations. As stated in Exporting Harm, “The concept of pretending a material is not hazardous simply because it’s being recycled is an unscientific, dangerous policy and in fact, is a uniquely North American one.” While these exemptions normally achieve their designed objectives on a domestic level, they inadvertently facilitate unintentional and intentional transboundary eWaste movement.

2. Electronic Waste Exportation: Exemption and Exploitation on the Way to China

The economics of domestic versus foreign eWaste recycling clearly encourage overseas exportation. By exempting the bulk of eWaste from the definition of a “hazardous waste” under RCRA, the EPA has granted too much

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146 40 C.F.R. § 273.20(b) (2007).
148 The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), supra, at 28.
149 Instead of paying $3 to $4 for proper domestic handling, eWaste dealers can sell these materials for the same amount to foreign importers. Domestic eWaste recycling businesses have cited this discrepancy as a reason legitimate eWaste recycling in the United States is underutilized (emphasis added). The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), supra, at 10.
One EPA study concluded it is 10 times cheaper to chip CRT to China than recycle domestically. Id. (citing U.S. Envtl. Prot. Agency, Analysis of Five Community/Consumer Residential Collections of End-of-Life Electronic and Electrical Equipment (Nov. 24, 1998)).
discretion to those eWaste handlers looking for the export route of least resistance. The misconceptions about categorizing waste destined for recycling have enabled brokers to classify their eWaste materials as “recyclable or reusable” products without any confirmation they are handled as such once off-loaded in the receiving country.

a. **Electronic Waste is a “Product”**

In many cases, eWaste handlers may not recognize they are in violation of federal or international prohibitions against eWaste exportation. They assume they are exporting electronic materials overseas for proper recycling, reuse, and reclamation. Without understanding that the mishandling of their exported materials in the receiving country negates the “reusable product” exemption under RCRA, misinformed dealers are unaware they are actually exporting hazardous waste materials, and not reusable products. As put by the unidentified head of a major recycling company, “You get paid to pick it up, and you get paid by people who want to take it away.”

Exporters may comply with the notification and consent processes required by EPA, but often do not follow-up to ensure environmentally sound disposal practices are employed. They may not be aware of the appropriate foreign contact procedures – which may include several independent institutions

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152 Karl Schoenberger, *supra*.
or government agencies – causing a lack of coordination on an administrative level, bureaucratic delay, and difficulties enforcing the legal requirements governing transboundary waste movement.\textsuperscript{154}

Electronic materials exported to China may actually be reused for legitimate purposes, and then discarded as hazardous waste in China after deemed inoperable. Without extensive end-of-life studies to establish the reusable qualities of most electronic components abroad, it is difficult to determine the actual viability of discarded electronics intended for reuse.\textsuperscript{155} RCRA rules are unclear as to which party is then responsible for ensuring this eWaste – technically created on foreign soil – is handled accordingly. One provision does provide, however, “\textit{Use constituting disposal: Glass from used CRTs that is used in a manner constituting disposal must comply with the requirements of 40 CFR part 266, subpart C instead of the requirements of this section.}”\textsuperscript{156} This regulation subjects exporters of electronic “products” to \textit{all} RCRA standards applicable to transporters and generators of hazardous wastes\textsuperscript{157} when such products are subsequently disposed\textsuperscript{158} – effectively retracting the CRT exemption upon discard of the CRT into a landfill. This can be read to hold eWaste generators and exporters responsible for the ultimate disposal of reusable products converted to eWaste on foreign soil. Unfortunately, as will be further discussed infra, RCRA


\textsuperscript{157} 40 C.F.R. §§ 262 & 263 (2005).

\textsuperscript{158} 40 C.F.R. § 266.21 (1994).
regulatory reach is confined to United States’ jurisdiction, effectively nullifying this provision’s powers in China.

**b. Electronic Waste Trafficking from the United States to China**

The demand for used electronics in China far exceeds that in the United States. As a result of this demand, many businesses, schools, government agencies, and authorized recyclers in the United States[^159] are solicited by foreign brokers looking to purchase their obsolete computers and televisions.[^160] Under the guise of recycling and reuse, dealers accumulate massive quantities of unwanted electronics in the U.S. through solicitation, auctions, eBay, or other surplus outlets, and resell them to brokers with intentions to export illicitly.[^161] It is apparently an industry maxim that if a broker contacts you offering to purchase used electronics, especially when informed they do not function properly, chances are it is being purchased for export overseas.[^162] Though transporters are typically indiscriminant of where the eWaste is shipped to, as long as they get paid and the eWaste disappears,[^163] industry insiders have established Chinese brokers, their biggest buyers, as their primary conduit to the eWaste trade.[^164]

Some dealers know they are toeing the regulatory line, but continue to operate despite efforts to stop them. “Things have been backed up for the past three months [due to increased enforcement efforts], and you can’t export to China now without a special connection,” said former computer programmer

[^159]: A cursory search by the author indicated there are over 400 eWaste brokers in the U.S. alone.
[^160]: Elizabeth Grossman, *supra*.
[^161]: *Id*.
[^162]: Karl Schoenberger, *supra*.
[^163]: Karl Schoenberger, *supra*.
[^164]: *Id*.
Mark Dallura, president of Chase Electronics, Inc., an electronic-scrap broker outside Philadelphia. Dallura buys discarded computers in the United States and then ships them to China via Taiwanese middlemen based in Los Angeles, saying he has been in the trade for 15 years and has not been slowed by the [international and Chinese] ban. Electronic waste exporters are willing to circumvent national and international eWaste export regulations when the profits are so high, and the risks of getting caught are so low.

Another factor compounding the difficulty of EPA to adequately enforce applicable eWaste export restrictions is the number of different entities that may play a part in the process of getting the electronics from your office to a reclamation facility in Guiyu. Several different companies – including freight consolidators at both exporting and importing ports – may be involved in the sale, processing, tracking, storage, and movement of electronic waste during commerce. In addition, nonfunctional electronic materials are mixed with reusable electronic materials and other legitimate recyclables, such as scrap metal, further camouflaging their movement.

3. **RCRA Enforcement Abroad: “Cradle-to-Border”**

Authoritative jurisprudence holds that legislation passed by Congress “is meant to apply only within the territorial jurisdiction of the United States” unless there is express Congressional intent to apply such legislation extraterritorially. The “Foley Doctrine” serves to “protect against unintended clashes between our

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165 Id.
166 Peter S. Goodman, supra, at A01.
167 Elizabeth Grossman, supra.
168 Lisa T. Belenky, supra.
laws and those of other nations which could result in international discord.”

Protecting foreign state sovereignty from intrusion of U.S. laws is the underlying rationale behind this doctrine. With this presumption against extraterritorial application of domestic laws, RCRA has thus far been precluded from international application.

In determining Congressional intent to apply legislation outside U.S. territorial jurisdiction, three factors are considered: (1) the express language of the statute; (2) legislative history; and, (3) the statutory scheme. Addressing foreign application of RCRA prohibitions against hazardous waste mismanagement abroad, one court concluded: “substantive” provisions of RCRA’s exportation provision (42 U.S.C.A. § 6938) “clearly do not apply abroad”; the use of the term “any person” in RCRA’s citizen suit provision (42 U.S.C.A. § 6972) without more cannot be extended extraterritorially; and, RCRA’s clear recognition of individual American state sovereignty without mention of foreign state rights speaks to its exclusively national application.

This jurisdictional restriction, however, does not completely bar domestic civil or criminal action against violators who illegally export hazardous wastes. Domestic handlers of eWaste destined for exportation who do not comply with all applicable RCRA provisions face administrative penalties, criminal sanctions, and/or civil action. Exporters who falsify or fail to submit proper

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171 Hunter Salzman, & Zaelke, supra, at 1514.
175 42 U.S.C.A. § 6928 (g) (1986).
RCRA notice and consent documentation submitted to the EPA, or who fail to obtain consent from the receiving country, are subject to criminal penalties.\footnote{42 U.S.C.A. §§§ 6928 (d) (3), (5), and (6) (1986).} Exporters typically do not “know” the facilities receiving their wastes do not conform to RCRA guidelines, and may be alleviated from RCRA liability by consent given from authorities in receiving countries authorizing that imported eWaste is properly handled. Exporters with knowledge that their eWaste materials are not disposed at certified facilities – thereby placing foreign citizens in imminent danger – would otherwise be liable for knowingly endangering “persons”,\footnote{42 U.S.C.A. §§§ 6928 (e) (1986).} however, “persons” has not been extended to citizens of foreign states.\footnote{Amlon Metals, at 675.} These legal restraints have effectively eliminated standing for injured Chinese claimants to file compensation or injunctive actions under RCRA.

Some scholars argue that the “Foley Doctrine” is no longer applicable to today’s global market.\footnote{Jonathan Turley, “When in Rome”: Multinational Misconduct and the Presumption Against Extraterritoriality, 84 NW. U.L. REV. 598, 655-60 (1990).} Citing historical views that Congress had little concern for international application of domestic laws at the time of their drafting, such scholars contend that contemporary global transactions require some forms of domestic legislation to apply extraterritorially.\footnote{Assuming no express Congressional intent to confine such legislation to U.S. jurisdiction. Id.} This rationale is particularly interesting as applied to eWaste exportation. Supposing RCRA and CERCLA are binding in China, they would still allow for exemptions to facilitate recycling, but would make available the penalties levied for noncompliance and mandate costs\footnote{In 1993, a U.S. federal jury issued criminal convictions to two dealers who knowingly exported hazardous waste transboundary without EPA notification or required consent from the importing country. This was the first criminal conviction under RCRA for illegal hazardous waste exportation, though this figure is increasing. HUNTER, SALZMAN, & ZAELKE, supra, at 961.}
for remediation. This hypothesis holds that once eWaste is mishandled in any
country, the exemptions are void, and enforcement provisions would apply
extraterritorially.

**B. Electronic Waste Regulation Under CERCLA: Precluding Effective
Regulation of Transboundary Electronic Waste Movement**

CERCLA was designed to provide the authority, procedures, and federal
funding to remediate site contamination caused by the unauthorized release of
hazardous substances.\(^\text{181}\) The Act’s most imposing authority provides for the
party, or parties, potentially responsible for the contamination to reimburse or
compensate any government cleanup costs.\(^\text{182}\) Electronic waste contamination in
China from hazardous wastes generated in the United States could conceivably
activate CERCLA application. The statute itself and the Foley Doctrine against
the presumption of extrajurisdictional application, however, preclude such action.

CERCLA reach is limited to the waters of the contiguous zone, the ocean
waters of which are under the exclusive management authority of the United
States, land surface, or ambient air within the United States or under the
jurisdiction of the United States.\(^\text{183}\) The leading case on CERCLA application
outside U.S. jurisdiction held that CERCLA does not expressly (or implicitly)
allow for compensation claims filed by foreign citizens.\(^\text{184}\) Like RCRA, the
provisions within CERCLA so competent in regulating domestic hazardous waste
have effectively encouraged its transboundary disposal.


\(^{182}\) CRAIG N. JOHNSTON & JEFFREY G. MILLER, THE LAW OF HAZARDOUS WASTE DISPOSAL AND


\(^{184}\) ARC Ecology v. U.S. Dept. of Air Force, 411 F.3d 1092, 1098 (9th Cir. 2005).
The liability scheme under CERCLA has been characterized as “draconian” to the point where generators may opt to export waste abroad primarily to reduce domestic liability concerns.185 Because of the potential liability for astronomical remedial expenses in the United States, hazardous waste exporters frequently choose to take their chances under international jurisdiction rather risk an unanticipated release on U.S. soil or in U.S. waters.186 This fear is compounded by a United States Circuit Court decision declaring wastes exempted under RCRA (e.g., CRT and MCE) are not exempted from CERCLA regulation.187 Without risk of legal or financial liability for water, land, or air contamination overseas, eWaste transporters and generators need not deliberate long to conclude exportation is the legally ‘safer’ route of disposal.

A 2005 United States Government Accountability Office (GAO) report echoed this by declaring, “[Third], federal regulations do not prevent the exportation of used electronics to countries where disassembly takes place at far lower cost, but where disassembly practices may threaten human health and the environment.”188 By acknowledging the negative impact felt overseas from our administrative reluctance to tighten the controls on eWaste export, the federal

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186 Id. at 496.
187 B.F. Goodrich Co. v. Murtha, 958 F.2d 1192 (1992) (holding that substances not exempted from the definition of “hazardous substance” under CERCLA, but exempted from regulation under a separate statute, are not incorporated into CERCLA exemptions).
government potentially exposes itself to liability through continued inaction. But
to what liability is the billion dollar question.

C. The Commerce Clause of the United States Constitution and eWaste

The United States Supreme Court has held that hazardous waste, even that
without value, is considered commerce and is therefore protected from undue
state restrictions curtailing its interstate and/or international movement.\textsuperscript{189} While
some forms of eWaste are not classified as hazardous waste, the EPA has declared
most types of eWaste – particularly CRTs – to be “commodity-like”,\textsuperscript{190}
classifying \textit{properly managed} eWaste as commerce, not a hazardous waste. With
eWaste clearly considered commerce, the analysis turns to whether or not
Congress has the authority to regulate its transport and disposal in foreign
countries.

The Commerce Clause grants Congress the power “to regulate commerce
with foreign nations”\textsuperscript{191} The Supreme Court, Chief Justice Marshall, held that
Congress has authority to regulate “every species of commercial intercourse
between the United States and foreign nations”,\textsuperscript{192} forming the basis of the
Foreign Commerce Clause.\textsuperscript{193} The Foreign Commerce Clause is intended to
prevent individual states from frustrating the uniformity of national foreign

\textsuperscript{190} “EPA believes that today’s rule will encourage recycling, protect human health and the
environment, and ensure that the subject materials are handled as commodities rather than as
wastes.” Hazardous Waste Management System; Modification of the Hazardous Waste Program;
pts. 9, 260, 261, and 271).
\textsuperscript{191} U.S. CONST. art. 1, § 8, cl. 3.
\textsuperscript{192} Gibbons v. Ogden, 22 U.S.1, at 193, 6 L.Ed. 23, 9 Wheat. 1 (1824).
\textsuperscript{193} In 1979, the Court strengthened international application of the Commerce Clause by implying
that Congressional powers to regulate commerce may be greater when applied extraterritorially.
Japan Line, Ltd. v. County of Los Angeles, 441 U.S. 434, at 448, 99 S.Ct. 1813, 60 L.Ed.2d 336
(1979).
affairs, which could potentially advantage some countries and lead to retaliation from those disadvantaged. 194 The Foreign Commerce Clause precludes individual states from policing the exportation of electronic waste from the United States. These authorities make clear the Congressional authority to regulate movement of eWaste from the U.S. to China, reflected in the applicable RCRA provisions addressing the exportation of hazardous waste and recyclable materials. As demonstrated by the abundance of U.S. eWaste found on foreign soil, federal power to regulate transboundary eWaste movement under RCRA has not consistently resulted in effective regulation.

While federal power to regulate interstate commerce is definite, states can regulate commerce through exercise of the police power. 195 States do have authority to inhibit transboundary eWaste movement under the Commerce Clause upon finding of a “legitimate local concerns” related to citizen health and safety, presuming the absence of nondiscriminatory alternatives and compliance with applicable federal legislation. In 2005, California passed the Electronic Waste Recycling Act, which requires exporters of eWaste to comply with RCRA-like transport, storage, disposal, and notice requirements.197

When applied to eWaste intended for overseas transport and disposal, however, there is a lack of both “local concern” and citizen health and safety. As

194 Id, at 450.
195 “In the exercise of its police powers, a State may exclude from its territory, or prohibit the sale therein of any articles which, in its judgment, fairly exercised, are prejudicial to the health or which would endanger the lives or property of its people.” Chemical Waste Management, Inc. v. Hunt, 504 U.S. 334, at 347, 112 S.Ct. 2009, 119 L.Ed.2d 121 (1992) (citing Reid v. Colorado, 187 U.S. 137, 151, 23 S.Ct. 92, 97, 47 L.Ed. 108 (1902); Railroad Co. v. Husen, 95 U.S. (5 Otto) 465, 472, 24 L.Ed. 527 (1878)).
196 City of Philadelphia v. New Jersey, supra, at 624.
a result, the protections ensured to U.S. commercial and public interests under the Commerce Clause of the Constitution may not adequately protect the health and safety of citizens of other nations.

IV. HOW INTERNATIONAL TREATIES GOVERNING ELECTRONIC WASTE HAVE NOT PREVENTED ITS MOVEMENT FROM THE UNITED STATES TO CHINA

There are two major international treaties that play a significant role in the transboundary electronic waste trade: the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention); and, the General Agreement on Tariffs and Trade (GATT). Due to the restrictive nature of one (Basel Convention), and liberating nature of the other (GATT), these two treaties potentially conflict one another regarding electronic waste export.


The primary international treaty regulating the movement of electronic waste from the U.S. to China is the Basel Convention.198 By requiring all Party countries to reduce hazardous waste exports to a minimum and deal with their waste problems internally – regardless of the level of waste management technology within the country199 – the Basel Convention holds all Party countries responsible for the proper disposal of the hazardous waste they create. It also precludes hazardous waste exportation without the importing countries consent, and assurance by the importing and exporting states the waste will be handled in

198 Basel Convention, supra, § 1.
199 HUNTER, SALZMAN, & ZAELKE, supra, at 952.
an “environmentally sound manner”.\textsuperscript{200} The Convention was originally an initiative of developing countries (G-77, including China)\textsuperscript{201} and environmental organizations seeking to ban the export of hazardous waste from richer to poorer countries.\textsuperscript{202} Though China ratified the Basel Convention shortly after its conception (1991)\textsuperscript{203} and the U.S. is a signatory, neither country has thus far met the spirit of the treaty, nor their legal obligations.

\section*{1. The United States, the Basel Convention, and Electronic Waste}

The United States Senate has thus far resisted ratification of the Basel Convention, notwithstanding U.S. signing the treaty in 1990, and substantial U.S. contribution towards its development.\textsuperscript{204} The U.S. is currently the only industrialized nation not to have ratified the Basel Convention, with critics speculating Congressional efforts to weaken its jurisdiction during Convention negotiations.\textsuperscript{205} Active proponents of the Basel Convention cite the eWaste exportation industry as a key reason why U.S. Congress refuses to ratify the Convention.\textsuperscript{206}

While such speculation carries some credence, there are legitimate reasons why Congress has yet to ratify this treaty. The U.S. Senate has expressed reserves about ratifying any treaty with broad implications that preclude inclusion of

\begin{footnotesize}
\textsuperscript{200} Basel Convention, supra §§ 4 and 2.8. “Environmentally sound management of hazardous wastes or other wastes” means taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes.”
\textsuperscript{201} The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), supra, at 30.
\textsuperscript{202} Sasha Archibald, supra.
\textsuperscript{205} Sasha Archibald, supra.
\textsuperscript{206} Id.
\end{footnotesize}
declarations or statements by individual countries seeking exceptional conditions. Numerous attempts to ratify the Basel Convention have been inhibited by federal administrative and legislative reluctance to create implementing legislation that would revise favorable domestic hazardous waste provisions inconsistent with international Basel Convention requirements (i.e., RCRA). As drafted, the Basel Convention does not allow for reservations or exceptions, effectively requiring all party nations to amend their domestic laws to comply with the treaty. Ratification of the Basel Convention would require a complete overhaul of RCRA and the recently promulgated provisions facilitating eWaste recycling in the United States.

In addition to this administrative conundrum, the U.S. Government has communicated to the United Nations Secretary General that some of the concerns regarding ratification are focused on remedial liability to importing countries, the ability of countries to decline importation even upon showing of “environmentally sound and efficient” disposal methods, and the ambiguous rights of a ‘Transit

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209 Basel Convention, supra, §§ 26.1 & 4.11.

During ratification discussions, the Chairman of the Foreign Relations Committee expressed concerns about including in treaties, “a provision which has the effect of inhibiting the Senate from attaching reservations deemed necessary or of preventing the Senate from exercising its right to give its advice and consent to all treaty commitments before they can have a binding effect.” Cong. Research Service, Library of Cong., Treaties and Other International Agreements: The Role of the United States Senate, 106th Cong., 2nd Sess. 106-71, p. 112 (2001) (a study prepared for the Committee on Foreign Relations).
Despite these reservations, the U.S. Senate has signed the Basel Convention, and is working towards an agreement to satisfy national and international needs. Presuming the valid national justifications for not ratifying, by allowing continuous exportation of eWaste to China, the United States arguably violates both customary and hard international law.

Regarding eWaste, the Basel Convention is somewhat analogous to RCRA: eWaste triggers Basel Convention regulation due to its hazardous constituents (e.g., copper, zinc, cadmium, mercury, lead). Also analogous to RCRA, the Basel Convention allows for certain operations leading to recovery and recycling of these resource constituents to be exempted from regulation upon consent from the receiving country. This process requires oversight and authorization from the Secretariat of the Convention in order to ensure the hazardous wastes qualify for the intended mode of reclamation or recycling.

The United States’ status as a Non-Party allows the U.S. to circumvent these otherwise binding recordkeeping and consensual duties, thereby facilitating the unchecked movement of eWaste from the U.S. to China. More directly, Article 4.5 of the Basel Convention explicitly precludes a Party Nation (i.e., China) from exporting hazardous waste to, or importing hazardous waste from, a
Non-Party Nation (i.e., the United States).\textsuperscript{216} As stated, electronic waste is a regulated waste under the Basel Convention, and therefore its movement between these two nations is precluded.

On top of these restrictions is the customary international principle set forth in the Vienna Convention on the Law of Treaties holding that any signatory party, though not subject to the rule of a treaty to which it signed, cannot do anything to undermine the intent or purpose of that treaty.\textsuperscript{217} As a signatory nation the United States is obligated “not to defeat the object and purpose of [the] treaty”.\textsuperscript{218} Whether by treaty or customary law, by allowing for the exportation of electronic waste to China, the United States is in violation of the Basel Convention.

While liability may be clear, the sanctions for violating the Basel Convention are inadequate to deter the continuation of such profitable trade. Article 11 of the Basel convention sets forth the definition of “Illegal Traffic”, including lack of notice and consent, nonconformance with recordkeeping documents, and deliberate illegal dumping.\textsuperscript{219} The Convention, however, lacks any enforcement provisions. Party nations must take initiative to implement their own unilateral legal, administrative, or other policies to enforce Convention provisions.\textsuperscript{220}

\textsuperscript{216} Basel Convention, supra, § 4.5
\textsuperscript{217} Vienna Convention, supra, § 18.
\textsuperscript{218} Vienna Convention, supra, § 18.
\textsuperscript{219} Basel Convention, supra, § 11.
\textsuperscript{220} HUNTER, SALZMAN, & ZAELKE, supra, at 959.
Domestic enforcement policies could require re-importation back to the U.S. of eWaste found to have been imported to China illegally.\textsuperscript{221} Another possible unilateral remedy China may pursue would entail restricting trade with the United States, but such drastic measure would cause significant economic and social harm to both countries. Importers of unsanctioned eWaste can face domestic administrative penalties in China, but the ambiguous classification and commercial value of imported eWaste has thus far minimized significant enforcement efforts.

2. China’s Benefit from Soft Enforcement of Its Basel Convention Duties

“China was one of first global proponents for an international ban on the exportation of toxic wastes from developed to developing countries.”\textsuperscript{222} China’s proactive ratification of the Basel Convention furthers the country’s proclamation to cease illegal eWaste importation; however, China has experienced significant economic benefits from foreign electronic waste. One local Chinese government website estimates that the city electronics reclamation industry processes approximately 1.65 tons of eWaste per year – with as much as 80\% coming from overseas – garnering $75 million in revenue.\textsuperscript{223}

As discussed previously, Chinese and western press accounts estimate that between 50,000 to 100,000 workers are employed in the trade; figures not unnoticed in a country with a history of rampant unemployment.\textsuperscript{224} Official

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\textsuperscript{221} Basel Convention, \textit{supra}, § 8.
\textsuperscript{222} The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), \textit{supra}, at 31.
\textsuperscript{223} Tim Johnson, \textit{supra}; and, The Basel Action Network (BAN) & Silicon Valley Toxics Coalition (SVTC), \textit{supra}, at 12.
\textsuperscript{224} Udani Samarasekera, \textit{supra}.
statistics indicate that over 5,500 households in the town depend on the eWaste business for a living, with over 75 percent of the town’s estimated 300 private enterprises in the business of reclaiming, dismantling, or processing eWaste materials.\(^{225}\) Taxes on eWaste businesses provide Guiyu with 90 percent of its commercial and industrial taxes, making officials reluctant to regulate them at all.\(^{226}\)

### a. China, the Basel Convention, and Electronic Waste

China quickly ratified the Basel Convention in 1991 after its drafting, yet has not effectively implemented the Convention’s eWaste importation restrictions. As a Party Nation, China’s duties with respects hazardous waste importation from the United States require Chinese officials to ensure: all imported waste materials are recyclable or reclaimable; such materials are recycled and handled in an environmentally sound manner; and, the proper documentation is submitted to the Secretariat of the Convention.\(^{227}\) Chinese authorities are also bound under the Basel Convention to prevent the importation of wastes not handled in an environmentally sound manner.\(^{228}\) With the documented cases of massive U.S. eWaste importation and mishandling, China has not fulfilled its import preclusion duties under the Convention. China is also


\(^{227}\) Basel Convention, supra, §§ 2 and 3.

\(^{228}\) Basel Convention, supra, §4.3 (g).
bound to prevent trading with Non-Party nations as well,\textsuperscript{229} something its administrators have has failed, or not wanted, to achieve.

The lack of a clearly established “Competent Authority” has also played a key role in the importation of eWaste. As outlined in Article 6, the competent authority is the one authority designated by the government responsible for consenting to hazardous waste imports and monitoring the importation process.\textsuperscript{230} The State Environmental Protection Administration (SEPA) has been designated as such an authority,\textsuperscript{231} however, the Ministry of Foreign Trade and Economic Cooperation (MOFTEC), General Administration of Customs, and General Administration of Quality Supervision, Inspection and Quarantine are all involved in the oversight of hazardous waste importation.\textsuperscript{232} With these diverse government agencies, each with partisan agendas, U.S. eWaste importers may inadvertently obtain authorization from an unauthorized agency or official. U.S. EPA consent provisions in RCRA, however, do provide some safeguard against this, as EPA and SEPA work collaboratively to address the illegal eWaste movement issue.\textsuperscript{233} In addition to some administrative ambiguity regarding the proper contact, the vast geography of China and multiple ports of commerce – each with their own officials – have also allowed for illicit eWaste introduction into the country.

\begin{footnotes}
\item[229] Basel Convention, \textit{supra}, §2.
\end{footnotes}
Recently promulgated Chinese domestic laws prohibit the importation of any hazardous wastes that can not be reclaimed as raw materials.\textsuperscript{234} The distinction between which wastes can be imported due to their material value, and which wastes cannot, was simplified somewhat by listing allowable and prohibited materials.\textsuperscript{235} Like U.S. laws, exemptions are allowed for recyclable materials so long as the exempted materials are handled according to the governing exemptions. The materials themselves may be easy to identify, but the problem of determining which wastes contain the reclaimable raw materials has also contributed to the unregulated introduction of electronic materials into China.

\textbf{b. China, Hong Kong, and Electronic Waste Trafficking}

The biggest challenge facing Chinese officials administering the Basel Convention is eWaste smuggling. Multiple media outlets tell of corrupt, underpaid public security officers and customs agents accepting monies (e.g., $100 bills) taped to the inside of containers filled with illegal eWaste, easily circumventing international and Chinese importation bans.\textsuperscript{236} “They pay the customs officials off. Everybody knows it. They show up with Mercedeses, rolls of hundred-dollar bills. This is not small-time. This is big-time stuff. There’s a lot of money going on in this.”\textsuperscript{237}

Massive volumes of electronic materials continue to enter the country despite the Chinese government’s nationwide crackdown on these imports.\textsuperscript{238}

\begin{footnotesize}
\begin{itemize}
\item[234] Law of the People’s Republic of China on Prevention of Environmental Pollution Caused by Solid Waste (Apr. 1 2005).
\item[235] List of Goods Prohibited to be Imported (Apr. 24, 2003).
\item[236] Elizabeth Grossman, supra; and, Archibald, supra.
\item[237] Id.
\item[238] One Chinese eWaste broker buys electronic discards at about $600 per ton, and smuggles them into the port of Nanhai, and into Guiyu. The Basel Action Network, China Labour Bulletin, supra.
\end{itemize}
\end{footnotesize}
Central government officials claim to make headway against eWaste smuggling, evidenced by the seizing of 22 containers of ‘electronic contraband’ sent from the U.S.²³⁹ These small victories, however, do not mask the constant parade of trucks transporting electronic junk from coastal ports to inland reclamation centers.²⁴⁰ While much eWaste is trafficked directly into China, a significant proportion makes it way through Hong Kong.

Not a Party Nation per se, Hong Kong falls under Basel Convention jurisdiction as a Special Administrative Region to China.²⁴¹ Hong Kong’s environmental authority, the Environmental Protection Department (EPD), and the Customs and Excise Department, have been proactive in curtailing rampant eWaste smuggling through the region. Recent accounts indicate that Hong Kong is beginning to shed its image as a lawless entry point into China. The promulgation of the Waste Disposal Ordinance (WDO), which requires a permit before importing any regulated waste materials,²⁴² has been an effective administrative tool against eWaste smuggling. On March 3, 2007, EPD, acting on intelligence reports of a suspicious shipment from Japan, intercepted 31 tons of improperly packaged eWaste destined for Chinese shores.²⁴³

Hong Kong EPD is working collaboratively with agencies in other countries to create a wide web of information and intelligence in order to combat

²³⁹ Karl Schoenberger, supra.
²⁴⁰ Id.
²⁴² Waste Disposal Ordinance (WDO), Section 20A, Cap. 354.
this wide-spreading problem. Provision in the Basel Convention requiring the re-importation of illegally moved hazardous waste have proven to be somewhat effective in mitigating the influx of eWaste into Hong Kong and China. The Basel Convention has shown some signs of effectiveness in regulating eWaste movement from the U.S. to China, however, proposed amendments to the Convention would close the loophole allowing ‘recyclable’ materials to escape full regulation.

B. The Proposed Basel “Ban Amendment” and eWaste

The Basel Ban Amendment, upon entry into force, would prohibit hazardous and recyclable waste exportation for final disposal and recycling from Annex VII countries – EU and OECD (Organization of Economic Cooperation and Development) members, including the United States, and Liechtenstein – to non-Annex VII countries (all other Parties to the Convention, including China). This would technically end any eWaste movement from the U.S. to China, as electronic materials exported for legitimate reuse, recycling, and reclamations would also be prohibited. Unlike the quasi-legal nature of eWaste exportation under existing Basel Convention provisions, this Amendment would inarguably ban electronics containing toxic constituents from U.S.-China transboundary recycling and reclamations enterprises.

In addition to not ratifying the Basel Convention, the United States has opposed adoption of the Basel Ban Amendment (Basel Ban) for much of the same

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reasons it opposes the Basel Convention. As a Signatory Party, but not party
nation, the United States does not get to vote on the measure, but will be closely
observing its progression through the Basel convention ranks. China has already
ratified the ban, with hopes of eliminating the influx of unwanted and unknown
hazardous materials. The impact of the Basel Ban on illegal eWaste
importation, and the subsequent effect on the Chinese economy will be
fascinating.

Efforts to put the Basel Ban in force have been frustrated by ambiguity in
Basel Convention Article 17.5, which governs amendment adoption. Some
observers state that once this ambiguity has been removed, sufficient Basel
Convention members will put this ban in force.

C. The General Agreement on Tariffs and Trade (GATT) and eWaste

GATT reduces trade barriers among member countries in order to remove
distortions in international markets to ensure that goods and services are not
discriminated based on their national origin. Analogous to the Commerce
Clause of the U.S. Constitution, GATT functions by precluding the ratification of
international treaties that inhibit the transboundary movement of products by
discriminating against certain exporting or importing countries. The World
Trade Organization (WTO), an international organization created to reduce
international trade friction and create a secure global marketplace, succeeded

246 The Basel Convention Website, Status of Ratifications (Apr. 2007), available at
248 General Agreement on Tariffs and Trade, art. 1, Jan. 1948, 55 U.N.T.S. 194 (hereinafter
GATT).
249 Hunter, Salzman, & Zaelke, supra, at 1256.
250 Id.

Countries that attempt to restrict eWaste importation can do so under two “General Exceptions” adopted by GATT. Article XX provides, “Nothing in \textit{[GATT]} shall be construed to prevent the adoption or enforcement by any contracting party of measures: (b) necessary to protect human, animal, or plant life; or, (g) relating to the conservation of exhaustible natural resources.”\footnote{GATT, \textit{supra}, §§ XX (b) and (g).} Countries intending to exercise these exemptions must demonstrate provisional justification that one of the two exemptions applies, and must ensure that the proposed action does not violate the Article XX chateau mandating no arbitrary or unjustifiable discriminatory trade actions.\footnote{Id.}

A central part of this argument requires a showing that the measures taken to protect the environment are “necessary”, and that no other GATT-consistent measures are available.\footnote{HUNTER, SALZMAN, \& ZAELKE, \textit{supra}, at 1278.} Erring on the side of environmental protection, WTO has held that “necessary” could be so broad as to include any measures that will prevent harm to the ecological resources being protected, so long as the proposed
measures had the least drastic trade impact.\textsuperscript{256} A balance must be maintained between the measures needed to protect the environment, and the importance of maintaining free trade. With this analysis, GATT clearly provides for both free trade of electronic waste and adequate environmental protection \textit{if enforced}.\textsuperscript{257}

To date, the environmental protection provisions available under GATT have not been used to regulate eWaste movement connected to environmental degradation. While the specific reasons are unclear, it is clear that GATT currently serves as a facilitator of eWaste movement from U.S. to China by bridging the trade gap between the two countries, and encouraging the proliferation of free trade. The value of eWaste as a commodity has thus far overshadowed its inherent threat to the environment.

\textbf{V. ELECTRONIC & HAZARDOUS WASTE REGULATION IN CHINA}

Despite some ineptitude in preventing the introduction of banned eWaste, the Chinese government has made legitimate domestic efforts to stop the illicit electronic waste trade. Policymakers in Beijing are apparently unhappy about persistent illegal eWaste importation and direct culpability towards the exporting countries as much as local dealers and officials in “electronic waste industry towns”.\textsuperscript{258} They are embarrassed at proliferation of an illegal trade, but must balance this with the fiscal boon that it attaches. Since its conception in 1991, Chinese domestic regulation of transboundary hazardous waste movement has

\textsuperscript{256} Korea-Measures Affecting Imports of Fresh, Chilled, and Frozen Beef, para. 164, WT/DS169/AB/R).
\textsuperscript{257} In response to WTO decisions, since 2002, the U.S. has installed environmentally protective provisions within all free-trade agreements. Jaroslaw Anders, USINFO Staff Writer, Environmental Protection Vital Part of U.S. Trade Policy (Apr. 16, 2007), \textit{available at} http://usinfo.state.gov/xarchives/display.html?p=washfile-english\&y=2007\&m=April\&x=20070416144949zjsredna0.9548761.
\textsuperscript{258} Tim Johnson, \textit{supra}. 

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reflected the economic value of raw materials found within imported waste streams.259


A 1999 State Environmental Protection Administration (SEPA) report best summarizes China’s need for raw materials from foreign states; “China is a country whose resources are poor relatively. In order to make good use of resources and complement the lack of resource, importing some wastes resources that are needed imperatively in our country will do well to economy development.”260 SEPA, China’s counterpart to the United States EPA, promptly conditions this statement in the same report by making clear the Chinese environment will not be compromised by foreign wastes.261 Electronic waste materials contain many of the non-ferrous metals used in 91% of China’s industry; generally for electricity transfer, automobiles, construction, electronics, and telecommunications.262 The “scare domestic copper resources” and abundance of copper in eWaste make importation from foreign countries very economically attractive.263

259 In 1991, “The Circular on the Strict Control of Transboundary Movements of Hazardous Wastes to China” was issued by State Environment Protection Administration and General Administration of Customs. Hongchang, supra, at 6. Special uses of those wastes as raw materials must be examined and approved by the responsible environmental protection departments. Hongchang, supra, at 6.
260 Id.
261 Id.
263 Id.
B. The Evolution of Hazardous Waste Law in China and eWaste

The progression of Chinese hazardous waste laws has maintained the balance between environmental protection and the value of hazardous waste as a reclaimable commodity. China’s first domestic hazardous waste law, the “Circular on the Strict Control of Transboundary Movements of Hazardous Wastes to China”, issued by SEPA and the General Administration of Customs in 1991, reflected this focus on economics. This circular provided special treatment of those wastes with raw material value, conditioned upon approval by the responsible environmental protection departments. In 1995, the “Urgent Circular of the State Council on the Strict Control of Waste Imports” was drafted to combat the “chaotic”, unauthorized importation of hazardous wastes. This circular prohibited wastes from importation into China, except those recoverable as “raw materials”, which were subject to strict control. One year later, the “Law on Prevention and Control of Solid Waste Pollution to the Environment” or, “Solid Waste Act” of 1996, was created to prohibit the importation of unusable hazardous wastes (emphasis added). The “Provisional Regulation on Environmental Protection Management of Waste Imports” came out that same year (1996), forming the cornerstone of Chinese hazardous waste law today.

266 Id.
267 Id.
These are now the governing documents on eWaste importation, granting SEPA authority to determine which wastes can be reused and reclaimed. As part of this determination, the environmental damage associated with each waste material is factored into its value as a commodity. From this, in 2000, SEPA formulated the “Solid Waste Catalogue”, listing waste materials officially authorized for importation, including some electric/electronic products. Challenges arose with implementation as regulators found it difficult to separate authorized and unauthorized products, often forcing officials to take the “bathwater with the baby”. Some exemptions were allowed based on the need for importation of certain waste streams, however, application of these exemptions has proved to more daunting than planned.

In 2006, SEPA, the Ministry of Information Industry, and other Chinese government agencies involved in eWaste movement, promulgated the “Administrative Measure on the Control of Pollution Caused by Electronic Information Products”, known as the “Management Methods for Controlling Pollution by Electronic Information Products”, or the “Restrictions on Hazardous Substances” (RoHS). China’s RoHS was designed specifically to control and reduce environmental pollution caused by discarded electronic information.

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268 Id.
products, promote manufacture and sale of low pollution electronic information products, and protect environment and human health.\textsuperscript{271}

Effective March 1, 2007, China’s RoHS law is more demanding than its European Union counterpart, applying to all stakeholders in the supply chain, including manufacturers, distributors, importers, and retailers.\textsuperscript{272} This new law requires all electronic information products\textsuperscript{273} sold in China, or imported into China, to comply with the new regulations and should significantly impact eWaste importation from the United States. Manufacturers and importers of “electronic information products” containing hazardous materials – including those manufactured overseas and imported into China – must clearly mark those products; identifying the names, location, and content of toxic chemicals within, their level of toxicity, the recyclability of such electronic information products, and the safe use (i.e., end of life) period.\textsuperscript{274} China’s RoHS law also includes administrative enforcement provisions, and requires imported electronics to comply with national or industry standards.\textsuperscript{275} It is still too early to determine the overall impact of this new law, however, early reactions indicate it is being taken seriously. In response to this new law, companies in the U.S. and worldwide that

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\item \textsuperscript{271} China RoHS Solutions, \textit{Administration on the Control of Pollution Caused by Electronic Information Products} (Sep. 2007), available at http://www.chinarohs.com/.
\item \textsuperscript{272} Id.
\item \textsuperscript{273} “Electronic information products refers to products such as electronic radar products, electronic communications products, radio and television products, computer products, home electronic products, electronic instrument measuring products, specialized electronic products, electronic components and parts, electronic applications, electronic materials, and accessories.” Management Methods for Controlling Pollution by Electronic Information Products, \textit{supra}, § 3.1.
\item \textsuperscript{274} Management Methods for Controlling Pollution by Electronic Information Products, \textit{supra}, § 13; and, China RoHS, \textit{supra}.
\item \textsuperscript{275} China RoHS, \textit{supra}. Curiously, the Chinese RoHS does not apply to electronic information products destined for export. Management Methods for Controlling Pollution by Electronic Information Products, \textit{supra}, § 2.
\end{itemize}
\end{footnotesize}
import electronic information products into China have created a market for China RoHS compliance programs.

While these new directives appear to provide explicit control over illicit eWaste importation, domestic enforcement difficulties will persist. As written, Chinese laws are vague, focusing more on policy than substance. In addition, the weak judiciary system in China is subject to overwhelming commercial, executive, and legislative influences. With government control over judicial salaries, officials can dictate to what degree environmental laws are enforced. Compounding this issue, local officials have strong economic interest in the industries they are assigned to regulate. Finally, the limited citizen standing provisions in Chinese environmental laws removes a key enforcement mechanism so effective in the United States.

With these challenges in mind, the new regulations will have an immediate positive impact on curbing illegal eWaste movement into China. With the 10th “Five-year Plan”, the Chinese government has established environmental protection as one of the key pillar industries, initiating unprecedented development and growth in the environmental sector. The message delivered by the central Chinese government is clear to provincial officials and citizens throughout the country that protecting the environment is a governmental priority, and that local officials will be held accountable for poor enforcement efforts.

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277 Id.
278 Id.
280 Alex Wang, *supra*. 
In addition, China’s legal system has experienced significant advancement and reform in the past twenty years, much accredited to its acceptance into the World Trade Organization (WTO), and the legal duties WTO membership carries. Chinese lawmakers are promulgating laws publicly, provided much needed transparency into the lawmaking process, plaintiff citizens are beginning to taste legal victories against administrative agencies, and judges are beginning to educate and train themselves on judicial duties. Most important to eWaste regulation; new environmental legislation shifts bureaucratic power to environmental government entities, such as SEPA, that have traditionally been weaker than industry and economy related government bodies. Recent injunctions issued to stop massive energy projects for incomplete environmental assessments prior to construction demonstrate an unprecedented shifting of national priorities.

In addition to imported eWaste, SEPA must simultaneously develop regulatory framework to govern the voluminous generation of eWaste from domestic households, business, schools, and governments. According to

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282 Id.


China’s Computer Trade Association, some 2.3 million PCs, 2.7 million computer displays, and 1.35 million printers were dumped domestically in 2002.287 Not unlike US EPA’s early years, SEPA faces the looming challenge of combating decades of severe environmental contamination, and an industry-first national mindset.

C. The Importance of Sustainable Development in China

With China’s economy starting to really hit its economic stride, lawmakers may be reluctant to implement legislation that may negatively impact the exploding gross domestic product (GDP). At the same time, Chinese government officials recognize that exhaustion of national resources will be the primary restraint on the growth of the Chinese economy.288 The benefits from eWaste reclamation are seen in the developed provinces dedicated to the industry.289 In addition, eWaste legislation that impedes trade with the United States and other developed countries could potentially pose trade issues in the future and jeopardize China’s ranking as the third largest trading nation in the world.290 However, the documented costs of environmental damage prompted a

289 In the past two decades, provincial incomes have risen sharply. Locals have become middle class moving out of their traditional single-storey homes into newly built three- and four-storey buildings where the ground floor is reserved as a scrap-sorting workshop. AsiaNews.it, supra.
SEPA official to proclaim, “Our natural resources will soon be unable to support our population.”

This reality has prompted impetus towards achieving a “green gross domestic product”, whereby monetary value is assigned to environmental degradation from pollution and resource exploitation. This strategy of calculating the economic price of nationwide environmental degradation – or, “environmentally adjusted GDP calculation” – is a first for China, and has identified the major areas of concern. As summarized by a SEPA spokesman, “The implementation of green GDP will help China assess the environmental cost of the economic development and achieve a sustainable growth.”

As an inverse argument, some economists argue that improving the economic environment of China will improve the ecological environment. Either way, environmental degradation in China is so severe that economic and environmental health will be intrinsically linked for a long, long time.

Recognizing the importance of implementing national policies designed to achieve sustainable development, Chinese central government officials have pushed the concept of resource conservation attached to economic

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291 Rose Niemi, supra.
293 Water pollution, air pollution, and solid waste pollution account for 55.9%, 42.9%, and 1.2% of the total costs, respectively. GOV.cn, Chinese Government’s Official Web Portal, supra.
294 The campaign for “green GDP” assessment was initially stalled by the Chinese National Bureau of Statistics after calculation of the necessary figures was determined to be too uncertain. Richard McGregor, China Abandons Plan for Green GDP Index (May 10, 2006), available at http://www.ft.com/cms/s/9c7ac7ba-df8c-11da-afe4-0000779e2340.html.
295 “According to what economists call the Kuznets Curve, once a country's per capita income breaks $5,000, pollution levels begin to fall dramatically. That could happen in China before 2030. It's unclear whether by that time rampant development will have turned China into the Middle Landfill.” Bryan Walsh, The Middle Landfill (Nov. 17, 2003), available at http://www.time.com/time/magazine/article/0,9171,543833,00.html.
achievement. The “green GDP” movement is now on track to determine the environmental loss caused by industrial progress, with a three-phase plan to assess: (1) quantity of natural resources consumed in economic activities; (2) quantity of environmental loss caused by economic development; and, (3) valuation of the quantity of resources and environmental loss. Improper hazardous waste management will play a major role in these deliberations, and industrial adjustments will be considered to balance the economic growth-to-environmental degradation scale.

VI. CONCLUSION: ACHIEVE GREEN GROSS DOMESTIC PRODUCT

In today’s global climate – both economic and ecologic – it is critical that domestic laws also protect foreign states, as all countries are resources to one another. Regulation of electronic waste exportation from the United to China presents an excellent opportunity to achieve a green GDP. China’s new RoHS laws are designed to curb the environmental impact from worldwide commerce without placing too much burden on the industrial sector. If pollution is accounted for during the research, manufacturing, and development processes, it can be mitigated without excessive foreign or domestic costs.

Environmental accounting is recognized by the World Bank as a key “World Development Indicator”, and is working to develop programs that account

for environmental conditions when assessing country assistance efforts.\textsuperscript{299} Factors such as investment in human capitol (i.e., human consumption and needs), natural resource depletion, and damages caused by pollution, are used to “measure environmental benefits in monetary terms”.\textsuperscript{300} These figures provide government officials an appraisal of the economic impact caused by environmental degradation, and strategies to lessen that impact.

A. Reduce Hazardous Waste Generation

It will be interesting to monitor the success of the RoHS directives in Europe and China. After initial enactment by the EU, compliance rates were not as high as expected. Suitable alternatives to hazardous constituents must be found if this strategy is to work. Part of this reduction entails manufacturer and consumer responsibility for eWaste we generate. The “buy-back” programs employed by some major high-tech firms encourage consumers to return unwanted electronics to facilities that should know how to handle and reuse them best. Another factor to consider: consumers must be cautious to protect against intellectual property or identity theft via their discarded computer.

Computer donation programs have also been successful throughout the United States. Education systems are a major producer of waste electronics, so it makes sense to put onus on them to reutilize this equipment until it is nonfunctional. Obsolete technologies can be passed down the educational hierarchy. In China, new eWaste processing facilities are being built at a rapid


\textsuperscript{300} Id.
pace. Proper electronic waste management will decrease adverse human and environmental injuries. Again, enforcement is the key.

B. Increased Collaboration of International Police Efforts

EPA and SEPA have already joined forces to combat illegal eWaste exportation from the U.S. to China: in 2003, EPA and SEPA created Memorandum of Understanding (MOU) between the two agencies intended to facilitate the sharing of environmental protection technologies and sciences.\(^{301}\) On April 10, 2006, SEPA and EPA banded together to establish and strengthen environmental regulations for the management of electronic wastes.\(^{302}\) This cooperation is a significant step towards recognizing the global impact of air, water, and soil pollution in other countries.

Though it is an international treaty, the Basel Convention focuses on proper domestic handling of eWaste created on domestic soil. Customary international law mandates the U.S. Congress to regulate U.S. exporters to take foreign citizens and their environment into consideration, however, significant modification to RCRA eWaste exemptions may not be worth the price of ratification. RCRA is an intelligent, deliberately designed statute that protects against transboundary pollution, if enforced. Whether administering Basel or


RCRA, EPA needs assistance from foreign counterparts to achieve full compliance.

China could investigate the environmental protection provisions offered under GATT, provided eWaste trade is not restricted too significantly.

C. Extend Domestic eWaste Laws Abroad

The extraterritorial application of RCRA and CERCLA is currently available; it just hasn’t been fully explored. The decision to hold criminally liable exporters of waste who knowingly disregard their domestic legal duties is within Congressional intentions of RCRA and CERCLA. Pollution caused by our domestic wastes in foreign states will eventually cause injury to us, whether environmentally, economically, or socially. RCRA export requirements do work, but require close administration, enforcement, and some level of voluntary compliance. The Foreign Commerce Clause does allow Congress to regulate eWaste and recyclable electronic products destined for overseas use and disposal.

Reconsideration of existing household and small generator exclusions may now be warranted. These exemptions have clearly caused major problems to both foreign and domestic landfills, and will only escalate. Without legislative action, additional, convenient, legitimate, and inexpensive recycling facilities are necessary in the U.S. and China.

D. Implement State eWaste Programs Nationally

U.S. Congress needs to outline a strategy for Americans to dispose of our own wastes domestically, so we are prepared for the day when all countries prohibit the import of our wastes, valuable or not. Only 9% of eWaste generated
in the United States is recycled domestically.\textsuperscript{303} This figure must increase dramatically if the situation in China, and other developing countries receiving our hazardous waste, is to improve. To do this, a large majority of states are implementing electronic waste resolutions.

Without a single dissenting vote, Washington recently passed “landmark legislation” mandating manufacturers to establish and pay for the collection and recycling of electronics they produce.\textsuperscript{304} The new law also looks to facilitate consumer recycling by prohibiting recycling fees for households, schools, charities, and small businesses, and by providing for adequate recycling locations in both rural and urban counties.\textsuperscript{305} California’s Electronic Waste Recycling Act requires retailers selling certain electronic products defined as “Covered Electronic Devices in California” to collect an electronic waste recycling fee from the consumer upon purchase of any covered electronic devices, and submit them to the state.\textsuperscript{306} These recovery and recycling payments are then remitted to authorized entities to subsidize eWaste collection and recycling. Taking a page from the EU model, beginning January 1, 2007, electronic equipment with certain amounts of lead, mercury, cadmium, and hexavalent chromium are banned from being sold in California.\textsuperscript{307} Electronic product manufacturers are required to submit to the State Department of Toxic Substances Control (DTSC) information concerning product toxic components, concentrations, recycling, and disposal.\textsuperscript{308}

\textsuperscript{304} H.R. 2488, 58th Leg., Reg. Sess. (Wash. 2003).
\textsuperscript{305} Id.
\textsuperscript{306} Id.
\textsuperscript{307} Id.
\textsuperscript{308} S.B. 20, 2007 Leg., Reg. Sess., (Ca. 2007).
Most relevant to this subject; Senate Bill 20 also requires exporters to notify DTSC of the destination, content, and volume of exported electronic materials. These requirements are a good start, but do not provide guarantees that eWaste overseas is handled accordingly.

Legislation in other states focuses on: public education and eWaste strategies; reduction or elimination of hazardous materials in electronic product manufacturing; eWaste disposal program funding; and, the creation of a state oversight committee. States have also adopted legislation designed to facilitate electronic waste recycling by establishing eWaste program finance schemes.

The proliferation of various state eWaste laws demonstrates the variety of options available to China, but the inconsistent regimes illuminate the importance of federal regulation. On a smaller scale, even different departments and agencies within the same governmental unit may have different methods to address unwanted electronics disposal. An administrative system must be considered whereby each school, public office or agency, and federal faction is aware of a uniform procedure to proper handle unwanted eWaste in order to prevent the privately operated quagmire that is the flourishing electronic waste disposal industry in America.

Congress has thus far approached the eWaste dilemma through financial incentives leading to program development: grants established to create and

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311 Rhode Island, Minnesota, Maine, and Vermont have past and pending legislation addressing removal of toxic components from electronic products.
develop national recycling programs; manufacturer and consumer tax incentives and credits intended to encourage recycling; disposal restrictions; and fee programs.\textsuperscript{315} It is still too early to determine whether the promulgation of brand new federal eWaste-specific export regulations will, as intended by EPA,\textsuperscript{316} curtail the environmental and human harms caused by “unfettered” eWaste exportation. It is also too early to determine whether the promulgation of new Chinese, United States, and international laws is warranted; and if so, whether their enforcement will one day allow Chinese children to play in their rivers again.


\textsuperscript{316} Hazardous Waste Management System; Modification of the Hazardous Waste Program; Cathode Ray Tubes, \textit{supra}, at 42927-42949, 42938.