



U.S. Department of Energy
Office of Inspector General
Office of Audits and Inspections

Audit Report

Paducah Gaseous Diffusion Plant's Waste Diversion Efforts

OAS-M-13-01

March 2013



Department of Energy
Washington, DC 20585

March 15, 2013

MEMORANDUM FOR THE MANAGER, PORTSMOUTH/PADUCAH PROJECT OFFICE

A handwritten signature in blue ink, which appears to read "Rickey Hass", is positioned above the "FROM:" field.

FROM: Rickey R. Hass
Deputy Inspector General
for Audits and Inspections
Office of Inspector General

SUBJECT: INFORMATION: Audit Report on "Paducah Gaseous Diffusion
Plant's Waste Diversion Efforts"

INTRODUCTION AND OBJECTIVE

Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, mandates that each Federal facility maintain a cost-effective waste prevention and recycling program. Further, Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, requires that Federal agencies achieve a 50 percent diversion rate for construction and demolition materials and debris and a 50 percent rate for non-hazardous solid waste by the end of Fiscal Year (FY) 2015. Waste diversion includes the prevention and reduction of generated waste through recycling, reusing or composting. Diverting materials from the waste stream generates a host of benefits including conserving energy, reducing disposal costs and contributing to a cleaner, safer environment.

The Paducah Gaseous Diffusion Plant (Paducah) operations are carried out by three prime contractors and each plays a contributing role in the Department of Energy's overall waste diversion effort. Specifically, Paducah's three contractors are responsible for infrastructure support services, environmental remediation, and operation of the Depleted Uranium Hexafluoride Conversion Facility, respectively. During FY 2011, Paducah reported that it generated 340 metric tons of non-hazardous solid waste, including debris from construction and demolition projects. Because of the environmental, financial and social benefits of reducing the amount of waste sent to the landfill, we initiated this audit to determine whether Paducah is effectively diverting materials from the waste stream. This is our third in a series of reports on the Department's waste diversion efforts at select sites.

RESULTS OF AUDIT

Because of record keeping weaknesses, we could not determine whether Paducah was effectively diverting materials from the waste stream. While Paducah reported that it had exceeded the 50 percent diversion goals, we found that the data supporting that calculation was unreliable. In particular, we noted that Paducah lacked an accurate method of measurement of waste generation

and disposal. Further, we found that the contractors had not always assessed or acted on all opportunities to divert waste from landfill disposal and were inconsistent in their diversion efforts.

The problems we identified occurred, in part, because Paducah did not place sufficient emphasis on waste diversion. The individual assigned to coordinate such activities as a collateral duty did not ensure that data supporting diversion efforts was reliable. Also, Paducah had not assigned one of its three contractors the lead role in coordinating activities, awarding recycling contracts, and ensuring implementation of a consistent and comprehensive recycling program.

Notably, Paducah had established several recycling streams to divert materials from landfill disposal and had taken action to increase waste diversion awareness. In particular, Paducah established recycling streams for a number of materials including paper, concrete and aluminum cans. However, due to the data concerns noted in our report, we could not evaluate the effectiveness of these programs. In addition, contractors utilized widely distributed bulletins to employees to increase waste diversion awareness. Paducah also noted that it had been recognized by the U.S. Environmental Protection Agency for its environmental stewardship of electronic assets. While we recognize these positive actions, we believe that Paducah can improve the amount of waste diverted from landfills. Consequently, we have made several recommendations that, if implemented, should allow Paducah to achieve synergies and improve its contribution to the Department's waste diversion efforts.

MANAGEMENT REACTION

Management generally concurred with the report's recommendations and identified actions it has taken or planned to take to address our report recommendations. Specifically, management indicated that it had met with contractors and discussed the importance of demonstrating progress towards meeting the waste diversion goals and re-emphasized its expectations regarding the validity of waste diversion data. Further, management stated that it will re-evaluate staffing and contractor responsibility for overseeing and coordinating activities, as well as reassess its waste estimation procedures. We consider management's actions responsive to our report recommendations.

Management's comments are included in their entirety in Appendix 3.

cc: Deputy Secretary
Senior Advisor, Office of Environmental Management
Chief of Staff

REPORT ON PADUCAH GASEOUS DIFFUSION PLANT'S WASTE DIVERSION EFFORTS

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PADUCAH GASEOUS DIFFUION PLANT'S WASTE DIVERSION EFFORTS

Waste Diversion Efforts

The Paducah Gaseous Diversion Plant's (Paducah) waste diversion data was not always reliable. Also, contractors had not always evaluated opportunities to divert waste or implemented measures recommended in waste assessments. Further, there were inconsistencies or inefficiencies in the contractors' waste diversion efforts.

Waste Diversion Data

We found that Paducah's waste diversion data reported to the Department of Energy (Department) had incomplete, unsupported or invalid information, rendering it unreliable for determining the site's progress. As with other Department sites, Paducah reports its waste activities via the Department's Pollution Prevention Reporting and Tracking System. The Department uses this information to determine its progress towards meeting waste diversion goals.

According to the information reported in the tracking system, Paducah exceeded the 50 percent waste diversion objective. However, in our review of Paducah's Fiscal Year (FY) 2010 and FY 2011 reported data, we noted that the information could not be relied on. For example, one contractor's waste generation, disposal and diversion efforts were not included in the Department's analysis for FY 2010. Another contractor, whose data was included in the tracking system, could not provide support for the waste information it reported. Further, we found that the amount of recycled non-hazardous waste reported in the tracking system data was overstated.

While Paducah's data reliability improved somewhat in FY 2011, we still noted deficiencies. The site information did include waste data for all three contractors, but we found that one Paducah contractor could provide little support to validate its reported data for waste generation and disposal. In FY 2011, the contractor reported that it had generated and disposed of 23 metric tons of waste. However, the contractor's calculation, based on container size and dump rate, indicated that the waste sent to the landfill may have been 76 metric tons, or more than three times the amount reported in the Department's tracking system. Contractor personnel stated that they did not feel comfortable with the 76 metric ton calculation and decided to use the prior year's number of 23 metric tons. Further, we noted that a disposal rate of 23 metric tons had been used for the past 3 years. The contractor agreed that this number might also be inaccurate and

acknowledged that it did not have an accurate method of measurement. As a result of our audit, the contractor has taken steps to address these data concerns, and stated that it will properly account for its waste generation in the FY 2012 reporting. While we recognize that there are challenges in obtaining reliable waste disposal data, tracking and reporting reliable data is critical because it is used to establish a baseline to assess and monitor the site's diversion efforts.

Recycling Efforts

Notwithstanding the errors in reported data, we also noted that contractors had not always assessed opportunities to divert waste from landfill disposal or, in some cases, had not implemented measures recommended in completed assessments. Further, in the absence of a single contractor managing a site-wide program, we noted inconsistencies and inefficiencies in the contractors' efforts. Maximizing waste diversion in an efficient and coordinated manner is critical for Paducah to meet the objectives of Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*.

During our review of Paducah's recycling activities, we found that one contractor had not performed assessments aimed at identifying pollution prevention opportunities because no one had been assigned responsibility for performing them. These assessments could identify additional waste diversion opportunities and provide assurance that each process or waste stream is appropriately evaluated for potential opportunities.

While the site's other two contractors had assessed opportunities to divert waste from landfill disposal, we found that they had not always implemented measures recommended in such assessments. For example, the infrastructure contractor's FY 2010 assessment found that plastics, cardboard and alkaline batteries were not being routinely recycled. The contractor did initiate battery recycling subsequent to the assessment; however, at the time of our review it had not yet begun routinely recycling plastics or cardboard. According to contractor personnel, the contractor did not have the funding needed to procure a storage trailer to collect the items, but was unable to provide evidence that the cost of a storage trailer was prohibitive when compared to the potential cost benefits of recycling. Additionally, we found that as part of a one-time effort in FY 2010, the contractor had recycled over 2,000 pounds of cardboard and avoided approximately \$1,000 in disposal costs. Despite this effort, the contractor is currently disposing of cardboard, rather than recycling it.

While contractors had coordinated efforts to recycle several items including spent alkaline batteries and printer cartridges, we also noted inconsistencies and inefficiencies among their efforts. For example, two of the site's contractors informed us that printers were set to double-side print by default in an effort to reduce paper costs and minimize waste. However, the third contractor confirmed that printers had not been set to double-side print by default despite having the capability to do so. We did note that this contractor recycled paper via its contract with a paper shredding company, and had sent nearly eight tons of paper to be shredded in the first half of 2011. However, we believe that double-side printing would better align the site's actions with the Department's goal to reduce waste at the source. Subsequent to our fieldwork, the third contractor informed us that it had begun implementing double-side printing and would account for this effort going forward.

To the credit of Paducah's contractors, we noted they had taken several positive actions related to waste diversion. For example, one contractor informed us that it is transitioning its document management center to a paperless process. In addition to reducing waste at the source, the transition should reduce the costs associated with purchasing materials and supplies. Further, we found that contractors sought to increase employee awareness through various means such as bulletins and handouts. Employee awareness is a critical component in fostering and maintaining a successful waste diversion program. With continued support for these activities and appropriate attention to the concerns noted in our report, Paducah should improve its waste diversion efforts.

Organizational Structure

The problems identified throughout our report occurred, in large part, because Paducah's organizational structure was not aligned to fully support waste diversion. The Portsmouth/Paducah Project Office assigned an individual oversight responsibility for waste diversion activities at the site. However, we noted that this individual was also responsible for other high priority operational duties, which diminished their ability to properly oversee the contractors' waste diversion activities. For instance, while a quality assurance check was required on the data reported in the Department's tracking system, such checks, if performed by the assigned coordinator, did not prevent the data reliability problems we noted in this report.

Further, the Portsmouth/Paducah Project Office had not assigned one of its three contractors to assume a lead role in coordinating activities, awarding recycling contracts, and ensuring implementation of a consistent and comprehensive recycling program. While the infrastructure contractor had been assigned responsibility for janitorial services, including picking up waste and recyclables for two of the site's three contractors, it had not been given the authority to manage a site-wide recycling program. As a result, inconsistencies existed among contractors' recycling efforts.

Impact

Without a concerted effort, Paducah will be unable to gauge the effectiveness of the site's waste diversion efforts, may miss opportunities to achieve synergistic results towards meeting its waste diversion goals, and will continue to send unnecessary non-hazardous solid waste to the landfill for disposal.

RECOMMENDATIONS

To improve the effectiveness of Paducah's waste diversion efforts, we recommend that the Manager, Portsmouth/Paducah Project Office:

1. Ensure Paducah's organizational structure is properly aligned to provide sufficient emphasis and support for the waste diversion program;
2. Consider the benefit of assigning a single contractor responsibility for coordinating waste diversion efforts at the site;
3. Ensure the validity of waste diversion data; and,
4. Ensure that contractors appropriately evaluate and implement waste diversion opportunities.

**MANAGEMENT
REACTION AND
AUDITOR COMMENTS**

Management generally concurred with the report's recommendations and identified actions it had taken or planned to take to address our recommendations and to demonstrate progress towards meeting the waste diversion goals. In response to our first recommendation, management believed that its current level of support for waste diversion was appropriate, but planned to evaluate staffing levels and contract requirements against projected annual waste volumes. In regard to our recommendation to consider assigning a single contractor responsibility for coordinating waste diversion efforts at the site, management

commented that its current approach was the most cost-effective given the low volume of waste generated, but would consider a site-wide approach as part of future contract scopes. Additionally, management noted that it had taken action to improve the validity of waste diversion data and would evaluate its estimation methodology for improvement. Finally, management expressed its commitment to improving oversight of the contractors' programs and to ensuring that they are evaluating and implementing waste diversion opportunities.

We recognize that Paducah must balance the goals of waste diversion with the requirements to maintain a cost-effective waste prevention and recycling program and consider planned actions to be responsive to our recommendations.

Management's comments are included in their entirety in Appendix 3 of the report.

Appendix 1

OBJECTIVE	The objective of this audit was to to determine whether Paducah Gaseous Diffusion Plant (Paducah) is effectively diverting materials from the waste stream.
SCOPE	The audit was performed from October 2011 through March 2013. We conducted work at Paducah in Paducah, Kentucky and obtained information from the Office of Health, Safety, and Security in Washington, DC.
METHODOLOGY	To accomplish the audit objective, we: • Reviewed laws and regulations, and policies and procedures relevant to waste diversion; • Reviewed Paducah's Site Sustainability Plan; • Held discussions with Paducah Pollution Prevention officials; • Interviewed key personnel at the Department of Energy's (Department) Office of Health, Safety and Security; and, • Reviewed Paducah's Fiscal Year 2010 and FY 2011 Pollution Prevention Tracking and Reporting System waste diversion entries. We conducted this performance audit in accordance with generally accepted Government auditing standards. 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 objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We also assessed performance measures in accordance with the <i>GPRA Modernization Act of 2010</i> and found the Department had not established performance measures related to pollution prevention. We conducted an assessment of computer-processed data relevant to our audit objective and determined that this information was generally unreliable. Portsmouth/Paducah Project Office management waived an exit conference on this report.

PRIOR REPORTS

- Audit Report on [*Y-12 National Security Complex's Waste Diversion Efforts*](#) (OAS-L-12-08, July 2012). Fiscal Year (FY) 2011 reports prepared by Y-12 National Security Complex (Y-12) management revealed that Y-12 had met the targets of Executive Order 13514 by diverting 58 percent of its construction and demolition debris and 50 percent of its non-hazardous solid waste from the landfill. Further, Y-12 took action to increase its current waste diversion activities. In particular, Y-12 emphasized adding at least one new recycling stream to the recycling program each year. Although it had realized significant accomplishments, we found that Y-12 was facing challenges such as budget limitations and Department of Energy (Department) restrictions on the recycling of certain scrap metals.
- Audit Report on [*Oak Ridge National Laboratory's Waste Diversion Efforts*](#) (OAS-L-12-06, July 2012). In our review of Oak Ridge National Laboratory's (ORNL) FY 2011 data, we found that it recycled or reused over 5,100 of its 9,500 metric tons of solid waste, and thus diverted it from landfill disposal. While ORNL's performance in FY 2011 was notable, we did find inconsistencies between planned activities and actual performance. For example, we found that ORNL had not conducted pollution prevention opportunity assessments despite the fact that the program emphasized the importance of such assessments in helping to identify waste diversion opportunities.
- Audit Report on [*The Department of Energy's Pollution Prevention Program*](#) (DOE/IG-0680, March 2005). The Department had not maintained a completely effective pollution prevention program. In some cases, sites did not systematically research cost-effective opportunities to reduce waste generation or to increase recycling/reuse of materials. Additionally, sites did not always implement identified cost-effective measures to reduce pollution.

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United States Government

Department of Energy
Portsmouth/Paducah Project Office

memorandum

DATE: JAN 22 2013

REPLY TO
ATTN OF: PPPO:Dollins

PPPO-02-1770850-13

SUBJECT: PORTSMOUTH/PADUCAH PROJECT OFFICE MANAGEMENT REACTION TO THE
DRAFT AUDIT REPORT ON PADUCAH GASEOUS DIFFUSION PLANT WASTE
DIVERSION EFFORTS

TO: Daniel M. Weeber, Assistant Inspector General for Audits and Administration, Office of Inspector General

Reference: Memorandum from D. Weeber to W. Murphie, "Draft Audit Report on Paducah Gaseous Diffusion Plant's Waste Diversion Efforts," dated December 19, 2012

Portsmouth/Paducah Project Office (PPPO) is providing this management reaction to be included in the subject draft audit report. PPPO appreciates the insight provided by the audit team and believes it will assist in continuing to make progress towards the goals established in Executive Order (E.O.) 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, which requires that Federal agencies achieve a 50 percent diversion rate for construction and demolition materials and debris and a 50 percent diversion rate for non-hazardous solid waste by the end of Fiscal Year 2015. PPPO acknowledges that while the requirements of this E.O. are not yet effective, we are implementing actions to address the challenges faced with meeting these goals.

PPPO implements a Paducah Site Pollution Prevention Program integrating three site contractors with significantly diverse work activities, generating various waste streams. Although the waste streams are diverse, the volumes are relatively small, when compared to other facilities, such as Y-12 National Security Complex and Oak Ridge National Laboratory. PPPO is balancing the requirements for waste diversion along with implementing the requirements of E.O. 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, which mandates agencies to maintain cost effective waste prevention and recycling program in its facilities.

PPPO has been tracking and reporting these quantities each year as part of our input into the Pollution Prevention Tracking and Reporting System. We recognize that there have been some inconsistencies with terminology and intent for some of the data gathering, with respect to tracking progress towards the waste diversion goals outlined in E.O. 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, required by the end of Fiscal Year 2015. PPPO continues to improve recordkeeping practices, which will lead to a higher degree of accuracy and confidence with the reporting.

The report indicated that estimation methods for weights of solid waste collected in dumpsters could lead to inaccuracies in the data. Because of the low volume of municipal solid waste

Mr. Weeber

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generated, the most cost effective method for management is utilizing a vendor to provide dumpsters for sanitary waste collection and pick-up on a routine schedule. PPPO has been utilizing estimations to report generation weights for this waste stream. Due to the small volume generated, it is not cost-effective to implement a weekly weighing of the dumpsters across the site; however, PPPO is taking action to improve the estimating accuracies. Additionally, it was discovered that roll-off bins that were sent to the local municipal waste landfill were not tracked. This has been corrected. The corrections and improvements will greatly increase the accuracy of the estimated weight of municipal waste disposed for future reporting.

PPPO includes the following response to the recommendations listed in the audit report.

1. Ensure Paducah's organizational structure is properly aligned to provide sufficient emphasis and support for the waste diversion program;
Based on the discussion in the report, it appears that the issue raised is insufficient PPPO support rather than alignment. The amount of waste generated at the Paducah Site does not warrant full-time PPPO staff support. Given the amount of waste generated, the current level of support is appropriate. As we plan to accept the gaseous diffusion plant from the United States Enrichment Corporation over the next few months, staffing levels and contract requirements will be evaluated against the projected annual waste volumes to determine appropriate staff support and program requirements for pollution prevention program activities.
2. Consider the benefit of assigning a single contractor responsibility for coordinating waste diversion efforts at the site;
The current approach is the most cost-effective management of the program, given the low volume of municipal solid waste generated, along with the fact that the other waste streams for each contractor have little similarities. PPPO is working with current contractors to place more emphasis on waste diversion in order to share information and approaches that can improve the overall waste diversion activities at the site.

As part of the alternatives evaluation for management of the gaseous diffusion plant once the United States Enrichment Corporation returns the facilities to the U.S. Department of Energy, PPPO will consider a site-wide approach as part of future contract scopes in order to better integrate the waste management and recycling activities at the Paducah Site.
3. Ensure the validity of waste diversion data;
For future data entry, the municipal waste vendor is providing the actual weights of trash in the roll-off bins for all pickups. These weights will be combined with estimated weights from dumpsters to estimate the total weight of municipal weight. PPPO believes that it is still appropriate to estimate weights for reporting; however, the methodology for estimation of dumpster waste will be evaluated for improvement (such as doing a one-time weighing campaign with a curve developed for use in estimating).
4. Ensure that contractors appropriately evaluate and implement waste diversion opportunities;
Contractually, PPPO contractors are required to implement waste diversion opportunities.

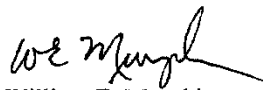
Mr. Weeber

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PPPO has met with all three contractors and re-emphasized that improvement is expected in the validity of the data reported for the waste diversion data and particularly discussed its importance in demonstrating the progress towards the 50% waste diversion goals. PPPO is committed to improve oversight of the contractors programs and waste generation/diversion activities to ensure they are evaluating and implementing waste diversion opportunities and keeping accurate records for reporting.

Please consider this response for inclusion in the final audit report. If you have any questions or require additional information, please contact David Dollins at (270) 441-6819.



William E. Murphie
Manager
Portsmouth/Paducah Project Office

cc:
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