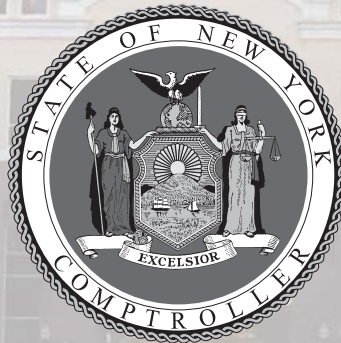




# Computer Equipment Disposal

2009-MR-3



Thomas P. DiNapoli

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# State of New York Office of the State Comptroller

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## Division of Local Government and School Accountability

April 2010

Dear Local Officials:

A top priority of the Office of the State Comptroller is to help local officials manage government resources efficiently and effectively and, by so doing, provide accountability for tax dollars spent to support government operations. The Comptroller oversees the fiscal affairs of local governments, community colleges and school districts statewide, as well as compliance with relevant statutes and observance of good business practices. This fiscal oversight is accomplished, in part, through our audits, which identify opportunities for improving operations and governance. Audits also can identify strategies to reduce costs and to strengthen controls intended to safeguard government assets.

Following is a report of our audit titled Computer Equipment Disposal. This audit was conducted pursuant to Article V, Section 1 of the State Constitution and the State Comptroller's authority as set forth in Article 3 of the General Municipal Law.

This audit's results and recommendations are resources for local government, community college and school district officials to use in effectively managing operations and in meeting the expectations of their constituents. If you have questions about this report, please feel free to contact the local regional office for your county, as listed at the end of this report.

Respectfully submitted,

*Office of the State Comptroller  
Division of Local Government  
and School Accountability*



## State of New York Office of the State Comptroller

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# EXECUTIVE SUMMARY

Electronic equipment is continuously being upgraded or replaced in favor of newer, more technologically advanced equipment, resulting in a growing volume of used electronic devices (e-waste or electronic waste). E-waste contains not only valuable recyclable materials (like copper, gold, and aluminum), but also many hazardous materials (such as lead and mercury) that require proper disposal. In 2001, the U.S. Environmental Protection Agency (EPA) conducted a study that found e-waste was growing at a pace of three times the rate of other municipal waste. Other information suggests that e-waste presently accounts for two percent of America's waste in landfills, but it accounts for 70 percent of the toxic waste.

According to the U.S. Government Accountability Office (GAO), by 2010, it is expected that e-waste will include 1 billion units of computer equipment. Consequently, local government entities will have to address many issues, including space and toxicity, which will increasingly arise from this massive amount of e-waste.

### **Scope and Objective**

The objective of our audit was to examine computer equipment disposal practices at selected local governments for the period July 1, 2007 through August 31, 2008. Our audit addressed the following related question:

- Did the local government entities safely dispose of their e-waste?

### **Audit Results**

The selected entities<sup>1</sup> generally disposed of e-waste in an environmentally safe manner. During the period of our examination, the four entities collectively owned approximately 4,200 computer work stations<sup>2</sup> and recycled 1,237 computer monitors and CPUs. Because this computer equipment was properly recycled, we estimate that the following hazardous materials did not enter the environment – approximately 1,406 pounds of lead and 37 pounds of mercury. In addition, we estimate that the recycling companies could have potentially recovered the following valuable materials – approximately 1,554 pounds of copper, 37 pounds of gold, and 3,146 pounds of aluminum.

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<sup>1</sup> Ulster County, Kingston City School District, Chatham Central School District and Schenectady County Community College

<sup>2</sup> Each work station is comprised of a computer monitor and CPU

Although we found some policies and procedures relating to equipment disposal, the school districts, county and community college had not adopted a policy governing the environmentally safe disposal of computer equipment. All four entities, however, contracted with a third-party to dispose of their computer equipment in an environmentally safe manner. For the policies and procedures that were in place, we found insufficient monitoring of policy implementation and a lack of comprehensive written procedures documenting the computer equipment disposal process.

### **Comments of Local Officials**

The results of our audit and recommendations have been discussed with local officials and their comments, which appear in Appendix A, have been considered in preparing this report. Local officials generally agreed with our findings and recommendations.

# Introduction

## Background

Electronic equipment is continuously being upgraded or replaced in favor of newer, more technologically advanced equipment, resulting in a growing volume of used electronic devices (e-waste or electronic waste), which contain not only valuable recyclable materials (like copper, gold, and aluminum), but also many hazardous materials (such as lead and mercury) that require proper disposal.

In 2001, the U.S. Environmental Protection Agency (EPA) conducted a study that found e-waste was growing at a pace of three times the rate of other municipal waste. Other information suggests that e-waste presently accounts for two percent of America's waste in landfills, but it accounts for 70 percent of the toxic waste. In 2005, the EPA estimated that e-waste amounted to approximately 1.9 to 2.2 million tons per year. Of this amount, the EPA estimated that approximately 1.5 to 1.9 million tons were primarily discarded in landfills, and only 345,000 to 379,000 tons were recycled.<sup>3</sup>

According to the U.S. Government Accountability Office (GAO), by 2010, it is expected that e-waste will include 1 billion units of computer equipment. Consequently, this will create an enormous e-waste problem for all local governments, who are going to have to address many issues, including space and toxicity, which will increasingly arise from this massive amount of e-waste.

## Objective

The objective of our audit was to examine computer equipment disposal practices of selected local governments. Our audit addressed the following related question:

- Did the local government entities safely dispose of their e-waste?

## Scope and Methodology

We examined the policies, procedures, practices and other pertinent documentation relating to computer equipment disposal in four local government entities that included one county (Ulster County), two school districts (Kingston City School District and Chatham Central School District) and a community college (Schenectady County Community College). Our audit period covered from July 1, 2007 through August 31, 2008.

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<sup>3</sup> Disposed of in an environmentally safe manner after removal of hazardous material

We conducted our audit in accordance with generally accepted government auditing standards (GAGAS). More information on such standards and the methodology used in performing this audit are included in Appendix B of this report.

**Comments of Local Officials**

The results of our audit and recommendations have been discussed with local government, community college and school district officials and their comments, which appear in Appendix A, have been considered in preparing this report. Local officials generally agreed with our findings and recommendations.

## Disposal of Computer Equipment

CPUs and computer monitors typically qualify as hazardous waste under the New York State Department of Environmental Conservation's (DEC) hazardous waste regulatory program which is based on Subtitle C of the Federal Resource Conservation and Recovery Act (RCRA) of 1976. New York State DEC requirements go hand-in-hand with the EPA's RCRA hazardous waste requirements, as DEC is authorized to implement the hazardous waste management program in lieu of the EPA as long as New York State's laws and regulations are at least as stringent as Federal laws and regulations.

During our audit period, the four entities we reviewed generally disposed of obsolete and surplus computer equipment by means of recycling, public auction/sale and donation. Because this computer equipment was disposed of properly, we estimate that approximately 1,406 pounds of lead and 37 pounds of mercury did not enter the environment. In addition, we estimate that the recycling companies could have potentially recovered the following valuable materials – approximately 1,554 pounds of copper, 37 pounds of gold, and 3,146 pounds of aluminum.

Although all four entities contracted with a third-party to recycle their obsolete computer equipment in an environmentally safe manner, the Kingston City School District was the only entity to receive certificates of recycling for the computer equipment disposed of during the audit period that explicitly guaranteed that all materials were recycled by environmentally safe methods and standards. The Kingston City School District and Schenectady County Community College were the only two entities that received a detailed invoice from the recycling company showing the total amount of computer equipment disposed of.

Also, while we found some policies and procedures relating to equipment disposal in place, none of the entities had adopted a policy governing the environmentally safe disposal of computer equipment. In addition, for the policies and procedures that were in place, we found insufficient monitoring of policy implementation and a lack of comprehensive written procedures documenting the computer equipment disposal process.

**Materials Recycled and Recovered**

Industry sources indicate that the materials in a typical personal desktop computer weigh approximately 60 pounds. A typical personal desktop computer generally contains 3.8 pounds of lead and .1 pound of mercury, both of which, if not properly disposed of, could create health risks. For example, computer circuit boards contain mercury and lead, and laptop computers have a small fluorescent lamp in the screen that contains mercury. In addition to the hazardous materials within e-waste, several valuable materials can also be found, such as copper, gold, and aluminum.

All four entities that we reviewed contracted with a third-party to recycle their e-waste in an environmentally safe manner. During our audit period, the four entities collectively owned approximately 4,200 computer work stations (each work station is comprised of a computer monitor and CPU) and recycled 1,237 computer monitors and CPUs, as shown in Table 1.

<b>TABLE 1: EQUIPMENT OWNED AND RECYCLED</b>			
<b>Government Entity</b>	<b>Approximate Number of Entity-owned Work Stations<sup>1</sup></b>	<b>Monitors Recycled During the Audit Period</b>	<b>CPUs Recycled During the Audit Period</b>
Chatham Central School District	850	208	N/A <sup>2</sup>
Kingston City School District	1,200	98	130
Schenectady County Community College	950	181	379
Ulster County	1,200	150	91
<b>Total</b>	<b>4,200</b>	<b>637</b>	<b>600</b>
<sup>1</sup> Computer monitor and CPU <sup>2</sup> The recycling company’s invoices did not include the number of CPUs recycled. Due to discrepancies in the District’s inventory records, we could not verify the number of CPUs recycled.			

By recycling e-waste, large amounts of hazardous materials are diverted from the environment. Because this computer equipment was disposed of properly, we estimate that approximately 1,406 pounds of lead and 37 pounds of mercury did not enter the environment. In addition, we estimate that the recycling companies could have potentially recovered approximately 1,554 pounds of copper, 37 pounds of gold, and 3,146 pounds of aluminum by recycling the entities’ e-waste. The following table includes the breakdown of these valuable materials by entity.

<b>TABLE 2: MATERIALS RECYCLED/RECOVERED (in pounds)</b>					
<b>Government Entity</b>	<b>Lead</b>	<b>Mercury</b>	<b>Copper</b>	<b>Gold</b>	<b>Aluminum</b>
Chatham Central School District <sup>1</sup>	N/A	N/A	N/A	N/A	N/A
Kingston City School District	372	10	412	10	833
Schenectady County Community College <sup>2</sup>	688	18	760	18	1,539
Ulster County	346	9	382	9	774
<b>Totals</b>	<b>1,406</b>	<b>37</b>	<b>1,554</b>	<b>37</b>	<b>3,146</b>

<sup>1</sup> Our calculations for the approximate total quantity of lead, mercury and other recoverable materials are unit based; one unit is comprised of a monitor and a CPU. Due to the District's recordkeeping and disposal methods, we were unable to determine the number of CPUs disposed of. Therefore, we could not calculate the approximate total quantity of lead and mercury diverted from the ecosystem or the amount of copper, gold and aluminum recovered.

<sup>2</sup> Although we found no evidence that the College's computer equipment was disposed of in an environmentally safe manner, using peripheral documentation, we were able to determine the number of monitors and CPUs recycled. We projected the materials recycled/recovered if the computer equipment was disposed of in an environmentally safe manner.

By recovering these valuable materials, the need to mine and process new materials will be reduced which in turn will help conserve natural resources, result in less air and water pollution, and lead to a reduction in greenhouse gas emissions.

### **Evidence of Recycling**

Local officials should request and obtain documentation (such as certificates of recycling, recycling/disposal manifests, etc.) from recycling companies, to affirm and substantiate that all e-waste (monitors and CPUs) is disposed of in an environmentally safe manner. The Kingston City School District was the only entity that we reviewed that received sufficient evidence of e-waste recycling during the audit period. The recycling company issued certificates to the Kingston City School District which guaranteed that all material was recycled by environmentally sound methods and standards.

- Ulster County received manifests that indicated monitors were properly recycled or disposed in accordance with Federal EPA and DEC standards and guidelines. However, the manifests did not include any reference to the CPUs recycled.
- The Chatham Central School District and Schenectady County Community College did not receive documentation that their e-waste was disposed of in an environmentally safe manner.

Finally, only two entities (Kingston City School District and Schenectady County Community College) received a detailed invoice from the third-party recycling company listing all of the e-waste recycled. Officials at Chatham Central School District and Ulster County stated that the third-party recycling company only bills for the monitors recycled and the number of the CPUs is not included on the invoice. We were able to determine the number of CPUs recycled by Ulster County from other documentation on file. We could not make such a determination for Chatham Central School District. Without certificates of recycling and detailed invoices of e-waste recycled, there is an increased risk that e-waste will not be disposed of in an environmentally safe manner.

## **Internal Controls**

Governmental entities should have a system of internal controls to ensure the safe disposal of e-waste. Effective controls over e-waste include the establishment of policies and procedures that provide guidance as to how it should be disposed of (i.e., recycled, sold, donated, etc.). While not required, good business practices prescribe that governing boards should authorize the disposal of municipal assets. Likewise, there is no requirement for governing boards to adopt formal policy guidance relating to the environmentally safe disposal of e-waste. However, adopting a formal policy will provide direction for making such disposals while protecting the environment. Having a disposal policy and procedures in place and monitoring implementation can ensure that e-waste disposals are made in an environmentally safe manner.

Although we found some policies and procedures relating to equipment disposal, none of the entities had adopted a policy governing the environmentally safe disposal of computer equipment. For the policies and procedures that were in place, we found insufficient monitoring of policy implementation and a lack of comprehensive written procedures documenting the computer equipment disposal process. The absence of an effective control system over the disposal of e-waste increases the risk that hazardous materials will not be responsibly disposed of in an environmentally safe manner.

- None of the entities audited had adopted a policy governing the environmentally safe disposal of e-waste.<sup>4</sup> However, all four entities contracted with a third-party

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<sup>4</sup> Schenectady County Community College's PC Procedures do include a provision that "hardware disposal will adhere to ENCON Procedures."

recycling company to dispose of their e-waste in an environmentally safe manner.

- Three of the entities (Kingston City School District, Chatham Central School District and Ulster County) had procedures that addressed the disposal of entity-owned equipment including computer equipment. For Schenectady County Community College, while certain elements of e-waste disposal are included in two separate sets of procedures, the provisions are vague and lack substance with regard to e-waste disposal.
- Only two of the four entities (Kingston City School District and Chatham Central School District) require prior Board approval for the disposal of e-waste. However, the Board did not monitor compliance with this requirement. Only one of the entities (Chatham Central School District) complied with this requirement; however, compliance was only in regard to CPUs, not computer monitors.

Because the boards have not included provisions for the environmentally safe disposal of e-waste in disposal policies, and did not approve the disposal of all computer equipment, the entities are at an increased risk that e-waste could unnecessarily be disposed of, be illegitimately taken for personal purposes, or disposed of in a manner that is not environmentally safe.

## **Recommendations**

1. Local officials should continue to dispose of their computer equipment in an environmentally safe manner.
2. Local officials should request and receive documentation (such as recycling/disposal certifications, etc.) affirming that e-waste was disposed of in an environmentally safe manner.
3. Local officials should obtain itemized invoices that describe the e-waste that the recycling company picks up for recycling, regardless of whether or not the entity is charged for the recycling service.
4. The governing boards should provide policy guidance related to the environmentally safe disposal of e-waste.

## APPENDIX A

### RESPONSES FROM LOCAL OFFICIALS

We provided a draft copy of this global report to each of the four entities we audited and requested responses. The following comments were excerpted from the three responses we received.

#### Overall Response to Report

“Ulster County Information Services management has reviewed the draft copy of the Computer Equipment Disposal report. We have no objections to the content of the report.” (Ulster County)

“Through researching the website links provided by the NYS Comptroller’s auditors and websites obtained through discussions with other public entities as to their disposal processes, the District has located and will continue to search for the most effective and lowest cost vendors that comply with the processes prescribed by the NYS Comptroller.” (Chatham Central School District)

#### Response to Findings and Recommendations

##### **Materials Recycled and Recovered**

“In the past, the District has and continues to perform due diligence in locating vendors considered to be environmentally sound in their approach to the disposal of technology equipment. Going forward, the District will require that these vendors provide documentation as to their disposal processes... The District will coordinate disposal of technology equipment through the most reputable and economical vendors that will provide appropriate certification as to the disposal of this equipment in an environmentally sound manner.” (Chatham Central School District)

##### **Evidence of Recycling**

“The District will request that all vendors provide accurate documentation as to the items that were picked up for disposal along with certification that the vendor will dispose of the equipment in an environmentally appropriate way. Along with the vendor’s certification confirming the environmentally sound disposal of technology equipment, the selected vendor will be required to provide the District with detailed invoicing as to the quantity and type of equipment to be disposed of with each technology equipment group determined to be surplus.” (Chatham Central School District)

“A process is in place to ensure computer equipment is recycled according to all applicable local, state, and federal guidelines. Upon request, [our vendor] provided SCCC a certificate of recycling for the computer equipment disposed for the period July 1, 2007 through August 31, 2008. The certificates confirmed the computer equipment was recycled according to all applicable local, state, and federal guidelines. SCCC will obtain a certificate of recycling from [our vendor] for all SCCC equipment disposed.” (Schenectady County Community College)

## **Internal Controls**

“The Board of Trustees and College officials have established and approved a Computer Equipment Disposal Policy and procedures to address the disposition of College-owned computer equipment, including the disposal of computer equipment in an environmentally safe manner and the sale of obsolete/surplus computer equipment in the best interest of the College. The College has an official form... this form is completed for all College equipment that is taken out of service and recommended to be disposed. The new policy and procedures went into effect on December 15, 2009.” (Schenectady County Community College)

“District policy... requires that “all” surplus equipment, including monitors be approved for surplus by the Board of Education. The District policy states “...Outdated and unused school property which cannot be salvaged or utilized effectively or economically may be sold by the District upon recommendation of the Superintendent and approval of the Board of Education.” The Board of Education’s Policy committee will review the current disposal policy to determine additional language needed to meet the NYS Comptroller’s goal for environmentally sound disposal of technology equipment...” (Chatham Central School District)

## **APPENDIX B**

### **AUDIT METHODOLOGY AND STANDARDS**

We interviewed local government, community college and school district officials to obtain an understanding of their e-waste disposal process. We reviewed the entities' policies and procedures over e-waste disposal. We examined inventory records, documentation from the recycling companies regarding the e-waste disposals (i.e., invoices, certificates of recycling, inventory lot forms), job request forms (if available), invoices for computer equipment purchases, and held discussions with local government, community college and school district officials and employees. We also viewed the physical inventory of computers and areas where the computer equipment is stored before the recycling company picks up the equipment.

We conducted this performance audit in accordance with generally accepted government auditing standards (GAGAS). Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

## APPENDIX C

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