

**A Time Allocation Monitoring Study of RCRA  
Enforcement at Region 1 of the United States  
Environmental Protection Agency**

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**A thesis**

**submitted by**

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## **Abstract**

A pilot study was performed at the United States Environmental Protection Agency Region 1 office to learn about the utility of time allocation monitoring for program process evaluation. The program under study here performs regulatory enforcement of the Resource Conservation and Recovery Act, the primary federal statute governing the handling of hazardous wastes. Time allocation monitoring is a potentially attractive method for assessing program performance because results can be useful for program improvement and for developing the metrics necessary for future impact evaluations. Time allocation monitoring results from this current investigation were able to capture only a limited proportion of staff activities during the study period, but future studies could improve results by expanding the scope of monitoring; increasing the degree to which program staff are involved in study design, data collection, and analysis; and integrating time allocations monitoring with a review of program records.

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## **Chapter 1: Introduction**

This thesis is written to satisfy the requirements of a Master's of Arts degree in Urban and Environmental Policy and Planning at Tufts University, and as part of my duties as an employee of the New England (Region 1) office of the Environmental Protection Agency (EPA). From November 2011 through September 2012, I took part in the Environmental Careers Program, a hiring and training program that allowed participating new employees to perform work rotations in various EPA offices. Until May 2012, I worked in the Resource Conservation and Recovery Act (RCRA, frequently pronounced "rick-ra") Enforcement Unit (the Unit) as part of a rotation in the Region 1 Office of Environmental Stewardship. In my work for the Unit, I trained to be a RCRA inspector, and engaged in a variety of projects intended to assist program staff members and to learn about the program. One of my primary projects, of which this thesis is a product, was to develop a program evaluation of the Unit.

For as long as the environmental protection regulations have existed, the public has debated the balance between the costs of regulation and the benefits that can be achieved. As part of that debate, the budgets of regulatory agencies such as the EPA have fluctuated according to the politics of the day. Even within the EPA, priorities have shifted as problems are viewed as more or less urgent, and various strategies to achieve Agency goals have fallen in and out of fashion. It is in this context that program evaluation of RCRA Enforcement Unit is studied. While hazardous waste management was front page news in the early 1980's, the issue has fallen out of prominence as other problems such as ozone

layer depletion, acid rain, and climate change have captured the public's attention. The more the Unit can demonstrate its program's value, the more likely it will be that the public and Agency management will preserve, or even expand, resources for RCRA enforcement.

Program evaluation can be used to measure the value of programs, but with complex social and environmental problems, a definitive demonstration of costs and benefits is a challenging proposition. As a student writing a thesis and as an EPA employee working in RCRA enforcement on a temporary rotation, I had limited resources with which to complete an evaluation. Fortunately, program evaluation is a versatile field of study that can be tailored to the resources available and the needs of a program. I aimed to select a study design that, while stopping far short of the goal of demonstrating the value of the RCRA Enforcement Unit, could build towards that goal by developing useful measurements of program processes, and in the mean time be useful to improve the program. This study is a step towards helping the Unit become more "evaluable" by documenting how the program develops enforcement actions and by improving program performance so that future evaluations of program outcomes will be as favorable as possible.

### ***Thesis Topic***

The Region 1 Office of the United States Environmental Protection Agency implements a program to enforce RCRA, a federal statute regulating the management of hazardous wastes. The RCRA Enforcement Unit at EPA Region 1 performs inspections of facilities handling hazardous wastes and brings

enforcement actions against facilities where violations are found. By ordering facilities to rectify observed violations and assessing monetary penalties to deter noncompliance among the regulated community, the RCRA enforcement program seeks to protect human health and the environment from exposure to hazardous wastes.

The EPA Region 1 RCRA enforcement program seeks to maximize the efficiency with which it develops enforcement actions and to demonstrate the value of the program to audiences inside and outside the EPA. Program evaluation can help the Unit achieve these goals by providing information for program improvement efforts and to measure program effectiveness. According to developmental models of program evaluation, programs should build towards evaluation of program outcomes by first evaluating program processes. This study investigates the utility of time allocation monitoring to describe program implementation, and reflects upon methods selected for collecting time allocation information. By piloting the use of time allocation monitoring, this study seeks to answer the three following questions:

1. How does the Region 1 office of the US EPA develop RCRA enforcement actions?
2. How can a staff time allocation monitoring study be useful to understand and improve the Unit's implementation of a RCRA enforcement program?
3. What recommendations for future time allocation monitoring studies can be made based on the experience of performing this pilot study?

## ***Thesis Methods***

This process evaluation piloted the use of time allocation monitoring as a tool for learning about program implementation. Following consultation with staff members to identify the activities involved in enforcement action development, staff members recorded their time allocations on a sample of ongoing enforcement actions for 5.5 months. Ideally, a time allocation monitoring study could be used by a program to identify activities that have the largest time allocations, allowing the program to target efficiency improvement efforts on those activities most influential on overall program efficiency. In addition, documenting progress on enforcement actions may lead to insights into delays in the enforcement action development process that may compromise the Unit's ability to address violations of hazardous waste regulations in a timely manner.

A pilot effort to use time allocation monitoring for program improvement has the potential to inform future studies of a similar nature about methods likely to be successful in achieving study goals. Of primary concern to study design is the tradeoff between the amount of staff effort that can be devoted to time allocation monitoring and the thoroughness of monitoring that is required for results to be useful. The decisions made to design this study are described in this thesis, and the implications of these decisions are discussed. Also of concern to the success of a time allocation monitoring study is the degree to which program staff members are involved in the development and implementation of the study.

Finally, opportunities for augmenting time allocation monitoring through reviews of program records are discussed.

Time allocation monitoring may have an important role to play in managing public environmental programs such as RCRA enforcement. Through this thesis, I hope to contribute to the conversation about how programs can best provide efficient, effective service; the mission of these programs to protect human health and the environment is too critical for anything less.

## **Chapter 2: RCRA Enforcement at Region 1 of the United States Environmental Protection Agency**

Implementing a program to regulate the management of hazardous wastes is critical to protecting human health and the environment from the risks associated with exposure to these materials. RCRA provides comprehensive rules for hazardous waste management, but requires vigilant enforcement for the rules to be consistently implemented and the intended protection provided. The Region 1 RCRA Enforcement Unit accomplishes this by performing compliance monitoring and, when necessary, developing enforcement actions, and by overseeing implementation of state RCRA enforcement programs.

### ***The Problem***

Modern economies produce a range of industrial byproducts, many of which can be hazardous to humans and ecosystems. When an industrial byproduct has no economic use, it is discarded and becomes a waste. Wastes discharged to the air and water are quickly transported from generating facilities to receiving airsheds and water bodies, where they are manifested as pollution. The Clean Air Act Amendments of 1970 (P.L. 88-206) and the Federal Water Pollution Control Act of 1972 (P.L. 92-500) established comprehensive federal rules for large dischargers of wastes into the air and water to eliminate, or at least reduce, the amount of polluting materials in their discharges. Another, more insidious, pathway exists, however, for wastes to be transported from industrial sources to the environment: discharges to the land.

When materials are deposited on the land surface or buried below ground, they are not, at least immediately, transported to neighbors by wind and streams, and so may be seen as being properly sequestered. To the contrary, buried materials may slowly migrate through the soil to ground and surface waters or may volatilize into the air above. Humans can be exposed to hazardous materials by drinking groundwater that leached through wastes deposited in soils or by living in areas where gases released by the wastes rise up through the ground.

This is, in fact, what happened at several sites in the United States, with terrible consequences for the families exposed. In the City of Niagara Falls, New York, an abandoned canal built by William T. Love was used by the city, the United States Army, and the Hooker Chemical Company as a dump from the 1920's to 1953, after which it was covered with soil and donated to the city. The area over and around the dump was developed into a residential neighborhood, with many homes and an elementary school. Residents noticed odors and skin irritation after touching the ground, and as time went on, severe health problems in the neighborhood emerged (Gibbs 1998). Elevated rates of seizures, learning problems, eye irritation, skin rashes, abdominal pain, and incontinence were documented in children living around the Love Canal (Paigen et al. 1985). The state of New York began to evacuate families from the Love Canal neighborhood in 1978. In 1980, the federal government declared a public health emergency, evacuating all remaining residents.

Together with other incidents, Love Canal focused public attention on the dangers associated with hazardous waste dumping. Drinking water wells in

Hardeman County, Tennessee, became polluted when waste pesticides and solvents migrated from buried barrels into groundwaters. Liver damage occurred in residents due to high levels of chlorinated solvents in their drinking water (Clark et al. 1982). The public demanded that the federal government act to implement laws that had already been enacted to regulate the management of hazardous wastes.

### ***The Solution***

#### **Origin and Evolution of RCRA**

The Resource Conservation and Recovery Act (RCRA, P.L. 94-580) was enacted by the US Congress in 1976 to provide rules for disposal of municipal and industrial solid wastes, and to encourage nascent recycling programs. RCRA set goals to minimize both the generation of hazardous wastes and the threat to human health and the environment from the treatment, storage, and disposal of the hazardous wastes (US Congress 2002). Although the name “RCRA” is generally applied to all federal hazardous waste management laws and regulations, the 1976 Act is just one statute in a series of legislative initiatives. RCRA is formally an amendment of the Solid Waste Disposal Act of 1965, which first authorized federal regulations for solid waste disposal practices (US Congress 2002).

Although RCRA was in place as legislation through the late 1970’s and early 1980’s, EPA stalled implementation of the law by failing to set the necessary standards and establish a permitting system (Plater et al. 2010). Incidents such as Love Canal and Hardeman County, Tennessee, convinced Congress that the problems of hazardous waste mismanagement were too serious

to allow further delay from a recalcitrant agency, and so Congress passed the Hazardous Solid Wastes Amendment (HSWA) to RCRA (P.L. 98-616). The HSWA of 1984 set new limits on land disposal of wastes and mandated that if the EPA were to miss new deadlines for implementation, land disposal in the US would be banned outright. The tactic was successful, as EPA subsequently promulgated the necessary regulations and set up the mechanics of RCRA enforcement (Plater et al. 2010). RCRA was amended again twice in the 1990's to expand RCRA enforcement to federally-owned facilities (such as the military) and to relax rules for land disposal of certain wastes (EPA 2007a).

RCRA contains several components that together provide a comprehensive framework for solid waste disposal. *RCRA Subtitle D* concerns management of non-hazardous wastes, such as household wastes, and provides state and local governments with guidance and regulations to properly operate municipal solid waste landfills. *RCRA Corrective Action*, created as part of the HWSA, allows EPA to manage the cleanup of sites where hazardous waste releases are currently occurring. The bulk of federal and state implementation of RCRA, however, is a hazardous waste pollution prevention program described in *Subtitle C* of the 1976 Act and fleshed out with regulations following the 1984 HWSA.

### **Hazardous Waste Management under RCRA**

RCRA regulations comprise a “cradle-to-grave” system of hazardous waste management, tracking materials from generation through transportation, storage, and ultimate disposal. The key assumption embodied in RCRA's

solution to hazardous waste mismanagement is that if the location of hazardous waste is known, and that location is secure, then the material is not causing environmental problems (Plater et al. 2010). Facilities that generate hazardous wastes above a minimum rate are required to enter a national registry, reporting the types of hazardous wastes generated. A manifest system is used to track the transfer of hazardous wastes between facilities, allowing regulators to determine the location at any given time of a generating facility's wastes. While materials are still sometimes buried for disposal, wastes are first treated to render them less mobile in air and water, and landfills are lined and covered (EPA 2007a).

Enforcement of RCRA is performed by the EPA and state agencies to which EPA has "delegated" hazardous waste enforcement programs. Forty-eight states nationwide, and all states in New England, have been delegated authority to implement RCRA enforcement programs. In these states, state agencies manage the majority enforcement work, but the EPA regional programs also perform compliance monitoring, development enforcement actions, and conduct reviews of state programs. The EPA has 10 regional offices that interact with the regulated community (referred to in regulations as hazardous waste "handlers") by inspecting facilities for compliance with RCRA regulations, and bringing enforcement actions against those that are in violation.

The most tightly regulated hazardous waste handlers are those that operate hazardous waste Transfer, Storage, and Disposal Facilities (TSDFs). TSDFs each require a permit from a regulatory agency that sets rules for wastes accepted, treatment processes employed, and monitoring to be performed. Regulations for

operation of a TSDF include personnel training, emergency planning, labeling containers, maintaining container integrity, groundwater monitoring, air monitoring, reporting, and other requirements. In addition, TSDFs are required to set aside money providing financial assurance that they can be properly closed if the entity were to go out of business. Since the HWSA was enacted, the increased complexity and expense of TSDF operation has driven smaller, financial marginal operations from the market (Plater et al. 2010). In 1982, EPA estimated that hazardous waste disposal was occurring at more than 180,000 sites nationwide (Plater et al. 2010). EPA statistics for 2009 show only approximately 800 operating TSDFs nationwide (EPA 2010).

While the number of TSDFs has been reduced dramatically since the implementation of RCRA, there are still a large number of other hazardous waste handlers in the US, most of them falling into the category of hazardous waste *generators*. Hazardous waste generators are primarily industrial entities, but institutions such as universities, hospitals, and the military are also sources of hazardous wastes. Approximately 390,000 facilities in the US are registered with the EPA as hazardous waste generators. RCRA creates a three-tiered system to categorize hazardous waste generating facilities according to the amount of hazardous wastes generated monthly. The top tier, of which there are approximately 25,000 in the US, are labeled “Large Quantity Generators” and produce at least 1,000 kilograms of hazardous waste per month (or 1 kilogram of substances defined as “acutely hazardous”). The second tier, of which there are approximately 150,000 in the US, are labeled “Small Quantity Generators” and

produce at least 100 kilograms of hazardous waste per month. The third tier, of which there are approximately 200,000 in the US, are labeled “Conditionally Exempt Small Quantity Generators.”

Large Quantity Generators have the most stringent requirements of hazardous waste generating facilities. Regulations require facilities to follow many similar procedures as TSDFs to perform emergency planning and employee training, and follow requirements specific to waste generation including identifying hazardous waste streams, reporting processes that generate hazardous wastes, properly storing hazardous waste prior to shipping, and tracking shipments of hazardous waste using manifests. Small Quantity Generators are required to follow many of these same regulations, but are allowed to store hazardous wastes on-site for a longer period of time and have fewer requirements for compliance documentation. Conditionally Exempt Small Quantity Generators are exempt from most of the requirements, but are still required to ensure that hazardous wastes are delivered to an appropriate TSDF (EPA 2007a).

Approximately 13,000 entities transport hazardous waste in the US. Transporters are required to register with the EPA, comply with the system for tracking hazardous wastes with manifests, and handle wastes according to EPA and US Department of Transportation regulations.

Since only TSDFs need to seek a permit, RCRA is sometimes referred to as “self-implementing.” Hazardous waste handlers are responsible for determining their regulated status and complying with regulations, often with little interaction with regulatory agencies. While the EPA and state agencies have

a variety of ways to educate handlers and persuade them to comply, the primary means by which the agencies implement RCRA is by legal enforcement.

Enforcement is necessary to combat the economic incentives for handlers to avoid the costs of proper hazardous waste management. Environmental agencies are given broad powers by RCRA to inspect hazardous waste handling facilities, and to compel facilities to comply with regulations as is necessary.

### ***RCRA Enforcement in Region 1***

#### **Administration of the RCRA Enforcement Unit**

The EPA, created in 1970, is an executive branch federal agency with the responsibility to write regulations for, and carry out enforcement of, environmental laws passed by the US Congress. To accomplish this, the EPA has 12 Headquarters Offices that write regulations and perform nationwide oversight and 10 Regional Offices that enforce regulations and perform oversight of state programs within their regions. The Region 1 office of the EPA, located in Boston, Massachusetts, has responsibility for the six New England states: Maine, Vermont, New Hampshire, Massachusetts, Connecticut, and Rhode Island (EPA 2013a). Environmental laws enforced by the EPA include the Clean Air Act (P.L. 88-206), the Water Pollution Control Act (P.L. 92-500), and RCRA.

The RCRA Enforcement Unit is administered from within the Region 1 Office of Environmental Stewardship (OES). OES contains technical enforcement staff, such as the RCRA Unit, and legal enforcement staff, who collaborate to bring enforcement actions against entities determined to be out of compliance with environmental laws. In addition, OES contains compliance

assistance staff who use outreach and education to encourage environmental compliance (EPA 2013b).

### **Program Mission and Objectives**

The Unit has a mission to protect human health and the environment from the risks associated with exposure to hazardous wastes. To accomplish this, the Unit pursues two objectives: compliance by hazardous waste handlers in New England with RCRA regulations and consistency of state hazardous waste enforcement program in New England with national standards.

### **Program Components**

The Unit's program objectives are pursued through two main components of program operations. In order to improve compliance with RCRA regulations at hazardous waste handlers in New England, the Unit performs compliance monitoring of regulated entities, and when handlers are determined to be out of compliance, takes enforcement actions against these handlers. Pursuant to its objective to promote consistency of state hazardous waste enforcement programs with national standards, the Unit performs evaluations of state programs, communicating findings of best practices and areas for improvement in publically available reports.

### ***Compliance Monitoring and Enforcement Actions***

A main element of the Unit's RCRA enforcement program is to perform compliance monitoring of regulated facilities and take enforcement actions against those facilities determined to be out of compliance. Compliance monitoring in RCRA enforcement is accomplished through inspections of

regulated facilities and review of facility records. Inspections of hazardous waste generators allow the Unit to gather information about the processes used by facilities that produce hazardous wastes, the practices used by facilities to manage hazardous wastes, and manifests for hazardous wastes transported off-site. Inspections of TSDFs involve a thorough review of the facility's conformance on-site with the conditions and standards set by their permits. Hazardous waste transporters can likewise be evaluated for compliance with standards for manifests and for allowable storage time (EPA 2007a).

Following an inspection, the Unit staff member with lead duty on the inspection reviews information gathered and, if necessary, develops an enforcement action. Preparing an enforcement action is a multi-step process in which various activities are performed to document the extent and severity of violations, to calculate an appropriate penalty to be assessed from the facility, and to bring legal action that ensures a return to compliance

Figure 1 displays a flow chart for formal enforcement actions and Figure 2 displays a flow chart for informal enforcement actions. The initial steps to preparing both an informal action (used for less severe violations) and a formal enforcement action (used for more severe violations) are similar, but a formal enforcement action requires additional steps to create an Order requiring facilities to pay penalties and to institute proper hazardous waste management practices. Before a facility is inspected, background research is performed on the facility to estimate the types of processes and wastes likely to be encountered during the inspection. An inspection reviews a facility's practices for hazardous waste

management and documentation of regulatory compliance. Following an inspection, additional follow-up information may be requested either informally or, for more detailed information requests, through the formal information request authorities provided by RCRA. The Unit staff member compiles an inspection report summarizing observations made at the facility and reviews results of information requests to determine if the facility is in compliance with hazardous waste regulations. If a Unit staff member determines that violations are present at the facility, an Enforcement Summary is written, recommending that either an informal or a formal enforcement action be pursued (EPA 2003a).

In federal fiscal years 2008 through 2010, the Unit completed 121 inspections of hazardous waste handlers, developing 19 informal enforcement actions and 21 formal enforcement actions, and assessing approximately \$540,000 in penalties (EPA 2013c).

Criteria for the appropriateness of informal enforcement actions and formal enforcement actions are set forth in a national guidance document, the Enforcement Response Policy (ERP, EPA 2003a). The ERP states that formal enforcement actions should be used whenever facilities are determined to be “Significant Non-Compliers.” Significant Non-Compliers are “those facilities that have caused actual exposure or a substantial likelihood of exposure to hazardous waste or hazardous waste constituents; are chronic or recalcitrant violators; or deviate substantially from the terms of a permit, order, agreement or from RCRA statutory or regulatory requirements” (EPA 2003a, 4). Informal actions should be used when facilities are determined to be “Secondary Violators;” these facilities

have violations, but pose no actual threat or a low potential threat of exposure to hazardous waste. *While both formal and informal enforcement actions require that facilities return to compliance, only the formal action can include an assessment of a penalty.*

Penalties perform an important role in the program theory employed by RCRA enforcement programs nationwide. Monetary penalties are designed to serve as a deterrent against non-compliance at facilities throughout the regulated community. There are too many facilities in New England (approximately 22,000) for the Unit to inspect (EPA 2010), but by publicizing enforcement actions, EPA can also produce a “general deterrent” effect (Gunningham, Thornton, and Kagan 2005).

Developing a formal enforcement action, however, is a complex endeavor. Following a Determination of Violations, the Unit staff member calculates an appropriate penalty for the case based on the RCRA Civil Penalty Policy (EPA 2003b). The Penalty Policy is extremely detailed, with provisions for recovering the economic benefit of non-compliance, and assessing punitive penalties based on the potential for harm to human health and the environment, and based on the extent of regulatory deviation. Penalties for severe cases typically reach tens of thousands of dollars, and larger facilities with more significant violations can reach hundreds of thousands or even millions of dollars. A Unit staff member partners with an EPA staff attorney to write a legal Complaint and negotiate a Consent Agreement Final Order with the regulated entity. The Consent Agreement Final Order is an administrative action by which the regulated entity

agrees to provide injunctive relief to ensure compliance with RCRA regulations and to pay a penalty to the United States government.

### ***Oversight of State Hazardous Waste Enforcement Programs***

The secondary responsibility of the Unit is to perform oversight of delegated state hazardous waste enforcement programs. Like other federal environmental statutes, RCRA is primarily implemented by state governments that have been delegated responsibilities for enforcement. The EPA Region 1 enforcement program acts as a backstop to state programs: providing expertise and logistical support for large facilities or novel situations where additional regulatory interpretation is required. In delegated states (which includes all six New England states), EPA conducts periodic reviews of state programs, identifying best practices and areas for improvement. In 2004, a consortium of state agencies and the EPA created the State Review Framework (SRF) to create a consistent, transparent system for reviewing state enforcement and permitting practices (US Government Accountability Office 2009). Reports are conducted on a four-year cycle, and states are evaluated on criteria such as data management, number of inspection performed, documentation of enforcement action decisions, and timeliness of enforcement actions (EPA 2012a and EPA 2009a).

### ***Impetus for a Program Evaluation of the Unit***

The RCRA Enforcement Unit's mission to protect human health and the environment from the risks associated with exposure to hazardous wastes is very challenging, and because of the large number of regulated facilities, one that will

always demand all of the resources available. In order to fulfill its mission to the maximum extent possible, the Unit must maximize the efficiency with which they implement their program. In this thesis, I focus on the element of the Unit's program concerning the development of enforcement actions, because in my time with the Unit, this program element appeared to occupy the preponderance of staff members' time and embody their mission most directly. If the Unit can decrease the time required per enforcement action, the staff can perform a greater number of inspections, correcting violations of hazardous waste regulations at a greater number of facilities, and increasing the number of formal enforcement actions with which to provide a general deterrent.

In addition to maximizing program effectiveness, the Unit also has responsibilities to implement its program according to national RCRA enforcement standards. Just as the state programs are subject to periodic review by the EPA regional office under the State Review Framework (SRF), the Unit's program is subject to periodic review by EPA headquarters. In an SRF report, among other categories, the timeliness of enforcement actions is reviewed. The Enforcement Response Policy (ERP) includes guidelines detailing the maximum duration between the inspection of a facility and several enforcement action development milestones. An internal review of the program's process can help the Unit develop a thorough understanding of the timeliness with which it is developing enforcement actions, and help the Unit correct any shortcomings before the SRF is conducted. Program evaluation provides a systematic means for performing such reviews of a program's performance.

## Chapter 3: Methods

Program evaluation is a versatile and powerful tool for learning about programs. Evaluation can help answer a variety of questions, from clarifying what needs a program should be addressing to performing an analysis of the relative costs and benefits of a program. Depending on the purpose of an evaluation, methods are available that can be used to document the problem addressed by a program, the processes employed by a program, or the results achieved by a program. As this evaluation progressed from design to implementation to reporting, the study questions evolved to reflect my increasing understanding of the RCRA enforcement program's operations and the challenges it faces. The study methods selected are tailored to answer the following three questions:

1. How does the Region 1 office of the US EPA develop RCRA enforcement actions?
2. How can a staff time allocation monitoring study be useful to understand and improve the Unit's implementation of a RCRA enforcement program?
3. What recommendations for future time allocation monitoring studies can be made based on the experience of performing this pilot study?

Rather than attempting to demonstrate the value of the program, these questions focus on providing information that can be used to improve the program. A measure of program implementation not previously used within the Unit – time allocation – was piloted, and its utility to the program and the methods by which it was monitored are evaluated. The first question is addressed

through interviews with staff members and a pilot staff time allocation monitoring study of the Unit's development of enforcement actions. The second question is addressed by analyzing the resulting data set for patterns and discussing results with program staff members. The third question is addressed by reflecting on the methods selected and postulating how other methods may result in more useful results.

### ***Uses of Evaluation***

Posavac and Carey (2003, 13) summarize the purpose of program evaluation as “contributing to the provision of services to people in need.” Likewise, Carol Weiss (1998, 4) defines program evaluation as “a means of contributing to the improvement of [a] program or policy.” The definition provided by Rossi, Freeman, and Lipsey (1999, 20) describes evaluation as a process designed to “inform social action in ways that improve social conditions.” By closely examining the operations and the results of a program, evaluation can provide useful feedback to understand what a program is doing and if a program is successful. Evaluation is used to improve societal conditions by expanding efforts that are successful, find ways to improve programs functioning below their potential, and eliminate programs that are beyond redemption.

### ***Types of Program Evaluation***

Two frameworks are used to contextualize this study within the diverse field of program evaluation. Both of these frameworks present a “developmental” model of program evaluation, placing types of evaluations along a continuum according to the focus of assessment: from program needs to program processes

to program outputs. Rossi et al. (1999) categorize evaluation into assessment of: (a) the need for the program, (b) the design of the program, (c) program implementation and service delivery, (d) program impact or outcomes, and (e) program efficiency (cost-effectiveness). Jacobs (1988) uses a five “tiered” framework of evaluation types and purposes: (1) needs assessment, (2) monitoring and accountability, (3) quality review and program clarification, (4) achieving outcomes, and (5) establishing impact. These models are developmental in that, as programs develop from vaguely defined to highly articulated, the categories of evaluation progress from more general investigations of the need for a program and the activities performed by a program to more sophisticated investigations into the efficacy of program logic.

Many considerations are relevant to the choice of evaluation type for a given program. The purposes for conducting an evaluation – be they demonstrating results for program sponsors or gathering program implementation information to help make internal program management decisions – are one consideration. Resources such as time and money available for evaluation may constrain the types of evaluations that can be completed. Knowledge gaps about the program may exist in uncertainty about the proper design of the program or in how a program should be implemented. Above all, evaluators should strive to produce an evaluation that is useful; this is likely to be very situation-specific and should be worked out in consultation with people with intimate knowledge of the program (Weiss 1998).

## **Outcome Evaluations**

“Outcome evaluation” is a general term for evaluations that focus on program results. Outcome evaluations seek to determine the extent to which a program is accomplishing its goals by examining conditions of program participants and non-participants, changes in program participants over time, or otherwise attempting to measure how a program is having an impact of the problem it is designed to ameliorate (Rossi et al. 1999). Outcome evaluations include what Rossi et al. (1999) call (d) the program impact or outcomes, as well as what Jacobs (1988) calls (4) achieving outcomes and (5) establishing impact. Outcome evaluations are often sought by program participants, funders, and observers eager to learn about the success of a program, and may be used to make decisions about future expansion, replication, or elimination of a program.

Determining the outcome of a program in complex policy environments, however, is a challenging endeavor. In order to document causality between a program and perceived changes in its target problem area requires a sophisticated design (including control groups and randomized sampling) and commensurately large amounts of time and money. Some suggest that most organizations are not prepared to attempt outcome evaluations (Snibbe 2006). Many programs do not have the combination of clearly-articulated theory, accurate implementation, and thorough records that will make a proper outcome evaluation feasible.

Attempting an evaluation without these factors in place will expend valuable time and energy to only obtain ambiguous or misleading results. In fact, since evaluation results are rarely used to make immediate “go or no-go” decisions

about the continuation of a program (Weiss 1998), evaluators would be wise to adopt alternative designs that have a higher likelihood of yielding actionable results.

### **Process Evaluations**

A “process evaluation” is not done to measure the results of a program, but instead to study the activities of which the program is comprised. A process evaluation seeks to measure what kinds of services, how much service, and under what conditions a program is providing services (Posavac and Carey 2003). Lin (2000) succinctly describes a process evaluation as, “the study of what a policy actually is.” Process evaluation is represented in the third domain of the framework presented by Rossi et al. (1999) as evaluation of implementation and service delivery. Process evaluation includes simply recording the activities of a program, as described by Jacobs (1988) in Tier 2 of her framework as “monitoring and accountability,” and a comparison of activities performed against some standard, as described by Jacobs in Tier 3 of her framework as “quality review and program clarification.”

Process evaluation can play a critical role in both the short- and long-term management of programs. In the short-term, documenting the activities performed by a program can lead to insights into ways that a program can be improved. As Weiss (1998) suggests, most programs are never finalized, but continually develop over time. If inefficient procedures and unnecessary delays are observed in a process evaluation, then programs can make changes to remove impediments to its operations. A process evaluation compiles operational data

into a digestible form that can help bridge the gap between the everyday frustrations encountered by staff members and managers who seek to help maximize program efficiency. By bringing to light the practices used by various staff members to do their work, a program can identify innovations that are worthy of replication by other staff members and of incomplete or inappropriate interpretations of program policies that should be corrected.

In the long term, process evaluation supports outcome evaluation. An outcome evaluation performed on its own would have no basis for distinguishing between a poorly designed program and an improperly implemented program. Rossi et al. (1999) identify three ways in which program implementation failure occurs: no, or not enough, intervention is delivered; the wrong intervention is delivered; and/or the intervention is nonstandard, uncontrolled, or varies across the target population. A process evaluation can document any discrepancies between program design and program implementation, allowing evaluators to continue towards an outcome evaluation with a clear understanding of the program that they are evaluating.

Many methods can be used to collect information for a process evaluation. Potential information sources include recipients of program services, program staff members, program records, and the opinions of experts with knowledge of a program. Data collection can be done using interviews, observation of activities, written surveys, or summaries of program records. To the extent possible, methods should result in data that are not influenced by the process of observation, reflects objective behaviors (not vague characteristics), reliable

enough that results can be replicated, and sensitive enough to detect changes over time. Use of multiple methods is advantageous because the weaknesses of one method can be complemented by the strengths of another method (Posavac and Carey 2003). Ultimately, the methods appropriate for an evaluation depend upon the specific purposes of the evaluation, i.e., the questions being asked.

### ***Time Allocation Monitoring***

Time allocation monitoring is a method of data collection whereby detailed records are maintained of the activities performed by program staff members. By documenting the types of activities performed, when, and for how long, activities are performed, time allocation monitoring can create a detailed account of program processes. Programs can analyze time allocation monitoring data to learn about the relative emphasis being placed on each program element, or how various activities are performed to carry out a program element. As with any process evaluation, the results indicating how a program is implemented can provide feedback for efforts to improve program management.

Time allocation monitoring is an attractive method for collecting program information, in part, because the data resulting are objective, and therefore less sensitive to differing perceptions of program operations among staff members than other methods. Program staff members, relying on their institutional knowledge, may be able to give descriptions of the way that projects (for example, development of enforcement actions) are completed, but when accounts vary regarding how a process is performed, evaluators may be left with no way to compile descriptions in a meaningful way, or to understand which accounts

represent typical conditions and which represent outlying cases. The amount of time expended on a project in a day, or to particular activities towards a project in a day, are discrete quantities that are not easily influenced by staff biases or faulty memories, and may therefore be appropriate measurements to adopt in a process evaluation.

Time allocation monitoring allows program data to be collected at a reasonable cost to both the evaluator and to program staff. Evaluator time commitments are low once an instrument for data collection is established – staff can record time allocations with no day-to-day involvement from the evaluator. Although time allocation monitoring must be performed frequently to ensure data accuracy, the simplicity of time allocation data minimizes the amount of effort required per data collection event, and the total expenditure of staff effort can remain low.

The quantitative nature of time allocation monitoring allows for easy aggregation of data across staff projects and staff members, but is also a limitation. Unlike more open-ended methods of inquiry such as interviews or direct observation, time allocation monitoring provides a narrow view of program operations. Without contextual information, however, variation between projects would not be accounted for, and learning about the reasons for the time allocations observed would be limited. For this reason, time allocation monitoring may be best employed when paired with another research method that allows for narrative descriptions to supplement time allocation data.

Time allocation monitoring results can be analyzed from a variety of perspectives to gain insight into program implementation. For example, an evaluation of a program to improve health care access and social supports for youth investigated variations in program implementation across different populations (Jacobs, Oliveri, and Greenstone 2009). By collecting daily logs from staff over a three-week period, the time allocation analysis revealed that boys involved in the program received much more direct contact time with staff than did girls. An evaluation of school counseling programs was planned to learn about variation in program implementation across different sites (Gysbers et al. 1992). By documenting counselor time allocation between four main program elements, the evaluation would determine the degree to which each program component is implemented at each site. Finally, an evaluation performed at a medical office allowed evaluators to describe changes in the time allotted per patient brought about by the implementation of electronic health records (Pizziferri et al. 2004).

Time allocation monitoring is well-suited to informing systematic efforts for program improvement because it provides specific information on program operations. Business and government organizations have developed various protocols for “continuous quality improvement” to improve performance by eliminating waste, reducing inconsistencies, and empowering front-line workers (Gabor 1990). Formalized into procedures such as “Total Quality Management,” “Lean,” and “Six Sigma,” continuous quality improvement places an emphasis on carefully monitoring program process data (Ross & Associates 2011). By

examining metrics such as time inputs, cost, quality, outputs, and process complexity, programs can identify areas of possible process improvement and have opportunities to assess the success of changes made to the process (EPA 2009).

### ***Program Evaluation in the Federal Government***

With a goal to reduce waste and inefficiency in federal programs, the Government Performance and Results Act of 1993 (P.L. 103-62) created a mandate for all federal government programs to undertake program evaluation. The Act sought to improve Congressional oversight and governmental managerial effectiveness by identifying program goals and reporting on results in obtaining those goals (US Congress 1993).

EPA has implemented the mandates of the Government Performance and Results Act, in part, by instituting the State Review Framework (SRF). In addition to its use by EPA Regional offices as a tool for oversight of state programs, EPA headquarters uses the SRF to report the performance of EPA regional offices. By tabulating numbers of enforcement actions, amount of penalties assessed, and reviewing the thoroughness and accuracy of program records, the SRF provides a periodic process evaluation of EPA programs (Industrial Economics 2005). The SRF process evaluations provide valuable information regarding *what* a program is producing and *how* a program produces those outputs. Further opportunities may exist, however, for more detailed process evaluations. In addition to adopting the standardized SRF required of all EPA regions and state programs, the Unit may benefit from adopting time

allocation monitoring as an evaluative tool that helps them delve further into the process of enforcement action development, leading to more specific guidance for improving their program.

### ***Study Design***

A pilot process evaluation of enforcement action development by the RCRA Enforcement Unit at the EPA New England Regional Office was performed to learn about the utility of time allocation monitoring for program improvement and evaluation. Time allocation monitoring, augmented by interviews and discussion with staff members, may hold promise for providing detailed information about program implementation that can be used to make enforcement action development faster and more efficient. By documenting methods used to perform this evaluation, this study hopes to improve not only understanding of the program, but also how evaluations such as time allocation monitoring are best implemented in such a program.

### **Site Description**

The Unit consists of five full-time staff members and one half-time Senior Enforcement Coordinator. The Unit performs compliance monitoring of hazardous waste handlers in New England, develops enforcement actions when violations are observed, and performs oversight of delegated hazardous waste enforcement programs implemented by the six New England states.

The Region 1 Office has been implementing a similar program of RCRA Enforcement for at least 25 years, and together with guidance published by EPA Headquarters, has developed a well-specified program. EPA has clearly

articulated the goals and scope of RCRA enforcement, and created numerous policies and manuals that describe how programs should perform compliance assessment and develop enforcement actions. Many program measures are in place through the State Review Framework that can be used to evaluate the fidelity of the program to the national model.

### **Study Motivation**

In my first several months working in the Unit, I met regularly with program staff members to discuss opportunities for me to learn about the program and find projects that would assist the program achieve its goals. Program staff members stated that they were interested in two goals: demonstrating the effectiveness of their program and improving the efficiency of their program. The Unit seeks to demonstrate its effectiveness to EPA management and to the public in order to preserve, and perhaps expand, the resources it receives to complete its mission. In order to maximize its effectiveness in such an assessment, the Unit seeks to improve its efficiency. The Unit seeks to increase the number of enforcement actions it takes per year without sacrificing the quality or the significance of enforcement actions taken.

I proposed a time allocation monitoring study for piloting because this method of evaluation holds considerable potential for facilitating program improvement, but is not typically performed in the management of public environmental programs. Time allocation provides a program metric that is particularly relevant to measuring the Unit's progress towards its goal of increasing the efficiency with which it develops enforcement actions. By

improving understanding of how the Unit distributes effort towards various enforcement action development activities, this study can highlight the activities that are most impactful on the overall efficiency of enforcement action development. In addition, a time allocation monitoring study will document the schedule on which enforcement actions are developed, allowing analysis of results to demonstrate when periods of non-activity occur.

Time allocation monitoring may play a useful role for the Unit to develop capacity to perform an evaluation of program effectiveness by adding to documentation of the Unit's processes and to aid in program improvement by providing information on which to base program management decisions. Using Jacobs' framework, time allocation monitoring is a "Tier 2" activity, answering basic questions about "by whom, when, and at what cost is a program being implemented?" (Jacobs and Kapuscik 2000). This lower tier of evaluation is appropriate for the Unit because, although RCRA enforcement is well-specified by EPA headquarters, the Unit has not recently implemented a process evaluations of its own program, and may not be prepared to compare its program to program standards (as in a Tier 3 evaluation), or determine program effectiveness (as in a Tier 4 evaluation). Before attempting higher tiers of program evaluation, the Unit should thoroughly understand how the RCRA enforcement program is implemented locally, and develop new metrics (such as, potentially, time allocation information) that can be used in future evaluations. In the mean time, new metrics of program implementation may be useful for improving program efficiency.

## **Study Time Frame**

This study was performed to pilot time allocation monitoring for use in the RCRA enforcement program and, as opposed to programs where time allocation monitoring has been institutionalized, the study time frame was limited from the outset. In addition, this study was constrained by the time available for preparing a master's thesis. The study period spanned five-and-a-half months, from July 15, 2012 to December 31, 2012. Since RCRA enforcement actions can take more than a year to develop, this time frame is shorter than is optimal for studying program process, but represents an acceptable concession to practical considerations. I attempted to compensate for this study's short time frame by selecting some projects for monitoring that were at the beginning of the enforcement action development process at the start of the study period, and other projects that were already further along in development.

## **Staff Participation**

This process evaluation used program staff as its primary source of data, both for time allocation monitoring data, and for descriptive information about the enforcement action development process and the projects studied. During study design, one-on-one interviews were conducted with most staff members to learn about the two types of enforcement actions (formal and informal) that the Unit develops, and the activities comprising both kinds of enforcement actions. The flow charts displayed in Figure 1 and Figure 2 are the result of these interviews.

At a staff meeting in May 2012, I proposed a pilot study to investigate the use of time allocation monitoring in program process evaluation. Staff members

were not overwhelmingly enthusiastic about performing time allocation monitoring, but agreed to participate. My rotation in RCRA enforcement ended in May 2012 and during data collection, I had only occasional contact with staff. I was, however, able periodically visit the Unit and offer assistance with use of the data collection instrument.

During the first several weeks of the study period, I checked the recorded time allocations weekly, noting which staff members had used the data collection instrument and which staff members might still have needed instruction on its use. Thereafter, I performed monthly checks of recorded time allocations, and after each of the first three months, I sent updates to the staff thanking them for their participation and summarizing preliminary results. Following the study period, I presented study results at a staff meeting, and solicited feedback on study methods and implications of the results. Separately from the staff meeting, I had informal discussions with staff members regarding their experience performing time allocation monitoring.

My time and staff members' time were limiting factors in the amount of staff participation that were incorporated into the study. While a more participatory model of evaluation for the purposes of program improvement may have been desirable, reaching consensus on study design would require time to negotiate, and could result in a decision not to implement a monitoring study at all. For this study, staff members were consulted in delineating the activities that comprise enforcement actions and to provide narrative descriptions of their

projects to supplement the time allocation data, but did not have significant participation in study design.

## **Sample Selection**

### ***Sample Selection Options***

Two consequential decisions were made in selecting a sampling design, both regarding a tradeoff inherent in collecting sufficient information to describe program operations and requiring staff members to commit precious time to recording their time allocations.

The first consideration for designing a sampling strategy involved the *scope* of time allocation monitoring selected. The scope refers to the number of program elements that are included in time allocation monitoring. At one extreme, every hour for which program staff members are paid could be monitored, including state oversight duties, time off, and “overhead” activities not ascribed to any particular program element. Including all program activities in the monitoring scope is attractive because this approach leaves little question about the overall importance (in terms of time allocation) of each program responsibility.

A drawback of a wide scope of time allocation monitoring is that more time is required of staff to record monitoring information. Staff members’ time is precious and any time dedicated to time allocation monitoring is time that is not spent on protecting the public from risks associated with hazardous waste management. Another drawback of a wide scope of time allocation monitoring is that staff members may be uncomfortable with this level of scrutiny. Staff

members may worry that the results will be used to bring sanctions against individuals whose time allocations are deemed inappropriate. When workers fear that monitoring information can be used against them, they are not motivated to participate, and may even conceal or falsify information (Posavac and Carey 2003).

The second consideration for designing a sampling strategy is the *detail* of time allocation monitored. Detail refers to the amount of specificity to which activities are described. A program element, such as developing enforcement actions, can be broken down first according to project (the facility inspected), and then according to activities within a project, such as performing an inspection or writing an inspection report. Boundaries between activities are not always clear, and judgment is required to arrive at activity categories that are numerous enough to provide useful descriptions of work, but not so many as to make the process of recording activities cumbersome.

Typically, a time allocation monitoring study identifies specific activities to be tracked at the outset of a study. Identifying activity descriptions before a study begins, rather than leaving participants to devise their own system of activity description, allows for easier compilation of time allocations between staff members and over time. Activity descriptions can simply be the program elements, as was done in the school counseling evaluation proposed by Gysbers et al. (1992), or subcategories, created by breaking each program element into constituent activities, as was done in the youth healthcare and social support program evaluated by Jacobs, Oliveri, and Greenstone (2009). Again, a key

consideration is the staff time that will be required to perform time allocation monitoring. A more detailed scheme for categorizing activities may have payoffs in obtaining more useful results from time allocation monitoring, but demanding too much detail can create an unacceptable burden on staff to understand and implement the monitoring study.

### ***Sample Selection Employed***

This study is the first attempt to monitor staff time allocation in the Unit, and therefore it took a conservative approach to asking staff members to devote time to program monitoring. The scope of the study is limited to the development of enforcement actions, and so does not include program elements such as state oversight, training, internal communications, public outreach, and time off. No formal statement is available as to the relative importance of each of these responsibilities, but development of enforcement actions is the primary responsibility of the Unit, and is the focus of efforts to improve performance. The scope of the time allocation monitoring is limited further by not including all instances of enforcement action development. Instead, only time allocated to a sample of enforcement actions is monitored. By sampling enforcement action development projects, a less comprehensive description of enforcement action development is provided, but a representative sample of projects may be able to achieve a reasonable description of the Unit's process to develop enforcement actions.

Limiting the scope of the time allocation monitoring to a sample of enforcement actions reduces the additional time that staff needs to devote to

performing program monitoring and may help to mitigate concerns about intrusive monitoring. By not recording all time allocations, staff members are also not as vulnerable to criticisms that too much time or too little time is allocated to the sampled enforcement actions. By the same token, however, the lack of a complete picture of how staff time is allocated does not allow for the sample enforcement actions to be placed into the context of all activities performed, potentially limiting the usefulness of the time allocation monitoring results.

Program records indicate that an average of approximately eight inspections per year are performed by each of the five Unit staff members (see Table 1). Since the sample period was approximately half a year, I expected staff to be working on approximately four projects during the study period. By choosing two projects to sample, I expected that the sample would include approximately one-half of staff work on enforcement action development during the study period.

To provide confidentiality of the identity of staff members and regulated hazardous waste handlers, all names of facilities and staff members have been removed from this presentation of study results. EPA policy prevents disclosing details of on-going enforcement actions, and staff members requested that their names not be attached to the study report. Inspections and enforcement actions are referred to as “Projects” with a two-digit identifier attached, e.g., “Project 03.” Staff members developing enforcement actions are coded with letters “A” through “E,” e.g., “Staff Member B.”

Table 2 presents core elements of the enforcement action development projects selected for this study. Sample projects were selected from lists that the Unit maintains of inspections completed in past years and planned for the current year. Sample project were selected to representative of the Unit's work according to the following criteria:

- Program staff member;
- Type of hazardous waste handler (TSDFs, Large Quantity Generators, Small Quantity Generators);
- Type of enforcement action (formal actions, informal actions); and
- Stage of enforcement action development (early activities, later activities).

Sampling according to stage of enforcement action development was necessary due to the long duration of some enforcement action development projects. Because formal enforcement action development frequently takes longer than the time available for this study, a formal enforcement action (Project 03) that had already been partially completed was selected in order to observe the amount of time devoted to the later stages of formal enforcement action development. While most projects selected had already been inspected at the start of the study period, one inspection (Project 04) was selected that had not been inspected at the start of the study period, so that the inspection activity could be captured in time allocation monitoring.

In addition, each potential project selected was screened with Unit staff members to verify that the work on the project was anticipated during the study

period. Several projects initially selected were rejected in favor of others deemed by staff as more likely to have time allocated during the study period.

### **Instrument Development**

To provide for a consistent, convenient procedure to collect time allocation information, I created a computer application and database called “*TimeTracker*.” A computer application was attractive compared to a paper form because it eliminated the need for me to collect and compile the reports. Staff members are all familiar with using computers, so I felt that technology would not present a barrier. The program interface is a familiar combination of pull-down lists, multiple choice buttons, and text entry boxes. *TimeTracker* was customized for each staff member to provide prompts for the sample enforcement actions that had been selected for them. To promote data accuracy, staff members were encouraged to enter time inputs for sample enforcement action development projects at the end of each day on which a project was worked on (Lewis 2007). A calendar interface was also available for entry of time inputs for up to two weeks previous.

The activities described in the enforcement action flow charts were available to categorize time devoted to a particular project, sorted by the type of enforcement action being pursued. The amount of time allocated to each activity on the selected projects could be entered, and space was provided for optional explanatory comments. Following data entry, staff members used a button in *TimeTracker* to upload results to a database on shared computer network space. In the event of problems using *TimeTracker* or time allocated to projects that were

not recorded in *TimeTracker* within the two-week maximum allowed by the program, staff members could also email descriptions of time allocations directly to me, and I could enter information into the database. An instruction manual was provided on use of *TimeTracker*, and staff members were instructed to contact me with any questions.

### ***Institutional Review Board and Human Subject Considerations***

To ensure that the staff members from whom time allocation data were collected were not put at risk by the proposed study, I requested for EPA Region 1 Human Subjects Research Coordinator to make a determination as to whether the study comprised human research and should therefore be reviewed by the EPA Institutional Review Board. Upon receiving a short description of the proposed study, the Human Subjects Research Coordinator determined that the study does not comprise generalizable research, and is therefore not subject to Institutional Review Board oversight.

### **Data Analysis**

Time allocation data and discussions with program staff members are analyzed to answer the three study questions.

### ***Question #1: How does the Region 1 office of the US EPA develop RCRA enforcement actions?***

Time allocation data are summarized by project to provide descriptions of the process used by the Unit to develop individual enforcement actions. Data are also summarized across projects to provide descriptions of the process used by the Unit to develop different types of projects, and the process used by the Unit to develop projects overall.

Various ways of presenting time allocation data are used, each with advantages for analyzing results. Tabular presentation of time allocation data displays the raw data as submitted by staff members. Pie charts are used to conveniently display relative proportions of different activities that comprise a single project or a group of projects. A histogram is used to present the quantity of time allocation monitoring results across all sample projects.

An important consideration in analyzing the time allocation monitoring data is protecting confidential enforcement information. Specific information regarding on-going enforcement actions is classified as confidential by the EPA. Any information that could be used to identify a regulated facility, such as the date of an inspection, is not presented in this report. Tables displaying time allocation data can only show dates of activities if the inspection is not included in the results. Therefore, the one project (Project 04) for which the inspection was included in the study period, is presented with days relative to the date of inspection rather than dates of activities.

***Question #2: How can a staff time allocation monitoring study be useful to understand and improve the Unit's implementation of a RCRA enforcement program?***

The results obtained from time allocation monitoring are examined for information suggesting possible areas for program improvement. In particular, the study seeks to identify opportunities for the program to improve its efficiency in developing enforcement actions. By identifying the activities that comprise the largest proportion of enforcement action development, the Unit can focus their efforts to reduce the time required per enforcement action. In addition, the project

timelines are examined to identify periods of inactivity in enforcement action development. The Unit may be able to improve the timeliness with which it develops enforcement actions by reducing these periods of inactivity.

***Question #3: What recommendations for future time allocation monitoring studies can be made based on the experience of performing this pilot study?***

Study design components such as staff participation, study time frame, scope of sampling, detail of sampling, and the data collection instrument are analyzed to identify strengths and weaknesses of the design selected.

Recommendations are provided for future efforts at time allocation monitoring in the Unit and in similar programs.

***Summary of Methods***

A time allocation monitoring study piloted in the RCRA enforcement program in Region 1 of the US EPA was conducted to learn about program implementation, to assess the utility of time allocation monitoring as an evaluative tool, and to generate recommendations for methods to implement future time allocation monitoring studies. Time allocation monitoring was selected for investigation because this type of process evaluation can provide detailed, quantitative information about program implementation not currently available to the Unit, and this information may have a high potential for utility for program improvement.

## **Chapter 4: Results and Discussion**

For 5.5 months, the five Unit staff members recorded time allocations to ten sample projects. At the outset of the study, most projects had been inspected, but enforcement action development had not yet begun. Other projects had either not yet been inspected, or some activities had been completed towards development of an enforcement action. Four projects were expected to result in formal enforcement actions, while the rest were expected to have either an informal enforcement action or no enforcement action. This study attempted to document the time that staff members allocated to these sample projects in order to provide a description of the process that the Unit uses to development enforcement actions, to evaluate the utility of time allocation monitoring to program improvement, and to provide recommendations for future time allocation monitoring studies.

### ***Question #1: How does the Region 1 office of the US EPA develop RCRA enforcement actions?***

Staff time allocation data may be useful for understanding how the Unit performs enforcement action development. Results are presented here for each sample project and then summarized for groups of projects. Table 3 displays a summary of time allocation data recorded for the sample projects.

### **Time Allocation Monitoring Results**

Of the 10 sample projects, seven had time allocations recorded during the study period. The results are presented here in order of project number. Project 01 and Project 02 did not have any time recorded. Staff members reported that

although they expected to work on these projects during the study period, other work prevented them from getting to these projects. Both projects are expected to be developed into formal enforcement actions.

Table 4 displays activities and time allocation recorded for Project 03. Project 03 is expected to be developed into a formal enforcement action. As described above, a formal enforcement action is developed by the Unit in response to a determination that a facility is in significant noncompliance of RCRA regulations, and a legal Order, typically with penalties attached, is appropriate. The activities recorded to Project 03 involved writing a Penalty Memo and assisting in the development of a Complaint. Project 03 had the most time recorded (122.5 hours) of any project, 55% of the total amount (224.5 hours). Figure 3 displays a pie chart of the time allocations to Project 03. The majority of the time devoted to Project 03 (109.5 hours) was spent writing a Penalty Memo, which was far greater than the time allocated to any other activity in the study.

Table 5 displays activities and time allocation for Project 04, an informal enforcement action. As described above, an informal enforcement action is developed by the Unit in response to a determination that a facility has secondary violations of hazardous waste violations, and a notification to the facility of violations observed, with no penalties attached, is appropriate. Project 04 had the greatest number of activities recorded of any project, and represents full development of an informal enforcement action. Project 04 had the second-most time recorded (62 hours) of any project, 27% of the total (224.5 hours). Figure 4

shows a pie chart of the time allocated to Project 04. The activity in Project 04 with the largest time allocation was writing the inspection report, which took 44% of the total project time (27 hours).

Table 6 displays activities and time allocation for Project 05, which was identified by staff members as likely to result in a formal enforcement action. Activities recorded include work on an inspection report and informal information requests to the facility. Staff Member C said in discussions following the study that (s)he did not record all of the time allocated to this project. The staff member reported that (s)he had forgotten that this project was one of the sampled projects and had neglected to record time after October 4, 2012.

Table 7 displays activities and time allocation for Project 06. Project 06, the only Transfer, Storage, and Disposal Facility selected for monitoring, was not expected to be developed into a formal enforcement action at the start of the study. All the time allocated to this project was for inspection report writing. No Enforcement Summary was written and no further steps were recorded towards either an informal or a formal enforcement action during the study period.

Staff Member D did not input time allocation information for Project 06 directly into *TimeTracker*. On November 11, 2012, I had a conversation with Staff Member D who reported that s(he) had done work on her/his two projects, but had not had the chance to enter the information into *TimeTracker*. On November 30, 2012, I received an email from Staff Member D describing time allocated to Project 06 on September 27, October 24, and November 2, 2012.

Because these data may be based on recollection of time allocations made up to two months earlier, they should be regarded as approximate.

Table 8 displays activities and time allocation for Project 07. Only a single day's activity is recorded for Project 07, explained in comments as reviewing training data submitted as part of the inspection. Project 07 was not expected prior to the study to result in a formal enforcement action. Although the inspection was performed prior to the study, no time was recorded for inspection report writing.

No time allocations were recorded for Project 08. Staff Member B said in discussions following the study that the project was worked on during the study period, but (s)he prioritized project work over recording time allocations.

Table 9 displays activities and time allocation for Project 09. Prior to the study, Project 09 was not expected to result in a formal enforcement action. The time allocated to this project is all for inspection report writing. No Enforcement Summary was written and no further steps were taken during the study period towards either an informal or a formal enforcement action.

Similar to Project 06, Staff Member D did not record the time allocations for Project 09 directly into *TimeTracker*. On November 30, 2012, I received an email from the staff member reporting time allocations to Project 09 on August 15, October 29, and November 6, 2012. Again, because these records of time allocation were provided to 2.5 months after the date of time allocation, they should be regarded as approximate.

Table 10 displays activities and time allocation for Project 10. Prior to the study, Project 10 was not expected to result in a formal enforcement action. The time allocated to this project is entirely for inspection report writing. No Enforcement Summary was written or further steps towards taking either an informal or a formal enforcement action were taken during the study period.

## **Analysis of Results**

### ***Summary of Time Allocations Recorded to All Monitored Projects***

Figure 5 displays the time allocations recorded for all monitored projects. Penalty Memo development and Inspection Report writing were the two activities to which the Unit recorded the most time for sample projects during the study period. The Unit allocated almost half of its monitored hours to developing a Penalty Memo, all of which occurred as part of Project 03. The type of activity that took the second highest proportion of the Unit's monitored time was preparing Inspection Reports. Inspection Report writing occupied about one quarter of the Unit's time, and was conducted for five different projects.

Fifty-nine percent of time allocations recorded were made to formal enforcement actions, and 41 percent of time allocations recorded were made to informal enforcement actions or projects for which no enforcement action resulted during the study period.

Of the 17 types of activities available for monitoring, nine were recorded during the study. Of the eight activities not recorded during the study, six are particular to the later stages of developing a formal enforcement action (DOJ Complaint, Negotiations, Alternative Dispute Resolution, Consent Agreement

Final Order, Litigation, and SEP Oversight). The two other activities not recorded are a Formal Information Request and an Early Warning Letter.

### ***Summary of Time Allocations for Formal Enforcement Actions***

Figure 6 displays the time allocations recorded to the sample projects expected to be formal enforcement actions: Projects 01, 02, 03, and 05. The activity with the highest recorded time allocation is developing a Penalty Memo, with the second-most recorded time allocation for developing an EPA Complaint. This result is dominated by Project 03, which represented 92% of recorded time allocations to formal enforcement actions.

### ***Time Allocations to Informal Enforcement Actions and Other Projects***

Twenty-eight percent of time allocations were made to the informal enforcement action developed during the study period (Project 04), and 13 percent of time allocations recorded were made to projects of an undetermined status. The projects of an undetermined status (Projects 06, 07, 08, 09, and 10) only had the activities of Inspection and Inspection Report recorded.

### ***Question #2: How can a staff time allocation monitoring study be useful to understand and improve the Unit's implementation of a RCRA enforcement program?***

The results of this study can be used to understand enforcement action timeliness and target efforts to improve efficiency on those projects that have the largest time allocations. Unfortunately, the time allocation data are limited in its ability to describe a significant proportion of the Unit's work on enforcement action development or place enforcement action development in context of other elements of the Unit's work.

## **Potential Uses of Results**

### ***Improving Awareness of Enforcement Action Timeliness***

In order to minimize the likelihood that violations of hazardous waste regulations result in exposure of humans and ecosystems to hazardous materials, the Unit seeks to minimize the time between the observation of a violation and an appropriate enforcement action. The Hazardous Waste Enforcement Response Policy (ERP) published by the EPA Headquarters Office of Enforcement and Compliance Assistance sets standards for timeliness of enforcement actions for RCRA programs nationwide (EPA 2003). The ERP states that, when significant non-compliance is determined, a formal enforcement action should issue an initial Complaint within 240 days of the first day of a facility inspection. When a secondary violation is determined, an informal enforcement action should issue a Notice of Violation within 150 days.

Time allocation data collected for Project 03 documents timely development of an informal enforcement action following an inspection. Table 4 displays time allocations to activities performed for Project 03. The inspection and related travel were performed over two days, and then, about a week later, the inspection report was drafted. The week after that, the inspection report and enforcement summary were worked on alternately, while performing regulatory and policy research. A draft inspection report and Notice of Violation (NOV) were submitted to the Senior Enforcement Coordinator (SEC) for approval 14 days after the inspection, and these documents were revised based on SEC comments on days 27 and 28. Project 04 completed an NOV on the 28<sup>th</sup> day following an inspection, well within the 150-day standard of the ERP.

A notable characteristic of the schedule to develop an informal enforcement action for Project 04 is the lack of any significant period of inactivity on the project. The longest stretch of time when Staff Member B did not work on Project 04 was 11 days during which the documents were under review by the SEC. This result was not typical of the projects monitored during this study.

Most projects had little time allocated during the study period, indicating that either no enforcement response is forthcoming or that the enforcement action development was delayed the entire study period. Two projects that were expected to warrant formal enforcement actions (Projects 01 and 02) had no time allocated during the 169-day study period. While the ERP allows more time for the development of formal enforcement actions (240 days from the first date of inspection), the gap in project activity documented by time allocation monitoring indicates that these enforcement actions may not be developed according to the timeliness standards of the ERP. Projects 06, 07, 09, and 10 were not likely to result in formal enforcement actions, and were not identified by staff as having incomplete recording of time allocations during the study period. If an informal enforcement action was appropriate for these projects, it was not issued within the timeliness standard of the ERP.

While staff members' "pipelines" of expected projects can be communicated verbally in regular staff meetings, time allocation monitoring provides quantification of the extent to which projects are delayed. Precise documentation of delays in enforcement action development could help staff members maintain timeliness of enforcement actions. For example, Staff

Members A and E stated after the study period that their backlogs of work did not allow them to devote any time to Projects 01 and 02, respectively. If program staff members tracked the progress of enforcement actions in a convenient system, then they would not have to wait until staff meetings to communicate that they are too busy to work on assigned projects. Staff members could review a time allocation database and quickly see the projects that they are working on, and compare the project's progress with standards for enforcement action timeliness. Program staff could even be automatically alerted by the time allocation monitoring computer application if the deadline given in the ERP was approaching for a given project.

If backlogs are preventing program staff from working on an enforcement action, a time allocation monitoring system could help the Unit develop plans for maintaining enforcement action timeliness. The monitoring system could be configured so that each staff member could review not only their own progress, but also the progress of their teammates. Staff members could then assist one another if backlogs accumulate. The Unit could develop policies for scheduling new inspections based upon progress on existing projects. Perhaps a cap on the total number of open projects or having no project deadlines due within 30 days would be appropriate criteria for scheduling new inspections. While increasing collaboration by staff members on projects and creating policies for scheduling new inspections could occur without a time allocation monitoring system, the system would make such efforts easier, increasing their chances of successful implementation.

### ***Improving Efficiency of Enforcement Action Development***

The Unit can increase the extent to which it can protect human health and the environment by improving the efficiency with which it develops enforcement actions. Efficiency in this case means obtaining the desired result with as little cost as possible, with the primary input to enforcement action development being the time of Unit staff members. If the Unit is able to develop each individual enforcement action using less staff time, the Unit may be able to improve its enforcement presence in the Region by allowing itself to take on a greater number of, or greater complexity of, enforcement actions.

Breaking an enforcement action down into constituent activities and monitoring time allocations to each activity allows the Unit to improve its understanding of how staff time is distributed. Activities that have the highest time allocations may yield the largest opportunities for time savings through efficiency initiatives. The Unit can use time allocation monitoring results to identify activities on which to focus its efforts to improve overall efficiency.

According to the results of time allocation monitoring displayed in Figure 5, the two activities with the greatest amount of time recorded during the study period were Penalty Memo development and Inspection Report writing. While the sample size for the study was small, and the results are dominated by Projects 03 and 04, this result is indicative of the utility of time allocation monitoring to improve program efficiency.

If Inspection Report writing, for example, is indeed one of the larger sinks of staff time, then efforts to expedite this activity would be a wise investment for

the program. Staff members may be able to find ways to reduce the amount of time spent on writing inspection reports by replacing sections of the report that are typically described in a narrative with a checklist that conveys the same information. Templates and office automation may also have the potential to reduce duplicative data entry, formatting, and manipulation of site photographs. Each of these efforts would need to be undertaken thoughtfully, with awareness of the standards for quality necessary for each kind of enforcement action.

Following the implementation of an initiative to improve efficiency of a given activity, time allocation monitoring would again be useful for evaluating the success of the initiative. Average time allocations to the activity before and after the initiative would demonstrate the efficiency gained or could indicate a need to revisit the problem with a different approach.

***Question #3: What recommendations for future time allocation monitoring studies can be made based on the experience of performing this pilot study?***

This pilot study of time allocation monitoring provided quantitative descriptions of how some enforcement actions are developed by the Unit and is indicative of how these descriptions could be useful, but is limited by the amount of data collected and the scope of the study. Reasons for the limited amount of resulting time allocation data are described below and recommendations for avoiding these limitations are outlined in Chapter 5.

**Limitations of Results**

The amount of time allocation monitoring data resulting from this study is not sufficient to provide a generalized description of the Unit's efforts to develop

enforcement actions. Assuming that there were 114 work days in the 168-day study period, 7.5 work hours per day, and five staff members, there were 4,275 total work hours available during the study period. A total of 224.5 hours of time allocation were recorded during the study, 5.3% of the total available. Even allowing that other job elements (such as state oversight, training, inter-office communication, and time off) required time allocations during this period, this study still does not capture a significant portion of the Unit's efforts to develop enforcement actions.

At least two factors may account for the small number of hours recorded in the study. First, two projects that staff anticipated would be worked on during the study (Projects 01 and 02) had no time allocated. As formal enforcement actions, these projects address conditions that, at the beginning of the study period, were believed to represent significant non-compliance with hazardous waste regulations. Project 03 demonstrates the large amount of time that can be allocated to a formal enforcement action – two more projects of equal time allocations to Project 03 would raise the total recorded time allocations to 469.5 hours, or 10% of the total work hours available. Second, time allocation monitoring was implemented imperfectly by staff members. Project 05, a formal enforcement action, only had some of the allocated time recorded and Project 08 had none of its allocated time recorded.

## Chapter 5: Recommendations for Future Research

This study pilots time allocation monitoring as an approach to learning about program operations and improving EPA's methods of developing hazardous waste enforcement actions. With the time allocations information collected, the study was able to document which activities may have had the largest amount of time devoted to them and identified projects that had significant period of inactivity during the study period. Future studies can improve upon this study by (1) expanding the scope of time allocation monitoring; (2) increasing staff members' involvement in study design, data collection, and analysis; and (3) integrating time allocation monitoring with a review of program records.

***Recommendation #1: The scope of time allocation monitoring should be expanded to include all enforcement actions, and perhaps even all elements of the Unit's operations.***

Sampling 10 enforcement action development projects for this study did not result in a dataset that describes a significant proportion of the Unit's work on this program element during the study period. By monitoring time allocations to all projects, future studies can obtain much more useful results, plus eliminate confusion over which projects have been selected. Results that are even more useful can be obtained if all program elements are included in the study scope, even if the level of detail is minimal.

*Including all enforcement actions in the study scope would increase the likelihood that results more fully describe distribution of time allocations.* The limitations encountered in using time allocation monitoring to describe how the Unit develops enforcement actions are in large part a consequence of decisions

made to limit the scope of the study. Because the time allocation monitoring data collected for the study only accounts for about 5% of staff time during the study period, it is difficult to draw conclusions about how staff members allocate time between enforcement action activities.

In future time allocation monitoring studies, evaluation designers should consider placing a greater emphasis on ensuring that the study produces useful results, and less emphasis on minimizing the administrative burden on staff members. While staff time will always be precious, a study that collects too little data may be of limited utility, and what little time was invested may be squandered. A more thorough time allocation monitoring effort may cross a threshold into a vastly more useful study without greatly increasing the amount of time expended in data collection.

It is difficult to estimate the number of sample projects that would have produced an acceptable representation of staff time allocations to compliance monitoring and enforcement action development. If the total amount of staff time that is dedicated to this program element were known, then sample size could be selected with a proportion of time allocated to this program element in mind. Lacking summary information about program time allocations to compliance monitoring and enforcement action development, the best way for a future study to ensure that a sample includes a sufficient number of projects is to include all current projects in time allocation monitoring.

According to informal conversations with staff members, this time allocation monitoring procedure was easy and convenient to use. Although no

measurements of time allocated to monitoring were made for the study, staff members who used *TimeTracker* reported that they could record their daily time in just a few minutes per project. Increasing the scope of the study, therefore, would not have a dramatic impact on the burden of a study on staff time. Several steps involved in recording time, such as opening the *TimeTracker* application and uploading information to the database would not increase with the number of projects tracked in a day. Including all enforcement actions in the study may have the additional benefit of routinizing time allocation monitoring.

*Including all enforcement actions should improve the consistency with which time allocation is implemented.* In addition to the effect that a small sample had on the robustness of the data set resulting from time allocation monitoring, the study also suffered from inconsistent implementation of monitoring by program staff members. For two projects, Projects 05 and 08, staff reported that at least some time allocations were not captured in the study. For two other projects, Projects 06 and 09, the time allocations were not recorded in the database until up to 2.5 months after the activities were performed, and so the data are approximate. The reasons for incomplete implementation of time allocation monitoring varied across projects, but could in each case be improved if time allocation monitoring were better incorporated into routine program processes, as opposed to being performed for just a few sample projects.

Project 05 is representative of a main drawback of the study design decision to limit the scope of time allocation monitoring to a sample of enforcement actions: staff members needed to remember which projects were

included of the sample set. Staff Member C stated that (s)he did not complete time allocation monitoring on Project 05 because (s)he forgot that this project was one of the sample projects. Rather than simply recording time allocations at the end of every day when an enforcement action is worked on (which would presumably be most days), staff needed to remember which projects were in the sample and record time allocations at the end of those days.

Staff Member D did not use *TimeTracker* to record time allocation monitoring for Projects 06 and 09, but instead communicated his/her time allocations with me via email. Staff Member D's first recorded activity on a sample project was on the 30<sup>th</sup> day (August 15, 2012) of the study period. The lack of activity on sample projects during the early portion of the study period may have affected the consistency of time allocation monitoring for Projects 06 and 09.

During the first few weeks of the study period, I made efforts to visit with staff members frequently to answer questions about the use of *TimeTracker* and to remind them about the study. Staff Member D told me in the early part of the study period the (s)he had not yet worked on any sample projects, and so had (s)he no questions for me. Following this first month of the study period, I visited the staff members less frequently, and if Staff Member D had had questions about the study, (s)he would have had to seek me out for answers. If all enforcement actions were monitored, this problem of staff members beginning time allocation monitoring at a delay from the launch of the study and the greater availability of assistance would not occur.

While performing time allocation monitoring for each project may increase consistency of results, Project 08 is representative of a counter argument – that increasing the scope of monitoring may decrease staff participation rates. Project 08, assigned to Staff Member B, had no recorded time. It is clear that Staff Member B understood how to use *TimeTracker* because, at the very beginning of the study period, (s)he had thoroughly documented the development of Project 04. Staff Member B, while acknowledging that it would not have taken long to perform monitoring of Project 08, (s)he felt that (s)he was too busy with developing enforcement actions to perform time allocation monitoring.

Although Project 08 may seem to indicate that program staff would not have additional time to dedicate to time allocation monitoring, Staff Member B's acknowledgement that time allocation monitoring would not take much additional time reveals that the difficulty in increasing monitoring may be more one of prioritization than actual time constraints. Recording time allocations are not part of the job descriptions of staff members, and it is only natural that work on enforcement actions is given a higher priority. As discussed in Recommendation #2 (below), the priority that staff members place on study implementation may be directly correlated to how much ownership they feel over the study. The study design of project sampling may also contribute to a low prioritization of time allocation monitoring because, up front, the study design does not address every project, thereby indicating it is acceptable to ignore some projects.

If time allocation monitoring were performed for each project, it likely would improve the consistency of results. As in the case of Project 05, staff

members would not have to remember that a particular project was part of the sample. Situations similar to Projects 06 and 09 could be avoided by ensuring that, from the beginning of the study period, each staff member would have time allocations to record, during which time evaluators could more easily support staff members in learning to use the data collection instrument. Finally, including every project in the study would help to communicate to staff that time allocation monitoring is a high priority, and projects cannot be neglected arbitrarily if the study is to result in a robust dataset.

*Including all elements of program operations may lead to useful insights into how time allocations to other program elements impact the Unit's performance of enforcement action development.* Increasing the scope of the study design to include all projects in a time allocation monitoring study would greatly increase the likelihood of yielding results that are expansive enough to provide a meaningful description of the Unit's efforts on enforcement action development. However, study proponents would still not know to what extent the results describe enforcement action development – any time not accounted for could either be work on other program elements or it could be time that was allocated to enforcement action development, but was not recorded for the study. A remedy for this problem would be to simply expand the study scope to all program elements. Since the total amount of time staff members are on duty is known, a survey instrument could require that all time be accounted for. The extent to which staff members are participating in the study would quickly be

obvious, and study proponents could follow-up with staff members who do not provide appropriate time allocation monitoring data.

Before expanding the scope of a time allocation monitoring study to include all program elements, study proponents should carefully consider the relative advantages and disadvantages of this approach. The advantages, as discussed above, include an ability to verify the total amount of time allocated to developing enforcement actions. In addition, such a study would provide valuable feedback about the time allocated to other program elements. For example, staff members report that the time allocated to state oversight has increased in recent years. The extent to which the state oversight program element occupies staff time would be valuable information for EPA managers to have as changes to the State Review Framework are considered.

It is likely that a change in scope from monitoring all enforcement actions to monitoring all program elements would not create a substantial change in administrative burden on staff. If staff members already are using a survey instrument to monitor time allocations on a daily basis, recording a few additional activities should not make a large difference. Considerations for avoiding onerous study burdens on staff time could be accommodated by limiting the detail at which program elements other than enforcement actions are monitored. Total time allocation to these program elements, and not any detail about the activities performed within each, could be recorded and still yield significant benefits.

Disadvantages associated with expanding the scope of time allocation monitoring to include all program elements includes some increase in the amount

of staff time required to perform time allocation monitoring. Perhaps more significant than this administrative burden, however, is the potential impact on staff morale and study participation that an increased scope would have. While it is commonplace in technical consulting and legal industries for professionals to monitor their time allocations, regulatory programs at the EPA do not typically require this documentation.

The extent to which staff members did not participate in the study is not known. All staff members recorded at least some time allocations, and no staff members stated in discussions that they were categorically opposed to time allocation monitoring. However, a reason for the low number of recorded time allocations could be reluctance of staff to perform time allocation monitoring. Expanding the scope of time allocation monitoring would likely exacerbate any hesitancy experienced by staff members in this pilot study. Recommendation #2 addresses how staff reluctance could be addressed by increasing the involvement of staff members in study design, data collection, and analysis.

***Recommendation #2: Time allocation monitoring studies may be able to achieve better results by more closely involving staff members in study design, data collection, and analysis.***

This study relied on staff member input to prepare the enforcement action development flow charts displayed in Figure 1 and Figure 2, and used staff member predictions to select the projects to include in the time allocation monitoring sample. The study did not, however, involve staff members in developing study questions, study scope, and design of the survey instrument. Increasing the degree to which staff members are involved in study management

may improve the quality of study implementation and increase the likelihood of study results being useful to the program.

*A lack of enthusiasm for time allocation monitoring among program staff may have limited the consistency of study implementation.* In addition to the limitations introduced by the study design decisions discussed above, study results may have been impacted by staff attitudes towards the study. While no staff members expressed antipathy towards the study, a lack of enthusiasm for the study may have compounded the shortcomings in the study design. Staff Member C, who reports having forgotten that a project was sampled, may have been less likely to forget if (s)he were more interested in the study results. Staff Member D did not learn to use *TimeTracker*, reflecting at least in part a lack of interest in the study. Staff Member B did not place a high priority on fully implementing the study, although (s)he acknowledged that doing so would not take a significant amount of time.

Another indication of how staff attitudes may have impacted study results is a decline in recorded time allocations over the course of the study period. Time allocation monitoring results for the first half of the study period far exceeded the results from the second half of the monitoring period: 203.5 hours (91% of the total) were recorded during the first 84 days of the study (through October 8, 2012), while only 21 hours (9% of the total) were recorded during the second 84 days of the study (after October 8, 2012). Factors potentially mitigating the severity of this discrepancy are that the second half of the study period contained the holiday season in which staff members typically take time off, and staff

members in some cases completed the projects included in the study sample. However, declining rates of recorded time allocations may also reflect declining participation in the study.

*A time allocation monitoring study can achieve more useful results by closer collaboration between evaluation proponents and program staff members.*

At least two strategies could be used to boost rates of staff participation in time allocation monitoring. First, program managers could create a formal mandate that ties staff members' performance reviews to participation in time allocation monitoring. Second, study proponents could try to spark staff members' interest in time allocation monitoring by involving them more deeply in the process.

While the first strategy may be effective in achieving high participation rates, formally compelling staff members to participate in a process that they do value may cause resentment, imperiling the study and program performance as a whole. The second strategy may be preferable because it avoids the downsides associated with conscripting staff members into the study, and is more likely to add value to the study by spurring staff members' creativity (Amabile 1998).

Staff members' experiences in the program and proximity to program processes are essential for designing the study, collecting data, and understanding results. As the people implementing time allocation monitoring, staff members know how study design decisions will place a burden on their time, and how best to minimize impacts on their work. During data collection, staff members can collaborate to solve problems that arise in using the survey instrument and sample project selection. When study results are reviewed, staff members can use their

institutional knowledge to evaluate the extent to which results conform to expectations and use their knowledge of sample projects to identify data errors.

As important as the value that staff participation adds to study quality, increased collaboration between study proponents and program staff would increase the legitimacy of the study to its most important audience – the program staff members themselves. A time allocation monitoring program evaluation is well-suited for models of program evaluation that tend towards more self-direction by the program. Since time allocation evaluation is intended solely to improve the program, and not to determine program efficacy, staff members have no motivation to introduce bias in results (Weiss 1998). Evaluation proponents can maximize the chances that study results will be utilized by having staff members participate to the maximum extent possible. Ideally, a partnership could be created between those with program expertise and those with evaluation expertise. Staff members can shape study questions towards those that are most pertinent for program improvement, and evaluators can help staff design measures that can help answer these questions.

***Recommendation #3: Time allocation monitoring results should be integrated with reviews of program records.***

Time allocation monitoring represents just one possible approach for documenting how Region 1 implements its RCRA enforcement program. Program records are available that can be used to further explore issues raised in this study: Region 1's conformance with EPA guidelines for enforcement action

timeliness and Region 1's production of enforcement outputs compared to other EPA regional programs.

*Examining records of enforcement action will contextualize time allocation monitoring results in overall program performance.* Time allocation monitoring results provide an insight into how the program allocates its time to various activities associated with developing enforcement actions. Other evaluations of the Unit's RCRA enforcement program could add to this understanding of program process. While this study, conducted at Tier Two of Jacob's Five-Tiered Approach, simply documented program operations, future evaluations could compare program operations to standards, a Tier Three evaluation (Jacobs 1988).

The timeliness standards of the Hazardous Waste Enforcement Response Policy (ERP) are a reasonable place to begin an inquiry into the program's fidelity to the model established by the EPA Office of Enforcement and Compliance Assistance. The standards enumerated in the ERP represent an accountability link from the Unit to EPA leadership and ultimately, to the public who pays for the program and depends upon its services. By including timeliness of enforcement actions in the ERP, the EPA is stating that effective protection of the environment requires that observed violations of hazardous waste regulations be addressed quickly.

Evaluating the extent to which the Unit adheres to the timeliness guidelines of the ERP is one measure of the effectiveness of the program, and will provide context for the results of time allocation monitoring. The results obtained

from time allocation monitoring show that at least in one case (Project 04), the Unit produced an informal enforcement action well within the timeliness guidelines of the ERP. In other cases, however (Projects 01 and 02), the timeliness of formal enforcement actions is questionable. This study is not designed to assess timeliness of enforcement actions, and is constrained by its nature as a public document from revealing enforcement confidential information such as the date of inspection. Future studies could evaluate questions of enforcement action timeliness, contextualizing observations of time allocations, or the consequences of periods in which no time is allocated to a project.

*Comparison of the Region 1 RCRA enforcement program with other EPA regional RCRA enforcement programs will provide context for study results.* In pursuit of its mission to protect human health and the environment from risks associated with hazardous waste management, the Unit aims at maximizing the number of and significance of enforcement actions taken. A Tier Three evaluation could seek to better understand the performance of Region 1 relative to other EPA regional programs, orienting the Unit as to their progress towards these goals. Comparison of Region 1 with its cohort of EPA regional programs is likely to be fruitful because each program includes similar elements, has similar resources, and operates under the same guidelines. Differences in the rate of enforcement actions developed per year or the average amount of penalties assessed in formal enforcement actions are fair proxies for understanding the relative performance of each regional program. Examination of program outputs for various regions can be used for program improvement at Region 1 by identifying

Regions with high production of program outputs, and then inquiring into the practices used by high-performing Regions to achieve those outputs.

### ***Final Thoughts***

While this study may not have produced enough time allocation monitoring to fully describe how the Unit develops enforcement actions, it was a worthwhile exploration of the value and the challenges associated with implementing a program evaluation in a public environmental program. In this pilot study, time allocation monitoring was useful to identify the activities that occupied the highest proportion of staff members' tracked time. In addition, the detailed project implementation schedules documented by time allocation monitoring raised questions about the timeliness of enforcement action development.

Program evaluation has enormous potential to help programs improve, but to be effective, studies need careful design and buy-in from program staff members. The sampling approach adopted for this study addressed an important concern of minimizing the impact on staff time, but may have also resulted in confusion about the projects monitored for the study and failed to take advantage of incorporating time allocation monitoring into staff members' daily routines. Staff members could be more willing to devote precious time to an evaluative project if they feel that it will ultimately help improve efficiency and reduce backlogs. The more that the staff members design an evaluation themselves, the more ownership over the study they will feel, and the higher that the level of participation will rise. It is my hope that this study gives the Unit and other

similar groups ideas for how to use time allocation monitoring to make their programs as successful as possible.

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## Figures

**Figure 1: Formal Enforcement Action Flow Chart**

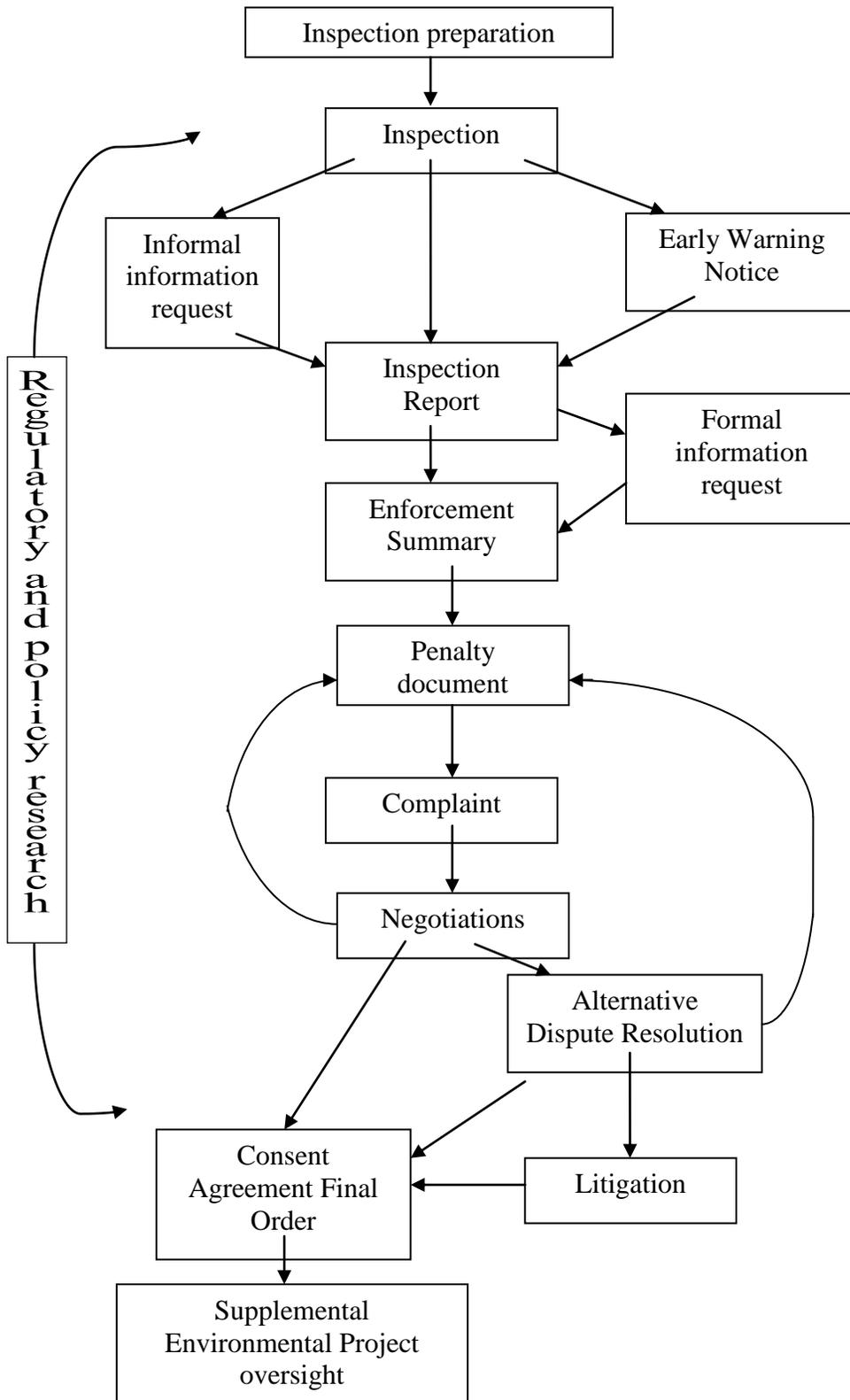
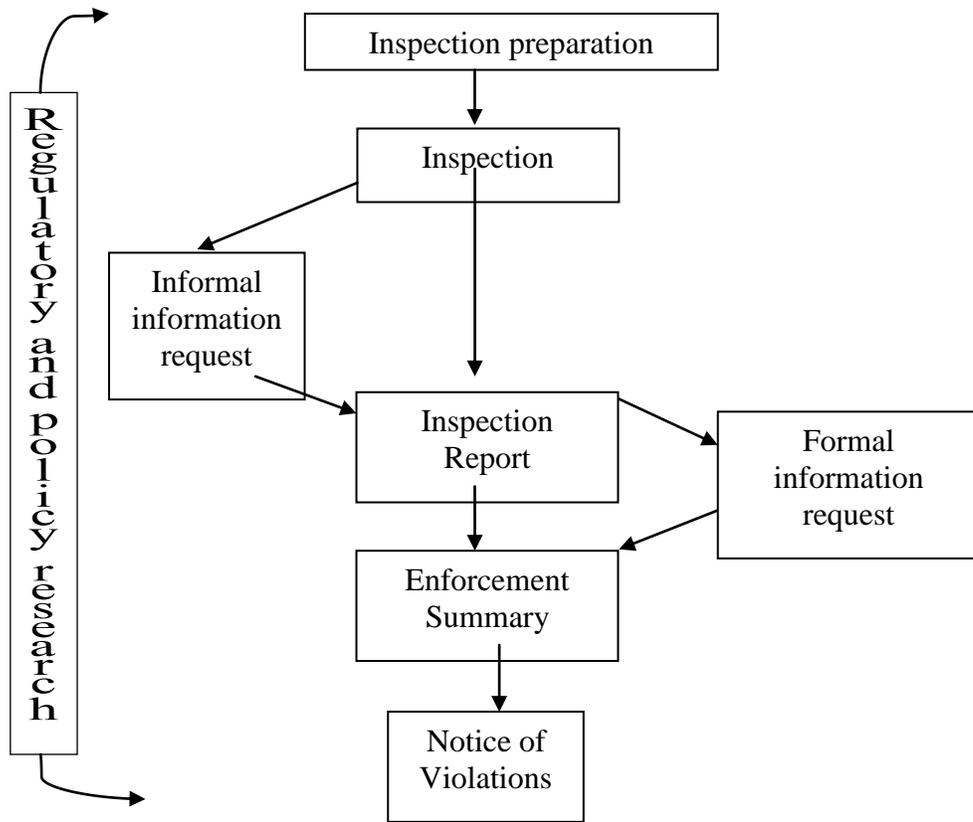
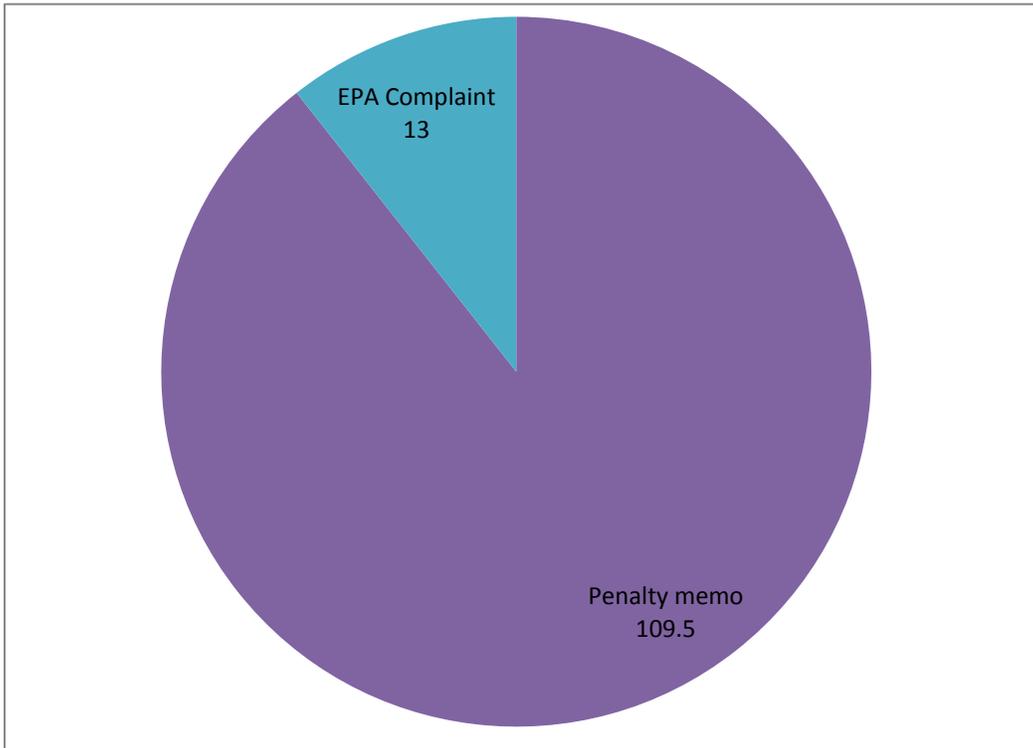


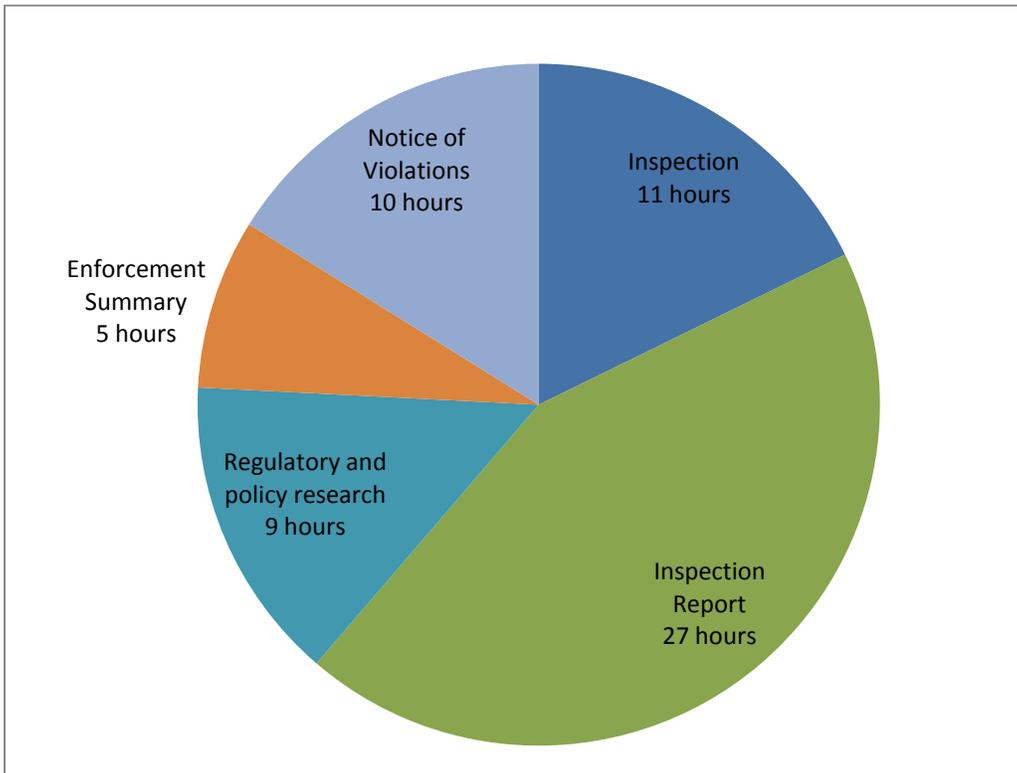
Figure 2: Informal Enforcement Action Flow Chart



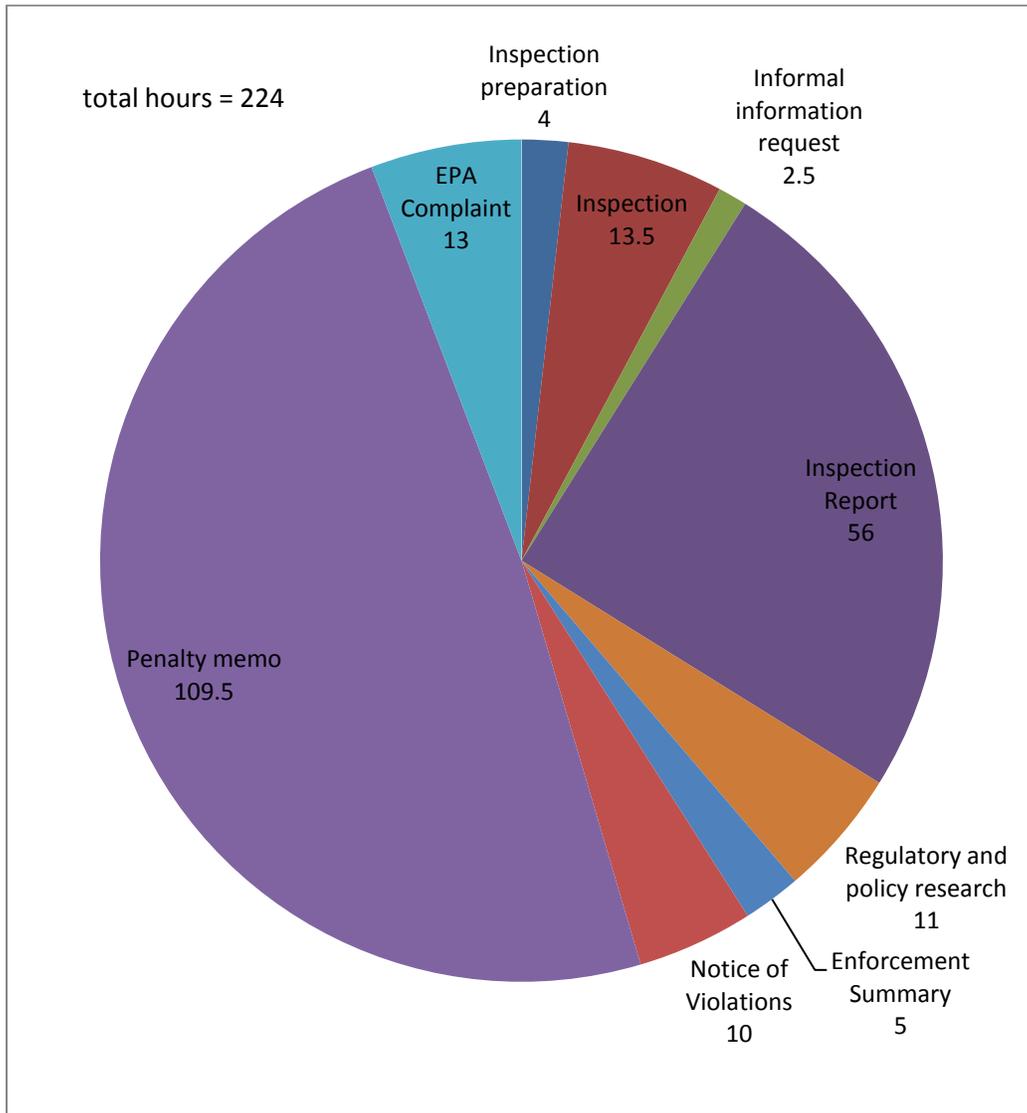
**Figure 3: Time Allocations Recorded to Project 03**



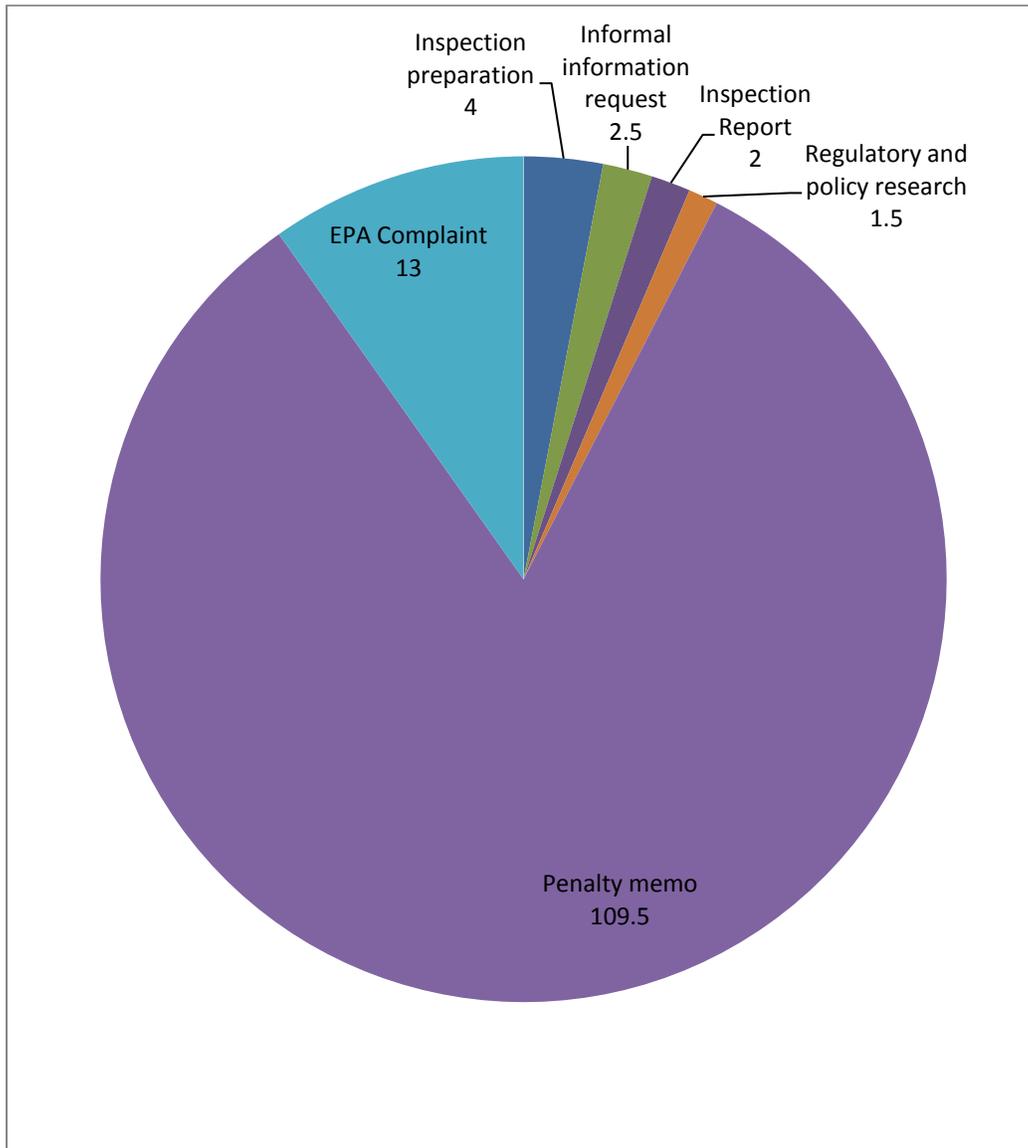
**Figure 4: Time Allocations Recorded to Project 04**



**Figure 5: Summary of All Time Allocation Data**



**Figure 6: Time Allocations Recorded to Formal Enforcement Actions**



## Tables

**Table 1: Region 1 Enforcement Outputs from State Review Framework Annual Reports (EPA 2013c)**

Fiscal Year	Inspections	Informal Enforcement Actions	Formal Enforcement Actions	Total Enforcement Actions
2008	47	6	10	16
2009	38	6	5	11
2010	36	7	6	13
Total	121	19	21	40

**Table 2: Selection of Sample Enforcement Action Development Projects**

Project	Type of Handler	Staff Member	Formal Action Expected?	Pending Activity as of July 1, 2012
01	SQG	A	Yes	inspection report
02	LQG	E	Yes	inspection report
03	LQG	E	Yes	penalty document
04	LQG	B	Unknown	inspection planning
05	SQG	C	Yes	inspection report
06	TSDF	D	No	inspection report
07	LQG	A	No	inspection report
08	LQG	B	No	inspection report
09	SQG	D	Unknown	inspection report
10	LQG	C	Unknown	inspection report

**Table 3 - Summary of Time Allocation Monitoring Results**

Project	Staff Member	Recorded Time Allocations (hours)	Activities Recorded	Comments
01	A	0	No time allocations recorded	Staff member did not work on project during study period due to other commitments.
02	E	0	No time allocations recorded	Staff member did not work on project during study period due to other commitments.
03	E	122.5	Penalty Summary and EPA Complaint	Project already underway at beginning of study period. Most recorded hours of any sample project.
04	B	62	Inspection Preparation, Inspection, Regulatory and Policy Research, Enforcement Summary, Notice of Violations	Complete documentation of the development of an informal enforcement action.
05	C	10	Informal Information Request, Regulatory and Policy Research, and Inspection Report.	Not all work on this project was recorded due to staff member forgetting that this project was included in study.
06	D	8	Inspection Report	
07	A	2.5	Inspection	Review of data submitted as part of inspection.
08	B	0	No time allocations recorded	Project was worked on, but staff member did not record time.
09	D	8	Inspection Report	
10	C	11	Inspection Report	

**Table 4 - Time Allocations for Project 03**

	Date	Activity	Duration (hours)	Comments
Jul	19	Penalty memo	8	
	20	Penalty memo	8	
	21			
	22			
	23	Penalty memo	8	
	24	Penalty memo	8	
	25	Penalty memo	8	
	26	Penalty memo	10.5	
	27			
	28			
	29			
	30	Penalty memo	9	
	31	Penalty memo	10	
Aug	01	Penalty memo	8	
	02	Penalty memo	9	
	03			
	04			
	05			
	06			
	07	Penalty memo	4	
	08	Penalty memo	6	
	09	Penalty memo	6.5	
	...			
Sep	29	Penalty memo	2.5	
		EPA Complaint	1	
	30	Penalty memo	4	
	31			
	01			
	02			
	03			
04	EPA Complaint	10		
05	EPA Complaint	2		

Total: 122.5

**Table 5: Time Allocations for Project 04**

Day	Activity	Duration (hours)	Comments
-1	Inspection	3	Travel to XXXXXX
0	Inspection	8	
1			
2			
3			
4			
5	Inspection Report	8	prepare ICIS report; update RCRA Info; prepare RCRA documents using RCRA efficiency utility; start inspection report; download photos & prepare photo log;
6	Inspection Report	1	write inspection report
7	Inspection Report	7	
8	Inspection Report	7	revise draft inspection report
9			
10			
11			
12	Inspection Report	1	
	Regulatory and policy research	5	
	Enforcement Summary	1	
13	Regulatory and policy research	4	
	Enforcement Summary	3	submitted draft Notice of Violations (NOV), Inspection Report, and Photos to Senior Enforcement Coordinator (SEC) on [day 15]
14	Inspection Report	1	edited for misc. typos
	Enforcement Summary	1	Edited NOV for clarity an correct typos
...			
27	Inspection Report	2	
	Notice of Violations	5	implement comments of SEC
28	Notice of Violations	5	

Total: 62

**Table 6: Time Allocations for Project 05**

	Date	Activity	Duration (hours)	Comments
Jul	19	Regulatory and policy research	1.5	review of submittals from company and review of [project] notes upon being referred to me
	...			
Aug	07	Informal information request	1.5	
	08			
	09			
	10			
	11			
	12			
	13	Inspection Report	2	
	...			
Oct	04	Informal information request	1	
		Total:	6	

**Table 7: Time Allocations for Project 06**

	Date	Activity	Duration (hours)	Comments
Sep	27	Inspection Report	3	
	...			
Oct	24	Inspection Report	3	
	...			
Nov	02	Inspection Report	2	
		Total:	8	

**Table 8: Time Allocations for Project 07**

	Date	Activity	Duration (hours)	Comments
Aug	07	Inspection	2.5	Reviewing training data submitted as part of inspection.

**Table 9: Time Allocations for Project 09**

	Date	Activity	Duration (hours)	Comments
Aug	15	Inspection Report	3	
	...			
Oct	29	Inspection Report	3	
	30			
	31			
Nov	01			
	02			
	03			
	04			
	05			
	06	Inspection Report	2	Trip report complete
		Total:	8	

**Table 10: Time Allocations for Project 10**

	Date	Activity	Duration (hours)	Comments
Jul	20	Inspection Report	1	
	...			
Aug	17	Inspection Report	5.5	
	...			
Aug	26	Inspection Report	4.5	
		Total:	11	