U.S. Environmental Protection Agency (EPA) & Major Partners' Lessons Learned from implementing EPA's Portion of the American Recovery and Reinvestment Act: Factors Affecting Implementation and Program Success

Information Systems Development and Enhancement

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PURPOSE

The American Recovery and Reinvestment Act (ARRA) enacted in 2009 required the U.S. Environmental Protection Agency (EPA) to rapidly obligate its ARRA funds to many hundreds of projects in six environmental programs across all fifty states, tribes and territories and to satisfy the special reporting requirements for oversight, accountability, and transparency. EPA contracted with Science Applications International Corporation (SAIC) to assess EPA's information systems development and enhancement efforts to implement ARRA.

METHODOLOGY

SAIC used interviews of EPA senior staff combined with additional information from literature and databases to capture, verify, and analyze the critical lessons learned and successful approaches related to EPA's system development and enhancement efforts. During the interviews, EPA respondents identified a number of challenges, successful approaches, recommendations/lessons learned, and systems and process changes that were initiated due to ARRA, but have had more expansive impacts to EPA's programs beyond ARRA.

FINDINGS

More than half of the respondents identified the following two challenges: 1) unclear and evolving Office of Management and Budget (OMB) and Recovery and Transparency Board (RAT Board) guidance, and 2) the time constraints for ARRA implementation. The majority of the respondents identified successful approaches that helped them meet the deadlines for ARRA implementation: 1) use existing funding or a simple process for obtaining funding for systems modification, 2) use existing staff, 3) modify existing systems, and 4) use existing contracts. Using existing personnel and infrastructure made it possible for EPA to meet the aggressive ARRA implementation schedule.

Respondents described the process and systems changes they made as a result of the ARRA program and plan to implement and maintain on a permanent basis. One EPA program established a systematic process for future system updates. Other programs expanded system capabilities to improve data management for the entire program, not just ARRA-related functions (e.g., providing states direct-entry, expanding the use of funding recommendation templates, improving accounting consistency between multiple funds management systems, and adding data elements to enable storage of estimated and actual data.) In addition to these process and system changes which EPA offices made permanent, three respondents noted that ARRA brought an increased focus on geospatial elements of data reporting.

RECOMMENDATIONS

Two of the recommendations proposed by the EPA interviewees were directly related to challenges that they faced. They might be possible to implement during future large-scale funding efforts.

- Respondents recommended providing additional lead time to allow for strategic planning related to systems changes. The short implementation schedule did not allow time for strategic planning.

- One EPA respondent strongly recommended that the responsible entities from all levels – highest management level to the lowest level (individual EPA offices) define the systems requirements before starting the effort (and not change them when implementing the requirements). (During ARRA, defining the system requirements was not possible due to the ongoing changes to the OMB and RAT Board guidance and the changes made to the data requirements only a few weeks before the first reporting period.)

SECTION 1. INTRODUCTION

In February of 2009, Congress passed the American Recovery and Reinvestment Act, aimed primarily at making new jobs and saving old ones, stimulating economic activity and long-term growth, and fostering accountability and transparency in government spending. Of the $787 billion authorized in the Recovery Act, EPA was given $7.2 billion. EPA distributed the majority of its ARRA funds to states in grants and contracts to support clean water and drinking water projects, diesel emissions reductions, leading underground storage tank clean-ups, Brownfields development, and Superfund clean-ups. This was a massive undertaking for EPA. The administration of the funds, which were to be injected into the economy at an unprecedented pace, required that EPA develop or revise policies, processes, and automated information systems. In the Fall of 2011, EPA tasked Science Applications International Corporation (SAIC), and its subcontractor Toeroek Associates, Inc., to design and conduct a study to examine several components of EPA's implementation of ARRA. The SAIC Team studied three management topics - **Cost Estimating** processes, **Funds Management** processes, and **Systems** enhancement and development. The Team also looked at three topics geared more towards outcomes than management processes. These include the **Green Project Reserve** initiative, the use of ARRA funds to spur **Innovative Technologies**, and the use of ARRA funds to **Leverage Local Economic Benefits**. After completion of the research phase, the SAIC Team produced a series of six reports, each covering one of the six topics noted above. The Team also prepared a separate overarching summary report with an Executive Summary, containing highlights of each of the six reports, as well as a description of the goals and methodology for the entire study.

1.1 PURPOSE/OBJECTIVES OF THIS STUDY

EPA tasked the SAIC Team to assess EPA's information systems development and enhancement efforts to implement ARRA. The assessment focused on EPA-managed information systems that were enhanced or developed to aid the Agency in the implementation of ARRA requirements. Information systems developed by other entities, outside of EPA, were not included as part of the assessment.

The primary objective of this task was to capture, verify, and analyze the critical lessons learned, successful approaches, and successful strategies related to EPA's system development and enhancement efforts.

This report, one of six in a series, presents the SAIC Team's findings. The report is presented in the following sections:

- *Section 1. Introduction* – provides an overview of what systems were included in the study and why EPA had to modify or develop systems in response to ARRA. This section also lists the study questions used by the SAIC Team to frame and guide the study.
- *Section 2. Methodology* – provides the approach for the data collection and analysis used in the study. This section also describes what limitations were considered in the study and their impact on the study's findings.
- *Section 3. Findings* – provides the lessons learned and successful approaches as communicated by EPA staff.

1.2 BACKGROUND

When Congress enacted ARRA and EPA was appropriated $7.2 billion in stimulus resources, it nearly doubled the Agency's annual budget. The challenge for EPA was to rapidly obligate its ARRA funds to many hundreds of projects in six environmental programs across all fifty states, tribes and territories. To accomplish this, EPA put in place an agency-wide executive level Stimulus Steering Committee (SSC) that provided a governance structure to ensure ARRA requirements were met. The SSC met frequently and reached out to all affected EPA Program Offices and stakeholders to adopt a number of measures, tools, and business process changes to ensure the timely obligation and expenditures of stimulus funds and to satisfy the special reporting requirements for oversight, accountability, and transparency (EPA,2010a).

It was recognized at the passing of ARRA that modifying existing information systems within EPA was key to meeting the spending, oversight, accountability, and reporting requirement deadlines of ARRA. Given the tight timelines, when possible, EPA modified and enhanced existing information systems and accompanying guidance materials. In a few cases, EPA also developed new database tools as well as related guidance materials to best meet their oversight, accountability, and reporting requirements.

There are fourteen main EPA information systems that were either developed or enhanced to accomplish the implementation of ARRA (see Table 1). A description of the general modifications made to the information systems is included in Appendix 1.

TABLE 1. EPA INFORMATION SYSTEMS ENHANCED OR DEVELOPED TO SUPPORT ARRA

NAME OF SYSTEM	DESCRIPTION OF SYSTEM
Office of Water Systems	
Drinking Water State Revolving Fund (Project and Benefits Reporting) (PBR) System	The Drinking Water State Revolving Fund Project and Benefits Reporting (PBR) system is used by EPA and State Drinking Water State Revolving Fund (DWSRF) programs to track and report on the environmental progress of the DWSRF program.
Clean Water State Revolving Fund Benefits Reporting (CBR) System	The CBR database contains data provided by Clean Water State Revolving Fund (CWSRF) programs on the environmental benefits achieved by CWSRF assistance. The CBR system is used by EPA and states to track and report on the environmental progress of the CWSRF program.
Watershed Assessment Tracking Environmental Results (WATERS)	The EPA Office of Water manages numerous programs in support of the Agency's water quality efforts. Many of these programs collect and store water quality related data in databases. These databases are managed by the individual Water Programs and this separation often inhibits the integrated application of the data they contain. Under WATERS, the Water Program databases are connected to a larger framework.
Office of Environmental Information (OEI) System	
Central Data Exchange (CDX) 1512 Data Warehouse	Section 1512 of the Recovery Act requires recipient reporting to the Office of Management and Budget (OMB). OMB established a specific website, FederalReporting.gov, for receipt of all ARRA information. EPA extracts recipient reported data from FederalReporting.gov to its CDX "1512 Data warehouse". EPA's CDX is the point of entry on the Environmental Information Exchange Network (Exchange Network) for environmental data submissions to the Agency.
Office of Air and Radiation (OAR) System	

NAME OF SYSTEM	DESCRIPTION OF SYSTEM
Database for Reporting Innovative Vehicle Emission Reductions (DRIVER)	EPA established this new Oracle system to manage, analyze, and report Diesel Emission Reduction Program (DERA) programmatic and Recovery Act data.
Office of Superfund Remediation and Technology Innovation Systems	
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	CERCLIS is the official reporting system for the Superfund program. CERCLIS identifies ARRA sites, the funding for ARRA sites, and ARRA activities within these sites.
eFacts	eFacts is an internal data reporting and servicing resource tool for organizing and reporting data about specific Superfund sites. ARRA information from CERCLIS and EPA's financial system, the IFMS database (see below under Office of Chief Financial Officer systems), is extracted, tabulated, sorted, and presented in a variety of report formats.
Office of Underground Storage Tanks (OUST) System	
LUST4 Leaking Underground Storage Tanks (LUST4)	LUST4, a new system, provides the ability for OUST to receive, store, process, and report its Recovery Act performance measures data as well as perform timely quarterly reporting. Data are provided by states in this web-based Oracle database.
Office of Solid Waste and Emergency Response (OSWER) Systems	
Assessment, Cleanup and Redevelopment Exchange System (ACRES)	ACRES is an analytical system used to support the Brownfields Program in meeting its mission by storing, tracking, reporting/querying, and sharing information related to Brownfields with other environmental programs throughout the Agency. ACRES is an online database for Brownfields grantees to electronically submit data directly to EPA through CDX.
Performance Assessment Tool (PAT)	PAT pulls/reads ARRA data from OSWER's major systems (ACRES, RCRAInfo, CERCLIS) needed for specific performance measures. It allows manual input of some measures data that are not currently stored in an OSWER database. It also pulls/reads additional data from Agency-wide grant and financial systems and stores these data for analysis, tracking, comparison, and ad hoc reporting.
Office of Grants and Debarment (OGD) System	
Integrated Grants Management System (IGMS)	The Integrated Grants Management System (IGMS) is EPA's management information system for all EPA grant programs. This national system is used by Headquarters, Regions, and states to track, award, administer, and monitor grants.
Office of Chief Financial Officer (OCFO) Systems	
OCFO Reporting and Business Intelligence Tool (ORBIT), Executive Management Dashboard	EPA designed and maintains this enterprise-wide web-based interface to provide access to multiple data sources containing financial, budget, human resources, and performance information. Data are pulled from Agency budget and financial sources. This system provides reports to OMB and Agency managers for accountability and transparency of use of Recovery Act funds. This system provides reconciliation with recipient reported funding, reports to meet OMB's reporting requirements, quality assurance reports, and performance measures reports. ORBIT was also modified to provide data for offices to use to double check recipient reporting.
Annual Commitment System (ACS) and Budget and Accounting System (BAS)	ACS is a performance module in the Budget and Accounting System (BAS) that tracks annual headquarters and Regional performance commitment information and results, Senior Management Measures, and Regionally-created measures.
The Integrated Financial	EPA designed the Integrated Financial Management System (IFMS) expressly

NAME OF SYSTEM	DESCRIPTION OF SYSTEM
Management System (IFMS)	for government financial accounting; it supports Government Accountability Office (GAO) requirements and OMB internal control requirements. It has recently (October 1, 2011) been replaced by a new EPA financial management system named COMPASS. These systems perform funds control from commitments through payment; update all ledgers and tables as transactions are processed; provides a standard means of data entry, edit and inquiry; and provides a single set of reference and control files.

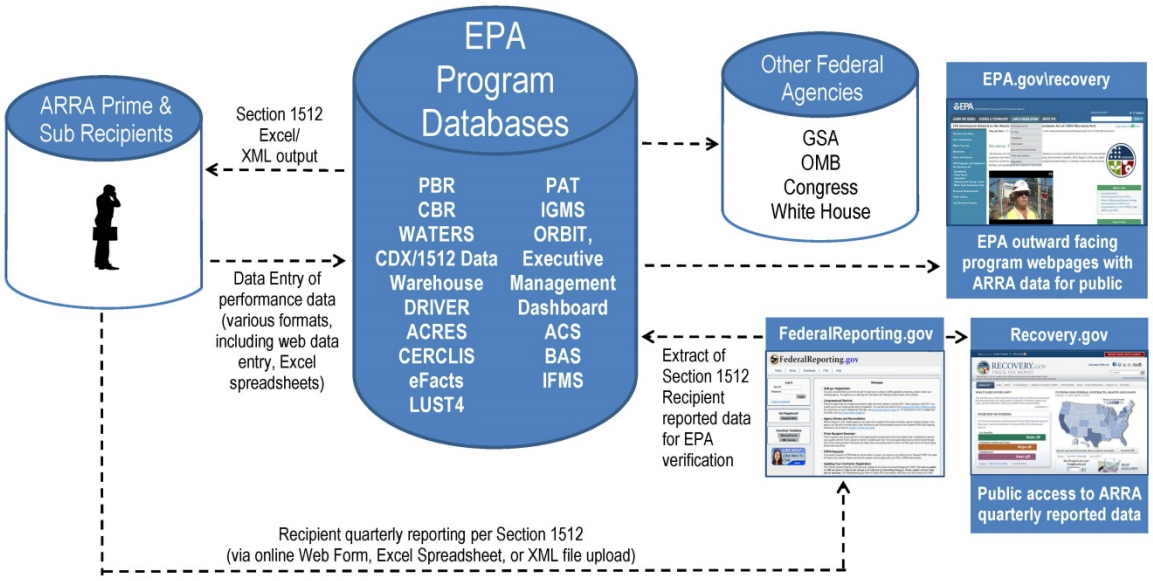
1.2.1 DATA FLOW BETWEEN STAKEHOLDERS

Information management needs for ARRA included entering, transferring, tracking, and managing data between multiple stakeholder entities – EPA Program Offices and Regions, ARRA Prime Recipients (e.g., States) and Sub Recipients (e.g., contractors, municipalities), the Office of Management and Budget (OMB), Congress, and the general public. EPA data systems were used to track and manage:

- *Funds Distribution* – the distribution of ARRA funds from EPA Program Offices and Regions to States and Tribes and to Recipients.
- *Funds Management* - Recovery Act obligations, expenditures, project requirements, performance measures, and project performance for both internal management use and for reporting to outside entities such as OMB, Congress, and the general public.
- *Reporting and Verification* – ensuring the accuracy and quality of data reported by ARRA Prime and Sub Recipients to OMB per Section 1512 requirements as well as internal and external metrics reporting. Transparency was a key requirement of ARRA.

Figure 1 provides a general data flow concept chart between EPA and outside stakeholders. ARRA funds distributions were tracked using EPA Program Databases (e.g., IGMS). Many ARRA grant recipients directly entered, or otherwise provided to EPA, grant project performance data into EPA program databases. For some ARRA recipients these data could also be retrieved from EPA program databases for upload to FederalReporting.gov, avoiding duplicate data entry. EPA extracted Section 1512 recipient reported data from FederalReporting.gov as part of its oversight and data verification responsibilities under ARRA (see Data Quality Review Process discussion below). EPA Program Databases provided ARRA output to the public through the EPA's web pages. In addition, EPA Program Databases provided ARRA data, including project performance, funds obligations and funds expenditures to other federal agencies including OMB, Government Services Administration (GSA), Congress and the White House.

FIGURE 1. GENERAL ARRA DATA FLOW CONCEPT CHART



1.2.2 DATA QUALITY REVIEW PROCESS

The Recovery Act required recipients of ARRA funds to report information on funded projects and activities on a quarterly basis. Recipient reporting was performed through data entry or import into an OMB hosted website - FederalReporting.gov, with public access to the reported data through Recovery.gov. The Recovery Act required EPA to conduct a limited review of recipient reported information each quarter in accordance with Section 1512 of ARRA. EPA established a detailed procedure for performing the review. The procedure applied to EPA organizations that administered and oversaw the following EPA programs: Brownfields cooperative agreements, Leaking Underground Storage Tanks assistance agreements, interagency agreements and contracts, Brownfields interagency agreements and contracts, Diesel Emissions Reduction grants, Clean Water State Revolving Fund grants, Drinking Water State Revolving Fund grants, Water Quality Management Planning grants, and Superfund contracts, interagency agreements and state cooperative agreements. See Figure 2 for the quarterly reporting and data quality review timeline (EPA 2010a).

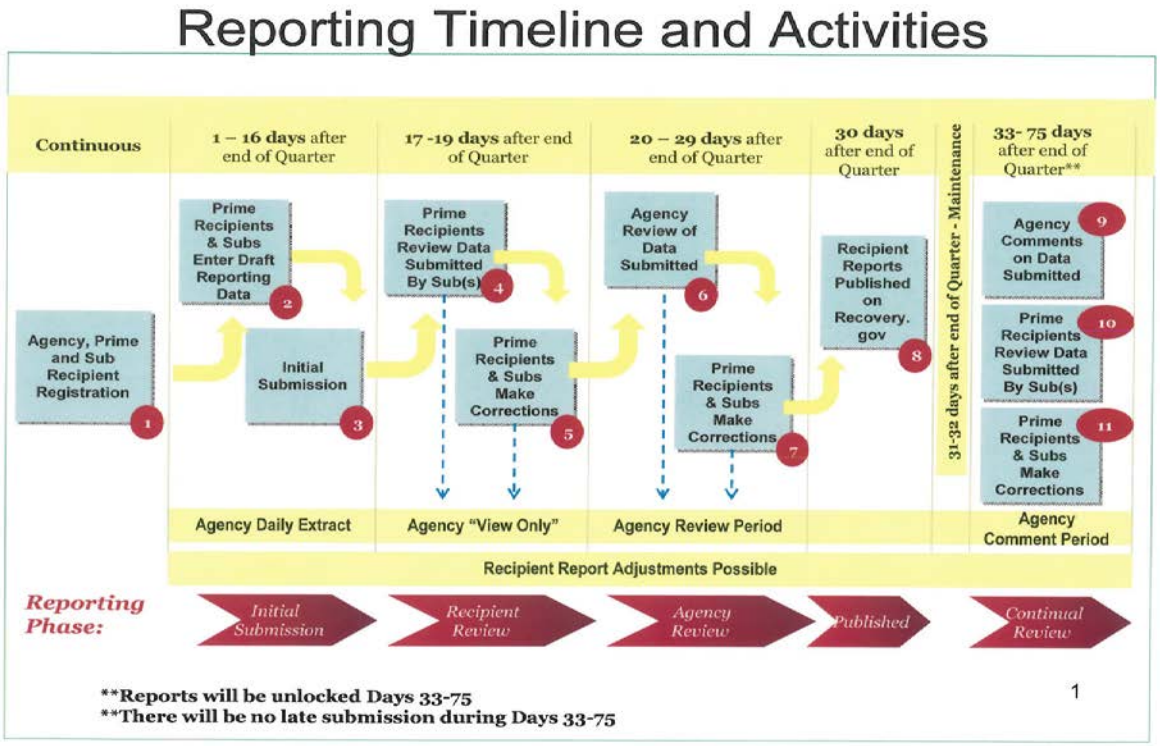


FIGURE 2. REPORTING TIMELINE AND DATA QUALITY REVIEW ACTIVITIES FOR ARRA SECTION 1512 REPORTING TO FEDERALREPORTING.GOV

Source: EPA 2010a

The procedure for EPA's limited review of Section 1512 recipient reported data focused on significant errors (e.g., missing one or more of four specific data elements of major concern to OMB) and material omissions (e.g., data provided is not responsive to a specific data element). Data were extracted by the Tracking and Reporting Subcommittee (a subcommittee of EPA's Stimulus Steering Committee) from FederalReporting.gov via an Extensible Markup Language (XML) data feed and stored in a data repository commonly referred to as the "Section 1512 data warehouse". Macro (agency-wide) reviews of recipient reported data across all programs were performed, as were local reviews by National Program Managers (NPMs) and Regions. Comparisons were made between the recipient reported data extracted from FederalReporting.gov and EPA's master list of awards provided to OMB. Specific data elements (e.g., Amount of Award, Award date, Project Description, Total ARRA funds received/invoiced) were also compared between what recipients reported against information housed in EPA's program databases

(e.g., IFMS, IGMS, ACRES, CBR/PBR, etc.) EPA and NMPs worked together to assist recipients in correcting errors to ensure the highest quality data was reported to the public.

1.2.3 REVISING EPA DATA SYSTEMS TO ADDRESS ARRA

EPA Program Office subject matter experts (SMEs) working with the Stimulus Steering Committee and using guidance provided by the Office of Management and Budget, and the Recovery Accountability and Transparency Board (RAT Board), determined what data elements, data definitions, and system modifications would be needed for each EPA program information system. The Recovery Act included a Management and Oversight (M&O) budget for EPA to administer the implementation of ARRA. Some of the M&O funds were used to enhance existing information systems or to develop new ones.

EPA's Office of Chief Financial Officer (OCFO) had direct oversight of the M&O funds. OCFO implemented a proposal process for EPA offices to request and receive funds for their systems development or enhancement efforts. Each Program Office submitted its proposal funding request to OCFO. The proposal requests included:

- Responsible National Program Manager
- Systems (IT) Program Name
- Existing or New Funding Vehicle
- Type of Spending (e.g., contract, grant)
- Recovery Act Purpose/System Need
- Description of Systems Development
- Contact Person(s)
- Funding Amount Requested (excel format).

EPA invested more than $1.6 million of M&O funds in modifying and developing information management systems to effectively implement ARRA. Table 2 provides a breakdown of the M&O funds invested in each system.

TABLE 2. EPA MANAGEMENT AND OVERSIGHT EXPENDITURES FOR ARRA SYSTEMS DEVELOPMENT AND ENHANCEMENT EFFORTS

OFFICE	RECOVERY ACT PROGRAM	BUDGETED AMOUNT
OW	ARRA SRG Reporting & Data Quality Monitoring System	$195,000
	PBR	$97,500
	CBR	$292,500
OSWER	Superfund Remedial	$125,000
	CERCLIS (OSWER)	$50,000
	e-Facts	$175,000
OSWER	LUST	$50,000
	LUST4 (part of OSWER's Performance Assessment Tool [PAT])	$50,000
OAR	DERA - Diesel Grants	$200,000
	DRIVER	$200,000
OCFO	Overall Reporting & Management	$370,000
	ORBIT, Executive Management Dashboard	$370,000
OCFO	Overall Reporting & Management	$42,000
	Budget Automation System/ Annual Commitment System	$42,000
OEI	Overall Reporting & Management	$500,000
	Central Data Exchange (CDX)/ Section 1512 Data Warehouse	$500,000
Totals		**$1,629,500**

Most of the system development and enhancement efforts used existing IT support contract vehicles to implement system revisions. Standard EPA protocols for modifying systems were followed (e.g., updated configuration management manuals, preparing data schema, updating data element dictionaries, etc.). Appendix 1 provides a summary of the system changes that were performed for each database system.

1.3 STUDY QUESTIONS

Based on the purpose and objectives of the study as described in Section 1.1, the SAIC Team and EPA developed questions to frame and guide the effort. Table 3, Study Questions, presents the questions. The findings are presented in the Lessons Learned in Section 3 of this report.

TABLE 3. SYSTEM DEVELOPMENT AND ENHANCEMENT STUDY QUESTIONS

STUDY QUESTION	FOCUS AREA	DETAILED STUDY QUESTIONS
Factors for Success: *What factors contributed to developing or modifying systems that met the needed data requirements of ARRA?*	**Responsibility for System Changes**	**Staffing:** How did the characteristics of the staffing team(s) (e.g., program expertise, seniority, authority, program office representativeness) responsible for developing and modifying data systems facilitate or impact the outcome of meeting the data requirements of ARRA?
		Coordination: How did responsible parties and program offices within EPA coordinate system development or modification efforts?
	Processes to Implement Systems Changes	**Process:** What were EPA's processes for implementing system development or modification efforts that allowed EPA to meet the schedule and requirements of ARRA?
System Development/Modification Challenges: *What were the challenges to developing or modifying EPA's information management systems?* *What factors created challenges to developing or modifying systems?*	**Identification of Needed Systems and System Modifications**	**Identification Process:** What were the challenges in identifying what information systems needed to be modified or developed to meet ARRA requirements?
		Identification Challenges: What were the challenges to meeting internal deadlines for identifying system revisions or development of new systems?
	Funding Mechanisms	**Funding Source:** How were system development/modification efforts funded?
		Funding Process: What was the process for securing funding?
		Funding Challenges: What were the challenges, if any, to obtaining funding?
	Implementation of System Development/ Modifications	**Responsibility for Implementation:** What skills and authority level were required of the staff responsible for implementing changes to EPA's information systems? What additional skills may have made the process easier?
		Implementation Schedule: What were the challenges of meeting the implementation schedule for ensuring ARRA data needs were met?
		Implementation Challenges: What types of problems were encountered when modifying existing information systems and why? How did EPA overcome them? How did EPA manage conflicting or evolving data system requirements that delayed or otherwise impacted system development/enhancement efforts?

STUDY QUESTION	FOCUS AREA	DETAILED STUDY QUESTIONS
Leveraging for Future Systems Development: *How well did systems development and modification efforts succeed in meeting their ARRA objectives?* *Which ARRA information management process changes have been and should be leveraged for future use?* *Are any system development changes applicable to multiple EPA program systems?*	**Benefits of System Development/ Modifications**	**Leveraging for Other Purposes (i.e., non-ARRA)[1]:** How might system modifications that were made to support ARRA implementation be useful for other purposes? Were the modifications unattainable without the recovery funds?
		Other Benefits (i.e., non-ARRA): What other beneficial changes attained through the system modifications (e.g., new views on data available due to enhanced data reporting, EPA/State data sharing, or increased transparency of data to public/state/regional/headquarters entities) should be made permanent?
		Successful Approaches: With regard to ARRA system development and modification efforts, what strategies (e.g., staffing approach, communication strategy, planning strategy) do staff consider successful approaches?

[1] EPA did not use ARRA funds for any non-ARRA purposes. This question addresses whether systems changes made to implement ARRA also facilitated the implementation of non-ARRA EPA programs.

SECTION 2. METHODOLOGY

The methodology for this study primarily focused on interviews of EPA senior staff combined with additional information from literature and databases to address the study questions. The majority of the information was gathered from EPA staff interviews.

The SAIC Team implemented the study methodology in the following steps which are described in more detail below:

1. Gathered, compiled, and analyzed existing information such as previous studies, system documentation (e.g., data element dictionaries, data verification procedures).
2. Interviewed EPA personnel representing all fourteen information systems that were either modified or developed in response to ARRA.
3. Analyzed the results of the interviews and integrated these with information found in the analysis of existing data.
4. Prepared results from the above analysis (see Section 3. Findings).

2.1 DATA GATHERING

The SAIC Team started the study by reviewing background information, accessing and looking at databases, systems documentation, data quality procedures, and guidance materials developed by EPA. A list of reference documents for this study is included at the end of this report.

2.1.1 STEP 1: COLLECT, REVIEW AND ANALYZE DOCUMENTS AND INFORMATION SYSTEMS

The SAIC Team reviewed and analyzed information and data from the following sources:

- Information system supporting documentation: The SAIC Team reviewed many information systems documents to include systems descriptions, data element dictionaries, data schemas, and reports/outputs from databases. Other documentation was also reviewed and analyzed, such as funding requests/proposals submitted to OCFO for system development/enhancement efforts specific to ARRA. Other supporting documents included EPA procedures for verifying recipient reported data.
- Access to EPA databases: The SAIC team was granted access to and was provided data from many of the EPA data systems included in this study. The SAIC Team was able to view and generate reports relevant to ARRA funding distribution, project management, and data verification to gain an understanding of the system and the revisions made to accommodate ARRA data requirements.
- Existing studies: EPA's activities related to ARRA, including ensuring data quality, have been reviewed within EPA by the Office of Inspector General (OIG) and by outside agencies such as the U.S. Government Accountability Office. The SAIC Team reviewed these reports and extracted relevant information on improvements, lessons learned, and successful approaches as it relates to systems development and enhancement efforts and integrated them into this report as appropriate.

2.1.2 STEP 2: CONDUCT INTERVIEWS WITH EPA PERSONNEL

The primary source of information that the SAIC Team used for this study were interviews with the EPA Subject Matter Experts (SMEs) who were responsible for the overall oversight and management of the system modification or development efforts. The SAIC Team first developed a list of key EPA personnel to interview, to cover the fourteen EPA information systems (listed in Table 1) that were modified or developed to meet ARRA data needs. Participation was voluntary and some staff were not available for interviews due to scheduling difficulties. In most cases, prior to an interview, the SAIC Team provided the interviewee with the study questions and provided a brief overview of the purpose of the study. Most interviews were approximately one hour in length. During a few EPA interviews, an EPA Office of the Chief Financial Officer representative was present. The interviewees were specifically asked and agreed to the OCFO representative's presence.

In all, the SAIC Team interviewed 27 EPA personnel that had a role in enhancing or developing information systems to meet the data requirements and needs of ARRA. The EPA staff interviewed served in various support roles, from management to staff level support, in modifying or developing the database systems that were included in the study.

TABLE 4. NUMBER OF EPA INTERVIEWEES BY EPA INFORMATION SYSTEM

EPA INTERVIEWS CONDUCTED												
PBR/ CBR/ Waters	CDX	Driver	Acres	CERCLIS/ eFacts	LUST4	PAT	IGMS	ORBIT	ACS/ BAS	IFMS	QA Process	Funding Process
x	x	x (3)	x	x (5)	x(5)	x(2)	x	x	x (4)	x	x	x

2.1.3 STEP 3: ANALYZE COLLECTED INFORMATION

The SAIC Team analyzed the information collected in Steps 1 and 2 above. Information from existing studies as well as interview responses was aggregated, summarized, categorized and analyzed to identify challenges, lessons learned, or successful approaches. Specifically, the SAIC Team reviewed the interviewees' responses that identified:

- Commonalities in interview responses with regards to implementation challenges for system modifications
- Accuracy and helpfulness of guidance materials from OMB, OEI, or other oversight entities (for the program offices that needed to modify existing systems)
- **Similarities** in problems encountered with regard to:
    - Funding information system development/modification efforts;
    - Meeting internal deadlines for information system roll-out;
    - Coordination of data and related guidance to Regions and states
- Benefits resulting from system modifications/development efforts that could be leveraged for future Agency-wide programs.

2.2 STUDY LIMITATIONS

The following limitations are noted with regard to this study:

- **There is inherent uncertainty introduced in the collection of subjective information**. The interview process introduces uncertainty through the collection of subjective information provided by individuals relaying recollections/memories of activities conducted three years ago. However, these recollections/memories are part of the institutional knowledge created during ARRA implementation.
- **Staff turnover**. The interviews of some key staff were not possible due to a change in their position or employment status (e.g., retirement). Thus, in a few cases, the interviewee did not have first-hand knowledge of all of the initial processes involved in modifying or developing systems for ARRA implementation.
- **Information systems outside of the scope of study**. This study, by design, focused only on information systems within EPA. Other information systems owned by states, tribes, or other federal agencies were not considered.

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SECTION 3. FINDINGS

During the interviews, EPA respondents identified a number of challenges, successful approaches, recommendations/lessons learned, and systems and process changes that were initiated due to ARRA, but have had more permanent and expansive impacts to EPA's programs.

In addition to information gleaned from the interviews, this section contains references and quotes from previous studies and reviews conducted by EPA, which are included as examples to illustrate how other studies and reviews corroborate the findings from the interviews conducted as part of this study.

Table 5 summarizes big picture findings for each study question. The table looks like the study questions table in the introduction but uses the third column to show the big picture findings. The big picture findings are based on interviews with EPA Headquarters staff responsible for managing and implementing changes to EPA systems in response to ARRA data needs. The text following the table includes a more thorough discussion of finding and is presented as five sections – challenges, successful approaches, recommendations/lessons learned, established changes moving forward, and observations made by the SAIC Team.

TABLE 5. SYSTEM DEVELOPMENT AND ENHANCEMENT STUDY QUESTIONS WITH BIG PICTURE FINDINGS

OVERARCHING STUDY QUESTION – FACTORS FOR SUCCESS	
Factors for Success: *What factors contributed to developing or modifying systems that met the needed data requirements of ARRA?*	
DETAILED STUDY QUESTIONS	**BIG PICTURE FINDINGS**
Staffing: How did the characteristics of the staffing team(s) (e.g., program expertise, seniority, authority, program office representativeness) responsible for developing and modifying data systems facilitate or impact the outcome of meeting the data requirements of ARRA?	**EPA used existing staff and existing contractors who already had the knowledge and expertise in their systems to facilitate and ensure systems modifications were done effectively and in the required timeframe.**
Coordination: How did responsible parties and program offices within EPA coordinate system development or modification efforts?	**EPA program offices maintained communications primarily through frequent meetings and coordination with all the stakeholders.** EPA staff used the meetings, which involved staff across multiple disciplines and multiple offices, as a mechanism to discuss issues and solutions. The meetings also resulted in collaborative efforts and relationship building across the agency, which were needed for the systems modifications.
Process: What were EPA's processes for implementing system development or modification efforts that allowed EPA to meet the schedule and requirements of ARRA?	**Use of *existing* processes, staff and contractors and modifying *existing* systems (rather than developing new systems) and constant and regular communication and collaboration were the common factors which allowed and enabled EPA to meet the schedule and system requirements of ARRA.**

OVERARCHING STUDY QUESTION – SYSTEM DEVELOPMENT/MODIFICATION CHALLENGES	
System Development/Modification Challenges: *What were the challenges to developing or modifying EPA's information management systems?* *What factors created challenges to developing or modifying systems?*	
DETAILED STUDY QUESTIONS	**BIG PICTURE FINDINGS**
Identification Process: What were the challenges in identifying what information systems needed to be modified or developed to meet ARRA requirements?	**This study did not find challenges in identifying the systems to be modified.**
Identification Challenges: What were the challenges to meeting internal deadlines for identifying system revisions or development of new systems?	**The challenges in identifying the systems modifications that were needed were a result of ongoing changes to the data needs and schema from the RAT Board**. **In the early stages of determining ARRA data requirements, additional coordination efforts could have been undertaken between data stakeholders (OMB, EPA program offices, OCFO, Regions, and States) to examine longer-term ARRA data needs.**
Funding Source: How were system development/modification efforts funded?	**Funding came from the ARRA Management and Oversight Funds administered by the OCFO.**
Funding Process: What was the process for securing funding?	**The OCFO implemented their standard proposal process, with which EPA program staff were familiar.** Program offices submitted funding requests that included the system enhancements/modifications needed.
Funding Challenges: What were the challenges, if any, to obtaining funding?	**Generally there were no challenges to obtaining the funding, although one EPA office thought the process could have been more transparent.**
Responsibility for Implementation: What skills and authority level were required of the staff responsible for implementing changes to EPA's information systems?	**Overall EPA used existing staff and existing contractors who already had the knowledge and necessary authority to facilitate and ensure systems modifications were done effectively and in the required timeframe**.
What additional skills may have made the process easier?	**This study did not find additional skills that would have made the process easier.**
Implementation Schedule: What were the challenges of meeting the implementation schedule for ensuring ARRA data needs were met?	**Challenges included the short timeframe to implement modifications to meet the deadlines (time constraints); unclear and evolving guidance from the RAT Board and OMB made the deadlines more difficult to meet since clarifications were needed before the systems could be revised.** Basically EPA addressed these challenges through the dedication and increased workload of the existing staff to ARRA implementation and the continuous communication and collaboration efforts (described under Factors for Success above).
Implementation Challenges: What types of problems were encountered when modifying existing information systems and why?	**Taking existing staff from their existing responsibilities and dedicating them to ARRA implementation created a challenge of having sufficient staff to implement the regular program responsibilities.**

Overarching Study Question – System Development/Modification Challenges	
	Data requirements were not in place with sufficient lead time. The RAT Board was slow to provide EPA with needed data requirements and often those requirements were evolving while system modifications were ongoing.
How did EPA overcome them?	**Some EPA programs addressed staffing challenges by using other (sometimes less experienced) staff to implement the regular program responsibilities.**
How did EPA manage conflicting or evolving data system requirements that delayed or otherwise impacted system development/enhancement efforts?	**To address evolving data requirements, EPA staff worked long hours to meet an already short deadline to implement system revisions.**
Overarching Study Question – Leveraging for Future Systems Development	
Leveraging for Future Systems Development: *How well did systems development and modification efforts succeed in meeting their ARRA objectives?* *Which ARRA information management process changes have been and should be leveraged for future use?* *Are any system development changes applicable to multiple EPA program systems?*	
Detailed Study Questions	**Big Picture Findings**
Leveraging for Other Purposes (i.e., non-ARRA)[2]: How might system modifications that were made to support ARRA implementation be useful for other purposes?	**Grant programs will benefit from the development of a standard funding recommendation template. All programs could benefit from web-based data entry by states into program information systems.**
Were the modifications unattainable without the recovery funds?	Although it is possible that these new processes would have been attainable in lieu of ARRA, they were primarily done to expedite the ARRA funds obligation and expenditures.
Other Benefits (i.e., non-ARRA): What beneficial changes attained through the system modifications (e.g., new views on data available due to enhanced data reporting, EPA/State data sharing, or increased transparency of data to public/state/regional/headquarters entities) should be made permanent?	**Three EPA offices implemented processes that became permanent:** - An established process for making future systems modifications - An established process for State entry of data - An established funding recommendation template.
Successful Approaches: With regard to ARRA system development and modification efforts, what strategies (e.g., staffing approach, communication strategy, planning strategy) do staff consider successful approaches?	**As described above, the factors considered as successful approaches are use of existing staff, contractors, and systems, and continual communication and collaboration.**

[2] EPA did not use ARRA funds for any non-ARRA purposes. This question addresses whether systems changes made to implement ARRA also facilitated the implementation of non-ARRA EPA programs.

3.1 CHALLENGES

The following provides an overview of the major challenges described by the EPA systems interviewees that the SAIC Team heard consistently or were specifically mentioned by an EPA interviewee:

> **"A challenge all programs faced in administering ARRA resources was ensuring the success of our state partners and recipients in meeting newly established deadlines, policies and business rules. The fast creation and an "on-the-fly" approach to rolling out FederalReporting.gov help desk support and guidance in general created an unnecessary tension with our recipients. If given the opportunity for a re-start, EPA would advocate for early interaction with recipients by OMB and the RATB."**
>
> *Quoted from EPA New Ways Evaluation Responses October, 2010*

Data Requirements Not in Place with Sufficient Lead Time: One EPA respondent reported that ARRA data requirements were not in place in time to prepare and test procedures for receiving and manipulating ARRA data. He noted that it was unclear what data would be on the Federal reporting web site, how the data would be organized and how a person would access the data, until about four weeks prior to the first data reporting period. EPA did not receive the finalized data schema[3] (the format in which the data would be supplied) until just two weeks before the first reporting period. However, even though EPA received the data schema at that time, EPA did not receive the test schema from the RAT Board until just a few days before the first reporting period started so that EPA could test their procedures for receiving and analyzing the data.

Unclear and Evolving RAT Board and OMB Guidance: The Office of Management and Budget and the RAT Board issued guidance for recipients and the EPA programs. Several EPA respondents indicated that the guidance from OMB and the RAT Board contained issues that resulted in implementation inefficiencies. The EPA respondents also noted that the RAT Board and OMB guidance was unclear and was continually evolving, even while the EPA program staff were working on the system modifications. Respondents also indicated that OMB's priorities changed once implementation began (e.g., a Financial Operations Report was only required two reporting quarters and environmental performance results were not updated on the OMB website).

Ongoing Changes to the Data Needs and Schema: Several EPA respondents agreed that the changing RAT Board data requests created a large challenge. One EPA respondent described a situation in which EPA had prepared its systems, and then without prior notice, the RAT Board changed the data schema. For up to three reporting periods, changes to the data schema caused problems with the EPA systems. EPA's

[3] A database schema of a database system is its structure described in a formal language supported by the database management system (DBMS) and refers to the organization of data to create a blueprint of how a database will be constructed (divided into tables).

systems semi-automatically pull data from the federalreporting.gov system. EPA did not know that changes had been made to the schema until the data pull failed. EPA then reviewed the data linkages to determine the problem. During this review, EPA discovered that the data schema had changed.

Nontransparent Process to Obtain Funding for Systems Modifications: One EPA respondent stated that the process for funding the system modifications implemented by the Office of the Chief Financial Officer was not transparent. Although OCFO did provide the form for submitting funding proposals, they did not provide specific information or criteria as to how the funding would be allocated. Further, another respondent indicated that in the early stages of identifying system changes and data needs, the finance and program staff would have benefitted from considering long-term data needs beyond the immediate data requirements as determined by the RAT Board.

One EPA respondent had a misunderstanding about the contract policy, and the existing systems support contract was undergoing a re-compete which would have complicated the process. Therefore, this EPA program office opted not to request funding because they thought they would need to develop a new contract and the timeframe would not allow that. As a further note, this EPA program office respondent stated that the dollars needed for implementing ARRA-related modifications were inconsequential compared to the normal budgets for systems maintenance and modification.

Time Constraints to Implement Changes: Most respondents described how the short ARRA implementation deadlines affected their systems enhancement efforts. One respondent stated that the time pressure was the biggest problem. Another respondent noted that with the short timeframe, staff did not have sufficient time to think through the changes that needed to be made and many changes were done 'on the fly.' Thus, some of the decisions made in haste had to be revisited later, and since these types of changes had never been done before, there were no predictable outcomes to the process. A third respondent noted that the due to the short timeframe, their system had quite a few bugs and problems; as a result, the program office has spent a large amount of money in the past fiscal year (i.e., Fiscal Year 2012) to address these problems and make improvements. Another EPA employee left after the policies and groundwork for systems changes had been established, and his successor was left to live with his predecessor's mistakes and was not able to revisit or revise those decisions due to the time constraints.

Another respondent noted that the time constraints for ARRA implementation required that ARRA system changes be made at the same time as the roll-out of the new EPA Acquisition System (EAS). During FY 2010, EPA was migrating data from the Integrated Contracts Management System (ICMS) to EAS. Like its predecessor ICMS, EAS provided summary procurement data to the Federal Procurement Data System Next Generation (FPDS-NG) including the information on ARRA-funded actions. The rollout of the EAS at this time greatly complicated reconciliations between data in the EAS, EPA's Integrated Financial Management System (IFMS), and FPDS-NG.

Increased Staff Workload: Seven respondents noted that the responsibilities associated with implementing ARRA systems requirements affected their existing staff's ability to complete their regularly assigned responsibilities. For example, one program respondent noted that creating the ARRA reports was done at the expense of creating other reports that the program may have needed. Another EPA respondent noted that their staff, who worked on the ARRA systems enhancement efforts, also managed the program hotline, and because of the intense effort needed for the ARRA systems enhancement, they probably took longer to address hotline issues. Finally another EPA program respondent noted that the

most difficult challenge associated with the ARRA systems enhancement was coordinating the system revision deadlines with other program priorities, such as data reporting, new initiatives, and other job functions. In response to this challenge, several respondents stated that EPA used less experienced staff to cover the workload of more experienced staff.

Inefficiency Due to Higher-Level Decision-Making: EPA respondents noted that the level of decision-making related to ARRA implementation was higher than usual, creating a challenge for staff. As examples, EPA respondents provided the following comments:

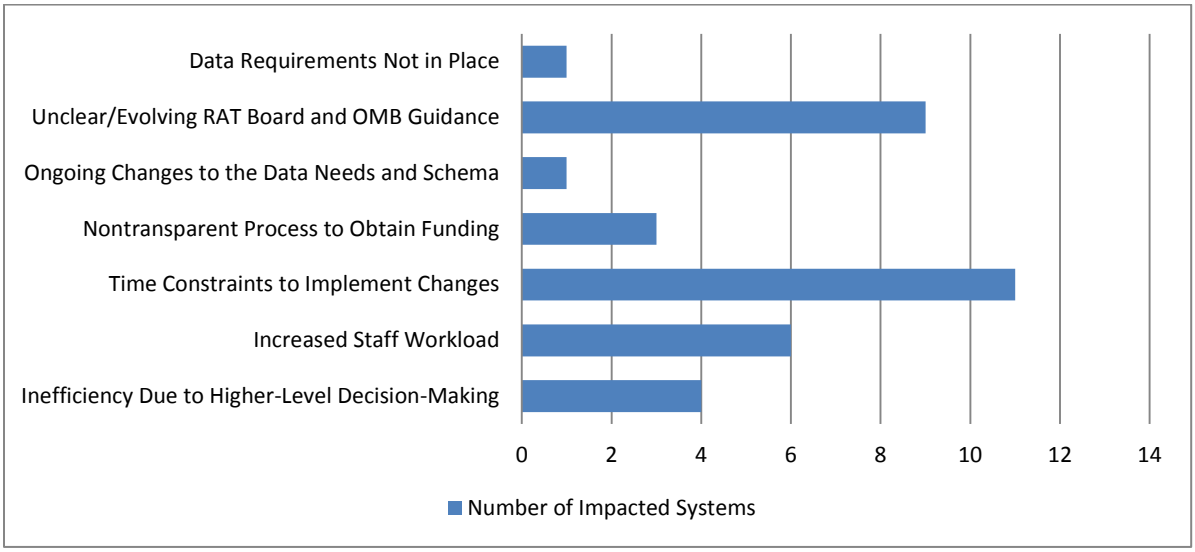
- The process for enhancing program systems had a higher management level of decision-making authority than was necessary primarily because of the potential risk of involvement by the Inspector General. The senior management personnel perceived career risks. As a result, decision-making authority was elevated several organizational levels higher than typical decision-making authority. This higher level of decision-making sometimes affected the ability of EPA staff to move forward and implement the required modifications.
- The levels of management oversight on the systems runs for the quarterly reporting data was burdensome to EPA program management staff, EPA Regions, and grantees.
- Because ARRA was a highly visible, highly politicized effort, everyone was very reactive, and did not communicate effectively at the Federal agency level (i.e., Federal agency to agency).

Table 6 summarizes the challenges described by the EPA systems interviewees that the SAIC Team heard consistently or were specifically mentioned by an EPA interviewee. Figure 3 indicates how many (of 14 total systems) were impacted by each challenge according to the EPA interviewees.

TABLE 6. SUMMARY OF CHALLENGES

SUMMARY OF CHALLENGES
Data Requirements Not in Place with Sufficient Lead Time
Unclear and Evolving RAT Board and OMB Guidance
Ongoing Changes to the Data Needs and Schema
Nontransparent Process to Obtain Funding for Systems Modifications
Time Constraints to Implement Changes
Increased Staff Workload
Inefficiency Due to Higher-Level Decision-Making

FIGURE 3. NUMBER OF SYSTEMS IMPACTED BY CHALLENGES ACCORDING TO INTERVIEWEES



The following two comments were provided as follow-up to one of the EPA interviews. The comments both deal with inconsistent or missing data elements within non-EPA systems that caused challenges for EPA staff. These data element issues are not represented in the graph above because they were problems with non-EPA systems.

Problems with the Federal Procurement Data System – Next Generation: The EPA and all other Federal agencies must submit detailed information regarding contract actions to the General Services Administration's FPDS-NG. The data elements used to identify which contract actions were ARRA-funded were inconsistent. Three data element problems are described below:

- The data identification method used at the start of ARRA required the Description of Requirement data element to begin with a prescribed format (e.g., TAS::68 8195::TAS). If that format was not followed to the exact letter, contract actions would not show up in the FPDS-NG's ARRA Report.
- In March 2010, OMB began requiring all agencies to complete the Treasury Account Symbol (TAS) Code data element for all contract actions. However, the TAS Code (68 0108) given to EPA to track ARRA M&O funds had already been used for over a decade for non-ARRA M&O funds. The Agency used manual fixes for about 3 months to ensure that EPA's ARRA-funded M&O contract actions were coded properly. Other Federal Agencies also found this to be a problem.
- Starting in July 2010, OMB added a new data element, the Initiative field, which needed to be marked "ARRA" for contract actions with ARRA funding. It was to be left blank on other actions. This particular modification posed a problem for EPA, because the EPA Acquisition System (EAS), which is used to upload data to FPDS-NG, did not have the capability to allow a particular TAS Code to be coded as ARRA for one action, but non-ARRA for another. Some other Federal Agencies also had problems with this.

Problems with the Federal Reporting.gov System: One respondent noted that every oversight/audit group that reviewed EPA's Section 1512 Recipient Reporting process concluded that the FederalReporting.gov system should have had the capability (i.e., data element) to separately document that a Contracting Officer Representative (COR), Contracting Officer (CO), and ARRA coordinator had reviewed a specific report. The only capability was to either mark a report as reviewed without comment or post written comments. EPA spent additional time and effort reaching out to the required reviewers to ensure they were aware of their responsibilities. Although this manual method of communicating with the reviewers worked, the respondent believed that it would have been preferable to program the system to allow documentation for each level of review.

3.2 SUCCESSFUL APPROACHES

The following provides an overview of the successful approaches described by the EPA interviewees.

Use Existing Funding or a Simple Process for Obtaining Funding for Systems Modifications: Most EPA respondents noted that they had no difficulties with the OCFO process (described in Section 1) to obtain funding and received the amounts they requested for systems development. The EPA respondents' reasons for this were the following:

- The OCFO process was similar to the process they typically use for requesting funding for system modifications.
- All of the interviewees responded that sufficient funds were available to make their systems changes.
- Several associated and necessary system activities and services (training, dashboard development, data integration services, and behind-the-scenes wiring) were paid for within the Working Capital Fund.

Use Existing Staff: All of the EPA respondents stated that their program offices used existing Full Time Equivalents (FTEs) to support the systems development and enhancement efforts needed for ARRA. This was essential to successful implementation because of their knowledge and expertise as well as the fact that they had existing working relationships. The EPA respondents described the different ways in which their offices used existing staff to accomplish the systems modifications in the required timeframe:

- One EPA program office awarded only ARRA grants in 2009, the first year of ARRA. Then this program office combined the 2009 and 2010 program funds and awarded both program and ARRA funds in 2010.
- Another EPA program office, which had multiple systems that needed to be modified, had a small core team that worked on their office's systems modifications. Existing staff managers took the leads for the modifications for their already-assigned systems.
- An EPA office, which is accustomed to shifting its focus based on the priorities of the administration, assigned approximately three existing FTEs to support ARRA. The minor staffing changes did not affect other activities in this office.

- Another EPA program office was able to easily and quickly update its system because of the close relationships among the existing staff that needed to work together. These same EPA staff were involved in all aspects of the system modifications including the formulation, control and execution.

Although most interviewees found this to be a successful approach, the use of existing staff caused an associated challenge in that existing staff working on ARRA implementation could not complete their regularly assigned program responsibilities (see Bullet 6 in Section 3.1 Challenges).

Modify Existing Systems (rather than Create New Systems): Most EPA respondents stated that EPA's success in meeting the ARRA's timely obligation of funds and subsequent data management and reporting requirements was largely due to EPA management's early decision to use existing program office data systems versus creating new ones. For example, one respondent stated that modifying existing systems allowed the data to flow more quickly while another respondent stated that it is better not to start from scratch. In addition, EPA program offices, Regions, and grantees were familiar with the existing systems and related business processes, so guidance and training needs were reduced. One respondent indicated that the main challenge with modifying existing systems is encountered during the testing stages. Testing is required to ensure that none of the underlying data relationships are damaged. Although this is a challenge associated with modifying existing systems, the respondent agreed that there are many more challenges associated with developing an entirely new system.

Many EPA respondents specifically mentioned the benefits of using the existing Executive Management Dashboard to create internal and public ARRA reports. The reports facilitated quality review of the data by the Regions and Program Offices and simplified reporting to the RAT Board.

> **"**[The] electronic dashboard and standardized reports for senior management and analysts to track Recovery Act obligations, expenditures and recipient reported information…**enabled the agency to maintain obligation/outlay progress, improve data quality of recipient information and keep non-reporting to a minimum."**
>
> *Quoted from EPA New Ways Evaluation Responses October, 2010*

Use Existing Contractors: Seven respondents stated that they used existing contracts/contractors to modify their systems to meet ARRA requirements. They cited reasons why modifying their existing data systems using existing contract vehicles was successful:

- A longstanding contract was already in place and the contractor had knowledge of the systems so they could modify them more quickly.
- EPA could simply increase funding and modify an existing contract (as long as the contract had capacity) to perform the work versus going through a time-consuming bid and proposal process.

Maintain Communication and Encourage Collaboration: Several EPA respondents described the initial efforts which they felt contributed to implementing the systems modifications. Many respondents participated in frequent and numerous meetings to discuss topics such as the data to collect, ways to

display the data and development of performance measures. The various efforts described by the EPA respondents included the following:

- One EPA program office was very effective working with their Congressional counterparts. They worked with the Congressional staff ahead of the curve to ensure a common understanding of what information management needs would be in the Act.
- Several EPA respondents felt that the frequent internal meetings, especially at the beginning of the process, were very useful. Responses from the EPA staff described the meetings as follows:
    - Meeting organizers showed vision and kept staff engaged.
    - Meetings helped to develop relationships that continue and are a source of support when needed.
    - Meetings provided a way for EPA to coordinate across offices with different goals and different information systems.
- Multiple respondents noted that coordination with other stakeholders was also important. One program office had previously established information coordinators in the Regions, which were critical in communicating with grantees throughout the process.

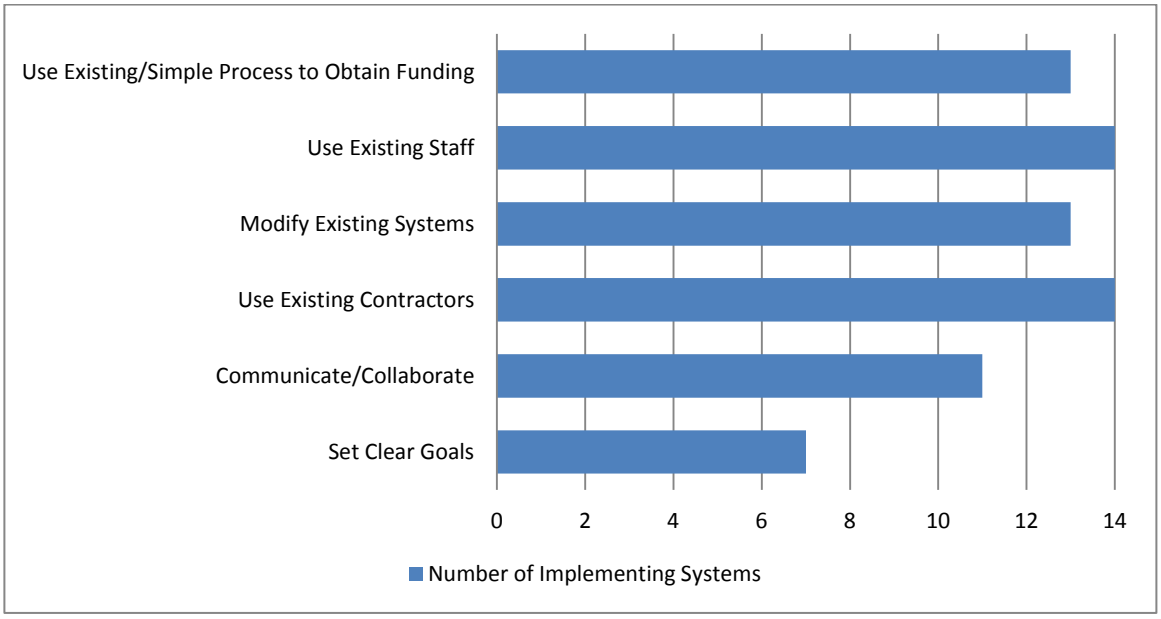
Set Clear Goals: Many respondents noted that the leadership shown by EPA management and staff facilitated ARRA implementation. One respondent stated that it was important to have a clear goal and that both EPA Headquarters and Regional staff stepped up. Another respondent noted that the overall community is needed to make things happen and that EPA had experienced and dedicated staff who did this. Another respondent commended management for rallying the troops.

Table 7 lists the successful approaches described by the EPA systems interviewees that the SAIC Team heard consistently or was specifically mentioned by an EPA interviewee. Figure 4 indicates how many (of 14 total systems) implemented each successful approach according to the EPA interviewees.

TABLE 7. SUMMARY OF SUCCESSFUL APPROACHES

SUMMARY OF SUCCESSFUL APPROACHES
Use Existing Funding or a Simple Process for Obtaining Funding for Systems Modifications
Use Existing Staff
Modify Existing Systems (rather than Create New Systems)
Use Existing Contractors
Maintain Communication and Encourage Collaboration
Set Clear Goals

FIGURE 4. NUMBER OF SYSTEMS IMPLEMENTING SUCCESSFUL APPROACHES ACCORDING TO INTERVIEWEES



3.3 RECOMMENDATIONS/LESSONS LEARNED

The SAIC Team asked the EPA respondents if they had any recommendations or lessons learned for moving forward in the event that they would receive another large influx of funding with specified requirements and deadlines. Below is a list of the recommendations from the EPA interviews.

Sufficient Lead Time/Strategic Planning: Although the comments were slightly different, these two topics are grouped together as one recommendation because sufficient lead time is needed to do appropriate planning for identifying and implementing systems changes. One EPA respondent described the recommendation that if EPA were to once again receive an infusion of funding, he would first prefer to do strategic assessment and planning before jumping into determining and implementing the systems modifications (see corresponding Challenge - Time Constraints in Section 3.1).

Data Requirements in Place: One EPA respondent strongly recommended that the responsible entities from all levels – highest management level to the lowest level (individual EPA offices) define the systems requirements before starting the effort (and not change them when implementing the requirements) (see corresponding challenges – Ongoing Changes to OMB and RAT Board Guidance and Data Requirements Not in Place with Sufficient Lead Time in Section 3.1).

Planning Process/Use Different Tools: Associated with the Strategic Planning recommendation, two EPA respondents stated that they would have used different data system tools if given the time to review and analyze. Further, one respondent noted that if EPA were to receive funding similar to the ARRA stimulus funds in the future, EPA would have an easier time managing the financial data using the Agency's new Compass Financial information, as the Compass tool has improved reporting capabilities. Another EPA

respondent stated that he would pick a different platform for the Business Intelligence Tool (i.e., Oracle Business), use a SharePoint dashboard, and use Microsoft Excel for statistical presentations.

3.4 ESTABLISHED CHANGES MOVING FORWARD

During interviews, respondents described the process and systems changes they made as a result of the ARRA program and plan to implement and maintain on a permanent basis. These process and systems changes are described in detail below.

Established Process for System Modifications: The ARRA process helped one EPA program office establish a systematic process for updating its system. The process, which the office is now implementing, involves system users submitting their issues, which are documented. The office reviews, ranks, and categorizes the issues based on priority or functional similarity. This analysis is then used to make deliberate choices for system enhancements. The issues are presented to the contractor in purposeful bundles, resulting in more streamlined releases of system updates.

Established Process for State Data Entry: One EPA program office had been trying for several years to provide access to the data system such that the states could enter their own data directly into the database system. When the opportunity arose through the ARRA funding, the program created a web-based system, designed mainly for the ARRA program, into which the States could now enter their data. The States are also responsible for performing quality assurance review of their data. The EPA Regions oversee what the States are reporting and because of this change, EPA now receives the data more quickly. In addition, the program office designed the data system such that their program office staff can open and close the window when data are to be entered, controlling the period when the States can enter their data.

Established Funding Recommendation Template: One EPA office respondent stated that they are re-inventing one of the products that they implemented for the ARRA funds. Prior to ARRA, when an EPA program office did a solicitation and made their selection for an award, the EPA staff prepared a funding package to submit to the EPA grants office. The package includes a form that justifies the decision and the commitment of funds. The funding package is lengthy and refers to policy and other types of in-depth information. The EPA office developed a template for each of the ARRA programs that generated responses for many questions on the funding recommendation form. It shortened the time required for EPA staff to complete the form, review the data, and distribute funding. The EPA office currently uses this funding recommendation template for several EPA programs.

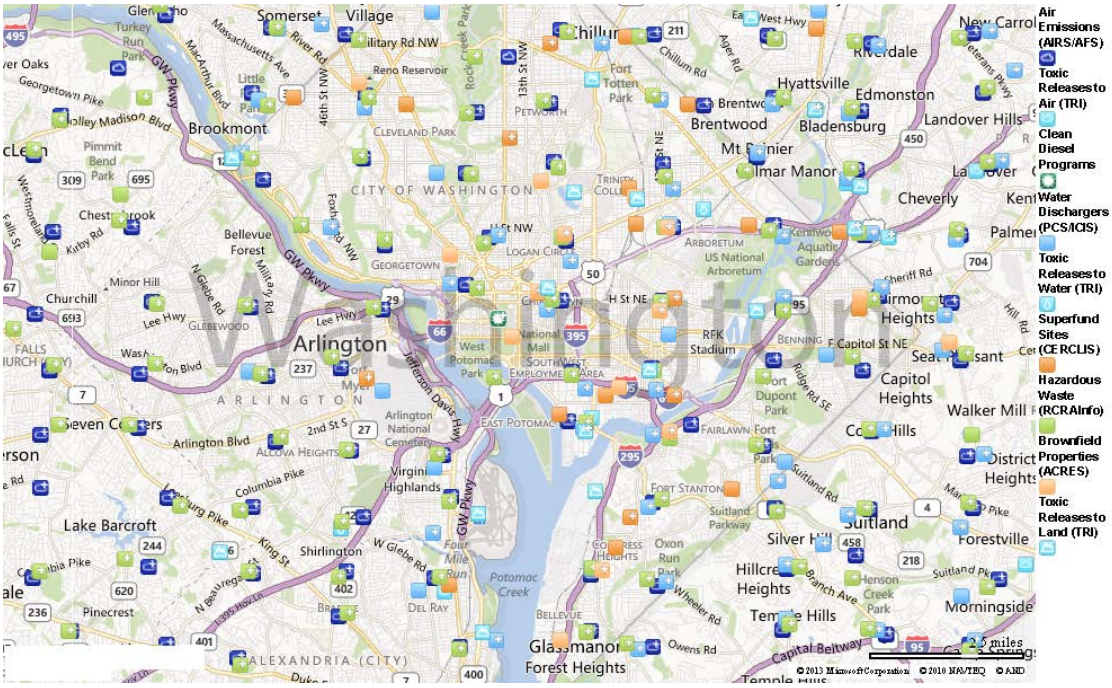
> **"Program offices worked with legal counsel to develop standard program funding recommendation templates. EPA's Grants organization posted the templates on the Agency's electronic grants management system for programs to access electronically and entered the specific award information for processing – this improved processing time."**
>
> *Quoted from EPA New Ways Evaluation Responses October, 2010*

Improved Accounting Consistency: ARRA resulted in system changes that ensure accounting consistency between multiple funds management systems, especially in tracing nonliquidated obligations (e.g., funds that are unused after a project is complete). The system changes go beyond ensuring accounting consistency for ARRA funds and provide greater consistency for a broader range of EPA grants.

Expanded Systems Capabilities: During ARRA, one program system added the ability to easily store both estimated and actual environmental progress data based on a grantee's original work plan and final report. This ability has improved EPA's reporting and has supported the writing of a Report to Congress.

In addition to these changes which EPA offices made permanent, three respondents noted that ARRA brought an increased focus on geospatial elements of data reporting. One EPA program focused considerable effort on translating its financial, emissions, and environmental benefits data to geospatial presentation. This resulted in the support of EPA's GeoGrants Initiative, in which the EPA program serves as a key data provider. The EPA respondent stated that this effort and the resulting database modifications would not have been attainable without ARRA funds. Figure 5 shows an example map of EPA's publicly available geospatial data.

FIGURE 5. MAP ILLUSTRATING EPA'S PUBLICLY-AVAILABLE GEOSPATIAL DATA



3.5 SAIC OBSERVATIONS

EPA was able to meet the deadlines for ARRA implementation by using existing staff, contractors, and systems. Using existing staff provided the knowledge and experience necessary to modify systems to meet the ARRA implementation deadlines, but posed the challenge of meeting the non-ARRA-related responsibilities of the existing staff. EPA offices used more inexperienced people to cover the regular duties.

Although the existing staff had experience and knowledge of what needed to be accomplished, convening multi-disciplinary, multi-organizational staff working groups to solve particular challenges allowed the separate EPA offices to more quickly and effectively manage major new requirements.

However, the aggressive implementation schedule resulted in a lack of strategic assessment regarding necessary system outputs and ways to implement those outputs. Ensuring that the RAT Board requirements were followed prevented organizations from looking at their own data needs for longer-term program assessment. Collaborative involvement of program offices and OCFO in determining data requirements and funding requirements could have led to more robust systems changes with more lasting programmatic impacts.

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APPENDIX 1: SYSTEMS ENHANCEMENT AND DEVELOPMENT EFFORTS TO EPA INFORMATION SYSTEMS SUPPORTING ARRA

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APPENDIX 1. SYSTEMS ENHANCEMENT AND DEVELOPMENT EFFORTS TO EPA INFORMATION SYSTEMS SUPPORTING ARRA

NAME OF SYSTEM	DESCRIPTION OF SYSTEM MODIFICATION OR DEVELOPMENT EFFORTS
Office of Water Systems	
Drinking Water State Revolving Fund (Project and Benefits Reporting) (PBR) System Clean Water State Revolving Fund Benefits Reporting (CBR) System	Modification of the CWSRF and DWSRF applications to meet final ARRA reporting standards. Creation of a spreadsheet and XML 1512 generator to leverage already-reported data to facilitate recipient reporting. Creation of an Office of Water (OW) Reporting Data Mart. Creation of linkages between CWSRF and DWSRF applications and the OW Reporting Data Mart. Creation of a linkage between the OW Business Intelligence data mart and OW web publishing database to facilitate transparency.
Office of Environmental Information (OEI) System	
Central Data Exchange (CDX)	Systems development includes building out an infrastructure for Really Simple Syndication (RSS) and ATOM (an enhanced RSS) feeds to support existing OMB reporting requirements, developing workflow capabilities to emulate the recipient reporting process, facilitating the proof of concept and documenting the results. OEI will also support integration of shared services with EPA program office and financial grant reporting systems to support greater automation of reporting to Recovery.gov.
Office of Air and Radiation (OAR) System	
Diesel Emissions Reduction Program Database for Reporting Innovative Vehicle Emission Reductions (DRIVER)	The DERA program created DRIVER to be able to interact (view reports, certify recipient data, run reports) with the Recoveryreporting.gov system to ensure timely review of recipient reports. DRIVER can consume the XML format for viewing and aggregating recipient data to accommodate a more thorough and expeditious review.
Office of Superfund Remediation and Technology Innovation (OSRTI) Systems	
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	CERCLIS required the addition of program priority flags for ARRA, new ARRA budget accounting codes and modified action codes to designate ARRA sites, the funding for ARRA sites and ARRA activities within these sites. Development of a web module for the Regions to input, transmit and store ARRA specific site progress information into CERCLIS, including review of this information by headquarters staff, was also required.
eFacts	e-Facts reports were required in order to provide information about the eight program measures EPA proposed to report for the Superfund program ARRA activities, including six new measures for ARRA purposes and two measures based on existing GPRA measures. The report logic is available for viewing for quality control purposes and report archiving is envisioned to allow these reports on program measures to be available for discrete time intervals to assess ARRA progress.

NAME OF SYSTEM	DESCRIPTION OF SYSTEM MODIFICATION OR DEVELOPMENT EFFORTS
Office of Underground Storage Tanks (OUST) System	
LUST4 Leaking Underground Storage Tanks (LUST4)	Creation of a set of database tables in the Agency's standard database management system, Oracle Database; creation of extraction, transformation, and load (ETL) specifications for use with the Agency's standard ETL tool, Informatica PowerCenter, to populate the LUST4 database from data previously entered in the LUST3 legacy application; development of specifications for the use of Oracle Application Express, a commercial-off-the-shelf (COTS) component of the Oracle Database, to provide data entry capability over the Agency's intranet; and development of specifications for the use of the Oracle Business Intelligence tool, provided under the Agency's Working Capital Fund, to perform reporting and presentation of the data.
Office of Chief Financial Officer (OCFO) Systems	
OCFO Reporting and Business Intelligence Tool (ORBIT), Executive Management Dashboard	Using the existing ORBIT system, EPA developed reports to meet OMB's reporting requirements, quality assurance reports, and performance measures reports. ORBIT was also modified to provide data for offices to use to double check recipient reporting. (Note – EPA converted to a new financial system on Oct 1, 2011.)
Annual Commitment System (ACS) and Budget and Accounting System (BAS)	Proposed systems developments and enhancements include modifying existing ACS reports to include the ARRA flag; developing spreadsheets/ pull reports and QA/QC data and reports; supporting importation of data from program systems (e.g. PAT); including data quality information and context in ACS; and providing support for ARRA related performance reporting in the budget and Performance Accountability Report (e.g. creation of new tabs or reports).