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Evaluating the Effectiveness and Efficiency of Region 2's Resource Conservation and Recovery Act Corrective Action Program

Final Report

Promoting Environmental Results

Through Evaluation

Acknowledgements

This evaluation was conducted by Industrial Economics, Incorporated (IEc) for EPA's Office of Policy (OP) under Contract EP-W-10-002 between EPA and IEc. The IEc evaluation team included Cynthia Manson, Daniel Kaufman, Peter Courtright, and Curtis Morrill. John Heffelfinger and Terell Lasane of OP were the Work Assignment Managers. Ariel Iglesias, Adolph Everett, Phil Flax, and Jennifer Thatcher from EPA Region 2 provided input throughout the course of the evaluation. Representatives from EPA Headquarters Office of Resource Conservation and Recovery (ORCR) and Office of Site Remediation Enforcement (OSRE) also provided valuable input.

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EXECUTIVE SUMMARY

Under the Resource Conservation and Recovery Act (RCRA), the United States Environmental Protection Agency (EPA) administers the Corrective Action program, which requires regulated facilities to investigate and clean up contamination of hazardous waste resulting from current and past practices at their sites. Work may be implemented as federal lead or with partner state agencies, depending on state authorization status. For purposes of the Corrective Action program, New York is fully authorized, New Jersey is not authorized but has a work sharing agreement with EPA under which the state assumes management of some sites, and Puerto Rico and the U.S. Virgin Islands are not authorized and EPA implements the program in these jurisdictions. In addition to assuming full jurisdiction of functions not delegated to Region 2's states and territories, EPA also provides oversight of the state programs and has shared responsibilities in some projects with state delegation.

EPA Region 2 manages a universe of 674 Corrective Action facilities, including 332 facilities that are tracked under the Government Performance and Results Act (GPRA). This evaluation focuses primarily on the 332 facilities in the "GPRA 2020" universe, including: 174 facilities in New York, 106 facilities in New Jersey, 51 facilities in Puerto Rico, and one facility in the U.S. Virgin Islands.

EPA Region 2 initiated this evaluation to study the efficiency and effectiveness of the Region's RCRA Corrective Action program. The study explores factors that hamper or delay the identification of the remedy decision, the program's effectiveness in achieving environmentally protective remedies, and the effectiveness of public participation and communication with external stakeholders.

EVALUATION QUESTIONS

The evaluation was guided by seven questions:

Process Questions

Is Region 2's RCRA Corrective Action program operating efficiently?

1) Within current EPA authority, policies, guidance and resources what actions could the Region take to accelerate the time it takes to reach a remedial decision? What are the differences in efficiency between federally-managed sites versus state-managed sites? Are decisions made in a timely manner? Do we have a schedule for the projects and are we holding facilities accountable to the schedule?
2) Are the resources adequate to support the program? Are the resources allocated effectively?
3) Are there identifiable delays in the projects or identifiable non-compliance that might have been prevented by the issuance of a RCRA Corrective Action order or by taking some other enforcement action?

4) Benchmarking with other regions: How does the efficiency of Region 2's program compare to other regions?

Outcome and Public Participation Questions

Is Region 2's RCRA Corrective Action program operating effectively?

5) Is the Region's selection of interim corrective measures and final remedies consistent with national guidelines and directives? Is the Region considering interim or final remedial alternatives beyond those proposed by facilities (e.g., an interim measure different from the one proposed by the facility, a final remedy different than the facility's preferred final remedy, or enhancements to the facility's preferred final remedy), as necessary?

6) What is the opinion of various stakeholders on the effectiveness of the Corrective Action program? What are their views on public participation?

7) Should the Region implement any changes to improve communication with external stakeholders for high profile facilities or facilities located in communities with environmental justice considerations?

METHODOLOGY

This evaluation uses multiple analytical methods and data sources, including a review of EPA guidance documents, interviews with more than 60 Corrective Action stakeholders, reviews of central project files for 20 selected Corrective Action sites in Region 2, analysis of program data in RCRAInfo, national and regional budget data, regional benchmarking data, and the Corrective Action process map. The data collection strategy makes the fullest possible use of existing data while undertaking targeted new data collections to provide comprehensive and robust answers to the evaluation questions.

We triangulate our findings across existing and new data sources using a combination of quantitative and qualitative analysis to answer each evaluation question. Using multiple sources of information to address the same question provides the opportunity for findings from one source to validate or contradict findings from another source. If we see consistent themes across methods, it bolsters the strength of the evaluation findings. Several evaluation findings are supported and validated by more than one source.

FINDINGS AND CONCLUSIONS

In this evaluation, respondents provided a set of observations about the structure of the program that were striking in their consistency, and led to a central finding about the program structure and process. Specifically, respondents observed that a key source of tension in implementing the program is responding concurrently to multiple priorities for site management. The objectives identified by interviewees most often are:

- Completing sites in an efficient (i.e., timely) manner;
- Ensuring through collaboration that states and responsible parties (RPs) maintain a central role in site remediation;
- Ensuring timely and adequate public participation; and
- Requiring stringent, environmentally-protective remedies.

The relative importance of these priorities has changed repeatedly over the history of the program. Moreover, these priorities are difficult to reconcile and in some cases can confound one another, particularly in the context of declining resources.

Certain site features are likely to affect both the importance and the success of a given objective. For example, a site with complex contamination with off-site exposure is not likely to be resolved in a short time; efficiency may not be the best determinant of success, but public participation and stringent clearance standards are likely to be critical. Similarly, an emphasis on collaborative approaches may conflict with a specific emphasis on stringent clearance standards, since the latter implies that EPA maintains not only a review role but a set of specific expectations for remediation. In a collaborative process, federal enforcement may signal that collaboration has been unsuccessful (unless requested by state leads), but in a process focusing on specific site cleanup objectives, enforcement may be appropriate for ensuring protective remedies (e.g., for residential areas).

Moreover, historical shifts in site management focus may affect EPA's ability to emphasize particular management strategies going forward. A historic focus on collaborative approaches, for example, may result in more informal communication records that would not support a new focus on enforcement.

In addition to this central finding, we summarize the key findings for each evaluation question in the following set of conclusions:

- **Competing management priorities complicate site management and, in the context of limited resources, can affect the program's efforts to make efficient progress at sites.** While stakeholders agree that many sites take longer to remediate than would be ideal, we did not identify any other systematic or structural elements of the Region 2 program that appear to cause delays across sites. Site management priorities within EPA, however, have historically varied both across sites and over time. This suggests several different "Corrective Action processes" that may be appropriate at different types of sites. When management priorities are not clearly aligned with site objectives, this can complicate efforts to enhance overall timeliness of either decision-making or broader site remediation.
    - While interview respondents universally agree that some sites do not move efficiently through the Corrective Action process, they also note a number of reasons for slow progress that do not directly result from Region 2's program. These include the delegated structure of the RCRA program and EPA's oversight role (particularly in New York and New Jersey) – which limits EPA's direct influence over many state-lead sites – and the need to forego speed to ensure public involvement and the development of stringent site cleanup standards at highly visible and/or technically complex sites.
    - One reason cited for the slow pacing at some sites is the EPA RCRA program's emphasis on solid waste management units (SWMUs) and localized cleanup, rather than site-level remediation objectives (in contrast to Superfund's site-wide emphasis). This marks a key difference in emphasis between EPA and the state governments in New York and New Jersey, which are focusing on site-wide anticipated use goals in their cleanup programs. Interview respondents note that the unit-level approach can result in repetition of project steps that could potentially be addressed concurrently.

- Although the strategic emphasis and approaches differ across jurisdictions (e.g., SWMU vs. site-wide emphasis), the RCRA Corrective Action process is broadly similar at both the federal and state level. Our statistical analysis of site progress to date found no significant differences in the full duration of the Corrective Action process, or the time required to achieve environmental indicators, between EPA-lead and state-lead sites. Factors affecting site progress appear to be largely independent of jurisdiction and existing program structure.
- Interviews and file reviews suggest that meeting site cleanup schedules is difficult, and that delays beyond initial schedules are common. In some cases patterns of delay result from old permit language or long-established relationships among RPs, states, and EPA, where EPA is strictly in an oversight role.
- Metrics and goals, when they reflect management priorities, are critical tools. In all contexts, *meaningful, well-targeted* metrics and goals, including GPRA goals, seem to motivate progress at sites. Though some interview respondents complained about "counting beans," most complaints arose where metrics were not aligned correctly with management priorities for specific sites.

- **Resources are not adequate to support the full range of management priorities outlined in guidance, GPRA requirements, and as described by staff in interviews.** Extensive resources are needed to ensure progress across multiple and sometimes conflicting priorities for site remediation, such as rapid site completion, meaningful public involvement, and effective working relationships that recognize state authority. Instead, Region 2's budget allocation for the RCRA Corrective Action program is declining. Furthermore, the recent transfer of 16 RCRA Corrective Action sites to the Superfund Division has not relieved resource constraints due to requirements involving cross-charging and overhead related to Superfund resources. The overall budget situation requires Region 2 to develop and communicate clear management priorities that may not address all policy objectives with the same level of urgency at every site.
- **Enforcement has traditionally been a lower management priority for Region 2's RCRA Corrective Action program than negotiated approaches.** This is due in part to historical management decisions, in part to Region 2's structure in which enforcement is separate from the permitting function of RCRA, and in part to the structure of the RCRA statute itself and EPA guidance, which has traditionally emphasized permitting and negotiation. In addition, the delegated structure of the RCRA program has meant that New Jersey and New York have traditionally taken the lead on enforcement for many sites. As a result, EPA Region 2 does not have an integrated "enforcement culture" in its RCRA program. The evaluation findings suggest that an emphasis on enforcement might in some cases be appropriate for certain sites, but site history and relationships with states and RPs may also suggest an alternative approach. The evaluation findings suggest that a commitment to significant increases in enforcement actions would require a realignment of enforcement resources to the Regional Corrective Action program such that, similar to the Superfund program, the remedial project managers' responsibilities would include an enforcement component. The integration of programmatic and enforcement resources would ensure that sufficient resources are available to integrate enforcement actions and Corrective Action requirements, including oversight.

- **Region 2's RCRA Corrective Action program is not notably different from programs in other regions.** Our benchmarking effort found that rates of progress at sites in the Region 2 RCRA Corrective Action program are similar to those in other regions, and that in general, the region is near the center of the distribution in terms of the number and characteristics of Corrective Action sites. Interviews with EPA Headquarters and Regions 3, 5, and 7 confirm that other regions face similar challenges in prioritizing activities and achieving site goals.
- **Region 2's selection of interim corrective measures and final remedies does *not* appear to be a "rubber-stamping" exercise.** Information from guidance, interviews, and file reviews indicates that Region 2 reviews potential remedies and provides detailed comments on remedial options. Resource constraints, including lack of access to technical expertise, may in some cases limit the depth of technical review that can be done in a timely manner on specific sites; management priorities are important determinants for how sites would proceed in these cases, since additional review and presentation of new options conflicts with an emphasis on more rapid site progress. In addition, the Region does not emphasize the use of presumptive remedies, even though this is a recommendation in EPA guidance. Overall, we could find no information that suggests that the Region is not thoroughly considering the remediation options and alternatives presented by the RPs, but in some cases it is possible that resource constraints may affect the quality of EPA review.
- **Stakeholders generally feel that RCRA Corrective Action sites would benefit from more meaningful public participation opportunities.** While the RCRA statute and policy require formal public meetings only when taking a permit action or at the final remedy selection stage, many stakeholders noted that additional, "two-way" public participation opportunities are necessary for the effective management of the sites. EPA has for many sites conducted additional public outreach, but it appears that historically public participation has not been a management priority, and interview respondents noted a lack of meaningful opportunities to provide input. Notably, third-party respondents, even when dissatisfied, appear to prefer to work with EPA rather than with state agencies and RPs, who often have lead roles in public outreach.

In the context of examining these specific questions, we also examined how respondents viewed the current operations of the program as a whole, and found that while specific issues are problematic, respondents also expressed some optimism. In general, all respondents emphasized that the Corrective Action program is constrained by the statutory structure that emphasizes an oversight role for EPA, by a long history of evolving site management practices at many sites, and, more recently, by increasingly constrained resources. Respondents and data suggest that the largest challenges facing Region 2's program are generally the same as those experienced across the country. However, in spite of recent budget constraints, interview respondents with many different perspectives also noted that program management, communication, and coordination across EPA, state agencies, and some other communities have seen several improvements in recent years. This appears to be at least in part a result of EPA's reorganization of the program to establish the Caribbean office and reconfigure the program branches, along with parallel changes in structure and personnel in both New York and New Jersey's Corrective Action programs. This general theme of cautious optimism in financially difficult times informs the various recommendations we lay out below.

RECOMMENDATIONS

Based on the conclusions presented above, we offer the following recommendations to Region 2 to address issues of efficiency and effectiveness related to the RCRA Corrective Action program.

- **Define management's highest priorities for every site in the Corrective Action program, and focus resources and metrics accordingly**:
  - Differentiate between different types of sites, based on the willingness, ability, and level of public interest in each site.
  - Allocate resources according to priority.
  - Develop and apply a limited number of meaningful metrics and goals for each management priority.
  - Develop a strategy for lower priority sites and non-GPRA sites.
- **In developing and implementing management priorities, build on existing efforts and momentum in states and other regions to optimize resource use.**
- **Encourage efficient site completion by adopting a long-term strategy for Corrective Action sites that emphasizes site-wide progress rather than process-based milestones.**
- **Enhance enforcement capabilities to support appropriate use of enforcement authority at sites that EPA and states identify as strong candidates for federal enforcement.**
- **At sites with strong public interest or potentially high impact, strengthen opportunities for meaningful, two-way public participation earlier in the process.**

CHAPTER 1 | INTRODUCTION

Under the Resource Conservation and Recovery Act (RCRA), the United States Environmental Protection Agency (EPA) administers the Corrective Action program, which requires regulated facilities to investigate and clean up contamination of hazardous waste resulting from current and past practices at their sites.

Work may be implemented as federal lead or with partner state agencies, depending on state authorization status. For purposes of the Corrective Action program, New York is fully authorized, New Jersey is not authorized but has a work sharing agreement with EPA under which the state assumes management of some sites, and Puerto Rico and the U.S. Virgin Islands are not authorized and EPA implements the program in these jurisdictions. In addition to assuming full jurisdiction of functions not delegated to Region 2's states and territories, EPA also provides oversight of the state programs and has shared responsibilities in some projects with state delegation.

EPA Region 2 manages a universe of 674 Corrective Action facilities, including 332 facilities that are tracked under the Government Performance and Results Act (GPRA). This evaluation focuses primarily on the 332 facilities in the "GPRA 2020" universe, including: 174 facilities in New York, 106 facilities in New Jersey, 51 facilities in Puerto Rico, and one facility in the U.S. Virgin Islands. Historically, EPA Headquarters guidance has prioritized GPRA sites, which collectively receive significant attention and resources. In keeping with the Region's reporting conventions, we analyze progress at these 332 facilities at the site-wide level.

Historically, EPA has measured the progress of Corrective Action projects by project milestones referred to as environmental indicators (EIs). While these EIs are useful milestones to ensure that relatively quick action is taken to mitigate potential and dramatic impacts, the development of the final remedy decision can then take years or even decades. The Region is interested in examining whether the Corrective Action process is being implemented as intended, pinpointing bottlenecks, and identifying opportunities to improve the program.

This study evaluates the efficiency and effectiveness of Region 2's RCRA Corrective Action program. The study explores: factors that hamper or delay the identification of the remedy decision; the program's effectiveness in reaching environmentally protective interim and final remedy decisions; and the effectiveness of public participation and communication with external stakeholders. The evaluation results are intended to help Region 2 identify program management opportunities to maximize limited federal, state, and territorial resources to reach final remedy decisions for projects significantly sooner and in a manner that provides long-term protection of public health and the environment. The results of this evaluation may also be of interest to EPA Headquarters Office of Resource Conservation and Recovery (ORCR) and Office of Site Remediation Enforcement (OSRE), and other regions that are working to streamline and strengthen the Corrective Action program.

This evaluation was funded by EPA's Program Evaluation Competition, through which EPA's Office of Policy (OP) encourages the use of program evaluation as a management tool throughout the Agency. Region 2's proposal to the competition was chosen to receive contractor support from EPA. EPA contracted with Industrial Economics, Incorporated (IEc) to provide contractor support for the evaluation.

REPORT ORGANIZATION

The report is organized as follows:

- The rest of **Chapter 1** presents the RCRA Corrective Action process map and the seven evaluation questions that guided this evaluation project.
- **Chapter 2** presents the evaluation methodology. IEc used several methods to assess Region 2's RCRA Corrective Action program, including: analysis of existing program data; review of EPA guidance documents and central project files; interviews with over 60 Corrective Action stakeholders; benchmarking data for other EPA regions; and preliminary findings from IEc's separate evaluation of EPA's Community Engagement Initiative. We also discuss the strengths and weaknesses of the methodology to assess program outcomes.
- **Chapter 3** presents the evaluation findings, organized by the seven evaluation questions.
- **Chapter 4** presents overall conclusions and recommendations for Region 2's RCRA Corrective Action program.

We include data collection instruments and supporting analyses as appendices. See the Table of Contents for the list of appendices.

PROCESS MAP

An initial challenge in evaluating both the efficiency and the effectiveness of the Region 2 Corrective Action program is clearly describing the Corrective Action process itself. One standard step in evaluations, particularly evaluations of process efficiency, is to describe the process and identify the specific steps in the process where inefficiencies occur. In the case of Corrective Action, however, RCRA program guidance describes only a very general process, and emphasizes that this process should be adaptable to account for different site conditions. As noted in EPA guidance materials:

> The corrective action process is not linear. The elements [of the process] should not be viewed as prescribed steps on a path, but as evaluations that are necessary to support good cleanup decisions. Because these elements may not occur in the same order (or at all) at every facility, we encourage planners to use them as general guidelines, while leaving flexibility for changes. A successful corrective action program must be procedurally flexible; no one approach to implementing these cleanup elements will be appropriate for all facilities.[1]

Exhibit 1-1 presents a process map developed by IEc of the general Corrective Action process. The map draws on previous process maps developed by EPA Headquarters in various publications, and has been revised to include specific input from Region 2 staff through the course of interviews. The map presents a

[1] U.S. Environmental Protection Agency: Office of Solid Waste, Permits Branch. *RCRA Public Participation Manual*, Chapter 4 (1996 Edition).

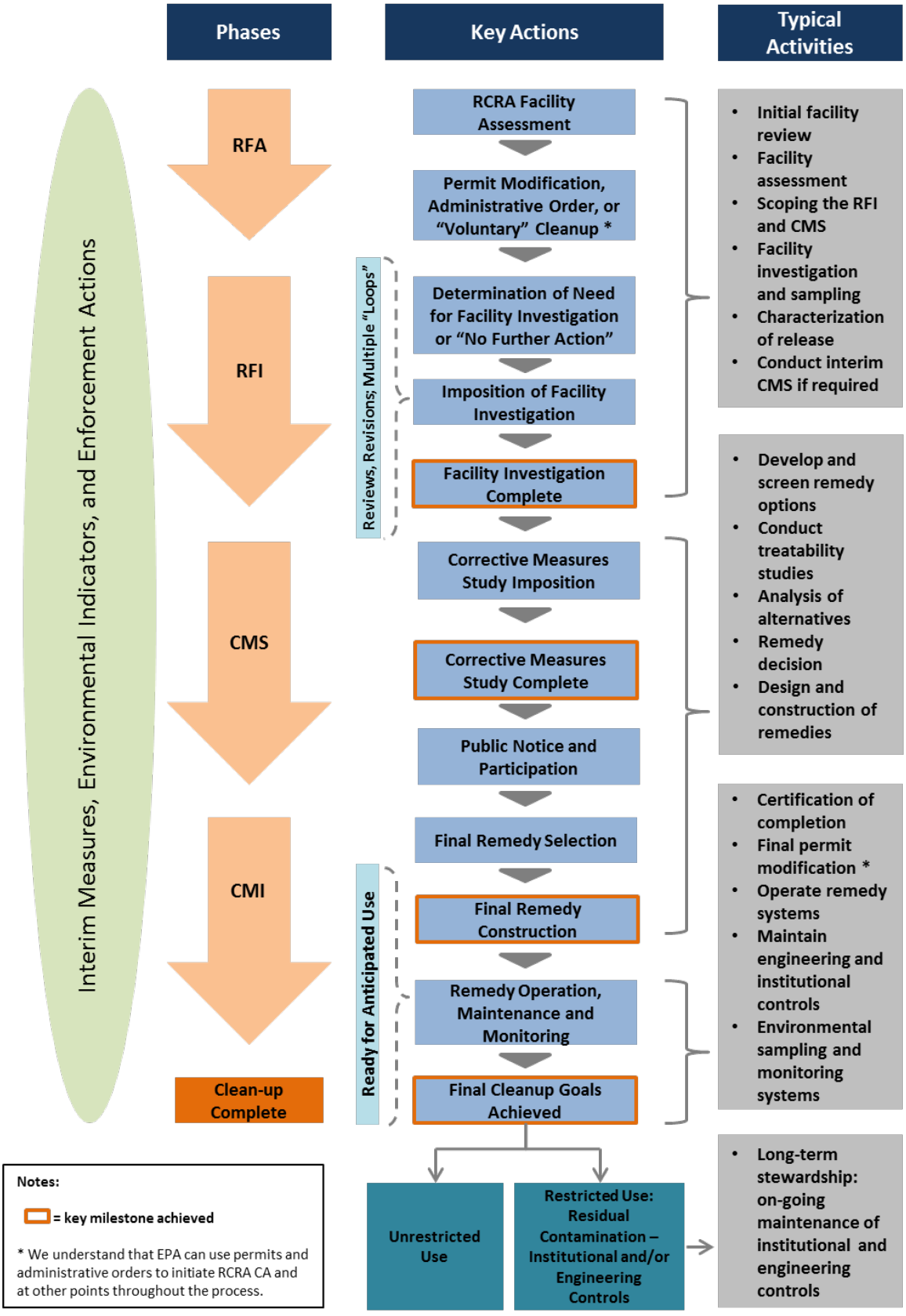
simplified conceptual process and does not attempt to describe the site- and unit-specific review processes and coordination steps that vary widely across jurisdictions, sites, and sometimes even across different units at a single site. For example, many sites have multiple solid waste management units (SWMUs); it is not atypical for activities and progress to vary across units. The final goal, however, is to achieve site-wide cleanup.[2] Feedback from interviews, including minimal changes to the map, suggests that this general map is most appropriate for a program-level description of the process.

Facilities may be required to initiate Corrective Action when applying for a RCRA permit, upon discovering a release at a permitted or interim status facility, or upon discovering additional SWMUs at a facility already conducting Corrective Action. When a release is discovered, Corrective Action may be initiated through modification of the facility's permit, through an administrative order or other enforcement action, or through a voluntary agreement. As described in EPA guidance documents and interviews conducted for this evaluation, the Corrective Action process has four key phases:

- **RCRA Facility Assessment (RFA).** Conducted by EPA, state authorities, or the facility once contamination is identified or suspected, the purpose of the RFA is to determine if a more detailed investigation is required. The RFA typically includes review of existing facility information, a visit to the facility, and sampling of environmental media to determine if there is an actual or potential release at the facility. Depending on the results of the RFA, the facility may be subject to Corrective Action or, if RCRA Corrective Action is not the appropriate legal authority, the site may be transferred to another cleanup program (e.g., Superfund). If no remediation is required, the Agency issues a "Determination of No Further Action."
- **RCRA Facility Investigation (RFI).** The RFI is the second phase of the Corrective Action process. The RFI is a detailed investigation to determine the nature and extent of the release, if any, and to provide a foundation for developing a strategy to address the contamination.
- **Corrective Measures Study (CMS).** If the RFI finds that there is a need to implement a corrective measure, the CMS phase focuses on examining the alternatives for the corrective measure. This phase involves developing remedy options, evaluating feasibility, engaging the public, and deciding on the appropriate remedy.
- **Corrective Measures Implementation (CMI).** The CMI phase includes the design, construction, operation, and maintenance of the corrective measure. After completing the CMI, the facility can apply for termination of Corrective Action.

[2] The GPRA environmental indicators – human exposure under control and groundwater contamination under control – can only be achieved at the site-wide level. Construction complete can be determined at the sub-site or site-wide level, but GPRA only assigns "credit" when construction complete is achieved at the site-wide level.

EXHIBIT 1-1. REGION 2 RCRA CORRECTIVE ACTION PROCESS MAP



EVALUATION QUESTIONS

This evaluation seeks to address the following questions about the Corrective Action process and outcomes in Region 2:

Process Questions

Is Region 2's RCRA Corrective Action program operating efficiently?

1) Within current EPA authority, policies, guidance and resources what actions could the Region take to accelerate the time it takes to reach a remedial decision? What are the differences in efficiency between federally-managed sites versus state-managed sites? Are decisions made in a timely manner? Do we have a schedule for the projects and are we holding facilities accountable to the schedule?
2) Are the resources adequate to support the program? Are the resources allocated effectively?
3) Are there identifiable delays in the projects or identifiable non-compliance that might have been prevented by the issuance of a RCRA Corrective Action order or by taking some other enforcement action?
4) Benchmarking with other regions: How does the efficiency of Region 2's program compare to other regions?

Outcome and Public Participation Questions

Is Region 2's RCRA Corrective Action program operating effectively?

5) Is the Region's selection of interim corrective measures and final remedies consistent with national guidelines and directives? Is the Region considering interim or final remedial alternatives beyond those proposed by facilities (e.g., an interim measure different from the one proposed by the facility, a final remedy different than the facility's preferred final remedy, or enhancements to the facility's preferred final remedy), as necessary?
6) What is the opinion of various stakeholders on the effectiveness of the Corrective Action program? What are their views on public participation?
7) Should the Region implement any changes to improve communication with external stakeholders for high profile facilities or facilities located in communities with environmental justice considerations?

Chapter 2 describes the methods that IEc used to answer the evaluation questions.

CHAPTER 2 | METHODS

This chapter describes the evaluation methodology used to assess Region 2's RCRA Corrective Action program. First, we provide an overview of the evaluation design. Next, we discuss methods for collecting and analyzing existing data. We then review new data collection strategies and analysis. The chapter concludes with a discussion of the limitations of the methodology.

EVALUATION DESIGN

This mixed-methods evaluation uses multiple analytical methods and data sources, including a review of EPA guidance documents, literature review, program data, central project files, regional benchmarking data, interviews, and the process map. The data collection strategy makes the fullest possible use of existing data while undertaking targeted new data collections to provide comprehensive and robust answers to the evaluation questions.

As explained in this chapter, we triangulate our findings across existing and new data sources using a combination of quantitative and qualitative analysis to answer each evaluation question. Using multiple sources of information to address the same question provides the opportunity for findings from one source to validate or contradict findings from another source. If we see consistent themes across methods, it bolsters the strength of the evaluation findings. As discussed in Chapter 3, several evaluation findings are supported and validated by more than one source.

DATA SOURCES

EXISTING DATA SOURCES

This section describes the existing data that we used to answer the evaluation questions, including: 1) documents describing EPA authority, guidance, and program management issues; 2) Region 2 budget and staffing data; 3) RCRAInfo; 4) regional benchmarking data; and 5) central project files. Each of these data sources is described below.

Documents

IEc reviewed a variety of documents to set the stage for the analysis:

- **Background documents.** As a first step in understanding the Corrective Action process, we reviewed a number of guidance documents provided by Region 2 and EPA Headquarters, including: *Proposed Rule: Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities*; *Notice of Proposed Rulemaking for RCRA Corrective Action Regulations*; *Federal Register Notice Withdrawing RCRA Corrective Action Regulations*; *National Enforcement Strategy for Corrective Action (NESCA)*; *NESCA Assessment*; *National Corrective Action Prioritization System (NCAPS)*; and the U.S. General Accounting Office's report *Hazardous Waste: Early Goals Have Been Met in EPA's Corrective Action Program, but*

Resource and Technical Challenges Will Constrain Future Progress. These documents provide an overview of current EPA authority, policies, guidance, and program management issues. IEc also conducted a literature review to identify other documents that could inform this evaluation, including the RCRA Corrective Action process map, guidance for expediting RCRA Corrective Action, the use of streamlined consent orders, information about EPA's Integrated Cleanup Initiative, and general information on measuring the extent and quality of public participation. A bibliography of reviewed documents is attached as Appendix A.

- **Preliminary findings from the evaluation of EPA's Community Engagement Initiative.** For a separate project, IEc is currently conducting an evaluation of the Community Engagement Initiative. The project team has conducted interviews with a variety of stakeholders on the nature and extent of community engagement, including interviews with Corrective Action stakeholders. We draw on preliminary results from the Community Engagement Initiative evaluation to inform our evaluation of the RCRA Corrective Action program in Region 2.

Budget and Staffing Data

Region 2 provided RCRA Enforcement and Permitting Assistance (REPA) expenditure data since March 2002. Region 2 also provided data on RCRA Corrective Action full-time equivalents (FTE) supported by EPA grants. In addition, IEc received a draft version of a *Corrective Action Program Workload Report* (March 2013) from EPA Headquarters, which describes Corrective Action resources at the national level. We use this information for a high-level assessment of Region 2's staffing and resources for Corrective Action, and we present Region 2's resource situation within the broader national budget context.

RCRAInfo

RCRAInfo was a key data source for this evaluation. EPA uses RCRAInfo to track information about entities regulated under RCRA Subtitle C (hazardous waste). RCRAInfo includes facility information, permit or closure status, compliance with federal and state regulations, and cleanup activities. We used RCRAInfo to calculate the time required to reach various milestones in the RCRA Corrective Action process, identify which steps take the longest, and attempt to explain variance across sites. Details about our analytical approach are included in the following section ("Analytical Approach").[3]

Benchmarking Data

We used two main benchmarking sources:[4]

- **Lean Event.** IEc participated in the RCRA Corrective Action Lean Event for Regions 3 and 7 in February 2013. The Lean Event included a detailed process mapping exercise, which focused on the RFI and CMS, and documented the time required to complete various steps in the Corrective Action process. We reviewed background materials and outputs associated with the Lean Event. We used the Lean data for general benchmarking purposes, as discussed in the next section ("Analytical Approach").

[3] We also explored the possibility of collecting data from the New Jersey Environmental Management System (NJEMS); however, after further discussions with New Jersey, we determined that the most relevant information available for our evaluation was captured in RCRAInfo.

[4] In addition to the data sources discussed in the body of this section, we investigated two other potential sources of benchmarking data: 1) We looked for results data for EPA's Integrated Cleanup Initiative, and 2) we asked other regions that we interviewed if they had any benchmarking data they could share with us. However, these lines of inquiry did not yield additional benchmarking data.

- **Other benchmarking data.** We were not able to benchmark across regions using the raw data in RCRAInfo, because different regions report to RCRAInfo in different ways. The time and resources available for this evaluation did not permit IEc to conduct a comprehensive study of how each region uses RCRAInfo. However, during the scoping phase of the evaluation, we learned that Headquarters ORCR has conducted a benchmarking exercise that builds on RCRAInfo and accounts for reporting differences across regions. ORCR provided IEc with internal benchmarking reports that summarize trends in the data. While the data are preliminary and we are not able to cite detailed findings, we obtained general insight into Region 2's performance in a number of key metrics relative to other regions. This provides a clear and simple overall comparison of Region 2 to all other EPA regions.

Central Project Files

The project files contain rich descriptive information about Corrective Action cases that is not stored in any database or other systematic format. The files include: correspondence between Corrective Action sites and project managers, notices of public participation, and case notes about the reasons for delays in the process. However, the project files are entirely in paper copy, and are stored in the file room at EPA Region 2's New York office. Given limited time and resources, we were selective about the number of files that we reviewed and the type of information that we looked for in the files. IEc worked with EPA to select 20 sites for file review using the purposive sampling criteria below. Purposive sampling provides insights into specific cases or areas of interest; however, because the sites are not randomly selected, the results may not be generalizable to the full universe of GPRA 2020 sites. Nonetheless, purposive sampling allowed us to focus limited evaluation resources on cases that provide relevant information for addressing the evaluation questions. The sampling criteria included:

- **High environmental concern.** Eighteen of the 20 selected sites were included in the original 2005 GPRA Corrective Action baseline.
- **Known or perceived concerns with cleanup progress.** Only two of the selected sites have achieved site-wide remedy construction.
- **State/federal program implementation variability.** Three of the selected sites in New Jersey have EPA Corrective Action permits, and the other five are state-lead. Two sites selected in New York have joint state/EPA orders, and the other four have state orders or permits. In Puerto Rico and the U.S. Virgin Islands, two of the selected sites are under an EPA order, three have an EPA permit, and one has no enforceable instrument.
- **Vapor intrusion concerns.** Two sites have case study level vapor intrusion concerns, and four have known or suspected concerns.
- **Transfer to Superfund Division.** Two sites are now fully managed by the Superfund Division, and one is in transition to full management by the Superfund Division.

We reviewed the central project files looking for specific information that would complement our other data sources, including: whether or not the files contain a project schedule; correspondence between the facility and the remedial project manager (RPM); EPA/state's rejection or acceptance of facilities' studies and proposed remedies; notices of public participation; and any identifiable delays or instances of non-compliance that might have been prevented by taking an enforcement action. The quantity and usefulness of documentation varied significantly across the 20 sites. All told, IEc reviewed 834 documents, which

we summarized in an Excel workbook to facilitate analysis across sites. Details about how we used the analysis to address specific evaluation questions are included below in the "Analytical Approach" section. Appendix B lists the 20 sites selected for the file review.

NEW DATA COLLECTIONS

New data collection efforts focused on two categories: 1) interviews and 2) collecting information to update the process map.

Interviews

Interviews played an essential role in this evaluation. All told, we interviewed 64 individuals.[5] The interviews addressed questions about the adequacy of public participation, use of administrative orders and other enforcement actions, adequacy of resources, and the root causes of delays in the Corrective Action process. Exhibit 2-1 summarizes the number of interviews that we conducted by category. The full list of interviews is included as Appendix C. The interview guides are attached as Appendix D.

EXHIBIT 2-1. NUMBER OF INTERVIEWS BY CATEGORY

INTERVIEW CATEGORY	NUMBER OF INDIVIDUALS
EPA Headquarters Office of Resource Conservation and Recovery	6
EPA Headquarters Office of Site Remediation Enforcement	2
EPA Region 2 Division Directors and Senior Management	5
EPA Region 2 Corrective Action Program Managers	5
EPA Region 2 Legal Counsel and RCRA Enforcement	2
EPA Region 2 Public Affairs Staff	3
Remedial Project Managers, Program Management Section, RCRA Corrective Action Program, EPA Region 2	6
Remedial Project Managers, Corrective Action Section, RCRA Corrective Action Program, EPA Region 2	5
Remedial Project Managers, Emergency and Remedial Response Division, EPA Region 2	3
Remedial Project Managers, Caribbean Environmental Protection Division, Response and Remediation Branch, RCRA Corrective Action Program, EPA Region 2	9
EPA Region 2 Comptroller's Office	1
EPA Region 2 RCRAInfo Data Specialist	1
New York State Department of Environmental Conservation	2
New Jersey Department of Environmental Protection	2
Non-governmental Organizations and Public Officials in EPA Region 2	3
Facilities in EPA Region 2	3
EPA Region 3: Land and Chemicals Division	1
EPA Region 5: Land and Chemicals Division; and Office of Regional Counsel	3
EPA Region 7: Air and Waste Management Division; Waste Remediation and Permitting	2
Total	**64**

[5] IEc conducted several group interviews; therefore, the number of individuals interviewed exceeds the number of interview sessions.

Process Map

During the literature review, IEc discovered a 1994 version of the RCRA Corrective Action process map.[6] We subsequently merged the 1994 version with an updated version provided by EPA Headquarters ORCR to develop the diagram in Exhibit 1-1. Though not technically a "data source," IEc used the process map as an analytical tool in our evaluation. Region 2 confirmed that the process map represents a reasonable starting point for analyzing the Corrective Action process in 2013. In addition, we understand that the *general* process and key milestones are consistent across regions, although authorized states may exceed the minimum guidelines. We refined the process map based on our discussions with Region 2 and other interviewees, and we use the revised process map and related visuals as a tool for communicating evaluation findings in Chapter 3.

ANALYTICAL APPROACH

This section describes how we used the data sources discussed in the previous section to answer the evaluation questions. Exhibit 2-2 provides a crosswalk of evaluation questions, data sources, and analytical approaches. The "Data Sources" columns indicate whether each data source is of primary (*) or secondary (x) importance for answering each evaluation question. The notes in the "Analytical Approach" column on the far right indicate how we used each data source, and the role of each data source in our analysis (primary, secondary, verification, or explanatory information). By "primary," we mean the data source(s) most crucial and informative for answering each evaluation question; by "secondary," we mean other data sources that were helpful but not of as high importance for answering that particular question. We cross-checked our findings against "verification" data sources, to validate our findings or identify areas that required further investigation. Finally, we used "explanatory" data sources to contextualize and interpret our findings. As shown in Exhibit 2-2, we triangulated across existing and new data, using a combination of quantitative and qualitative analysis, to answer each evaluation question.

Quantitative methods involved the use of RCRAInfo data, and included analyses of the time required to achieve selected milestones in the Corrective Action process. We calculated descriptive statistics (including minimum, maximum, mean, median, and mode) overall and for major categories of facilities (e.g., facility location, sector, and EPA vs. delegated authority). To the extent allowed by the data, we also conducted statistical analyses (e.g., t-tests and regressions) to explore the association between selected variables and the achievement of selected milestones in the Corrective Action process. Other quantitative data included regional benchmarking data from the Lean Event and EPA Headquarters. The benchmarking data allowed us to conduct high-level comparisons across Region 2 and the other EPA regions.

Beyond RCRAInfo and the benchmarking data, our analysis was primarily qualitative, focusing on more than 60 interviews and a limited number of file reviews. Broadly speaking, the interviews explored stakeholder perceptions about the Corrective Action process, root causes of delays and opportunities to accelerate the process, environmental protectiveness of remedy decisions, and the effectiveness of public participation. We also conducted file reviews for the 20 sites identified in the previous section. Following the crosswalk table below, the rest of this chapter discusses the data sources and analytical approaches that we employed to answer each evaluation question.

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[6] U.S. Department of Energy, *A Comparison of the RCRA Corrective Action and CERCLA Remedial Action Processes*, Figure 1. February 1994.

EXHIBIT 2-2. CROSSWALK OF EVALUATION QUESTIONS, DATA SOURCES, AND ANALYTICAL APPROACHES

EVALUATION QUESTION	DATA SOURCES							ANALYTICAL APPROACH
KEY: * = PRIMARY DATA SOURCE X = SECONDARY DATA SOURCE	DOCU-MENTS	BUDGET DATA	RCRA INFO	INTER-VIEWS	FILE REVIEWS	LEAN EVENT	PROCESS MAP	
Process Questions: Is Region 2's RCRA Corrective Action program operating efficiently?								
1a. Within current EPA authority, policies, guidance and resources what actions could the Region take to accelerate the time it takes to reach a remedial decision?	*			*	x	*	x	• **Primary 1:** Reviewed national guidance documents, national policies, and Region 2 budget and staffing data to determine what actions are possible within existing authority and resources • **Primary 2:** Interviewed Region 2 managers, RPMs, EPA Headquarters staff, and other regions on the causes of delays and suggested/tested solutions • **Primary 3:** Reviewed findings from the Corrective Action Lean Event for Regions 3 and 7 • **Verification:** Consulted central project files for insights on causes of delays and potential remedies • **Explanatory:** Used the process map as a communication tool to identify and describe where delays occur and possible areas for reform
1b. What are the differences in efficiency between federally-managed sites versus state-managed sites?			*	x	x			• **Primary:** Calculated statistics for federally-managed vs. state-managed sites in RCRAInfo o Tested for statistically significant differences across groups • **Secondary:** Interviewed HQ RCRA managers, Region 2 program managers, and state Corrective Action managers • **Verification:** Validated RCRAInfo data in interviews and file reviews (selected sites)
1c. Are decisions made in a timely manner?			*	*	x			• **Primary 1:** Calculated statistics on time required to reach key milestones in the Corrective Action process, overall and by key parameters (e.g., state) o Tested for statistically significant differences across groups • **Primary 2:** Conducted group interviews to brainstorm on causes of delays and possible solutions • **Explanatory:** Followed up with program managers to gather additional data for selected sites, as needed • **Verification:** Validated perceptions through select file reviews
1d. Do we have a schedule for the projects and are we holding facilities accountable to the schedule?				*	*			• **Primary 1:** Interviewed selected RPMs, Region 2 managers, state program managers, and external community stakeholders on perceptions of accountability • **Primary 2:** Looked for project schedules in the central project files for the 20 selected sites
2. Are the resources adequate to support the program? Are the resources allocated effectively?	x	*	x	*				• **Primary 1:** Used high-level budget data to characterize level and distribution of program resources • **Primary 2:** Conducted interviews with groups of RPMs, R2 and HQ managers, and state Corrective Action managers on the adequacy/implications of resources • **Verification 1:** Checked RCRAInfo for insights into work load • **Verification 2:** Validated against national trends in resources available for Corrective Action as reflected in national studies – e.g., HQ's *RCRA Corrective Action Program: Workload Report*

EVALUATION QUESTION	DATA SOURCES							ANALYTICAL APPROACH
KEY: * = PRIMARY DATA SOURCE X = SECONDARY DATA SOURCE	DOCU-MENTS	BUDGET DATA	RCRA INFO	INTER-VIEWS	FILE REVIEWS	LEAN EVENT	PROCESS MAP	
3. Are there identifiable delays in the projects or identifiable non-compliance that might have been prevented by the issuance of a RCRA Corrective Action order or by taking some other enforcement action?	x		*	*x	x	*		• **Primary 1:** Compared progress at sites with and without the use of administrative orders and enforcement actions (RCRAInfo) • **Primary 2:** Interviewed HQ OSRE (Enforcement) and regional managers on when/how they would consider using administrative orders and enforcement actions • **Primary 3:** Interviewed RPMs about their perceptions and experience of using administrative orders and enforcement actions • **Primary 4:** Drew on Lean Event discussion and interviews with Regions 3 and 7 about the use of administrative orders and enforcement actions in these regions • **Secondary**: Interviewed other regions that have used administrative orders and enforcement actions • **Verification**: Consulted EPA guidance documents and project files to verify cases where administrative orders or other enforcement have been, or could have been, used **Note:** In comparing the efficiency of sites with and without administrative orders and other enforcement actions, we were not able to control for underlying differences in facility characteristics.
4. Benchmarking with other regions: How does the efficiency of Region 2's program compare to other regions?	*			x		*		• **Primary:** Used EPA Headquarters' (internal) cross-regional benchmarking reports to conduct high-level benchmarking comparison between Region 2 and all other EPA regions. • **Secondary 1:** Benchmarked efficiency of the RCRA Facility Investigation and Corrective Measures Study between Region 2 and Regions 3 and 7 using Lean Event data (high-level comparison). • **Secondary 2:** Obtained anecdotal information from key informant interviews with HQ, regions
Outcome Questions: Is Region 2's RCRA Corrective Action program operating effectively?								
5. Is the Region's selection of interim corrective measures and final remedies consistent with national guidelines and directives? Is the Region considering interim or final remedial alternatives beyond those proposed by facilities, as necessary?	x			*	*		x	• **Primary 1:** Interviewed Region 2 managers, RPMs, states, and industry representatives to understand the remedy selection process • **Primary 2:** Interviewed NGOs and public officials to understand whether proposed remedies at selected sites were sufficiently protective from the public's perspective • **Primary 3:** For selected sites, reviewed central project files for correspondence between RPMs and the sites, including acceptance or rejection of initial measures proposed by the site, and internal memoranda that indicate deliberation about proposed measures • **Verification:** Validated against national guidelines and directives, process map
6. What is the opinion of various stakeholders on the effectiveness of the Corrective Action program? What are their views on public participation?	x			*	x		x	• **Primary 1:** Interviewed regional managers and public affairs staff, RPMs, NGOs, and public officials • **Secondary 1:** Reviewed central project files for indicators of public participation; e.g., number of public meetings, letters from the public, etc. • **Secondary 2:** Drew on early findings from IEc's evaluation of EPA's Community Engagement Initiative • **Explanatory:** Explored areas where public participation could be enhanced, in light of national guidelines and key steps in the process map
7. Should the Region implement any changes to improve communication with external stakeholders for high profile facilities or facilities located in communities with environmental justice considerations?	x			*				• **Primary:** Interviewed stakeholders within and outside the Agency (see above) • **Secondary:** Drew on early findings from IEc's evaluation of EPA's Community Engagement Initiative

1. Within current EPA authority, policies, guidance and resources what actions could the Region take to accelerate the time it takes to reach a remedial decision? What are the differences in efficiency between federally-managed sites versus state-managed sites? Are decisions made in a timely manner? Do we have a schedule for the projects and are we holding facilities accountable to the schedule?

We used a combination of quantitative and qualitative analysis to answer this evaluation question, using the following methods and data sources:[7]

- **RCRAInfo:** RCRAInfo was our primary data source for understanding the time required to reach various milestones in the Corrective Action process and to compare efficiency across federally-managed and state-managed sites.[8] Our approach to analyzing the RCRAInfo data is summarized in Exhibit 2-3. The first section of this table shows the key phases we used to measure how sites progress through the RCRA Corrective Action process. Most of these phases measure the duration between the start date when a site enters the Corrective Action process (CA070YE or CA100[9]) through achievement of key milestones, including the remedy decision, remedy construction, human exposures under control, groundwater contamination under control, and Corrective Action process terminated. Others, however, track time *within* phases, including the duration from CMS imposition to CMS completion, RFI initiation to RFI completion, and remedy decision to remedy construction.

  We also used RCRAInfo to determine whether sites have completed these key phases and the time it has taken them to do so, to the extent the data allowed. For sites that have multiple instances of the same milestone, we used the *first* instance of the milestone to consider that component of the RCRA Corrective Action process complete at the site. EPA Region 2 tracks progress towards meeting its GPRA goals in a similar fashion; goals are marked complete when a process step is completed at a site for the first time. We generally adopted the same approach, as repeat instances of a previously completed step are likely a result of work conducted at a subsequent stage of the process. For example, in tracking the time between remedy decision and remedy construction, we used the first date entered for remedy decision and the first date entered for remedy construction.[10]

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[7] In addition to the data sources discussed in the main text, we examined whether budget and staffing data might indicate differences in efficiency between federally-managed sites and state-managed sites. We analyzed RCRA Enforcement and Permitting Assistance (REPA) expenditures since March 2002, and RCRA Corrective Action FTEs supported by EPA grants. Although useful for analyzing the adequacy and distribution of resources (see Question 2 below), the data were not sufficiently detailed to support an assessment of state and federal efficiency in site management.

[8] We analyzed facilities' progress at the site level. However, the analysis attempts to explain how sub-site events relate to overall cleanup progress at the site.

[9] CA070YE stands for "Investigation is Necessary," while CA100 stands for "Investigation Imposition." After an initial review of the data, we found that many sites enter both of these codes, with CA100 entered first about half the time and CA070YE entered the other half. Region 2's data specialist advised us that where two codes are entered, we should use the earlier code as the start date. Where only one of the two codes is entered, we use that code as the start date.

[10] In contrast, EPA Headquarters' internal benchmarking data counts the *last* instance of the milestone to consider a component of the RCRA Corrective Action process complete at a site. To ensure consistency in our analysis, we adopted EPA Headquarters' convention for our regional benchmarking analysis in Question 4.

EXHIBIT 2-3. RCRA INFO DATA ANALYSIS

KEY PHASES IN THE RCRA CORRECTIVE ACTION PROCESS	ISSUES/ASSUMPTIONS
Investigation Necessary => Investigation Complete **(CA100) => (CA200)**	Process time is measured from the first CA100 code to the latest CA200 code, if multiple dates are entered. Codes for intermediate actions in the RFI process are not required in RCRAInfo.
CMS Imposition => CMS Complete **(CA250) => (CA350)**	Process time is measured from the first CA250 code to the latest CA350 code. Codes for intermediate actions in the CMS process are not required in RCRAInfo.
Investigation Necessary or Imposed => Remedy Decision **(CA070YE) or (CA100) => (CA400)**	None.
Investigation Necessary or Imposed => Remedy Construction **(CA070YE) or (CA100) => (CA550)**	Analysis treats CA550, CA550NR, and CA550RC codes equally.
Remedy Decision => Remedy Construction **(CA400) => (CA550)**	Analysis treats CA550, CA550NR, and CA550RC codes equally. Sites that enter CA550 before CA400 are considered as having negative process times.
Investigation Necessary or Imposed => Human Exposure Under Control **(CA070YE) or (CA100)** => **(CA725)**	None.
Investigation Necessary or Imposed => Groundwater Contamination Under Control **(CA070YE) or (CA100)** => **(CA750)**	None.
Investigation Necessary or Imposed => Corrective Action Process Terminated **(CA070YE) or (CA100)** => **(CA999)**	None.
EXPLANATORY VARIABLES	**ISSUES/ASSUMPTIONS**
Location State	None.
Date entered into GPRA Universe	All sites are assigned a "GPRA Designation" year based on the first year they are placed within any GPRA goal universe. GPRA 2005 sites have a designation year of 1999, 2008 sites of 2006, and 2020 sites of 2009.
Facility Priority	Facilities' current priority levels are used.
Facility Size	None.
Financial Assurance Required	"Yes" if FA is required, "No" if not. Does not consider type of FA required.
Orders or Decrees Used	"Yes" if an action at a site has ever been implemented through a consent order, consent decree, judicial decree, judicial order, or unilateral order, "No" if not.
Implementing Agency	None.
Operator Type	None.
Interim Measure Decisions	"Yes" if any interim measure decision has been reached at a site, "No" if not.
Interim Measure Construction	"Yes" if an interim measure has been constructed at a site, "No" if not.
Multiple Instances of One Event Code	Counts the number of times an event code is entered after the first instance.
Air Release Indicated	Not a required field in RCRAInfo.
Groundwater Release Indicated	Not a required field in RCRAInfo.
Soil Release Indicated	Not a required field in RCRAInfo.
Surface Water Release Indicated	Not a required field in RCRAInfo.
Date for Public Notice on Proposed Remedy	Not a required field in RCRAInfo.

Notes:

1. Facilities may have Corrective Action events linked at a sub-site level. The analysis attempts to explain how sub-site events relate to overall cleanup progress.
2. Process times are measured using the difference between the first date entered for each event code specified, unless noted above. For the investigation phase and the CMS phase, we analyze time from start to finish *within* the phase; therefore we use the first date entered for the initiation code and the *latest* date entered for the completion code.
3. The analysis also measures the time required to complete milestone events in the Corrective Action process using the date a facility is entered into the GPRA universe as a "Corrective Action Start Date."
4. A separate analysis investigates the relationship between the explanatory variables listed above and the likelihood that facilities have completed various milestone events.

We conducted the following analyses with the RCRAInfo data:

- **Summary statistics for key phases.** IEc looked at the data gleaned from RCRAInfo on a macro level across the 332 GPRA 2020 sites to determine how long it generally takes Region 2 sites to complete key phases of the Corrective Action process. We generated summary statistics, including the average, median, mode, and standard deviation, for the number of years it takes all Region 2 RCRA Corrective Action GPRA 2020 sites to complete each key phase. These summary statistics benchmarked how Corrective Action sites typically progress through each milestone. This exercise provided an estimate of how long each Corrective Action phase typically takes and which phases typically take the longest. Additionally, since not every site has completed each key phase, we calculated the percentage of sites that have not yet completed key phases, and the time that has elapsed since these sites entered the Corrective Action process.
- **Histograms.** We generated histograms to visualize data gleaned from RCRAInfo. IEc generated one histogram for each key phase identified in Exhibit 2-3, showing the number of sites that have completed each phase in annual increments. These histograms highlight key distributions in the duration for RCRA Corrective Action sites to complete each phase of the Corrective Action process. In addition, we examined the relationship between the achievement of environmental indicators (human exposure under control and groundwater contamination under control) and when sites entered the GPRA universe. To evaluate this relationship, IEc generated a histogram that shows the number of sites completing each environmental indicator by the number of years since their GPRA designation.
- **Potential outliers.** We looked at individual sites to identify outliers that have taken significantly longer than others to reach certain milestones. These outliers shed light on factors that may delay cleanup progress.
- **Regression analyses.** We conducted regression analyses to try to explain why some sites take longer than others to complete the Corrective Action process. These regression analyses used the explanatory variables listed in the bottom half of Exhibit 2-3 as independent variables. We generated regressions using the presence of site-wide and sub-site explanatory variables to assess their impact on both (1) whether or not a site has completed a key phase and (2) the differences in the time required to complete key phases between sites that have completed the phase. We report the results of regression analyses for each key phase, including F-statistic, r-squared values, and any significant explanatory variables. These regression analyses identify whether the explanatory variables as a whole can explain variance between sites, how much variance they explain, and highlight any specific variables that have statistically significant effects on the RCRA Corrective Action process. The regression results are summarized in Chapter 3; additional details are provided in Appendix E.

While we were able to conduct a number of analyses with RCRAInfo, it is also important to note that RCRAInfo has some limitations:

- **Missing key explanatory variables.** While RCRAInfo contains a number of important facility characteristics, it does not include some essential characteristics that may impact cleanup progress, such as facility bankruptcy, changes of ownership, and contamination confirmed on-site. Therefore, the explanatory power of our regression analyses was generally

fairly low. In any case, the interviews provided ample opportunity to probe these and other factors that affect cleanup progress. Although the interview data were not, in general, able to be linked directly to specific sites in RCRAInfo, they provided useful qualitative information to complement our quantitative analysis.

- **Inability to use as a benchmarking tool**. We were not able to use RCRAInfo as a tool to benchmark with other regions and states, because other regions and states do not report to RCRAInfo in a consistent way. IEc's interactions with EPA Headquarters staff at the Lean Event suggest that other regions may have different reporting protocols for RCRAInfo, affecting data consistency across regions and preventing comparisons. Therefore, as discussed in the previous section, we looked to other data sources to obtain benchmarking data.
- **Inability to map individual sites to the process map**. Individual sites rarely have event codes that correspond to *every* key phase of the RCRA Corrective Action process. Additionally, many sites do not complete key phases in a linear fashion. Therefore, we were not able to track how each individual site progresses through the RCRA Corrective Action process in a linear fashion.

- **EPA guidance documents and policies:** After establishing how long the process actually takes for different types of facilities, we considered what the Region could do to accelerate the process under current authority. IEc reviewed national program guidance and policies to determine what could or could not be done.
- **Interviews:** IEc interviewed a variety of stakeholders to develop a better understanding of the root causes of delays and ways to accelerate the process. Region 2 managers, RPMs, state Corrective Action managers, and EPA Headquarters staff were the primary informants for this question; however, we also asked NGO and industry stakeholders about their perceptions of the process. In addition, we anchored our interviews with RPMs in specific cases that took an unusually long or short time to resolve. It is important to note that this was not a "statistically valid" sample, and the results may not be generalizable to all 332 sites in the GPRA 2020 Corrective Action universe. However, we believe that our purposive sampling approach was appropriate for examining the factors that influence how quickly sites move through the Corrective Action process. We used group interviews to gain insight into the causes of delays and how to accelerate the process; we also inquired about differences in efficiency between federally-managed sites and state-managed sites, and perceptions of accountability. In addition, IEc interviewed contacts in other regions and in EPA Headquarters to understand actions that have been, or could be, taken to accelerate Corrective Action under current authority, including through the use of administrative orders or other enforcement actions.
- **Central project files:** The project files contain information that cannot be obtained from any other data source, including project schedules and the RPM's notes about why a site is experiencing delays. We "sampled" project files for 20 sites, which were generally the same sites that we discussed in interviews with the RPMs. However, IEc was *not* able to conduct a full file review for 20 sites with the resources available; therefore, we looked for very specific data fields in our analysis for the 20 sites. For this evaluation question, we looked to see

whether or not the files contained a project schedule.[11] We also looked for indications of delays, such as copious "back-and-forth" correspondence between the facility and EPA or state authority.

- **Process map:** The "event codes" in RCRAInfo generally correspond to the events and milestones in the process map. We used the process map as a basis for discussing areas where the Corrective Action process gets delayed and where it could be accelerated. We also use the process map and related visuals as a communication tool when presenting the evaluation findings in Chapter 3. IEc refined the process map during the course of the evaluation based on data collected from the interviews and file reviews.
- **Lean Event:** The Lean Event for Regions 3 and 7 mapped the current process in those regions, and developed recommendations to accelerate the Corrective Action process. IEc reviewed the outputs of the Lean Event for ideas about actions that might be used to accelerate the process in Region 2. In addition, we interviewed Region 3 and 7 contacts from the Lean Event to understand the current implementation of the recommendations and their assessment of the prospects for significant reforms.

In summary, RCRAInfo and interviews were our primary data sources for describing the timeliness of remedy decisions and other cleanup milestones as well as differences between federally-managed and state-managed sites. For selected projects, file reviews and data collected from RPM interviews were our primary data sources in determining whether facilities have a project schedule and are being held accountable to the schedule. Interviews, guidance documents, and findings from the Lean Event were our primary data sources for understanding what actions Region 2 could take, under current authority and guidance, to accelerate the time it takes to reach a remedy decision. We attempted to verify and explain our findings with these and other data sources, as discussed in the preceding table and text.

2. Are the resources adequate to support the program? Are the resources allocated effectively?

To address this evaluation question, we used a quantitative and qualitative approach that drew on both existing and new data to describe general trends in funding and workloads, and to gather impressions on the extent to which resources are adequate to support the program. In the absence of site-specific budget data, we were not able to calculate efficiency at the site level. However, we solicited the opinions and experiences of program managers on how adequately resources are allocated across sites. We also conducted a high-level workload comparison between Region 2 and the national Corrective Action program using interviews and documents:

- **Budget data:** As previously noted, Region 2 provided RCRA Enforcement and Permitting Assistance (REPA) expenditures since March 2002 and information on RCRA Corrective Action FTEs supported by EPA grants. We used this information to document trends in funding and workloads and distribution across key sites. We also used REPA expenditure data to characterize the types of sites to which Region 2 has directed substantial resources. In addition, we analyzed annual FTE data for New York and New Jersey, which provides some indication of trends in program resource levels.

[11] For sites with project schedules, we attempted to cross-reference the schedule against the actual times reported for that site in RCRAInfo.

- **Interviews:** We interviewed regional program managers, RPMs, state Corrective Action managers, and EPA Headquarters staff to understand the perceived adequacy or inadequacy of resources, trends in resource levels over time, and the connection between the level of funding awarded to states and progress at state-lead Corrective Action sites. We cross-referenced our interview notes with the budget and staffing data provided by Region 2. Of particular interest in the interviews was allocation of resources across different types of sites (e.g., high priority vs. low priority), and the extent to which current allocations appear to be aligned with progress or affect program efficiency.
- **RCRAInfo:** We checked RCRAInfo to supplement the budget data for our efficiency calculations. For example, we looked at sites that received a significant share of REPA funding to see if they were the most complex or time-consuming sites.
- **Documents:** The U.S. GAO's report *Early Goals Have Been Met in EPA's Corrective Action Program, but Resource and Technical Challenges Will Constrain Future Progress* (July 2011) and U.S. EPA's *RCRA Corrective Action Program: Workload Report* (Draft, March 2013) provided useful context for understanding Region 2's available resources and constraints.

In summary, our primary data sources for answering Question 2 included budget data and interviews. We verified our findings with RCRAInfo and national workload reports.

3. Are there identifiable delays in the projects or identifiable non-compliance that might have been prevented by the issuance of a RCRA Corrective Action order or by taking some other enforcement action?

To address this question, we used primarily qualitative methods that drew on both existing and new data sources, and used a range of different sources to verify and/or add specific insights to inform the findings. We attempted to identify delays through: 1) RCRAInfo data confirmed by interviews, 2) interview data, and 3) a combination of RCRAInfo or interview data confirmed by file reviews. Anecdotal information obtained in the interviews and file reviews provided insight into the causes of delays.

- **Documents.** To identify the range of enforcement options available to program staff, we reviewed national policy and guidance documents, including U.S. EPA's *Transmittal of the National Enforcement Strategy for RCRA Corrective Action* (April 2010) and *Assessment of the National Enforcement Strategy for RCRA Corrective Action* (September 2012). These documents summarize current EPA policy and guidance on the use of administrative orders and enforcement actions in the RCRA Corrective Action program.
- **Interviews.** We identified non-compliance primarily through interviews. To the extent that interviews directed us to project files, we verified interview data with the written record. We interviewed individuals in several different categories to glean insights on the experiences that Region 2 and other regions have had with different enforcement strategies at Corrective Action sites. To start, we interviewed U.S. EPA Headquarters ORCR (RCRA program) and OSRE (enforcement) managers to understand when administrative orders and enforcement actions *have been* and *could be* used, consistent with national guidance. We also interviewed program managers in Region 2 to understand the outcomes when they have *actually used* administrative orders and enforcement actions; whether they believe (in retrospect) that enforcement actions *might have* prevented delays or non-compliance; and the types of sites/situations (if any) where

they believe that increasing the use of administrative orders and other enforcement actions could be helpful going forward. In addition, we interviewed RPMs to see whether their experience and opinions regarding administrative orders and enforcement actions confirmed management's perceptions. Finally, we interviewed other regions that have used enforcement actions more extensively than Region 2 to understand their experience, and what has and has not been helpful in those regions.

It is important to note that we cannot know with any certainty whether or not the use of an enforcement action would have expedited cases that have already passed, or whether enforcement actions have helped or could help in cases that are still in progress. We relied on participant judgment and expert opinion, which we triangulated with the other analytical approaches described in the following bullets.

- **RCRAInfo:** We compared efficiency at sites with and without the use of administrative orders or other enforcement actions as a general verification of what we learned from interviews. Drawing on our analysis for Question 1, we looked for patterns in the time required to move through the Corrective Action process for sites that have and have not used administrative orders and other enforcement actions. However, we note that RCRAInfo results are not by themselves conclusive. For example, finding that sites with administrative orders and enforcement are faster may simply mean that the permitting process is too slow; it does not necessarily mean that administrative orders and enforcement are the right solution. Moreover, we do not know the counterfactual – i.e., what would have happened at those sites if administrative orders and enforcement actions had not been used. For example, even if a site with administrative orders or other enforcement action moved slowly, it might (or might not) have moved *even more slowly* if these actions had not been used.
- **Central project files:** In some cases, the project files include information on the use of enforcement actions that goes beyond the data available in RCRAInfo. We worked with Region 2 to select a limited number of sites that have used enforcement actions for inclusion in the file review. The file review sought to explore the circumstances under which enforcement actions were used, and the RPM's notes on whether or not this was effective. We also interviewed the RPMs for these sites to understand their experience, and whether or not the same or similar enforcement actions could be used effectively at other sites. We also identified sites that encountered significant delays or non-compliance, but were not under an order or other enforcement action, and interviewed the RPMs for these sites on whether they believe the use of an administrative order or enforcement action would have prevented problems.
- **Lean Event:** The background materials and discussion during the Lean Event suggest that legal issues, including administrative orders and enforcement actions, may delay rather than expedite progress at sites in Regions 3 and 7. Using the summary materials from the Lean Event, we documented the experience of Regions 3 and 7, and followed up with Region 3 and 7 contacts to understand their experience in light of the specific circumstances of their respective regions. This gave us a more solid basis to determine whether, and under what circumstances, the experience of Regions 3 and 7 could be relevant to Region 2.

In summary, in answering Question 3, we consulted four primary data sources: RCRAInfo, interviews with Region 2 RCRA Corrective Action program managers, interviews with RPMs, and information

obtained at the Lean Event. Interviews with EPA Headquarters and with other regions that have used administrative orders and other enforcement actions for Corrective Action sites provided secondary data. Documents and file reviews helped verify expert opinion and perceptions about the feasibility and potential benefits of using administrative orders and enforcement actions.

4. Benchmarking with other regions: How does the efficiency of Region 2's program compare to other regions?

We addressed this question using regional benchmarking reports provided by EPA Headquarters ORCR to examine Region 2's performance in a number of key metrics relative to other regions. This provided a clear and simple overall comparison of Region 2 to all other EPA regions. To supplement this general assessment, we also examined information from the recent Lean Event and streamlining effort undertaken by Regions 3 and 7 to improve the Corrective Action process as it is implemented in those regions. This included attendance by IEc at the Regions 3 and 7 Lean Event, as well as follow-on discussions and data collection with Region 3 and 7 representatives, and information from interviews with Region 2 staff. The details of our analytical approach are discussed below:

- **Documents:** We were able to benchmark Region 2 to other EPA regions in general terms using information from EPA Headquarters. The Headquarters information reflects a rolled-up analysis using cross-regional data from RCRAInfo; we therefore used this information rather than separately conducting a cross-regional comparison of data within RCRAInfo. Although the RCRAInfo data are not of sufficiently high resolution to quantitatively benchmark Region 2 to other regions,[12] we used Headquarters' information to contextualize our findings for Region 2.
- **Lean Event:** As part of the Lean Event, Regions 3 and 7 mapped the Corrective Action process and the time required to achieve key events and milestones. IEc staff attended the Lean Event, reviewed reports from the event, and conducted follow-up interviews with staff in Regions 3 and 7. Because the Lean Event focused only on two specific stages of the process (RFI and CMS), we did not have benchmarking data for the entire process, but only for the portions of the process covered in the Lean Event. We used the Lean data to conduct a high-level benchmarking comparison with Region 2.
- **Interviews:** Anecdotal information and process insights offered by EPA Headquarters, Region 2, and other EPA regions shed light on the efficiency of the RCRA Corrective Action program. The interviews generated qualitative insights into some of the similarities and differences across regions.

In summary, regional benchmarking reports from Headquarters were our primary data source for Question 4, along with the Lean Event data for Regions 3 and 7. Interviews provided secondary data to address this evaluation question.

[12] See the discussion for Question 1 above regarding the limitations of RCRAInfo.

5. Is the Region's selection of interim corrective measures and final remedies consistent with national guidelines and directives? Is the Region considering interim or final remedial alternatives beyond those proposed by facilities (e.g., an interim measure different from the one proposed by the facility, a final remedy different than the facility's preferred final remedy, or enhancements to the facility's preferred final remedy), as necessary?

This question aims to understand whether Region 2 is following a process that evaluates what is really needed to protect human health and the environment, rather than approving sites' proposed remedies by default. RCRAInfo does not include an event code for when EPA *rejects* a proposed interim or final remedy. Therefore, we obtained this information from other data sources, primarily interviews and file reviews.

We note also that the Lean Event with Regions 3 and 7 identified a tension between process efficiency and extensive or repeated review cycles during the RFI and CMS stages of the Corrective Action process. We were therefore attentive both to the concern about the appropriateness and stringency of final remedies, and to the potential impact of additional remedies and the review cycle on the efficiency of the Corrective Action process as identified in Question 1.

- **Interviews:** We interviewed regional managers, RPMs, state Corrective Action managers, and industry representatives to understand the process (intended and actual) for selecting remedy decisions, and to identify specific examples (if any) when the Region has rejected or proposed modifications to remedies suggested by facilities. We also interviewed NGOs and public officials to understand whether proposed remedies at selected sites were environmentally stringent from the public's perspective.
- **Central file reviews:** We looked for correspondence between the RPMs and the sites, including any indications that initial measures proposed by the site were rejected. We also looked for internal (within EPA or the state authority) memoranda that indicate deliberation about the interim corrective measure or final remedy proposed by the facility.
- **Documents and process map:** We validated findings from the interviews and file reviews against national program guidance, EPA policy, and the process map.

In summary, interviews were our primary data source for answering Question 5, along with file reviews for selected sites. We verified data obtained from interviews and file reviews with the RCRA Corrective Action process map and EPA's national guidelines and directives.

6. What is the opinion of various stakeholders on the effectiveness of the Corrective Action program? What are their views on public participation?

To address this question, we used a qualitative approach that relied primarily on new data collected from interviews.

- **Interviews:** IEc interviewed regional program managers, regional public affairs staff, state program managers, RPMs, NGOs, and public officials to understand their perceptions of whether or not public participation was deemed sufficient and their assessment of the effectiveness and efficiency of the Corrective Action process. The list of interviews generally corresponded to the list of sites selected for the file review; we tailored our questions for

specific interviews/sites to help anchor the discussion. We interviewed many of the RPMs who manage these sites, as well as selected industry representatives. IEc also asked Headquarters RCRA staff about guidance and best practices regarding public participation.

- **Central file reviews:** We looked for documentation that public participation took place for our selected sample of sites. We aimed to quantify the amount of public participation by, for example, counting the number of public meetings, letters from the public, etc. In addition, we cross-referenced the project files with our interview notes to document the quality of public participation, and the public's (and EPA's) satisfaction with the process.
- **Documents.** We drew on preliminary findings from IEc's ongoing evaluation of EPA's Community Engagement Initiative. IEc has conducted interviews with a variety of stakeholders on the nature and extent of community engagement, including interviews with Corrective Action stakeholders. We used the preliminary results from the Community Engagement Initiative evaluation to inform our evaluation of the RCRA Corrective Action program in Region 2. In addition, we looked to national guidance on public participation, including U.S. EPA's *RCRA Public Participation Manual* (1996).
- **Process map:** We understand that the Agency is required to hold a public comment period before announcing a final remedy decision, and is also trying to get out to the public more often when other milestones are completed (e.g., completion of the RFI). In conjunction with the interviews, we used the process map as a basis for exploring other areas where the Region could increase public participation in the Corrective Action process.

In summary, interviews were our primary data source for addressing Question 6. IEc's ongoing evaluation of EPA's Community Engagement Initiative was a secondary data source, as were the file reviews. We used the process map, along with national guidelines and directives, as explanatory data sources to explore areas of the RCRA Corrective Action process where public participation could be enhanced.

7. Should the Region implement any changes to improve communication with external stakeholders for high profile facilities or facilities located in communities with environmental justice considerations?

To address this question, we used a qualitative approach that relied on new data collected from interviews.

- **Interviews:** Similar to the previous question, we used interviews as our primary data source to answer Question 7. As noted above in Question 6, we interviewed a variety of stakeholders within and outside the Agency, including industry representatives and community leaders, who offered diverse perspectives on the effectiveness of the program, communication with EPA, and suggestions to improve the process. The interviews also explored environmental justice considerations, as reflected in the interview guides in Appendix D.
- **Documents:** Similar to the previous question, we drew on preliminary findings from IEc's evaluation of EPA's Community Engagement Initiative to characterize the effectiveness of the Region's communication with external stakeholders regarding the Corrective Action process.

In summary, interviews were our primary data source for Question 7, and IEc's ongoing evaluation of EPA's Community Engagement Initiative was our secondary data source.

LIMITATIONS OF THE METHODOLOGY

Given available data, resources, timeframe, and the scope of the evaluation, the evaluation approach has limitations, which we detail below.

- **Coverage.** We address two aspects of coverage – site coverage and interview coverage:
  - **Site coverage.** This evaluation focuses on Region 2's 332 "GPRA 2020" Corrective Action facilities. It does not focus on the Region's 342 non-GPRA facilities, which have not historically been EPA Headquarters' priority, and therefore have not been actively managed. As a result, data are limited for most non-GPRA sites. (Nationally, EPA is working to finalize a strategy for addressing the non-GPRA sites.) Nonetheless, interviews with EPA and state program managers suggest that non-GPRA facilities may face issues and challenges similar to GPRA sites.
  - **Interview coverage.** Although we interviewed six individuals from communities or facilities affected by the Corrective Action process, most interviews were conducted with EPA and state program managers. Four factors constrained our interviews with community stakeholders. First, the Paperwork Reduction Act limits systematic data collection from non-federal entities to nine people/organizations, unless EPA obtains a formal Information Collection Request (ICR). Project resources were not sufficient for obtaining an ICR. Second, several individuals that we invited for interviews declined our requests. Third, EPA and IEc have recently conducted a comprehensive national evaluation of EPA's Community Engagement Initiative (CEI); this evaluation involved an extensive data collection effort and provides relevant insights about the public participation process for Corrective Action in Region 2 and other EPA regions. Fourth, as discussed in Chapter 3 (Findings), because the majority of Corrective Action sites generate little or no public interest, it is often not possible to identify active contacts in these communities. Despite this limitation, however, the insights gained from our interviews and the CEI evaluation provide a consistent and clear set of insights about the successes and challenges facing the RCRA program; these efforts generally validate each other and provide a robust basis for conclusions and recommendations.
- **Lack of comparison groups.** Several of the evaluation questions ask, either explicitly or implicitly, whether sites could have been managed more efficiently. For example, Question 3 asks whether, in retrospect, the use of administrative orders and enforcement actions might have prevented delays or non-compliance. Answering this question in a definitive manner would require information about the counterfactual – i.e., what would have happened if the Region had used administrative orders or enforcement actions. Similarly, while we were able to use RCRAInfo to compare the efficiency of sites with and without the use of administrative orders or other enforcement actions, we cannot say whether a site that used administrative orders or other enforcement actions would have moved *even faster* or *even slower* if it had *not* used administrative orders or other enforcement actions. The use (or not) of administrative orders and other enforcement actions is one among many factors that may affect cleanup progress. Therefore, even if we find a difference in efficiency between sites with and without administrative orders or other enforcement actions, we cannot necessarily attribute this difference to the use of the order or other enforcement actions.

The "gold standard" for parsing out the effect of a treatment (e.g., use of administrative orders or other enforcement actions) from other, confounding factors is to conduct randomized controlled trials, which randomly assign some participants to receive treatment and withhold treatment from others. If the only difference across the two groups is that one group received treatment and the other group did not, we can attribute different outcomes between groups (e.g., speed of cleanup progress) to the treatment. Obviously, this approach would not be feasible for the RCRA Corrective Action program; Region 2 cannot simply withhold enforcement action from a site that is in non-compliance for purposes of conducting a social experiment. As a "second best" approach, evaluators often use quasi-experimental designs, which do not use random assignment but attempt to construct *ex post* comparison groups *after* the treatment has been administered.

However, our ability to construct valid comparison groups for this evaluation was limited by: the large number of variables that would need to be matched across groups (e.g., facility size, sector, location, age, when they entered the GPRA universe, etc.); the relatively low number of sites with each configuration of variables; and the absence of data for key factors that may influence cleanup progress. Although we compared sites across variables for which we had data and a large number of observations, we were not able to control for all confounding factors. Therefore, our analysis focused less on demonstrating causality, and more on explaining the factors that influence cleanup progress at Corrective Action sites. In addition, our methodology relied on triangulating across a variety of methods, including expert opinion and participant judgment, regression analysis, and file reviews for selected sites. If multiple data sources and methods lead to the same or similar conclusion, this increases confidence in our findings. Conversely, if data sources and methods generate conflicting information, this helps identify areas of uncertainty and/or areas for future investigation.

In addition, our quantitative and qualitative data sources have certain limitations, which we describe below.

- **Quantitative limitations:** RCRAInfo was our primary source of quantitative data for this evaluation. As discussed in the previous section, while we were able to conduct several analyses with RCRAInfo, the data has limitations. To recap, these limitations include the following: RCRAInfo does not store data on some key variables that might help explain cleanup progress, such as bankruptcy and changes in ownership; we were not able to use RCRAInfo as a benchmarking tool across regions, because other regions do not report to RCRAInfo in a consistent way; and we were not able to map progress at individual sites to the process map, because sites rarely proceed in a linear fashion or enter data for all event codes. To fill in the information gaps and gain additional insight, we supplemented our analysis of RCRAInfo with interviews and other qualitative data.

  The budget data also presents certain limitations. Specifically, the budget data does not generally map to specific sites, with the exception of a few high-profile sites that received significant extramural funding. The inability to quantify the costs of Corrective Action at specific sites limited our ability to assess efficiency at the site level. Instead, we analyzed general trends in funding and workloads at the aggregate (regional and national) level.

- **Qualitative limitations:** Qualitative analysis, primarily interviews and file reviews, played a crucial role in this evaluation. However, given the very large and diverse universe of 332 sites, we were not able to conduct in-depth reviews of every site or interview every knowledgeable stakeholder (e.g., industry, the public, and NGOs). For our file reviews, we conducted a purposive sample to maximize learning opportunities. Similarly, we worked with EPA to select individuals to interview based on their knowledge and experience pertaining to Corrective Action. Our purposive (rather than statistically representative) selection method, and the limited number of individuals/cases, limits our ability to generalize or replicate our findings. However, we believe this approach provides the greatest potential insight into the efficiency and effectiveness of the Corrective Action process in keeping with available evaluation resources.

In this chapter, we described the evaluation design, data sources, analytical approach, and limitations of the methodology. The next chapter (Chapter 3) presents the detailed findings for each evaluation question.

CHAPTER 3 | FINDINGS

This chapter presents the findings of our evaluation, and is generally organized by evaluation question. However, the complexity of the RCRA Corrective Action program and the broad themes that emerged during data collection demand a broader discussion of findings related to the program's overall structure and process. We therefore begin this chapter with an overview of the Corrective Action process in the context of different management objectives. This provides a framework and context for the detailed findings associated with each of the specific evaluation questions below.[13]

HIGH-LEVEL FINDING: MULTIPLE MANAGEMENT OBJECTIVES AFFECT THE RCRA CORRECTIVE ACTION PROCESS

In investigating the individual evaluation questions that Region 2 presented, we also examined the themes that emerged among interview responses and other data sources across evaluation questions. In this evaluation, respondents provided a set of observations about the structure of the program that were striking in their consistency, and led to a central finding about the program structure and process. Specifically, respondents observed that a key source of tension is responding concurrently to multiple priorities for site management. The relative importance of these priorities has changed repeatedly over the history of the program. Moreover, these priorities are difficult to reconcile and in some cases can confound one another, particularly in the context of declining resources. Responses across questions and across different stakeholder groups revealed that the challenge of managing multiple, and sometimes conflicting, priorities often affects site progress.

To capture this broad finding, we developed a thematic diagram of the RCRA Corrective Action process that illustrates where site management priorities demand different activities and resources. We first present Exhibit 3-1 (repeated from Exhibit 1-1) to provide an overview of the general process that most Corrective Action sites follow. In Exhibit 3-2, we identify four site management objectives, and describe the activities that each requires for success. The objectives identified by interviewees most often are:

- Completing sites in an efficient (i.e., timely) manner;
- Ensuring through collaboration that states and responsible parties (RPs) maintain a central role in site remediation;
- Ensuring timely and adequate public participation; and
- Requiring stringent, environmentally-protective remedies.

[13] Consistent with the format and structure of the evaluation questions, some of our findings (particularly the findings for Questions 1A and 7) identify options for addressing specific issues. While this type of language is typically reserved for evaluation conclusions and recommendations, we include these direct responses to the evaluation questions as findings.

EXHIBIT 3-1. REGION 2 RCRA CORRECTIVE ACTION PROCESS MAP

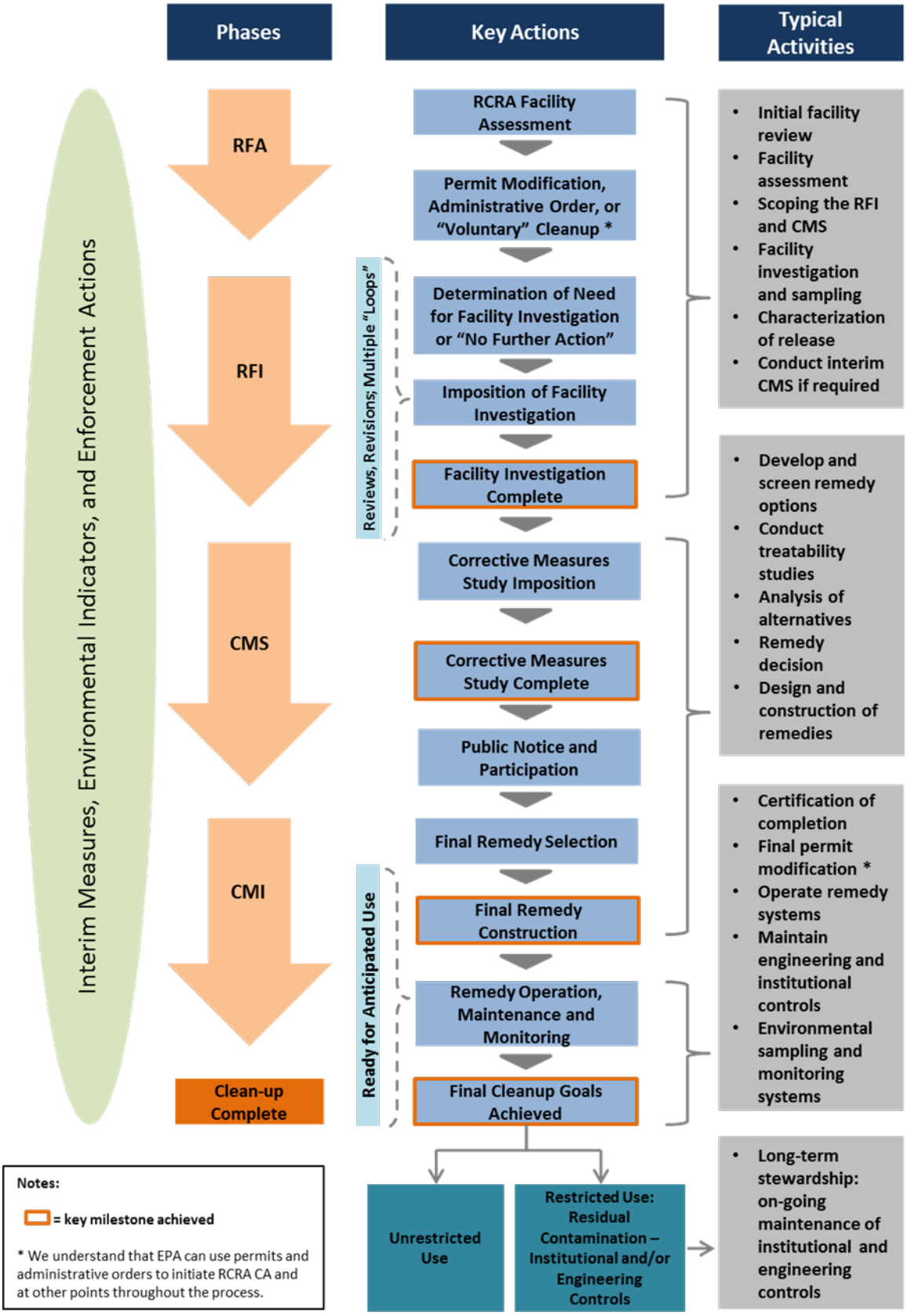
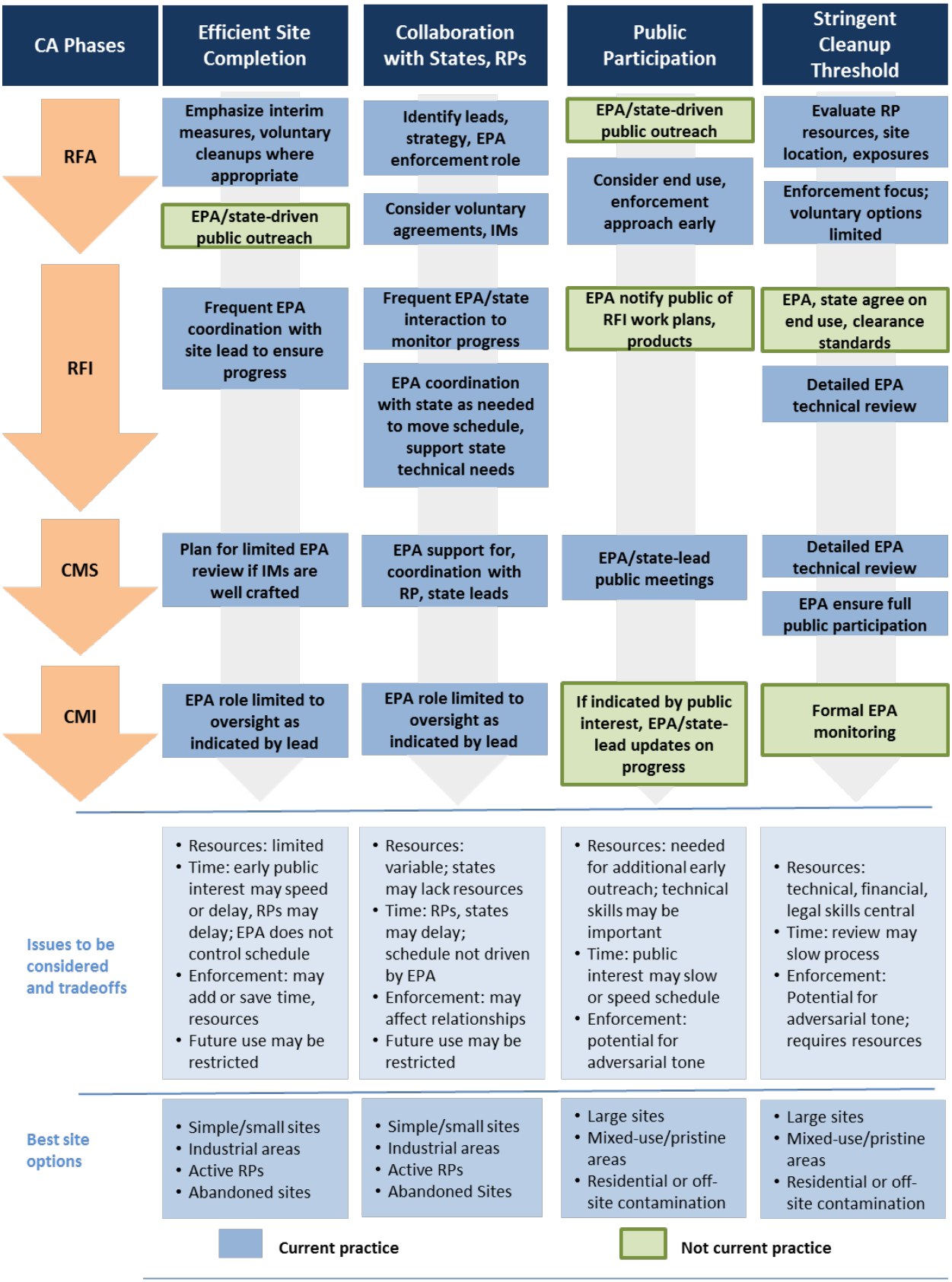


EXHIBIT 3-2. KEY ACTIONS TO SUPPORT DIFFERENT RCRA CA MANAGEMENT OBJECTIVES



For each objective in Exhibit 3-2, IEc notes activities identified as important to successful site management, including activities that are not currently standard practice (noted in green). The exhibit also draws on interview responses to note issues that arise in pursuing each objective, and site features suggesting that a specific objective would be most appropriate. As the exhibit shows, the objectives that EPA has identified for effective Corrective Action site management (reflected in the specific evaluation questions) require different, and sometimes conflicting, approaches and resources. The most important objectives are likely to differ across sites, based on specific site characteristics.

Certain site features are likely to affect both the success and the importance of a given objective. For example, a site with complex contamination with off-site exposure is not likely to be resolved in a short time. While efficiency may not be the best determinant of success for that site, public participation and stringent clearance standards are likely to be critical. Similarly, an emphasis on collaborative approaches may conflict with a specific emphasis on stringent clearance standards, since the latter implies that EPA maintains not only a review role but a set of specific expectations for remediation. In a collaborative process, federal enforcement may be a signal that collaboration has been unsuccessful (unless requested by state leads), but in a process focusing on specific site cleanup objectives, enforcement may be an appropriate primary approach for ensuring protective remedies (e.g., for residential areas).

Moreover, historical shifts in site management focus may affect EPA's ability to emphasize particular management strategies going forward. A past focus on collaborative approaches, for example, may result in communication records that are too informal to readily support a new focus on enforcement.

This general finding has important implications for each of the findings below, because answers to questions about efficiency and effectiveness vary widely by site and by management priority. This finding therefore provides important context for the conclusions and recommendations of this evaluation; any discussion of the findings below should consider that past or current objectives and associated metrics may not be best aligned for all sites. The specific findings discussed throughout this chapter often reflect the impact of different site management priorities and objectives on results.

QUESTION 1A: WITHIN CURRENT EPA AUTHORITY, POLICIES, GUIDANCE AND RESOURCES WHAT ACTIONS COULD THE REGION TAKE TO ACCELERATE THE TIME IT TAKES TO REACH A REMEDIAL DECISION?

Evaluation Question 1A addresses what actions EPA could take, within current authority, guidance, and resources, to expedite the Corrective Action process. We begin by reviewing key Agency guidance documents from 1990 through 2011. We find the guidance makes available a number of tools and authorities to expedite the process, and grants significant flexibility to regions and authorized states to select from the available menu of options. Next, we summarize our interviews with EPA Headquarters, Region 2, and state program managers to understand the strategies and approaches that EPA Region 2, New York, and New Jersey have adopted, within existing guidance, to advance their objectives. We also present findings from the file review regarding factors that appear to cause delays in Region 2. We conclude the section by looking beyond Region 2 to the improvement efforts currently underway in Regions 3 and 7 following their Corrective Action Lean Event in February 2013.

Summary of Key Findings for Question 1A

- EPA guidance emphasizes flexibility and highlights a number of steps that regions and states might take to accelerate the process. These include: adopting a holistic approach to site cleanup; integrating cleanup authorities; focusing on results; streamlining the process, including remedy selection; leveraging economic incentives; and taking enforcement action.
- The interviews with Region 2 and state staff confirmed that the process is basically the same at the federal and state level, but they highlighted important differences in the strategic emphasis and approach across jurisdictions. While the approaches used by EPA Region 2, New York, and New Jersey differ, they are all consistent with Agency guidance for Corrective Action.
- Region 2 has implemented significant organizational changes over the past few years, including: transferring the management of the majority of Corrective Action sites in the Caribbean to its office in Puerto Rico and increasing the staffing of that office; reorganizing the branch and the division that manage Corrective Action in the New York office; and transferring 16 RCRA Corrective Action sites to the Superfund Division.
- New York State recently combined its RCRA Corrective Action and state Superfund divisions, and is managing cleanups in an integrated way. The State of New Jersey has also taken steps to reform the process, including the creation of the Licensed Site Remediation Professionals program, and a law requiring facilities to complete site investigations by May 2014. The respective approaches highlight the tradeoffs inherent in the program.
- Regions 3 and 7 are currently piloting a set of processes that are outcomes of a recent Lean Event directed at streamlining the Corrective Action programs in those regions. These include design and implementation of a Corrective Action Facility Agreement (CAFA) to clarify site cleanup objectives and RFI parameters, development of standardized order/permit language to simplify those processes, and coordinated incentives and communication tools to ensure effective implementation of the CAFA and other streamlining efforts.

Guidance Documents

We reviewed guidance documents provided by EPA Region 2 and EPA Headquarters Office of Resource Conservation and Recovery (ORCR), in addition to documents that IEc identified through a literature search. Key Agency guidance documents include the *Proposed Rule for RCRA Corrective Action* (1990) and the *Advanced Notice of Proposed Rulemaking (ANPRM)/"Subpart S Initiative"* (1996). EPA promulgated a few elements of the 1990 proposal in 1993, but the majority of the proposal was not made final. The 1996 ANPRM provided guidance on areas of the program not addressed by the 1990 proposal and replaced it as the primary guidance for much of the Corrective Action program. EPA subsequently withdrew the majority of the 1996 Notice of Proposed Rulemaking. However, both proposals continue to serve as guidance documents for the program. As such, the Corrective Action program operates based on guidance and not on regulations. We also reviewed subsequent EPA guidance that was intended to enhance the program's effectiveness and efficiency; enforcement guidance; ORCR's *Getting to YES* training materials (2009); and the implementation plan (2011) for the Agency's Integrated Cleanup Initiative (ICI), a three-year strategy to better use EPA's land cleanup programs to accelerate cleanups, address more sites, and put sites back into productive use while protecting human health and the environment. Finally, we also reviewed GAO's *Corrective Action Workload Report* (2011). Though not a guidance document per se, the GAO report cites examples of innovative approaches that regions and states have adopted to deal with scarce and declining resources.

As summarized in Exhibit 3-3, the guidance documents highlight a number of recommended actions to accelerate cleanups at Corrective Action sites. In keeping with the evaluation question, the gray shading in the table rows indicates areas where the evaluators feel that EPA Region 2 could be taking greater advantage of existing authority and guidance to accelerate the time required to reach a remedial decision. (This is *not* meant to imply that Region 2 never does these things, but our review suggests there may be opportunities to further leverage existing tools in certain circumstances.) Key existing guidance includes the following:

- **Take a holistic and flexible approach to Corrective Action.** Agency guidance from 1990 through 2011 emphasizes the flexibility inherent in the RCRA Corrective Action process. In fact, the decision to withdraw the majority of the 1996 proposal was based in part on the Agency's intent to ensure a holistic and flexible program.[14] The universe of Corrective Action sites is large and diverse. A variety of factors – including size and complexity of the site, nature and extent of contamination, compliance history, proximity to a residential area, financial assurance, and cleanup costs – may influence the approach taken at an individual site. The guidance articulated in the 1990 and 1996 proposals, and reaffirmed in subsequent guidance and training materials, emphasizes that the Corrective Action process should be tailored for each site. For example, cooperative sites with good compliance history, technical and financial ability, and contamination contained onsite may merit consideration for a more flexible, voluntary approach; on the other end of the spectrum, recalcitrant sites with poor compliance history, financial difficulties (or bankruptcy), and offsite contamination may merit more federal supervision and enforcement. Simpler sites may be able to combine process steps (e.g., conduct the RFI and CMS concurrently), whereas sites in the latter category may need to follow a more linear process with more intensive Agency review and technical input.

[14] *Federal Register* / Vol. 64, No. 194 / October 7, 1999 / Proposed Rules.

EXHIBIT 3-3. SUMMARY OF CORRECTIVE ACTION GUIDANCE

GUIDANCE	PROPOSED RULE (1990)	NCAPS (1993)	ANPR (1996)	CREATIVE SOLUTIONS (2001)	EXPEDITING RCRA CA (2001)	GETTING TO YES (2009)	NESCA (2010)	GAO REPORT (2011)[1]	ICI PLAN (2011)
Take a holistic and flexible approach to Corrective Action.	✓		✓			✓	✓		
Prioritize action at the most environmentally significant facilities.	✓	✓							
Focus on performance and results, not process and reports.			✓			✓			
Conduct process steps concurrently rather than sequentially (e.g., RFI and CMS).			✓			✓		✓	
Recognize and encourage economic incentives to encourage voluntary or faster cleanups.	✓			✓		✓			
Use streamlined orders or voluntary agreements to expedite progress at willing and able facilities.	✓				✓	✓	✓	✓	
Streamline the remedy selection process; use interim measures and presumptive remedies, as appropriate.	✓		✓			✓		✓	
Include enforceable language and schedules in permits and take enforcement action, as warranted.					✓	✓	✓		✓
Use integrated cleanup authorities (e.g., CERCLA orders) to accelerate site investigation and remedial action.[2]			✓		✓		✓		✓
Continue to monitor sites after remedy construction, and modify remedies based on new technology and site uses.						✓			

Key: In keeping with the evaluation question, the gray shading in the table rows indicates areas where the evaluators feel that EPA Region 2 could be taking greater advantage of existing authority and guidance to accelerate the time required to reach a remedial decision.
Notes: (1) Though not an EPA guidance document, the GAO report cites examples of innovative approaches that regions and states have adopted to deal with limited resources. (2) Region 2 transferred 16 sites to the Superfund Division, but they are still being managed as RCRA Corrective Action sites.

- **Prioritize action at the most environmentally significant facilities.** The primary goal of the RCRA Corrective Action program has always been, and remains, to achieve cleanups that protect human health and the environment. Historically, EPA emphasized "high-priority" sites, which were thought to pose a greater risk to human and environmental health based on an initial assessment of the facility. Similarly, the Government Performance and Results Act (GPRA) goals have historically emphasized project milestones referred to as environmental indicators (EIs): human exposures under control and groundwater migration under control. Over time, EPA has expanded the GPRA goals to include medium- and low-priority sites, and final remedy construction. The guidance has also evolved to place a somewhat greater emphasis on a site's anticipated use. However, the primary goal remains to protect human health and the environment.
- **Focus on performance and results, not process and reports.** A frequent critique, both in the project files that IEc reviewed as part of our evaluation, and in interviews conducted with Region 2 and state staff, is that the program is overly "process heavy," with numerous studies, reports, and review cycles. In this regard, EPA Region 2 has indicated that the overarching focus of the program until the late 1990s was on process, as reflected in the permits and administrative orders issued in the late 1980s through mid-1990s. The EIs were among the cleanup reforms of the late 1990s to early 2000s that were intended, in part, to focus on results. In fact, Agency guidance strongly encourages RCRA Corrective Action managers to focus on results, including the ultimate goal of cleaning up sites and returning them to productive use. As noted in ORCR's *Getting to YES* training manual (2009), this requires project managers to be risk managers, striking the appropriate balance between *reducing* uncertainty via data collection and further studies and *managing* uncertainty via remedial actions and contingencies. Focusing on performance also requires an upfront assessment, by the Agency and facility, of remedial action objectives, milestones, endpoints, and performance expectations. Once agreement on the cleanup objectives and approach has been reached, the Agency should focus on ensuring the timely attainment of cleanup milestones and the effectiveness of interim and final remedies.
- **Conduct process steps concurrently rather than sequentially (e.g., RFI and CMS).** The program's flexibility and guidance imply that the process should be tailored to conditions at each site. While most sites will pass through the four key phases shown in the process map – RCRA Facility Assessment (RFA), RCRA Facility Investigation (RFI), Corrective Measures Study (CMS), and Corrective Measures Implementation (CMI) – these steps may not occur in the same order, or at all, at every facility. In fact, the guidance documents suggest that sites conduct processes concurrently rather than sequentially, to the extent appropriate. For example, the *Advanced Notice of Proposed Rulemaking* (1996) states that it may be appropriate to combine the RFI and CMS stages, or to eliminate the CMS entirely if a desirable remedy can be identified without this step. In general, the guidance notes that if EPA and the facility already have a strong sense of what the final remedy is likely to be, the RFI should focus on gathering data to validate or refine the remedy, as opposed to conducting an open-ended investigation for the sake of gathering more data. A variation on this theme is the use of interim measures (IMs), also known as interim corrective measures (ICMs), which facilities frequently implement prior to completing the RFI and CMS. As discussed in Question 5 below, IMs often become the final remedy, though they may delay the CMS and thereby push off the final remedy decision. The

GAO's *Corrective Action Workload Report* (2011) noted that some regions and states have eliminated the CMS for some sites.

- **Recognize and encourage economic incentives to encourage voluntary or faster cleanups.** The *Proposed Rule* (1990), *RCRA Cleanup Reforms: Fostering Creative Solutions (2001),* and *Getting to YES* training (2009) encourage project managers to recognize and use economic incentives to promote voluntary or faster cleanups. This depends on the nature of the site. If the site owner's goal is to develop the land for investment, or to transfer the property, it is in their interest to clean up the site quickly. For example, New Jersey's property transfer law requires sites to develop a cleanup plan before they can be transferred. In a similar vein, EPA's guidance encourages Corrective Action project managers to identify and leverage economic incentives for sites to move through the process.
- **Use streamlined orders or voluntary agreements to expedite progress at willing and able facilities.** A number of guidance documents issued from 2001 through 2010 suggest that EPA should consider using voluntary agreements or streamlined orders for sites that are capable and motivated to implement Corrective Action. Streamlined orders specify performance standards over process; they also typically contain less legal language than traditional orders, although they are still enforceable instruments. Voluntary agreements also focus on performance standards, but may not be enforceable. Therefore, voluntary orders and, especially, voluntary agreements should be used selectively and only at well-qualified facilities. Well-qualified facilities include those with good compliance history, strong financial assurance, straightforward cleanup requirements, and a strong incentive to clean up the site. Given these conditions, EPA may be able to play a less "hands-on" role, freeing up staff and financial resources to focus on more challenging sites. Streamlined orders or voluntary agreements may be especially useful for clearing lower priority sites that might not be receiving significant management attention or resources, but are still subject to Corrective Action. Actual experience in other EPA regions suggests that streamlined orders or voluntary agreements can be helpful, but can also have drawbacks. Further discussion about streamlined orders, including experience with these instruments in other EPA regions, is provided under Question 3 below.
- **Streamline the remedy selection process; use interim measures and presumptive remedies, as appropriate.** Agency guidance encourages project managers to identify potential remedies early in the process and target the rest of the process to validating or refining those remedies. Given the mature tenure of the Corrective Action program and EPA's prior experience, it may be possible in some cases to use presumptive remedies. For example, the 1996 *Proposed Rule* states that EPA expects presumptive remedies to be used at all appropriate sites; this guidance has been repeated in various forms through the present. A variation on this theme is that the CMS need not consider all potential remedies, but should focus on a single remedy (or set of remedies) that is environmentally protective and feasible. Similarly, the guidance suggests that IMs should be designed in such a way that they can become the final remedy.
- **Include enforceable language and schedules in permits and take enforcement action, as warranted.** On the other end of the spectrum, some facilities are not willing or able to take Corrective Action, and may have a financial incentive to delay the process as much as possible. Facilities that are recalcitrant, or financially marginal or bankrupt, may merit enforcement.

However, enforcement depends on having several prerequisites in place, including enforceable language and schedules in permits and orders. In addition, EPA must have adequate documentation of delays and non-compliance to bring an effective enforcement case. Moreover, if EPA seeks to bring an enforcement action, it should be clear that the delays were due to inaction by facilities, not EPA or the state-lead agency. Finally, the guidance strongly suggests that EPA exercise its enforcement authority, when appropriate, to compel cleanup in specific cases, and to show the regulated community that enforcement is a real option in cases of non-compliance.

- **Use integrated cleanup authorities (e.g., CERCLA orders) to accelerate Corrective Action.** The RCRA Corrective Action program contains robust enforcement mechanisms. However, the Agency has long maintained that it may be appropriate to draw on other cleanup authorities in certain situations. For example, the *Guidance on Enforcement Approaches for Expediting RCRA Corrective Action* (2001) noted that, where appropriate, the Agency should consider using CERCLA §106(a) authority – which carries high penalties for non-compliance, and treble damages if EPA incurs response costs due to the facility's inaction – for problematic sites in certain situations. Agency guidance notes that such decisions should be well-supported and well-documented. Region 2 program managers indicated that Region 2 counsel has looked into the use of CERCLA §106 authority and noted some concerns. While CERCLA authority may be used in very specific circumstances, Region 2 notes that the RCRA Corrective Action program has its own robust authorities to compel cleanup actions (e.g., IMs).

  More recently, the Agency's Integrated Cleanup Initiative has sought to leverage EPA's land cleanup tools and authorities to accelerate cleanups and return sites to productive use. In this vein, the *National Enforcement Strategy for Corrective Action* (NESCA, 2010) "strongly encouraged" EPA and states to consider using CERCLA enforcement authorities (or the state equivalent) to help further the GPRA 2020 goals. Notably, although the RCRA *NPL Deferral Policy* has strict requirements for listing RCRA Corrective Action sites on the National Priorities List (NPL),[15] the NESCA notes that CERCLA enforcement tools may, in some cases, be used at RCRA Corrective Action sites without an NPL listing.

- **Continue to monitor sites after remedy construction, and update remedies based on new technology and site uses.** Over time, as more sites have achieved their environmental indicators and/or constructed remedies, the program guidance has evolved to focus more on post-remedy construction monitoring and stewardship. As explained in ORCR's *Getting to YES* training materials and discussed in interviews with ORCR staff, the Corrective Action process does not end with final remedy construction. The Agency expects project managers to continue monitoring sites after remedy construction to ensure that remedies remain effective. In cases where remedies are no longer sufficient – either due to improvements in technology or changes in site use – further corrective action may be required. Interviews with external stakeholders found that communities and site owners may also wish to revisit remedy decisions, if, for example, new technology indicates that the current remedy is not sufficiently protective or

[15] *The National Priorities List for Uncontrolled Hazardous Waste Sites; Deletion Policy for Resource Conservation and Recovery Act Facilities*, 40 CFR Part 300. Federal Register Vol. 60, No. 53, March 20, 1995.

allows for a more cost-effective remedy. This requires project managers with limited time and resources to continually monitor sites, or at least be willing and able to revisit sites that were previously thought to be "finished."

Overall, the guidance points to the importance of Agency culture and adaptive management. The flexibility inherent in the Corrective Action program necessitates strategic thinking, creativity, and sound judgment. Unlike highly regulated and proscriptive programs, the Agency does not have a "formula" or step-by-step manual for Corrective Action. Identifying the most appropriate objectives and methods for individual sites depends on site-specific characteristics. It also requires EPA managers to set explicit goals and priorities, and to indicate the relative importance and focus of those priorities across sites. As discussed in the next section, the interviews find that EPA Region 2, New York, and New Jersey are managing their options in different ways that are consistent with Agency guidance for Corrective Action.

Interviews

The interviews with Region 2 and state staff explored approaches that EPA Region 2, New York, and New Jersey are using to manage their RCRA Corrective Action programs. ***The interviews confirmed that the basic process steps – RFA, RFI, CMS, and CMI – are basically the same at the federal and state level in Region 2. However, the interviews also highlighted important differences in management strategy and approach across jurisdictions.*** As shown above in Exhibit 3-3, all of these various approaches are consistent with Agency guidance for Corrective Action.

Distinctive features of the approaches used for managing RCRA Corrective Action facility cleanups in New York, New Jersey, and the Caribbean include the following:

- **EPA Region 2:** EPA Region 2 managers and staff observed that the RCRA Corrective Action program was intended to be implemented by states, with EPA oversight. Still, Region 2 has a hybrid structure that includes one authorized state (New York), one state that is not authorized but has a work sharing agreement with EPA (New Jersey), and two territories where the program is directly administered by EPA (Puerto Rico and the U.S. Virgin Islands). EPA tends to be directly involved as lead or in partnership with the state at the most complex or difficult sites, which are inherently more contentious and resource-intensive. Overall, however, the majority of sites are state-lead. Region 2's RPMs attempt to coordinate closely with their state counterparts, as well as the facilities. Often, this is done through informal communication (phone and email), which is perceived to be more efficient than formal letters and documentation. However, as discussed in Question 3 below, the lack of documentation can complicate enforcement efforts. Interview respondents reported that states and facilities are typically seen to "drive" the process, which can result in a "lack of ownership" on the part of EPA project managers. Senior managers at EPA Region 2 and the state agencies cited the "culture of the RCRA program" – including the perceived lack of authority to push progress at sites – as a barrier to effective implementation of the program.

  Region 2 has implemented significant organizational changes over the past few years with the goal of strengthening the program. The first major change was the establishment of the Puerto Rico office in 2007; before that time, the Caribbean branch was managed out of the Region 2 headquarters office in New York. The Puerto Rico office has experienced "growing pains" typical in a major reorganization. This transition coincided with a general decline in program resources (see Question 2 below), which appears to have resulted in the Region 2 New York office not

being able to provide the level of support to the Puerto Rico office that was initially planned. Also, the Caribbean branch is the only branch in Region 2 that combines Corrective Action and enforcement in the same division. Balancing limited staff and resources between enforcement and Corrective Action is critical, and challenging. RPMs in Puerto Rico have managed these challenges by developing an informal support system in which experienced RPMs work across sites to help mentor those with less experience. However, technical capacity remains a challenge.

The second major change was the reorganization of Region 2's structure to establish a branch that aligned resources based on the relative complexity of Corrective Action facilities, and a division focused on air and waste. In 2011, the responsible New York office RCRA branch reorganized from a geographic structure overseeing facilities in New York and New Jersey, to a structure which focused on high priority sites and lower priority sites along with other base program implementation functions. In 2012, its parent division (DEPP) reorganized to remove the sizeable water program from its purview and focus on the air, sustainability, and waste programs including Corrective Action. The new structure allows for more focus by senior managers on specific RCRA-related issues and activities.

The third change was the Regional Administrator's decision to transfer 16 sites from the Corrective Action Division to the Superfund Division as part of the 2012 reorganization described above. The transfer is meant to leverage Superfund staff and lead to "cross fertilization" between the Corrective Action Division and the Superfund Division. This is broadly consistent with the Agency's focus on an integrated cleanup program. However, it is important to note that these 16 sites are still being managed as RCRA Corrective Action sites; they are not on the National Priorities List and are not being managed as Superfund sites. Therefore, EPA cannot "cross-charge" Superfund resources for management and overhead expenses related to these 16 Corrective Action sites, and the program is using Corrective Action FTEs to cover management and overhead expenses (see Question 2 below). Similarly, the Region is precluded from using technical support resources available to address Superfund sites.

At a national level, the GPRA goals set annual targets for human exposures under control and groundwater contamination under control (collectively known as environmental indicators, or EIs). According to Region 2's division directors, ***the GPRA goals have been very helpful in motivating project managers to achieve environmental indicators.*** (Program managers in New York and New Jersey also emphasized the importance of setting/tracking against annual targets.) Not surprisingly, the focus at the national level and within Region 2 has been on the GPRA sites. There is a currently a discussion at the national level about how to handle non-GPRA sites.

- **New York:** ***The New York State Department of Environmental Conservation (NYDEC) has taken a holistic approach to Corrective Action, as evidenced by the recent consolidation of its RCRA Corrective Action and state Superfund divisions.*** NYDEC has been "unofficially" managing sites in an integrated way for more than a decade, but within the past few years, the state officially consolidated the two divisions into one integrated cleanup program. NYDEC's RPMs typically manage a diverse portfolio of sites in different cleanup programs. NYDEC's managers report that this arrangement has improved the sense of ownership and motivation to remediate sites on the part of site managers. NYDEC's program managers indicated that, in addition to drawing on state Superfund authorities as needed, the reorganization allows them to

leverage "Superfund's philosophy" of "Don't take 'no' for an answer," which includes exercising enforcement options. They expressed that Superfund takes a more holistic, long-term, and site-wide view, whereas RCRA sites have historically tended to focus more on one solid waste management unit (SWMU) at a time, and on gradual progress. Instead of focusing a few months out on gathering more data and completing the next report, ***NYDEC focuses on managing sites with an eye towards future site use.*** This approach requires a change in culture, which is still underway. NYDEC managers also noted the ***importance of setting goals and recognizing achievement in motivating RPMs to make progress.***

- **New Jersey:** The New Jersey Department of Environmental Protection (NJDEP) has taken a different approach to Corrective Action than either New York or Region 2. The Site Remediation Reform Act of 2009 created the Licensed Site Remediation Professional (LSRP) Program, which is now starting to be fully implemented. Under the Site Remediation Reform Act and the LSRP Program, sites requiring cleanup are required to hire an LSRP to conduct investigations and propose a remedy. ***The LSRP Program shifts oversight responsibility from the state to licensed professionals hired directly by the facilities.*** However, per negotiations with EPA, GPRA 2020 sites, Superfund sites, and federal facilities will receive enhanced oversight, including Agency review of proposed remedies (we discuss different approaches to remedy selection under Question 5 below). Although it is premature to assess the effectiveness of the LSRP approach at the present time, it would be worth revisiting the data in a few years to assess progress and to compare the LSRP strategy to the older approach.

  The Site Remediation Reform Act ***requires all sites with pre-1999 discharges to complete their remedial investigation phase by May 2014***. Sites that fail to meet the May 2014 deadline will fall under the state's direct oversight, and NJDEP will be able to select the remedy. NJDEP managers expect this will create a strong incentive for sites to hire an LSRP and complete site investigations. Although it is too soon to draw any definitive conclusions, anecdotal information suggests that the deadline has already motivated some facilities to take action: Since the law was passed, some sites that were previously stalled have expressed active interest in working with NJDEP to meet the May 2014 deadline, and have hired LSRPs to help meet the requirements. Though anecdotal, these accounts are consistent with information from the Corrective Action Lean Event for Regions 3 and 7, which indicated that facilities can more easily access cleanup resources from parent companies when they can point to a tangible cleanup requirement (e.g., enforceable deadline). Along similar lines, ***the 1983 Industrial Site Recovery Act requires sites to develop a remediation plan before ceasing operations or transferring property***.

  New Jersey's program frames the tradeoffs between a flexible/voluntary approach and agency oversight/approval authority to ensure environmental stringency. NJDEP's program managers explained that ***the state manages sites along a "bell curve," with willing and able facilities at one end, and recalcitrant/financially marginal facilities at the other end of the spectrum.*** They expect the former category of sites will respond to incentives and enforceable deadlines, while the latter may require more active supervision and enforcement.

  Organizationally, NJDEP manages its cleanup program as "one program with different divisions." Project managers draw on RCRA, Superfund, and any other appropriate tools to get sites cleaned up. The state has found that assigning a mix of sites to RPMs works best, while

program administrators should be well-versed in the requirements of their specific program. NJDEP will focus on sites that rank highly in the state's remediation priority system – a GIS-based system currently under development that examines the receptors around a site. NJDEP anticipates that the 2014 requirements will help move lower-priority sites through the process.

On balance, we find that EPA Region 2, New York, and New Jersey are managing the Corrective Action process differently, albeit in ways that are consistent with Agency guidance. All three programs have taken steps to manage cleanups in an integrated fashion, but this has played out differently in each case. New York seems to take a more holistic, long-term view towards cleanups; New Jersey aims to create incentives that achieve program goals while reducing agency burden; and Region 2 focuses on balancing its oversight responsibilities and its goal of protecting human health and the environment within the structures of a largely delegated program.

Central File Review

The file review did not identify specific actions that can be taken to accelerate the process; however, by identifying causes of delays, the files shed light on actions that might accelerate the process. The main cause of delays that we found in the file review was extensions that EPA granted to facilities for studies or other deliverables. Although extensions may be warranted in certain situations based on unforeseen circumstances, the analysis suggests that on the whole, extensions are quite common and a major factor contributing to delays. We analyze this issue in more detail in Question 1D.

Lean Event

In February 2013, Regions 3 and 7 conducted a Lean Event that identified options for streamlining the Corrective Action programs in those regions. The regions are currently implementing the recommendations of the Lean Event as a pilot. The key recommendations include ***design and implementation of a Corrective Action Facility Agreement (CAFA) to clarify site cleanup objectives and RFI parameters, as well as development of standardized order/permit language to simplify those processes, and coordinated incentives and communication tools to ensure effective implementation of the CAFA and other streamlining efforts***. The CAFA anticipates a meeting or a series of meetings with EPA, state, and responsible party representatives to develop a brief written agreement, signed by senior representatives of each organization, which will define key parameters for RFIs and other site activities. The CAFA is designed to work within the current Corrective Action framework and is consistent with existing guidance to emphasize early agreement on site cleanup objectives and priorities. Regions 3 and 7 are currently working to design the CAFA language and communicate the amended process to RPMs, enforcement staff, state regulators, and, ultimately, responsible parties.

Region 3 and 7 staff noted several conditions that will affect project implementation. They do not anticipate that the CAFA will be appropriate or feasible for all sites; responsible party interest and state priorities will be important in selecting sites. They also note that the CAFA will require additional resources at the initial implementation stage. While they anticipate that longer-term site schedules will be shortened and resource demands will be reduced, they noted that it will be important to align resources and incentives to encourage RPMs to undertake the CAFA process where feasible. Incentives may include shifting of workloads in the short term to accommodate the preparation for and negotiation of the CAFA.

Regions 3 and 7 also noted that initial response to the CAFA concept has been strong enough among responsible parties that they are likely to be able to meet a portion of the demand for the streamlined approach. The criteria for sites will likely include financial strength, responsible party engagement, and contamination types that are amenable to relatively standard approaches. The implementation of the CAFA could potentially encourage facilities to improve financial assurance instruments and increase engagement if they wish to participate in the CAFA process.

QUESTION 1B: WHAT ARE THE DIFFERENCES IN EFFICIENCY BETWEEN FEDERALLY-MANAGED SITES VS. STATE-MANAGED SITES?

Summary of Key Findings for Question 1B

- RCRAInfo was our primary data source for answering Question 1B. Our analysis finds no significant difference between the full duration of the Corrective Action process, or the time required to achieve environmental indicators, at EPA-lead versus state-lead sites.
- However, EPA-lead sites take slightly longer to complete site investigations, remedy decisions, and remedy construction, as measured from the start of the Corrective Action process. Observed differences in process times between EPA-lead and state-lead sites are likely attributable to characteristics of the sites themselves, rather than the means by which each agency deals with site cleanups.
- The RCRAInfo results are consistent with the interviews, which suggested that EPA typically deals with more challenging (slower) sites.
- In general, the project files did not provide enough information to validate the times recorded in RCRAInfo. Other findings related to the file review suggest this reflects more on the completeness of the central files rather than RCRAInfo.

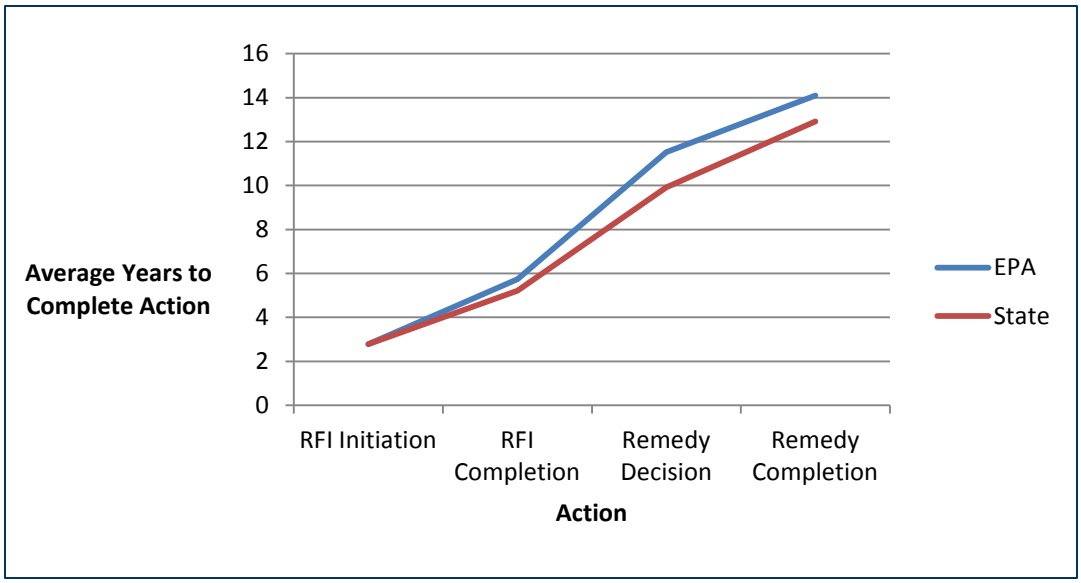
RCRAInfo

We drew extensively on RCRAInfo data to address this evaluation question.

Of the 310 Region 2 sites on the GPRA 2020 baseline for which RCRAInfo lists a lead agency, 210 are state-lead and 100 are EPA-lead. This evaluation question examines whether the efficiency of the Corrective Action process differs across these state-lead and EPA-lead sites.

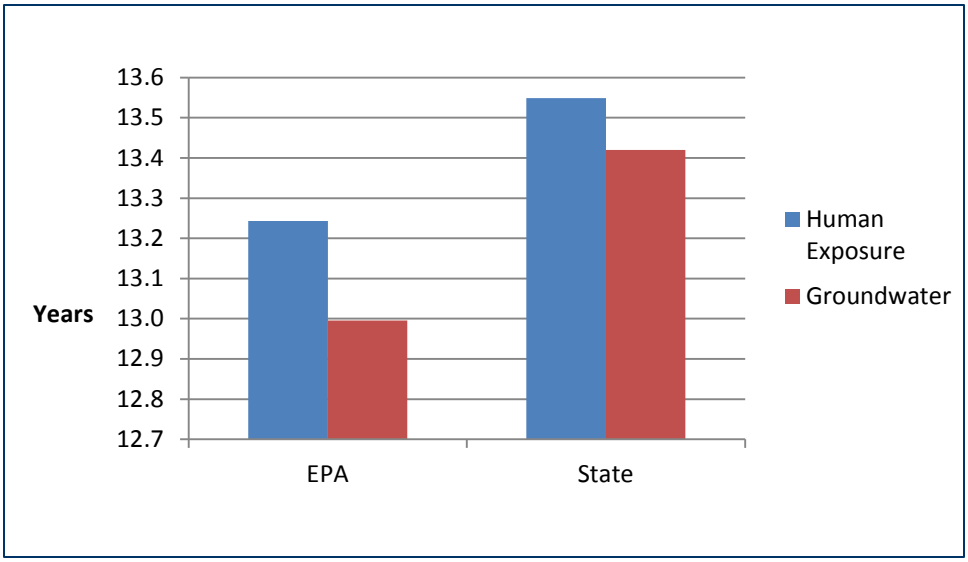
An initial review of data gleaned from RCRAInfo reveals a discrepancy in RCRA Corrective Action process times between state and EPA-lead sites. Using the methodology outlined in the *Methodology Document*, IEc calculated process times for completion of key phases of the RCRA Corrective Action process for each site in Region 2. Exhibit 3-4 displays the average number of years required for sites to reach key actions for both state-lead and EPA-lead sites, measured from the initiation of the Corrective Action process.

EXHIBIT 3-4. YEARS FROM START DATE TO KEY ACTIONS AT EPA-LEAD VS. STATE-LEAD SITES



These data show that, on average, ***EPA-lead sites take slightly longer to complete site investigations, remedy decisions, and remedy construction, as measured from the start of the Corrective Action process.***[16] Overall, EPA-lead sites require an average of 14.1 years to progress through these phases, while state-lead sites require an average of 12.9 years. Exhibit 3-5 illustrates that, ***by contrast, state-lead sites take slightly longer, on average, to achieve key environmental indicators.***

EXHIBIT 3-5. TIME NEEDED TO REACH EI'S AT EPA-LEAD VS. STATE-LEAD SITES



[16] However, as discussed below, EPA-lead sites take *less* time to reach Corrective Action terminated.

While these statistics provide a useful snapshot of progress at Region 2 sites, a more rigorous analysis is necessary to determine the extent to which process times are associated with lead agency. We therefore perform t-tests to determine whether apparent differences in process times between EPA- and state-lead sites are statistically significant.[17] T-tests use the sample size and magnitude of process time differences between EPA-lead and state-lead sites to determine whether these differences are likely caused by chance, or by inherent characteristics of these sites. To quantify these differences we divide all sites based on whether they have completed a given phase within one standard deviation above the mean number of years for all sites.[18] We use "one standard deviation above the mean" as a cutoff point beyond which sites require significantly more time than average to complete any given process.[19] We then create a ratio of sites that meet this condition to those that do not. The statistical test compares these ratios between EPA-lead and state-lead sites. Exhibit 3-6 summarizes the results of the t-tests.

EXHIBIT 3-6. T-TEST COMPARISON OF EPA-LEAD VS. STATE-LEAD SITES

		FEDERAL		STATE		
ACTION	NAME OF ACTION	# OF SITES IN SAMPLE	% SITES ABOVE MEAN + 1 STD. DEV.	# SITES IN SAMPLE	% SITES ABOVE MEAN + 1 STD. DEV.	P-VALUE
CA200	Site Investigation Complete	76	59%	168	45%	**0.0432**
CA350	Corrective Measures Study Complete	75	87%	166	73%	**0.0183**
CA400	Remedy Decision	66	77%	159	53%	**0.0009**
CA550	Remedy Construction Complete	50	54%	114	37%	**0.0405**
CA725	Human Exposure Under Control	79	13%	189	8%	0.2904
CA750	Groundwater Contamination Under Control	75	23%	183	16%	0.1938
CA999	Corrective Action Process Terminated	38	68%	77	77%	0.3461
Key: shading = statistically significant at a 95% confidence level						

[17] Since skewness/kurtosis statistical tests determined that site process times were not distributed normally for key Corrective Action phases, t-tests could not be performed using process times as a dependent variable. However, since the assumptions for conducting t-tests using binary variables are less stringent than those using continuous variables, t-tests could be performed based on a binary indicator of site process times.

[18] For this analysis, we only used sites that have had the opportunity to complete the phase in this timeframe. For example, if the mean and standard deviation for a specific phase were five years and two years, respectively, sites that have not had at least seven years to complete this phase were not included in the analysis.

[19] Only sites that have *reported an end date for a phase* were used to calculate the mean and standard deviation for that phase. Sites that have *not reported an end date* were included in the sample that falls "one standard deviation above the mean," if the amount of time since the initiation of the phase exceeded the "mean + one standard deviation" cutoff. We find that a majority of sites fall above this threshold for most phases. There are two possibilities: (1) Sites that have not reported an end date actually require more time to complete the phase, or (2) these sites actually completed the phase, but did not report an end date. We use the same analytical approach for t-tests and the probit analyses discussed below.

The results for the CA725, CA750, and CA999 variables indicate that ***no significant difference could be found between the full duration of the Corrective Action process, or the time required to achieve environmental indicators, at EPA-lead versus state-lead sites.*** For CA725 and CA750 (EIs), the close proximity of the ratios across groups seem to have prevented the test from detecting a statistically significant difference between EPA-lead versus state-lead sites. For CA999 (Corrective Action process terminated), the result seems to be driven primarily by the small number of sites that have terminated the Corrective Action process.

In contrast, we find a statistically significant difference between EPA-lead sites versus state-lead sites for the other phases of the process that we tested (CA200, CA350, CA400, and CA550), with EPA-lead sites likely to take longer. This result implies that some characteristic of EPA-lead sites – whether relating to the lead agency, the sites themselves, or some other factor – lengthens the Corrective Action process at these sites. For example, the interviews with Region 2 indicate that EPA often assumes responsibility for sites that are inherently difficult or complex to manage. If true, this could explain why EPA-lead sites take longer than state-lead sites.

To investigate why EPA-lead sites sometimes take longer than state-lead sites, IEc conducted a number of Ordinary Least Squares (OLS) and probit regressions. These regressions are designed to isolate the individual significance of sites' lead agency on site process times, while controlling for the effects of other site characteristics.[20] Although we ran a number of regressions using different variables, only one regression's results are statistically significant at the 95 percent confidence level. Specifically, a probit regression using the remedy decision as the dependent variable assigns a statistically significant and positive coefficient to the binary variable denoting EPA-lead sites. This indicates that EPA-lead sites are less likely than state-lead sites to reach a remedy decision within one standard deviation above the mean. In every other iteration of the probit analysis that we conducted, statistical significance is not consistently assigned to the lead agency. ***This suggests that observed differences in process times between EPA-lead and state-lead sites are likely attributable to characteristics of the sites themselves, rather than the means by which each agency manages site cleanups.***

Interviews

The interviews support the finding that EPA typically manages sites that may be inherently more time-consuming and/or require enhanced coordination with the states. The interviews suggest that, compared to New York and New Jersey, EPA Region 2 has a lead role at both the most difficult sites as well as numerous lower-priority sites that are still stuck in the process.

New York has a legacy program that has recently focused on clearing lower-priority sites (the "low-hanging fruit," as one manager put it).[21] New Jersey is also aiming to clear sites while using minimal agency resources, by providing incentives for sites to hire an LSRP and penalties for not completing the investigation phase by a date certain. At this point, it is too early to tell how sites will respond.

In contrast, for a variety of reasons, EPA is typically involved in the management of higher profile and more difficult sites. Also, EPA aims to coordinate the process with the Agency's state counterparts and facilities, which can further increase the time required to complete the process. In addition, EPA retains

[20] For a more thorough description of regressions run, variables included, and results, see the discussion for Question 1C.

[21] The primary focus of New York's legacy program has been to reevaluate sites with prior final remedy determinations to rule out vapor intrusion.

oversight authority even at state-lead sites. Finally, unlike New York and New Jersey, EPA has not yet finalized a strategy for clearing lower-priority sites. The 2011 branch reorganization was implemented in part to address this issue, and staff are currently examining these sites. Combined, these factors help explain why EPA-lead sites in the data reflect longer times than state-lead sites in some versions of the model.

Central File Review

We tried to use the project files to validate the dates in RCRAInfo. We found a handful of files that provided the dates when specific milestones were completed, and we were able to verify these dates in RCRAInfo. However, the files generally did not provide enough information to confirm or amend the RCRAInfo data. As discussed in the following sections, we attribute this result to the completeness of the project files available for review rather than RCRAInfo.

QUESTION 1C: ARE DECISIONS MADE IN A TIMELY MANNER?

Summary of Key Findings for Question 1C

- Overall, from the start of the Corrective Action process, sites that have completed the process have taken 5.0 years on average to complete the RFI, 10.2 years to select a site-wide final remedy, and 13.1 years to construct a site-wide final remedy. It appears that Puerto Rico completes the RFI at a slower rate than sites in other parts of Region 2.
- Many more sites have achieved their environmental indicators (EIs) than have constructed, or even selected, a site-wide final remedy. Many sites achieve their EIs by adopting interim measures (IMs) for specific contamination early in the remediation process. In contrast, final remedy selection occurs at the end of the CMS phase, which typically comes later in the Corrective Action process.
- The vast majority of sites achieve their EIs within six years of GPRA designation. The analysis confirms Region 2 and New York's stated focus on the GPRA goals. The results indicate that New Jersey's sites take longer to achieve their groundwater EI; this may reflect less of a focus on the GPRA goals in New Jersey, the state's stringent groundwater cleanup requirements, the nature of sites and hydrogeological features in New Jersey, and/or some other factor.
- The RCRAInfo data suggests that IMs generally *increase* the time required to complete the facility investigation (RFI), but *decrease* the time required to reach final remedy selection and construction. This result is consistent with the interviews, which indicate that IMs are frequently adopted retroactively as the final remedy.
- We found widespread, though not unanimous, agreement that the process takes "too long" – this perception was shared strongly by all interview groups except RPMs, who were more mixed in their assessment. Deliberate delays by sites, discovery of new contamination, and lack of Agency resources and/or staff were the most frequently identified causes of delays. These factors are generally not tied to a specific process step, but can occur at any step in the process. Although delays can occur at any time, once a delay occurs, it can have downstream effects on the rest of the process.
- EPA guidance suggests that sites are "stuck" if they have not made meaningful progress in the past three years. In half of the site files that we reviewed (10 of 20 sites), we found 14 instances where there was no documentation for at least three years. In subsequent discussions with Region 2, we found that many "files" reside at individual workstations or in emails, outside of the central filing system.

RCRA INFO

Overview

IEc calculated summary statistics on the percentage of sites and time required to complete key steps in the Corrective Action process, measured from the initiation of the Corrective Action process through the completion of each step. The results are shown in Exhibit 3-7. ***Overall, from the start of the Corrective Action process, sites that have completed the process have taken 5.0 years on average to complete the RFI, 10.2 years to select a site-wide final remedy, and 13.1 years to construct a site-wide final remedy.***[22] These averages do not include sites that are still in process; the average duration will likely increase over time as these "lagging" sites reach completion. On the other hand, the large standard deviations suggest that outliers (sites that progressed especially slowly) may be pulling up the average.

Notably, many more sites have met each environmental indicator than have constructed, or even selected, a site-wide final remedy. Approximately 73 percent and 64 percent of sites have met the human exposure and groundwater indicators, respectively, while only 41 percent of sites have selected a final remedy. These findings are consistent with the process map in Exhibit 3-1. The process map shows that sites can achieve their EIs at *any* point during the process by adopting interim measures to address immediate risks. In contrast, final remedy selection only comes following public consultation at the end of the CMS phase, which typically occurs later in the process. Furthermore, the threshold for meeting the EIs is lower than the threshold for final remedy selection.

EXHIBIT 3-7. SUMMARY STATISTICS OF RATES AND TIMES TO COMPLETE KEY ACTIONS

ACTION	# SITES[1]	% SITES[1]	MEAN (YEARS)[2]	MEDIAN (YEARS)[2]	STANDARD DEVIATION (YEARS)[2]
RCRA Facility Investigation Imposed	243	73%			
RCRA Facility Investigation Initiated	195	59%			
RCRA Facility Investigation Complete	156	47%	5.0	4.0	4.6
Corrective Measures Study Initiated	39	12%	2.8	1.4	3.2
Corrective Measures Study Complete	68	21%	5.3[3]	4.3	4.1
Final Remedy Selected	136	41%	10.2	9.8	6.5
Remedy Construction Complete	133	40%	13.1	14.5	6.7
Human Exposure Under Control	242	73%	13.5	14.0	4.5
Groundwater Contamination Under Control	212	64%	13.4	14.1	4.6
Corrective Action Process Terminated	44	13%	10.0	13.6	9.2

(1) Considers all sites that have completed the specified action.
(2) Considers only sites that have recorded both the specified action and a start date for the Corrective Action process.
(3) Some facilities reported the CMS start date and end date on the same day, which pulls down the average time required to complete the CMS. This could occur if an Interim Measure was retroactively adopted as the final remedy; alternatively, the result could simply reflect how data was reported in RCRAInfo.

[22] These figures are cumulative (not additive) – i.e., it has taken 13.1 years, on average, from the start of the Corrective Action process to achieve final remedy construction.

Exhibit 3-8 illustrates trends in the time required to complete various steps in the Corrective Action process. Exhibit 3-8A shows the number of years from the initiation of the Corrective Action process to the construction of a final remedy. The exhibit displays data for all sites that have reported a date for both the start of the Corrective Action process and the construction of a site-wide final remedy.[23] ***These sites have a mean of 13.1 years and a median of 14.5 years to completion.***[24] As shown in Exhibit 3-8A, sites tend to construct a final remedy in five years, or in 18 years, but are less likely to construct a remedy closer to the overall mean of 13 years. Within this timeframe, most sites will have completed the RFI, CMS, and remedy decision. Distributions for these intermediate phases are shown in Exhibits 3-8B – 3-8D. The distributions of the data suggest that sites that complete one phase of the process slowly are likely to complete other phases of the process slowly.

Similar distributions are also presented for the attainment of each environmental indicator in Exhibits 3-9 and 3-10. Whereas Exhibit 3-9 reveals a wide range of years required for sites to meet these goals since initiating Corrective Action, Exhibit 3-10 shows that ***a large majority of sites achieve their EIs within six years of GPRA designation.*** Note that a larger distribution of times is expected in the first graph, since many sites initiated the Corrective Action process long before the creation of the GPRA universe in 1999. However, had these sites already controlled human exposure and groundwater contamination, the GPRA process time in the second graph would be recorded as zero or negative. Instead, we see that most sites met the GPRA goals shortly after GPRA designation. This could suggest that their inclusion in the GPRA universe prompted an efficient effort leading to the completion of the GPRA goals. Alternatively, sites may have met these environmental goals prior to their inclusion in the GPRA universe, but recorded this fact several years after their designation.

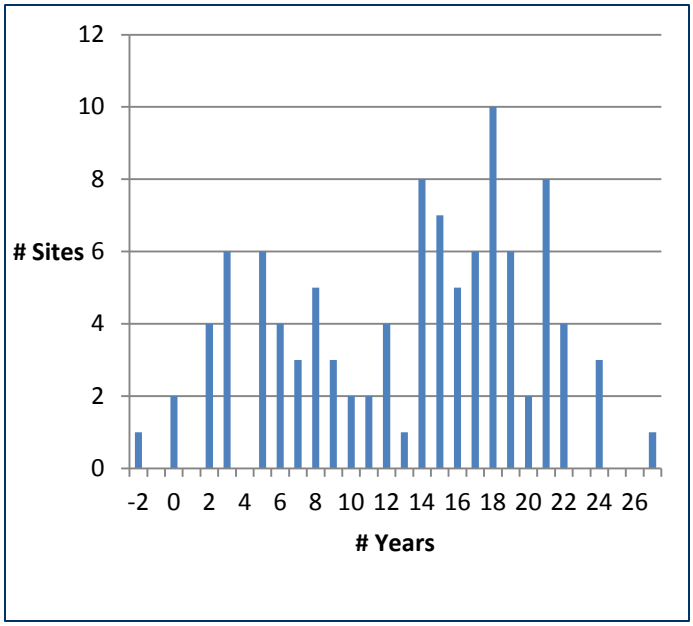
As discussed earlier in this section, IMs can play an important role in helping sites achieve their EIs. In fact, the data show that many sites that have achieved their EIs have constructed more than one IM. To further explore the connection between IMs and EIs, we conducted the analysis shown in Exhibit 3-11. The exhibit compares the average number of IMs at sites that have achieved their EIs versus sites that have not achieved their EIs. As shown in Exhibit 3-11, ***sites that have achieved their EIs have about three times the number of IMs, on average, as sites that have not achieved their EIs.*** The results are statistically significant. This analysis provides a further indication of the association between IM construction and the attainment of EIs. Also, as discussed in the regression analysis later in this chapter, we find that interim measures generally decrease the time required to select and construct a final remedy.

[23] Note that 81 sites have recorded both a Corrective Action start date and remedy construction date. This differs from the 133 sites (shown in Exhibit 3-7 above) that have recorded remedy construction complete.

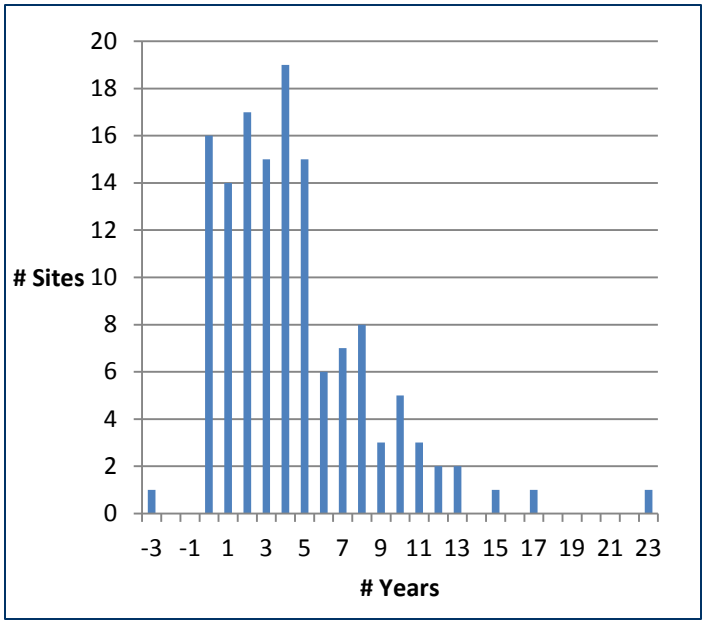
[24] This is based on the 24 percent of sites in Region 2's GPRA 2020 Corrective Action universe that entered both a Corrective Action start date and a final site-wide remedy construction date. Region 2 has reported that 31 percent of sites constructed a final remedy by the end of 2012. The discrepancy (24% vs. 31%) is likely due to our exclusion of sites without a start date.

EXHIBIT 3-8. TIME REQUIRED TO COMPLETE THE CORRECTIVE ACTION PROCESS

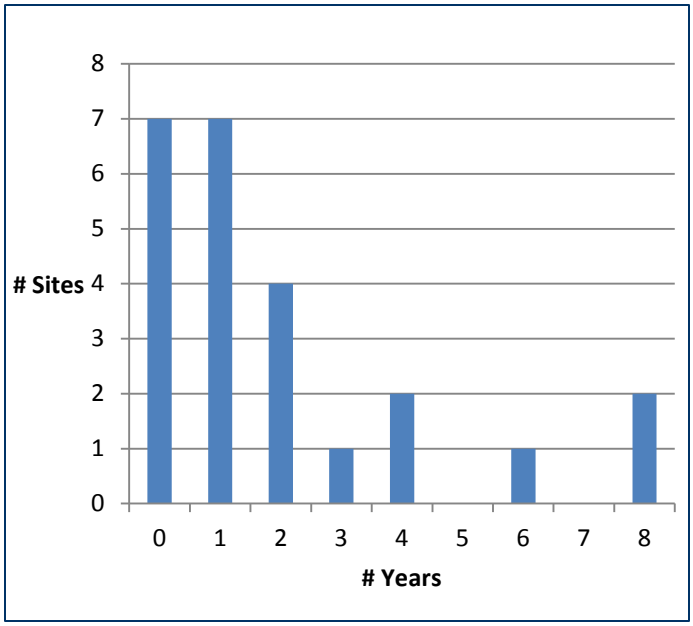
A - YEARS UNTIL FINAL REMEDY CONSTRUCTION AFTER INITIATING CORRECTIVE ACTION



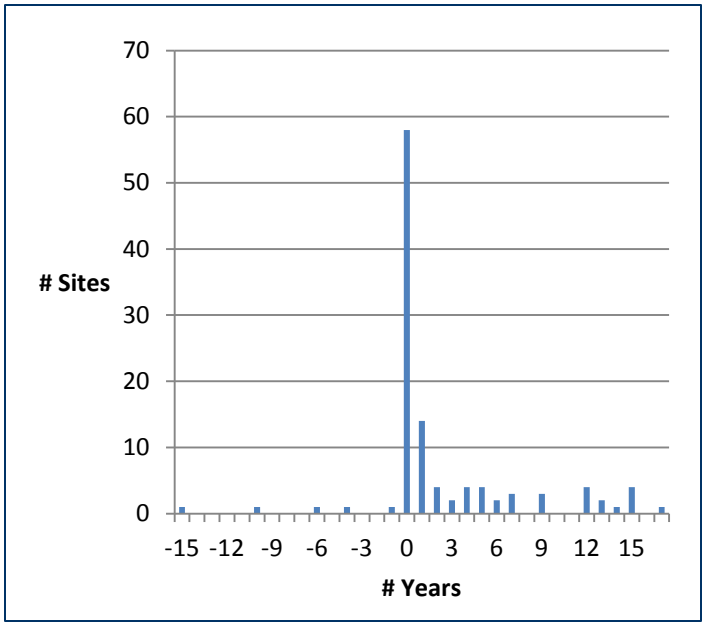
B - YEARS REQUIRED TO COMPLETE THE RCRA FACILITY INVESTIGATION PHASE



C - YEARS REQUIRED TO COMPLETE THE CORRECTIVE MEASURES STUDY PHASE



D - YEARS REQUIRED TO CONSTRUCT A REMEDY, ONCE A REMEDY HAS BEEN SELECTED



Note: The negative numbers indicate that some sites recorded milestones *before* their Corrective Action start date. The negative sign is difficult to interpret in this context, and may reflect reporting anomalies in RCRAInfo. Despite these anomalies, the patterns that emerge from the figures are clear enough to provide general insights for the program.

EXHIBIT 3-9. YEARS NEEDED TO MEET EI'S, ONCE AN RFI HAS BEEN IMPOSED

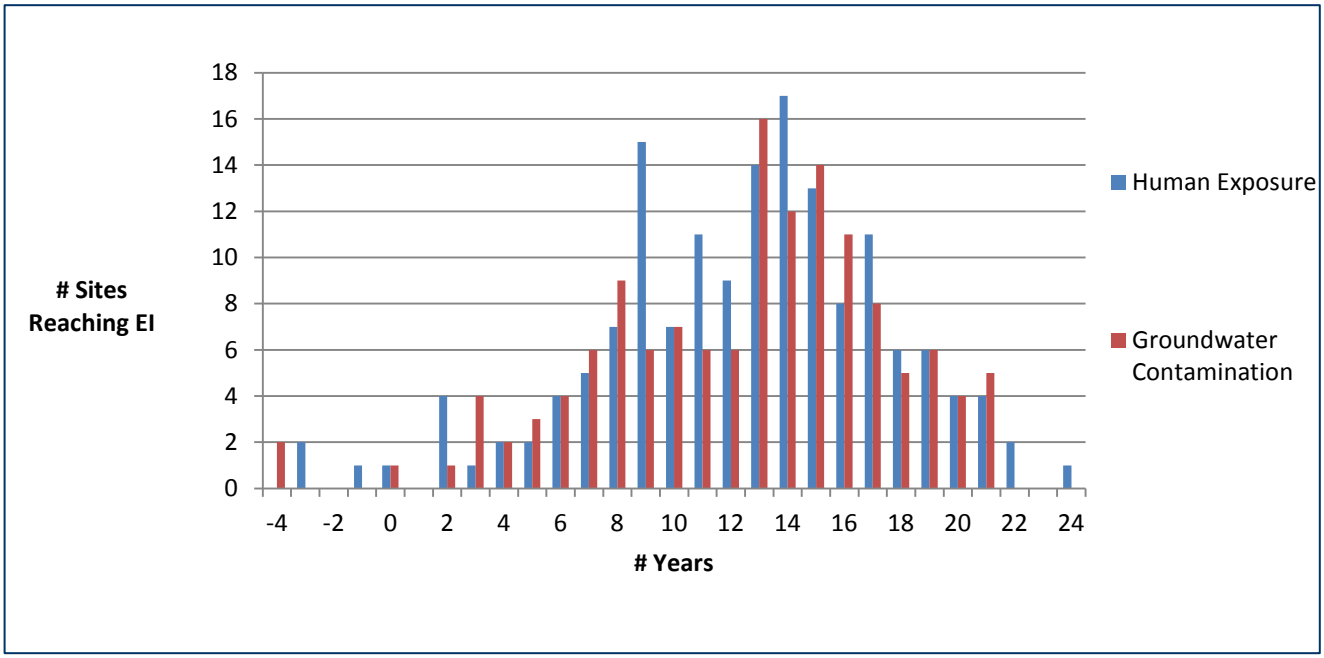


EXHIBIT 3-10. YEARS NEEDED TO MEET EI'S, ONCE ADDED TO GPRA UNIVERSE

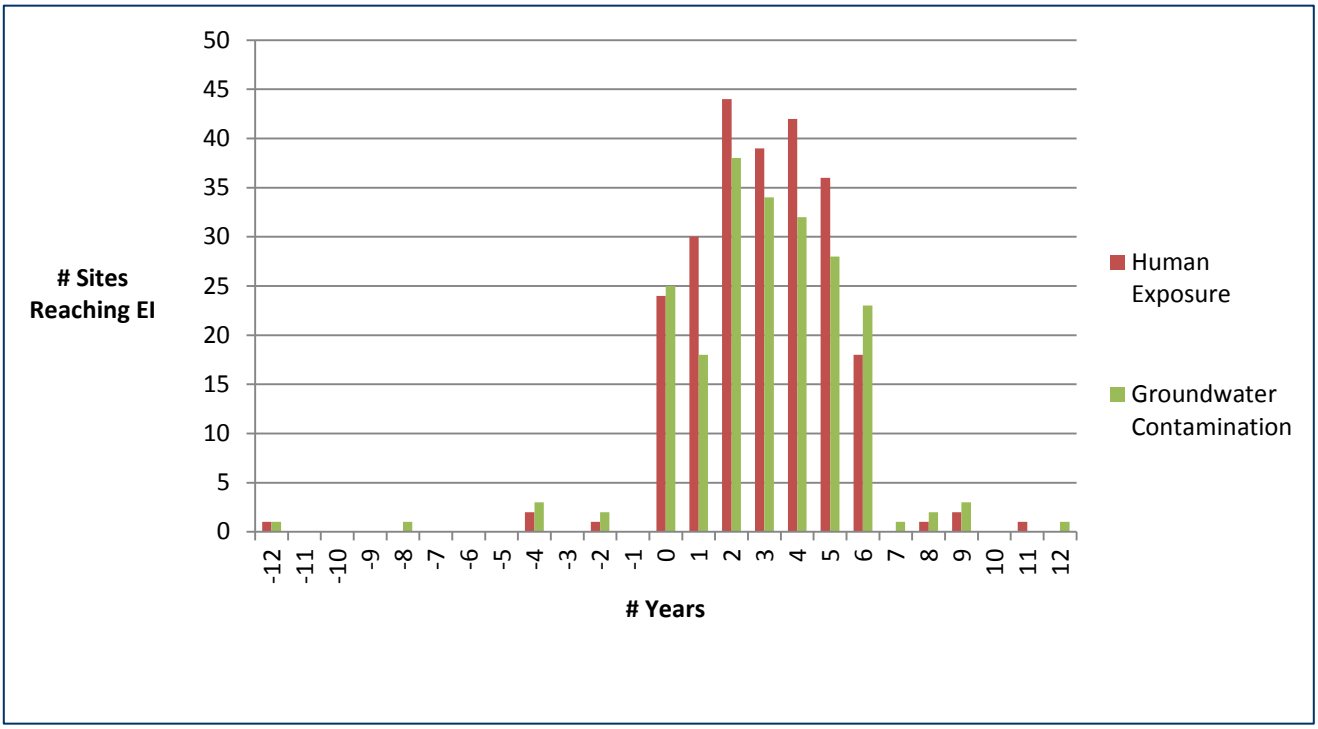


EXHIBIT 3-11. RELATIONSHIP BETWEEN EI'S AND IM'S

	EI ACHIEVED?	AVERAGE NO. OF IM'S AT SITE
Human Exposures Under Control	Yes	1.244
	No	0.427
Groundwater Migration Under Control	Yes	1.307
	No	0.521

Outlier Analysis

We hypothesize that site characteristics are related to the time required to complete the Corrective Action process. To test for a correlation between slow-moving sites and various site attributes, IEc conducted an outlier analysis for sites falling within the slowest 25th percentile for completing four or more key phases of the process. Compared to the characteristics of all sites in Region 2, these 11 sites were disproportionately more likely to:[25]

- Have been added to the GPRA universe in 1999 (rather than in 2006 or 2009)
- Be state-lead
- Have contaminated groundwater and soil
- Be given a high priority National Corrective Action Priority System (NCAPS) ranking.

Due to the small number of sites that fall within the slowest 25th percentile, we were not able to conduct statistical analysis to determine whether these factors are statistically significant. Therefore, the results should be treated more as anecdotal information than general conclusions about factors that influence cleanup times.

Regression Analysis

While the outlier analysis described above suggests several site characteristics that may slow down the Corrective Action process, a more rigorous regression analysis is helpful in evaluating these correlations in a more systematic way. In particular, regression analysis can isolate the impact of individual site characteristics on site process times by controlling across many other variables. Appendix E provides descriptive statistics for the primary explanatory variables included in our regressions and presents the regression output tables, along with the caveats and limitations of our analysis.

We ran two types of regressions:

- **Ordinary Least Squares (OLS):** The OLS regressions considered factors that affect the *number of years* required to complete key phases of the Corrective Action process. The following variables were statistically significant at the 95 percent confidence level:
    - Sub-site IM decisions tended to *increase* the time required to complete the RFI phase.

[25] See Appendix E for additional details about the outlier analysis.

- Sub-site remedy construction tended to *increase* the time required to reach a final remedy decision.
- Use of orders or decrees tended to *increase* the time required to control groundwater contamination.
- EPA-lead (rather than state-lead) tended to *decrease* the time required to achieve the Corrective Action process terminated milestone.[26]
- Surface water contamination tended to *decrease* the total duration of the Corrective Action process.
- Repeating the same step multiple times tended to *decrease* the time required to reach remedy decisions, remedy construction, and Corrective Action process terminated. This finding appears counterintuitive, and we discuss possible interpretations at the end of this section.

- **Probit analysis:** The second set of regressions (probit) uses a *binary variable (yes/no)* that captures whether or not a site takes a long time to complete key phases of the process.[27] Key results from the probit analysis include the following:
  - IM decisions have a negative (i.e., time-reducing) effect on process times for corrective measures studies, remedy decisions, and remedy construction.[28] ***This finding suggests that IMs generally decrease the time required to reach remedy decisions and construction. For regressions involving remedy construction, this result may reflect the fact that sites will often retroactively determine a previously-constructed IM to be sufficient as the final remedy.***
  - Being located in New York and New Jersey (rather than Puerto Rico) has a negative (i.e., time-reducing) effect on the time required to complete the RFI. ***This result suggests that sites in Puerto Rico may complete the RFI at a slower rate than sites elsewhere in Region 2.***
  - In contrast, ***being located in New Jersey has a positive (i.e., time-increasing) effect on the time required to achieve the groundwater EI.*** This could be due, in part, to New Jersey's relatively stringent water standards. However, as discussed in Appendix E, this finding may also reflect unobserved characteristics of sites in particular geographic jurisdictions, rather than the agency or means used during site cleanups.

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[26] "Corrective Action process terminated" is a distinct event code from final remedy construction. The analysis in Question 1B above found that EPA-lead sites take slightly longer, on average, to reach final remedy construction and to complete the intermediate steps. In contrast, the present analysis shows that EPA-lead sites take less time to reach Corrective Action process terminated.

[27] As in our previous analyses, our cutoff between "fast" and "slow" sites was *one standard deviation above the mean (average) process time*. Factors associated with greater speed tended to increase the likelihood that a site completed a phase or milestone in less than one standard deviation above the mean; in contrast, factors associated with slower progress tended to decrease the likelihood that a site completed a phase or milestone within one standard deviation above the mean.

[28] Note this finding is different than the results of the OLS regression discussed above. The OLS regression suggested that sub-site interim measures *increase* the time required to complete the RFI. The probit analysis indicates that interim measures *decrease* the time required to reach remedy decision and construction.

- "Medium priority"[29] or "high priority" NCAPS ranking tended to *increase* the time required to construct a final remedy.[30]
- Use of orders and decrees tended to *increase* the time required to construct a final remedy.[31]
- Financial assurance requirements tended to *increase* the time required to construct a final remedy.[32]
- EPA-lead tended to *increase* the time required to select a remedy.
- Groundwater contamination tended to *increase* the time required to select a remedy.
- Soil contamination tended to *decrease* the time required to select and construct a remedy.[33]
- As with the OLS regressions, ***repeating the same step multiple times was found to decrease the time required to complete a phase***. ***This finding seems counterintuitive and seems to contradict our interview findings, which indicate that "do-loops" increase the time required.*** Our regression results may reflect that within a facility, individual SWMUs and/or parcels went through the process on different tracks. The results might also indicate that sites that that have had to revisit portions of the Corrective Action process multiple times have become more efficient with each subsequent "re-do," or have revisited phases with progressively less contamination needing to be addressed. Alternatively, the results could simply reflect anomalies in the data.

In summary, the RCRAInfo analysis provides an overview of the time required to complete important phases and milestones in the Corrective Action process, and identifies variables that seem to accelerate or delay progress. On average, sites that have completed the process have taken more than a decade to select and construct a final remedy. However, the vast of majority of sites achieve their EIs within six years of GPRA designation. IMs generally *increase* the time required to complete the RFI, but *decrease* the time required to reach final remedy selection and construction. This result is consistent with the interviews, which indicate that IMs are frequently adopted retroactively as the final remedy. The next section explores the interview findings, and summarizes perceptions about the timeliness of the process and the causes of delays.

Interviews

We found widespread, though not unanimous agreement that the Corrective Action process takes "too long" – this perception was shared strongly by all interview groups except RPMs, who were more mixed in their assessment. However, with very few exceptions, all of the RPMs we interviewed were

[29] As compared to "low priority" sites. This result held for the remedy construction phase and remedy construction as measured since the start of the Corrective Action process.

[30] Process times were measured from the Corrective Action start date.

[31] Process times were measured from the Corrective Action start date.

[32] This result held for the remedy construction phase and remedy construction as measured since the start of the Corrective Action process.

[33] Process times were measured from the Corrective Action start date.

able to identify factors that cause the process to take longer than it would ideally take. Exhibit 3-12 summarizes: the reason for delays, in order from those cited across the largest number of interview categories to the least; which category or categories of interviewees identified each delay; and the phases of the process that the delays affect.[34] (See the process map in Exhibit 3-1.) ***Lack of agency resources and/or staff was the only delay identified by respondents across all seven interview categories. Deliberate delays by sites, lack of "big picture" focus, discovery of new contamination, and agency turnover also ranked high on the list.*** As we move down the list, some factors appear contradictory – for example, lack of data to make decisions seems to contradict lack of "big picture" focus. These apparent contradictions reflect which type of interviewee made the comment, as well as the competing priorities and inherent tradeoffs in the process. As denoted by the asterisks, there was some disagreement expressed within the community stakeholder group with respect to whether community input slows down the process, and within the state category with respect to competing priorities between EPA and states.

Notably, the causes of delays identified in Exhibit 3-12 are generally not tied to any particular process step, but can occur at any time during the Corrective Action process. For example, lack of agency resources and staff, deliberate delays by sites, and lack of "big picture" focus do not arise from a particular process step. Rather, these cross-cutting "thematic" factors depend on the general budget situation and the characteristics of the lead agency and facility. A recurring theme from the interviews is that these factors can "derail" the process at any time, regardless of how much or how little progress has already been made. For example, facility bankruptcy can be a problem whether it occurs in the RFI or CMI stage. Similarly, an uncooperative facility can impede progress at any time during the process.

Delays can build on and reinforce each other, creating a downward spiral. For instance, initial disagreement between the lead agency and facility about the scope of the site investigation may eventually give way to mutual understanding; however, by the time the facility finishes its site investigation, the original RPM may no longer be working on the case. The new RPM may not be familiar with the case, and may reopen questions that were already decided with the previous RPM, further delaying the process. In the meantime, the site may change ownership, and the new owner may require additional time to get up to speed on the cleanup. Although delays can occur at any time, once a delay occurs, it can have downstream effects on the rest of the process.

In contrast to the majority of delays listed in Exhibit 3-12, *three* factors in the exhibit *do* appear to be tied to specific phases of the Corrective Action process. These three factors include: lack of data to make decisions (RFI), lack of technical knowledge of the agency or contractors (RFI and CMS), and community comment (RFI and CMS). Some interviewees indicated that project managers are unwilling to make decisions with imperfect information. This may reflect the inadequacy of information submitted by some facilities, and/or a risk-averse agency culture that discourages decision-making under uncertainty. Lack of technical knowledge of the lead agency or contractors also affects the efficiency of the RFI and CMS. In particular, lack of knowledge in specialized areas such as hydrology and geology may impede expeditious review of site investigation reports and proposed remedies. Finally, community comment may delay the process, according to RPMs, states, and some NGOs (however, opinion among NGOs was mixed). RPMs, in particular, reported that public comments at the end of the CMS phase – just prior to

[34] We asked the question in an open-ended manner and provided prompts to spur discussion. Exhibit 3-12 captures factors that different categories of interviewees identified and affirmed during our semi-structured discussion. However, the absence of a "check" mark should not necessarily be interpreted to mean that a factor is not important to a particular category of interviewee.

announcing a final remedy – can delay the final remedy decision, and may even require reopening the RFI, depending on the comments received. These statements may reflect a belief that public participation is an "add-on" to the Corrective Action process rather than an integral part of it. If appropriate and realistic timeframes for public outreach and comment were factored into the Corrective Action planning process, they would simply be accepted phases of the work and would not be considered delays.

EXHIBIT 3-12. CAUSES OF DELAYS IDENTIFIED BY INTERVIEWS

REASON FOR DELAYS	INTERVIEW CATEGORY							PHASE			
	HQ	R2 MGMT	RPMS	STATES	OTHER REG.	NGO	SITES	RFA	RFI	CMS	CMI
Lack of agency resources and/or staff	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Deliberate delays by sites	✓	✓	✓	✓	✓	✓			✓	✓	✓
Lack of "big picture" focus		✓		✓	✓		✓	✓	✓	✓	✓
Discovery of new contamination	✓	✓	✓			✓		✓	✓	✓	✓
Agency staff turnover	✓		✓			✓	✓	✓	✓	✓	✓
Lack of data to make decisions	✓		✓			✓			✓		
Lack of enforcement		✓	✓			✓		✓	✓	✓	✓
Lack of attention from agency staff (1)	✓					✓	✓	✓	✓	✓	✓
Lack of technical knowledge of agency or contractors			✓	✓			✓		✓	✓	
Change in site ownership	✓		✓				✓	✓	✓	✓	✓
Community comment			✓	✓		*			✓	✓	
Different priorities between EPA and states			✓	*		✓		✓	✓	✓	✓
Lack of company resources			✓	✓				✓	✓	✓	✓
Legal issues, including issuing or modifying orders			✓		✓			✓	✓	✓	✓

Notes: (1) Lack of attention from agency staff could be related to lack of agency resources and/or staff.

Legend:

✓- denotes either general agreement by interview category or applicability of a reason to a certain phase of the Corrective Action process

* - denotes general disagreement within interview category regarding the stated reason

Overall, the interviews found widespread agreement that the Corrective Action process takes "too long," and identified the perceived causes of delays. We attempted to validate the perceptions expressed in the interviews by conducting a review of selected project files. The next section summarizes the relevant findings from our file review for Question 1C.

Central File Review

One intended purpose of the file review was to assess whether decisions are made in a timely manner. EPA guidance suggests that facilities are "stuck" in the Corrective Action process if they have not made any meaningful progress in achieving their remedial objectives for three years.[35] As part of our file review of 20 selected sites, we looked for gaps in the documentation of three years or longer. We *initially* planned to use three-year gaps in the written record as an indicator that sites were "stuck." Subsequent discussions with Region 2 revealed this may not be a valid indicator of progress, for reasons discussed below; however, the file review findings are instructive for other reasons.

Findings from the file review for Question 1C include the following:

- ***In half of the project files that we reviewed (10 of 20 sites), we found a total of 14 instances where there was no documentation for at least three years.***[36] Of these 14 instances of three-year gaps, 11 took place after February 1997. Pinpointing the cause of the gaps is difficult because some files were missing from the central archives. However, these instances all occurred after e-mail became a prominent form of communication, and it is possible that recent communication occurred (and remains stored) electronically. Also, Region 2 staff note that project files for active sites may be kept at individual workstations, rather than the central archives.
- ***Facilities do not appear to progress at a constant pace throughout the Corrective Action process.*** Instead, the files appear to have periods of heavy correspondence between the lead agency and the facility, and periods with little correspondence. This may mean that progress is not steady, or that some stages of the process require less correspondence than others.
- ***The most active periods of correspondence tend to focus on specific solid waste management units rather than sites as a whole.*** Though anecdotal, this finding is consistent with comments offered by Region 2 staff and other interviewees indicating that sites have traditionally been managed on a SWMU-by-SWMU basis, rather than holistically.

Subsequent to our file review, Region 2 indicated that some of the apparent gaps in correspondence reflect how the files are archived. For example, RPMs sometimes keep the project files for active sites at their individual workstations, and frequently communicate with facilities over email. Although the central file is supposed to contain *all* site-related documentation – including email correspondence – the Region is still developing electronic storage protocols, and we found little email correspondence in the files that we reviewed. Similarly, the central file is supposed to contain all correspondence between facilities and state agencies, but in some cases this may be missing. Therefore, the three-year gaps that we identified in our file review may reflect more on the quality of the central file than the actual progress at the sites.

[35] U.S. EPA, *National Enforcement Strategy for RCRA Corrective Action*, April 27, 2010.

[36] For all but one of these instances, we verified in RCRAInfo that no major site-wide milestones were achieved during the three-year gaps. Progress may have been made at the sub-site level, and/or not recorded in RCRAInfo.

QUESTION 1D: DO WE HAVE A SCHEDULE FOR THE PROJECTS AND ARE WE HOLDING FACILITIES ACCOUNTABLE TO THE SCHEDULE?

Summary of Key Findings for Question 1D

- The interview findings reflect a perception that facilities are able to significantly delay the process. However, we found less agreement on how to reduce delays.
- Our file review did not find any comprehensive project schedules covering the entire Corrective Action process. It appears that companies are almost always given *short-term* schedules; however, facilities frequently requested – and received – extensions.

Interviews

As shown in Exhibit 3-12 above, "deliberate delays by sites" was one of the most frequently cited causes of delays. Some interviewees – especially Region 2 senior management and community stakeholders – explicitly cited lack of accountability (or variations on that theme) as a significant problem.

While many interviewees seem to feel that facilities are able to extend existing deadlines more than they should, we found far less agreement on how to ensure timely cleanups. Some stakeholders strongly encouraged more active enforcement. Others argued that enforcement slows down the process, both internally (legal review) and externally (facilities may stop work while the action is being challenged). Program managers noted that "accountability" goes beyond simply adhering to EPA's project schedule, particularly for state-lead sites. Several RPMs have found it more productive to work collaboratively with facilities than to initiate enforcement; in a similar vein, participants at the Lean Event for Regions 3 and 7 stated that enforcement causes delays. (Other enforcement-related issues are discussed in Question 3 below.) Still others felt the best way to hold facilities "accountable" was to provide economic incentives to accelerate Corrective Action. As discussed throughout this chapter, our analysis indicates that various approaches might be more or less useful in different situations, depending on facility characteristics and the Agency's priorities for the site.

Central File Review

Our file review did not find any comprehensive project schedules outlining the entire RCRA Corrective Action process. While it is possible that such schedules exist, they were not in the project files that we reviewed. It appears that EPA or the state almost always assigns deadlines for facilities to meet *short-term* project goals. However, for the 20 sites that we reviewed, we found eight instances of companies requesting extensions to short-term deadlines – and ***EPA or the state granted all requested extensions.*** Extensions ranged from 30 days to six months and averaged approximately 73 days. Requests for an extension were typically due to imprecise estimates of how long tasks would take or unforeseen events. For example, in 1999, EPA granted a 30-day extension when a facility discovered that it needed to recover archived information to complete a task appropriately. In 1994, EPA granted an extension to another facility to complete Task 1, Phase 2 of its RFI because of poor weather and soil conditions. The longest extension (six months) was to allow a facility to procure "unbiased, representative data" for its Detection RFI Sampling Results Submittal. However, in one case, EPA granted an extension because of inaction by a state-lead agency. Specifically, in 1992, a facility received an extension for constructing an IM due partly to the state agency's delay in approving a necessary permit.

QUESTION 2: ARE THE RESOURCES ADEQUATE TO SUPPORT THE PROGRAM?

This evaluation question addresses the adequacy of EPA and state resources to support the Corrective Action program in Region 2.[37] We consider three aspects of "resource adequacy": (1) adequate staff and funding levels to achieve the GPRA 2020 goals on time, (2) access to technical expertise to ensure the quality of remedy decisions, and (3) ability to reach lower priority and non-GPRA sites.

We draw on three data sources to answer this question. First, we review two reports, one by the Government Accountability Office (GAO) and the other by ORCR, to glean insight into nationwide trends in Corrective Action resources and workload. Second, we analyze budget and staffing data provided by Region 2 to understand the situation in the Region, and the extent to which Region 2 mirrors national trends. Third, we summarize interview findings related to the adequacy of program resources.

Summary of Key Findings for Question 2

- Federal and state resources for Corrective Action have declined over the past decade, while the program's goals have become increasingly ambitious. While earlier goals have been met, analyses conducted by GAO and EPA suggest that meeting the GPRA 2020 goals will be challenging given budgetary and technical constraints.
- The resource situation in Region 2 mirrors the nation as a whole. EPA faces several resource-related challenges involving technical expertise, community outreach, staffing, and organizational changes. Declining program resources are forcing difficult management decisions about tradeoffs among speed, environmental stringency, and public participation.
- New York and New Jersey have lost some EPA grant-supported FTE for Corrective Action; at the same time, state resources have also declined. The two states have responded to resource limitations in very different ways, reflecting the tradeoffs inherent in the program.

Documents

We reviewed two reports that address the adequacy of resources for Corrective Action nationwide: GAO's *Hazardous Waste: Early Goals Have Been Met in EPA's Corrective Action Program, but Resource and Technical Challenges Will Constrain Future Progress* (July 2011) and EPA ORCR's *Corrective Action Program: Workload Report* (Draft, March 2013):

- **GAO:** The GAO report notes that EPA has set a series of progressively more ambitious goals over the past decade and expanded the number of facilities that must meet them.[38] It finds that

[37] This question does not address the adequacy of *facilities'* resources; however, the documents and interviews indicate that problems related to inadequate financial assurance and bankruptcy can significantly delay cleanups.

[38] The 2005 GPRA goals aimed to control human exposures at 95 percent of the 1,714 high-priority facilities, and control groundwater migration at 70 percent of these facilities. The 2008 GPRA goals increased the total number of high-priority facilities from 1,714 to 1,968; the goals for these facilities were: a) control human exposures at 95 percent of these facilities, b) control groundwater migration at 80 percent of these facilities, c) select final remedies at 30 percent of these facilities, and d) complete final remedy construction at 20 percent of these facilities. The 2020 GPRA goals further expanded the GPRA universe to 3,747 facilities, which includes medium- and low-priority facilities; the goal is to control human exposures, control groundwater migration, and complete final remedy construction at 95 percent of these facilities by 2020. GAO 2011, op. cit.

EPA and authorized states have made considerable progress in meeting the EI goals, but meeting the 2020 goal will be challenging.[39] Most EPA and state officials interviewed by GAO agreed that the 2020 goal of construction complete was unlikely to be met. EPA, states, and facilities identified fiscal and human resource constraints and groundwater cleanup as key challenges for achieving the 2020 goals. GAO recommends that EPA assess the remaining Corrective Action workload, determine the extent to which the program has resources needed to meet 2020 goals, and take steps to either reallocate its resources or revise its goals. In response to GAO's recommendation, EPA ORCR is conducting a workload analysis for the Corrective Action program, as discussed in the following bullet.

- **ORCR:** In response to GAO's recommendation, ORCR is currently developing a report on the Corrective Action workload. As of March 2013, this report was in draft form, and while specific results are not yet available, the report documents a decline in federal and state resources available for Corrective Action. The report finds that ***between 2004 and 2011, federal resources available to the program decreased significantly, and EPA full-time employee (FTE) staffing levels also decreased.*** Although EPA lacks specific data on actual funding and staffing trends for state Corrective Action programs, a 2011 report indicated that state overmatches for the entire RCRA Subtitle C (RCRA-C) program (including permitting and other activities beyond just Corrective Action) fell from approximately $59 million in 2006 to approximately $34 million in 2009. The report also noted that ***from 2006 to 2009, state RCRA-C FTEs decreased 19 percent, representing a loss of approximately 400 state FTEs out of about 2,000.***[40] Concurrent with these resource reductions are other challenges: increased workloads; programs losing experienced staff; difficult facilities remaining to be addressed; later steps in the process being more difficult to address than earlier steps; post-construction monitoring; economic hardship and bankruptcy complications; large, complex federal facilities; and renewed emphasis on community involvement. EPA's analysis suggests that achieving the 2020 goals, particularly final remedy construction at 95 percent of facilities by 2020, may be negatively affected by resource constraints.

In the following section, we place Region 2 within the national context of declining resources and being asked to do more with less. As discussed below, Region 2 faces the same resource constraints as the program nationwide, including tight budgets, declining FTEs, and increased workload.

Region 2 Budget and Staffing Data

This section presents our analysis of the budget and staffing data provided by Region 2:

- **Budget data.** Region 2 provided data on RCRA Enforcement and Permitting Assistance (REPA) expenditures for REPA 3 (March 2002 – May 2007), REPA 4 (March 2007 – March 2012), and

[39] By the end of FY 2005, 96 percent of the 1,714 facilities had controlled human exposures, and 78 percent had controlled groundwater migration. By the end of FY 2008, 96 percent of the 1,968 facilities had controlled human exposures, and 83 percent had controlled groundwater migration. Also by the end of FY 2008, final remedies had been selected at 43 percent of these facilities and construction was completed at 35 percent of them. For the 2020 universe, 72 percent have controlled human exposures, 63 percent have controlled groundwater migration, and 37 percent have constructed final cleanup remedies. Ibid.

[40] Presentation by Stephen A. Cobb. June 14, 2011. "State of the States." Association of State and Territorial Solid Waste Management Officials (ASTSWMO), as cited in the March 2013 draft *Corrective Action Workload Report*.

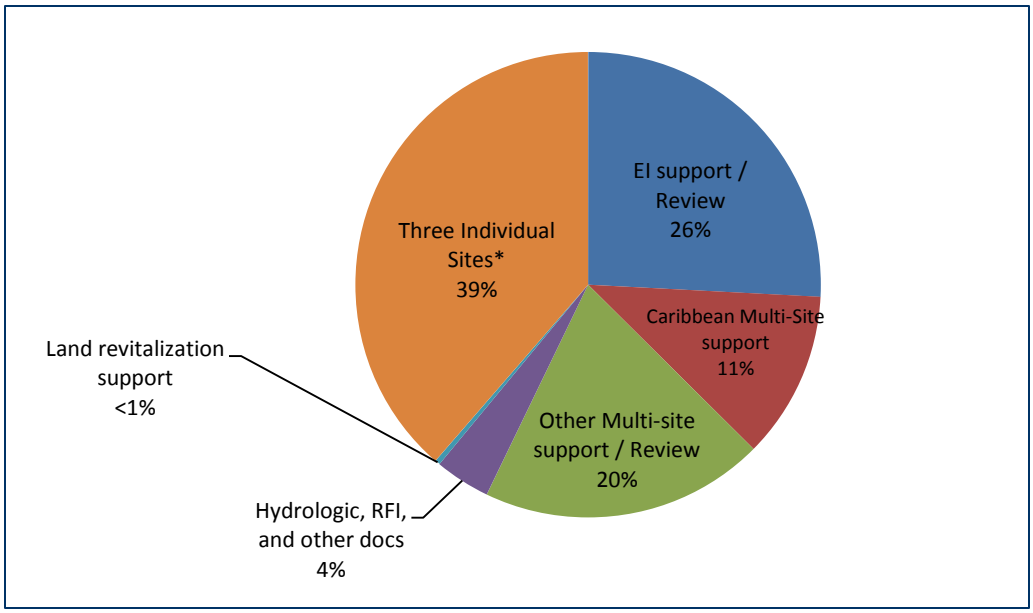
REPA 5 (May 2012 – present). REPA is a contract vehicle that funds projects supporting the Region's direct implementation of the Corrective Action program. EPA funds the REPA contract with extramural funds and, under certain conditions, State and Tribal Assistance Grant (STAG) funds. REPA does not include FTE costs, which are discussed in the following bullet point (staffing data).

Overall REPA expenditures over the period covered by the data (March 2002 – present) totaled slightly under $2.8 million. Incurred costs per period ranged from about $1.1 million in REPA 3 to $180,547 in REPA 5; however, this simple comparison is misleading because REPA 5 was still in its first year when the data was provided. A more meaningful metric is how resources have been allocated across task orders and work assignments. Exhibit 3-13 shows REPA expenditures from March 2002 through the present across six categories: EI support and review, Caribbean multi-site support, land revitalization support, hydrologic/RFI/other document review, other multi-site support, and support for three individual sites.[41] These three Corrective Action sites account for 39 percent of total REPA expenditures; one of the three sites accounts for 23 percent of total expenditures. This analysis confirms interview data suggesting that ***Region 2 devotes a high share of resources to a small number of high-profile and/or technically complex sites.***

EI support/review accounts for just over one-quarter of the allocation, reflecting EPA's traditional emphasis on environmental indicators; in contrast, land revitalization support reflects less than one percent of the total. It is also notable that sites in the Caribbean, and hydrologic review, each received a relatively small share of funding (11 percent and four percent, respectively). Interviewees cited concerns about resource adequacy for the Caribbean office; they also cited difficulties accessing technical expertise and staying apprised of recent technological developments affecting Corrective Action cleanups. The interview analysis (see below) discusses these issues in more detail.

[41] IEc defined the categories based on our review of the raw data and grouped expenditures in each category.

EXHIBIT 3-13. ALLOCATION OF REPA EXPENDITURES



* The three individual sites are: Naval Station Roosevelt Roads/Naval Academy Puerto Rico, HOVENSA, and DuPont Pompton Lakes.

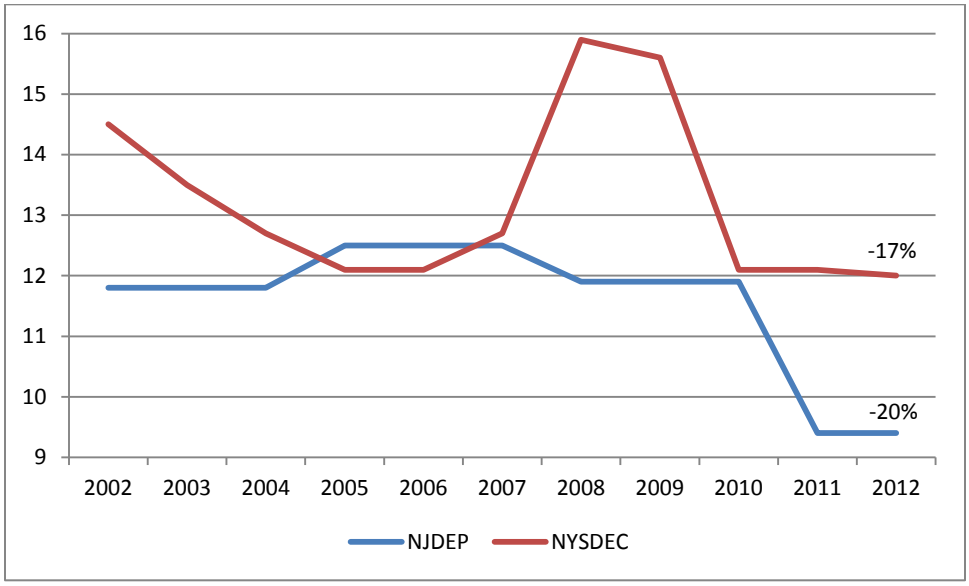
- **Staffing data.** EPA provided Region 2 Corrective Action Project Manager staffing data for 2003-2013. In 2013, EPA Region 2's Corrective Action program had 14 project managers in the New York office (11 in the program division and three in the Superfund division), which translates to 13.8 FTE. The Puerto Rico office had an additional 7 FTE, bringing the regional total to 20.8 FTE. This is a slight increase (11%) over the approximately 19 regional FTE that the program had in 2003. However, over the same time period, ***the number of GPRA Corrective Action sites managed out of Region 2's offices increased by 137 percent – from 140 sites in 2003 to 332 sites in 2013 – as the Agency expanded the GPRA universe. Put differently, the number of sites per Corrective Action FTE more than doubled, from 7.4 sites per FTE in 2003 to 15.8 sites per FTE in 2013.*** These findings are in line with the national-level analyses presented above.

  Though not the primary focus of our analysis, EPA also provided some state-level staffing data. The data shows the number of Corrective Action FTE supported by EPA grants (federal grant plus state match) for 2002-2012. During the past decade, the states have seen a significant decline in their Corrective Action FTE. As shown in Exhibit 3-14, ***New Jersey's FTE for Corrective Action declined by 20 percent, and New York's declined by 17 percent, between 2002 and 2012.***[42,43]

[42] NJDEP receives funding via a three-year Performance Partnership Grant and did not break out FTE by program for the years 2002-2004. EPA Region 2 estimated FTE for 2002-2004 using actual FTE figures for 2005-07, holding salary, fringe, and indirect costs constant. If cost increases were taken into account, the actual decline in resources would be even greater than shown in the figure.

[43] According to New York, the EPA grant supports about 40 FTE. This includes staff that do not work full-time on Corrective Action. As discussed elsewhere in this chapter, New York recently consolidated its RCRA Corrective Action division with its other land cleanup programs. Under this setup, staff manage a mix of Corrective Action sites and other sites.

EXHIBIT 3-14. CORRECTIVE ACTION FTE SUPPORTED BY EPA GRANTS



Note: NYDEC received additional federal funding in 2008-09 and provided the additional matching funds during these years, and was thus able to support additional FTEs.

Interviews

We asked interviewees to describe the adequacy of resources to support the program. Respondents from EPA Headquarters, Region 2, the states, and communities identified lack of agency resources and/or lack of staff as a major cause of delays, as shown in Exhibit 3-12 above. Some respondents noted that the lack of resources may affect not only the speed of the process, but also the quality of remedy decisions, as well as the extent/quality of public outreach and participation. Respondents identified several specific priorities/needs that are adversely affected by lack of resources, which we summarize in the remainder of this section. Most of this discussion focuses on EPA Region 2; however, the last bullet explains how New York and New Jersey are addressing their resource constraints.

- **Access to technical/scientific expertise:** Several program managers and project managers cited lack of access to technical and scientific expertise as a serious constraint. In particular, respondents reported that both the timeliness of review and the quality of remedy decisions would benefit from easier access to hydrologists, geologists, risk assessors, and other technical experts. Unlike Superfund, which has dedicated hydrologists and other experts, the RCRA Corrective Action program does not. One senior manager noted that without this expertise, EPA is at risk of getting "jerked around" by facilities, and needs to rely heavily on the states. Alternatively, the Agency may simply take a long time to respond to reports and proposals, as staff get up to speed on new technologies or wait for technical assistance. Given Region 2's focus on efficiency and collaboration, it is worth noting that the Agency's technical challenges have not been lost on the regulated community. One facility manager that we interviewed stated it took EPA "two years" to review a deliverable, and attributed this to the Agency being "terribly under-resourced."
- **Support for community outreach:** Community engagement is a priority for EPA and the Corrective Action program – but unlike Superfund, Corrective Action does not have community engagement (or environmental justice) staff dedicated full time to the program. According to

Region 2 directors, the Public Affairs Division never turns away requests from RCRA Corrective Action sites. However, as discussed under Question 6 below, the Region's strategy for outreach in the Corrective Action program is responsive to needs at specific sites – and very few sites generate public interest. In fact, the regional public affairs staff only deals with two Corrective Action sites on a regular basis. At less high-profile sites, either the RPMs or the states take the lead on community engagement. However, effective community engagement requires a specialized type of expertise. Moreover, states may not necessarily give community engagement the same weight as EPA, particularly when faced with staff reductions and other resource limitations.

- **Staff recruitment, development, and retention:** Region 2 senior management and directors reported that attracting and retaining staff in the RCRA Corrective Action program is difficult. They noted that Superfund is better-known and better-resourced, and generally viewed as a more desirable program in which to work. During the three RPM interview sessions that we conducted at EPA Region 2 headquarters, we only met one recent hire; most RPMs had one, two, or nearly three decades of experience. While this experience is valuable, it may be difficult to transfer, particularly as people retire. Puerto Rico was an exception; the office has fewer experienced staff, and they have developed an informal mentoring system that pairs experienced RPMs with less tenured RPMs. In terms of staff development, RPMs noted they have fewer opportunities to attend training than in the past, which is consistent with observations by Headquarters ORCR. Finally, staff retention has been challenging. This is likely due, at least in part, to the fact that Superfund has a higher salary structure (i.e., a higher staff automatic career ladder on the General Schedule) than RCRA Corrective Action. According to managers, Superfund routinely attracts well-qualified RPMs away from the Corrective Action program.
- **Comprehensive site management:** EPA's Corrective Action program has traditionally emphasized the GPRA goals, which traditionally focused on the EIs for human exposure and groundwater migration. Over the past few years, the Agency has expanded the GPRA goals to include final remedy selection and final remedy construction, which typically occur later in the process after the EIs. The Agency is also placing greater emphasis on ongoing monitoring and site stewardship following final remedy construction. These newer, more ambitious goals have been *added* to the already-existing EIs. Achieving these longer-term goals will further stretch existing resources, as noted in the analyses conducted by GAO and ORCR. According to Region 2 management, due to resource constraints, Region 2 removes sites from "active" management after they achieve the GPRA goals. It is unclear how quickly these sites will achieve longer-term goals if they are not actively managed. Moreover, EPA (nationally and in Region 2) has not yet fleshed out a strategy for clearing non-GPRA sites, although this effort is underway. While these sites may not represent the same level of effort as some GPRA sites, they will require some level of staff time and resources.
- **Transfer to Superfund Division:** The Regional Administrator recently transferred 16 RCRA Corrective Action sites to the Superfund Division (see Question 1 above). Three FTE were transferred to the Superfund Division along with the sites. The transfer has benefits and challenges. On one hand, relieving the Corrective Action Division of 16 complex and challenging sites allows them to focus on other sites. Many of the transferred sites are being managed by Superfund staff that can bring their own experience, knowledge, and skills to the sites. On the

other hand, the transfer has costs for both divisions. The RCRA Corrective Action Division has lost three of its best-qualified FTE. The Superfund Division, meanwhile, has expressed concerns that the additional workload is heavier than the number of allocated FTE. Although the Superfund program is better-resourced than Corrective Action, Corrective Action sites are not able to access these resources. Specifically, the rules prohibit Superfund staff and managers from "cross-charging" their time to work on Corrective Action sites. As a result, the program is investing FTE to duplicate overhead costs (to avoid cross-appropriations), at the expense of program implementation. In addition, the Superfund Division is precluded from using for RCRA Corrective Action sites the technical resources (e.g., hydrogeologists, risk assessors, etc.) available to address cleanups at Superfund sites. An interviewee with extensive knowledge of the situation described it as a "zero-sum game": Either the Corrective Action Division will need to transfer additional FTE to Superfund, or the Superfund Division will need to scale back efforts on the transferred sites to fit within the three currently allocated FTE. The "resolution" will depend on management's decision about where to invest scarce resources.

- **States:** New York and New Jersey have also taken steps to respond to declining resources:
    - **New York:** New York's recent consolidation of its cleanup programs effectively tripled the number of staff available to work on Corrective Action. This is especially helpful in light of the decline in dedicated Corrective Action FTE supported by EPA grants over the past decade (see Exhibit 3-14 above). In addition, New York's legacy program cleared a number of lower-priority sites (the "low-hanging fruit"), freeing up the state's attention to focus on more complex sites.
    - **New Jersey:** New Jersey has taken a different approach. New Jersey's Licensed Site Remediation Professionals (LSRP) Program requires sites to directly hire an LSRP, shifting the cleanup burden from the state to the facilities. However, this reduces the state's direct oversight role. In response to concerns raised by EPA, New Jersey has agreed to continue providing direct oversight for the GPRA 2020 sites. While this added layer of scrutiny supports the objective of a stringent cleanup threshold, it may conflict with the objective of efficient site completion.

In summary, analyses conducted by GAO and ORCR, Region 2 budget and staffing data, and interview results suggest that existing resources may not be adequate to support the program. Resources for Corrective Action have declined over the past decade, while the program's goals have become more ambitious. The budget situation is forcing difficult decisions by EPA and the states about where to focus their limited resources.

QUESTION 3: ARE THERE IDENTIFIABLE DELAYS IN THE PROJECTS OR IDENTIFIABLE NON-COMPLIANCE THAT MIGHT HAVE BEEN PREVENTED BY THE ISSUANCE OF A RCRA CORRECTIVE ACTION ORDER OR BY TAKING SOME OTHER ENFORCEMENT ACTION?

This question addresses the use of administrative orders and other enforcement actions to compel cleanup at Corrective Action sites. As discussed under Question 1A above, EPA guidance has long encouraged agencies to consider using enforcement for Corrective Action – most recently, in the *National Enforcement Strategy for Corrective Action* (2010). Region 2 senior management also is interested in the potential to increase the use of enforcement in the Corrective Action program. Question 3 aims to provide insight on when enforcement could be useful in reaching timely remedy decisions.

To address this evaluation question, we begin with RCRAInfo data for Region 2, comparing progress at facilities with and without the use of an order or decree. The remaining evaluation findings are qualitative, focusing mostly on interviews, and to a lesser extent on the file review. It is important to note that we cannot know, with any certainty, whether or not the use of an enforcement action would have expedited cases that have already passed, or whether enforcement actions have helped or could help in cases that are still in progress. We rely on participant judgment, expert opinion, and enforcement experience in other regions to guide our thinking and inform our findings.

In the analysis that follows, it is important to understand the different uses of the word "enforcement." Enforcement is an umbrella term that can have very different meanings in different contexts. For example, EPA can issue administrative orders on consent (AOCs), which are based on a negotiated agreement with a facility, or unilateral orders. Orders or decrees may require site investigation and cleanup; alternatively, enforcement actions may be taken when facilities fail to complete required actions in specified timeframes. When Region 2 uses enforcement, it tends to be AOCs. The Region does not typically issue unilateral orders or initiate enforcement action for cases of non-compliance. An additional nuance is that states may issue their own orders without going through EPA. In fact, our research suggests that New York issues more orders than EPA Region 2 – which is not surprising for an authorized state in a highly delegated program. Many state laws include enforcement authorities that are analogous to those under RCRA and CERCLA. EPA retains independent enforcement authority even after a state is authorized for the RCRA base program or Corrective Action.

RCRAInfo

To address this question, we first used RCRAInfo data to compare Region 2 facilities with and without orders or decrees.[44] Of the 332 GPRA sites in RCRA Region 2, 113 have implemented at least one instance of Corrective Action under an order or decree, rather than through a permit action or on a voluntary basis. After further focusing the analysis only on sites completing certain key actions at a site-wide level, we are left with 93 facilities that have used orders or decrees. This analysis seeks to determine whether orders and decrees are associated with faster or slower site cleanup.

An initial glance at the RCRAInfo data suggests there may be a slight difference in process times between sites that have used orders and decrees as compared to sites that have not used them. Exhibit 3-15 shows the process times for key stages, and years to achieve EIs (from the start of the Corrective Action process) at sites with and without orders or decrees.

[44] Our analysis includes Administrative Orders on Consent (AOCs) as well as non-consent based orders. This analysis does not distinguish between orders vs. decrees.

Summary of Key Findings for Question 3

- Regressions with the RCRAInfo data generally did *not* find statistically significant differences in process times between sites with and without the use of orders. The two cases where this variable *was* statistically significant found that it *increased* the process time. However, this does not prove that orders slow down the process; sites with orders may be inherently more difficult, and therefore take longer, than sites without orders.
- A wide variety of considerations come into play in deciding whether and how to use enforcement. Positive considerations include: streamlined consent orders, compelling site investigations, integrated cleanup authorities (e.g., Corrective Action and Superfund), recalcitrant or financially marginal or bankrupt facilities, and financial assurance. Negative considerations include: legal review, concerns about over-filing states, threat of facilities appealing the order and stopping work, lack of enforceable language in permits and orders, lack of adequate documentation of facility non-compliance, evidence that EPA informally extended schedules for facilities, limited time and resources to issue an order or build an enforcement case, and lack of coordination with states. The interview results suggest that Region 2 is working to balance positive and negative considerations in its approach to enforcement.
- The interviews found a difference of opinion within and across Region 2 on the adequate level of enforcement activity. Region 2 division directors, managers, and RPMs indicated that the current level of enforcement is generally appropriate. In contrast, other interviewees (internal and external to the Agency) stated that enforcement activity in Region 2 is lower than it could be. They indicated that, in at least two cases, the Region has not taken enforcement action at sites that were good candidates for enforcement.
- The file review did not find any instances where sites outright refused to comply with EPA's requirements, although we did identify delays. Overall, we found several apparent gaps in the documentation in the central file, as well as multiple instances where EPA extended deadlines. Incomplete documentation – and evidence that EPA allowed facilities to extend schedules – constrains the Agency's ability to make a strong case for enforcement.
- EPA Headquarters and Region 2 identified Region 5 as a leader in using innovative enforcement approaches. EPA Region 5 is using a performance-based model order, and other enforcement tools, to advance progress at Corrective Action sites. Region 5's experience provides insights that may be informative for Region 2.

EXHIBIT 3-15. YEARS TO ACHIEVE CORRECTIVE ACTION MILESTONES AT SITES WITH AND WITHOUT ORDERS OR DECREES

EXHIBIT 3-15A. PROCESS TIMES AT SITES WITH AND WITHOUT ORDERS OR DECREES

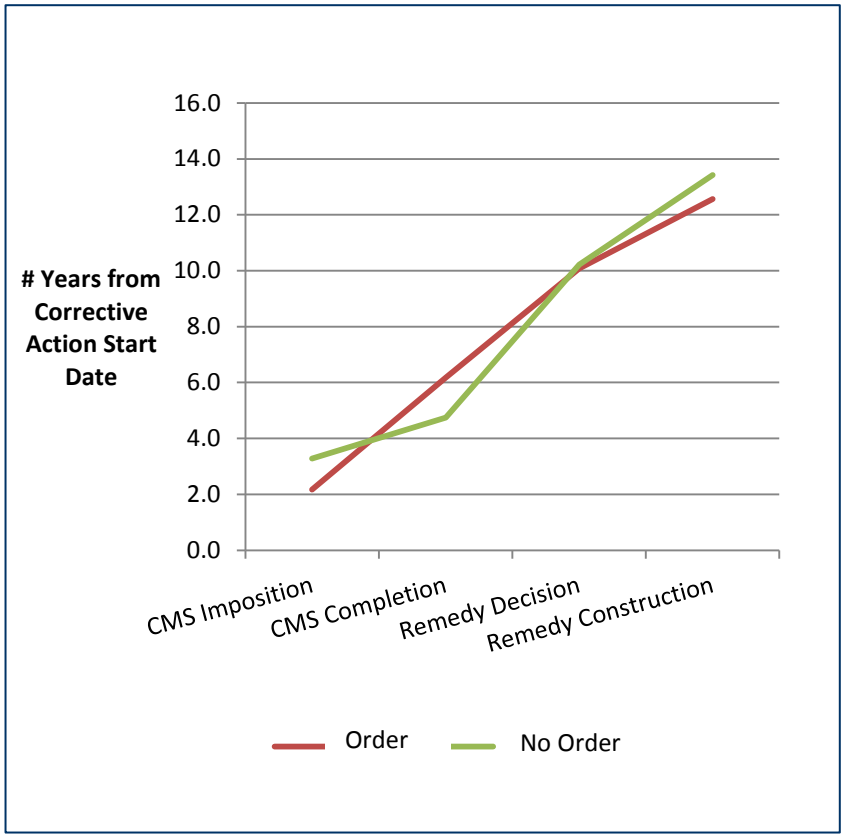
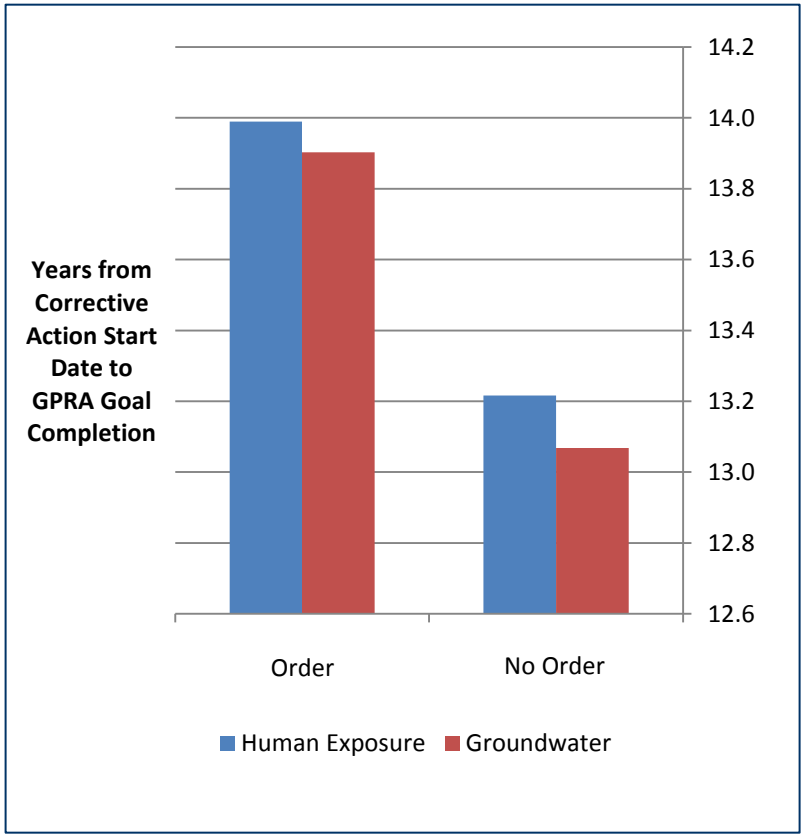


EXHIBIT 3-15B. YEARS TO ACHIEVE EI'S AT SITES WITH AND WITHOUT ORDERS OR DECREES



The data show that facilities with orders or decrees take an average of 0.8 years *longer* to achieve each EI, as compared to sites without orders or decrees. By contrast, sites that have used orders or decrees take an average of 0.8 years *less* to construct a final remedy.

Despite the slight difference in process times between facilities with and without orders or decrees, further analysis (t-tests) found that these differences are *not* statistically significant at a 95 percent confidence level.[45] This finding might reflect a variety of different factors. It is possible that using orders or decrees has no effect on the duration of key phases in the Corrective Action process. Alternatively, sites that use orders and decrees may be inherently more complex and time-consuming than sites that do not use orders and decrees. The available data do not indicate whether such sites would have progressed faster or slower without the use of an order or decree.

To isolate the effect of orders and decrees while controlling for other facility characteristics, we ran a series of OLS and probit regressions. We ran several versions of the regression model, controlling for the effects of contamination type, lead agency, priority level, and other characteristics. ***Overall, the results of our regressions were not statistically significant. However, two regressions detected a statistically significant difference, with longer process times at sites with orders or decrees.*** Specifically, a statistically significant OLS regression showed that an order or decree is associated with an increase of 0.96 years in the time required to control groundwater contamination. A statistically significant probit regression found that the use of orders or decrees increases the time required to construct a final remedy. ***These findings may or may not indicate that orders and decrees are inherently slower mechanisms for implementing the Corrective Action process.*** On one hand, several interviews suggested that administrative orders and related authorities are more time consuming to draft and enforce, due largely to the lengthy negotiation process often involved. On the other hand, it is important to note that our regressions were not able to account for all other facility characteristics that affect process times and that may be correlated with the use of orders or decrees, such as the extent of contamination. We are therefore not able to determine whether such facilities may have taken *even longer* to complete a phase without an order or decree. The RCRAInfo analysis alone is not sufficient to answer this question.

In the rest of this section, we turn to the interviews and the file review for additional insight into the effects of administrative orders and other enforcement actions. These data sources suggest that the effects depend on the specific context in which an enforcement action is taken.

Interviews

Interviews were our main source of information for Question 3. To answer this question, we focus primarily on interviews with Region 2 managers and RPMs, but also EPA Headquarters Office of Site Remediation Enforcement (OSRE), ORCR, state program managers, and community stakeholders in Region 2. We also draw on Lean Event and interview data for Regions 3 and 7, and interview data for Region 5. First, we discuss factors affecting the use of enforcement. Second, we assess the level of enforcement activity in Region 2. Third, we summarize lessons learned from Region 5's experience using enforcement for Corrective Action.

[45] As with the analogous tests run for the EPA-lead variable described in Question 1 above, these tests are based on a binary variable that indicates whether or not a site required more than one standard deviation above the mean process time for any given phase of the Corrective Action process.

Considerations in the Use of Enforcement

A wide variety of considerations come into play in deciding whether and how to use enforcement. As shown in Exhibit 3-16, positive considerations for using enforcement include: streamlined consent orders, compelling site investigations, integrated cleanup authorities (e.g., Corrective Action and Superfund), recalcitrant or financially marginal/bankrupt facilities, and financial assurance. Negative considerations include: legal review, concerns about over-filing the states, threat of near-term delays due to facilities appealing the order and stopping work, lack of enforceable language in permits and orders, lack of adequate documentation of facility non-compliance to support enforcement actions, evidence that EPA informally extended project schedules, limited time and resources to issue an order or build an enforcement case, and lack of coordination between the RCRA Corrective Action division and the Enforcement division. Enforcement culture can be positive or negative, depending on prevailing norms within regions, states, and programs.

The interviews suggest that Region 2 is working to strike an appropriate balance across positive and negative considerations in its enforcement approach. On one hand, enforcement can be useful for compelling site investigation and cleanups. This is particularly true for interim status facilities, where Corrective Action cannot proceed through a permit modification. Region 2 has also used negotiated orders at facilities that change ownership or transfer property. For example, Region 2 recently issued a 3008(h) order for a site in Puerto Rico that sold off a parcel of land. Finally, orders may be useful for compelling actions at sites that are not making adequate progress or are incapable of doing the work (e.g., bankrupt facilities). Region 2 managers also noted that the *threat* of enforcement can be useful for getting facilities to the negotiating table. EPA Region 2 managers reported that the threat of enforcement is the "800-pound gorilla" in the room – although other interviewees questioned whether the threat is *credible* given how rarely the Region pulls the trigger. The data available do not track instances of effective (or ineffective) coordination where EPA and states work together to encourage facilities to move faster to avoid federal enforcement.

Region 2 managers and RPMs expressed a number of concerns related to the use of enforcement. Drafting an order requires significant legal expertise, time, and resources, and can be especially time-consuming at sites with long histories of collaborative management or state-lead activities. Even when the Corrective Action program and enforcement were in the same division (which is no longer the case), the enforcement branch was able to handle only a small number of Corrective Action orders per year. Part of the time required is internal to EPA – i.e., drafting the order language.

In addition, negotiating AOCs with facilities can be time-consuming. The NESCA states that some regions have successfully limited negotiation times by presenting facilities with the alternative of a unilateral order, but this approach does not appear to be commonly used in Region 2. Beyond time and resource constraints, the interviews raised concerns about coordination with states and sites. In New York (fully authorized) and New Jersey (work-sharing agreement with EPA), RPMs are wary about "over-filing" the state.[46] This additional layer of coordination adds time and effort to the enforcement process. RPMs also expressed concerns about issuing orders without prior agreement with facilities, because

[46] By "over-filing," we mean both the legal definition of over-filing from the *RCRA Orientation Manual* ("enforcing a provision for which a particular state has authorization"), as well as the sentiment (expressed by managers and staff in Region 2) that EPA should consult with its state counterparts before taking action at sites in those states.

EXHIBIT 3-16. CONSIDERATIONS IN THE USE OF ENFORCEMENT

CONSIDERATIONS IN THE USE OF ENFORCEMENT (+/-)	SOURCE	CONTEXT	CONSIDERATIONS FOR REGION 2
Streamlined consent orders (+)	R3, R5, others	• Preserve key provisions, but flexible • Large universe of sites (esp. in R5); time-consuming to "reinvent the wheel" • Negotiated orders unlikely to be challenged • Focus on performance/results, not process • Can set deadlines for negotiations	• Model language may save time and resources in the long run • R2 has fewer sites than R5; "economies of scale" may be limited • Preference for negotiated consent orders vs. unilateral/enforcement
Compel site investigation (+)	HQ, R2, NJ, others	• Orders 3007 (information gathering) and 3013 (monitoring/testing) can compel RFI • NJ's Site Remediation Reform Act (SRRA) requires sites to finish the RFI by May 2014	• R2, HQ interested in this option • PR interested, but lacks resources • NJ law has penalties for not complying with May 2014 deadline[1]
Integrated cleanup authorities (+)	NY, NJ, R5; and R7, R8, R9, R10 (per NESCA)	• NY's consolidated cleanup program integrates RCRA CA and SF orders • NJ SRRA covers RCRA CA, SF, and other sites • R7,8,10 delegate CERCLA section 104e (information request) to RCRA CA mgrs. • R9 issued a joint RCRA 7003/CERCLA 106 order (imminent substantial danger)	• Consistent with R2's interest in using orders to compel site investigation • Consistent with sr. mgt. priorities • Unilateral orders (e.g. CERCLA 106) more difficult to issue than AOCs • EPA retains enforcement authority even in authorized states
Recalcitrant or bankrupt facilities (+)	HQ, various regions, R2 communities	• Enhanced enforcement (e.g., CERCLA) may be esp. useful for these types of facilities • Strongly suggested in the NESCA • May spur progress at "stuck" sites	• Concerned/frustrated citizens may favor an enforcement approach • Requires clear determination (and documentation) of recalcitrance
Financial assurance (+)	HQ, R5	• NESCA suggests that regions have found enforcement useful to ensure FA • R5's new model order has enhanced FA	• Lack of facility resources causes delays in the CA process • Orders may help ensure FA
Legal review (-)	R2, R3, R7	• Legal consultations slows down the process	• Limited staff with requisite expertise
Over-filing / lack of coordination with states (-)	R2, HQ	• RCRA CA is a highly delegated program; requires close coordination with states • NESCA emphasizes coordination across EPA and with the states	• R2 prioritizes cooperation with states • NY is fully authorized • Work-sharing agreement with NJ • Can take direct action in PR
Facilities appeal / delay action (-)	R2	• Sites presented with an order may stop work completely while they appeal	• RPMs concerned progress will cease completely if enforcement taken
Lack of enforceable language (-)	HQ, R2	• Critical to include enforceable language and deadlines in orders and permits	• Lack of enforceable language makes enforcement action difficult
Lack of adequate documentation (-)	HQ, R2	• If missed deadlines not well-documented, may not be able to build a case	• R2's central files contain significant gaps, missing information
Informally extend schedules (-)	HQ, R2	• Informal extensions by EPA undermine enforcement action for non-compliance	• R2's central files indicate that EPA frequently grants extensions
Limited time / limited resources (-)	HQ, R2	• Significant expertise and time required to prepare orders and enforcement cases	• Would be difficult to issue more than five orders per year (per interviews)
Lack of coordination with Enforcement (-)	R2, HQ	• RCRA CA program needs to refer cases to the Enforcement Division	• RCRA CA and Enforcement are in two separate divisions (except PR)
Enforcement culture (+/-)	HQ, R2, NY	• Tradeoffs between enforcement vs. cooperation with states and facilities • RCRA viewed by some as permit-driven (not order-driven) • Stronger enforcement culture in SF	• Sr. mgt. feels the CA program does not value enforcement enough • RCRA CA mgrs. and staff concerned about tradeoffs (over-filing, etc.)

Notes: (1) Facilities that do not comply with the May 2014 deadline will fall under direct NJDEP oversight. The sites will still need to hire an LSRP, but NJDEP will be able to select the remedy and access the site's funding source for conducting the cleanup. NJDEP managers believe this provides a strong incentive for facilities to comply with the law.

facilities may stop work and enter a lengthy appeal process. Most RPMs would prefer to negotiate with facilities than for the work to stop completely. A senior manager agreed, stating: "The [enforcement] tool is available, but it's not our culture to use it when we've been having a dialogue with the company."

The collaborative approach that many RPMs take with their facilities reduces bureaucracy and delays, but can also have the unintended consequence of undermining enforcement efforts. For example, several RPMs stated that they prefer calling or emailing facilities, rather than issuing a formal letter. While this approach may accelerate the process (at least in the short term), it has resulted in a lack of documentation in the central project files. The lack of documentation makes it difficult to build a strong enforcement case for a non-compliant company. Moreover, the documentation that *does* exist in the project files indicates that EPA has in the past granted extensions to the project schedule with some frequency, in response to requests from facilities. As various enforcement experts noted, this flexibility makes it difficult to argue that a facility is being non-compliant.

The interviews also revealed philosophical differences about the use of enforcement at the senior management level in Region 2. Top-level management is concerned that EPA is in a "paper chase" with powerful and well-resourced companies, and sees enforcement as a tool that might bring closure to cases that otherwise seem intractable. A similar sentiment was expressed by some community interviewees. On the other hand, managers noted that RCRA, unlike Superfund, is a permit-based program and should only use enforcement when it is not feasible to modify permits (interim status facilities, or facilities that are making insufficient progress under a permit). At the same time, interviewees stated it is difficult to include enforceable language in permits, especially given the distinction between the Corrective Action program and the Enforcement division in Region 2 headquarters, and limited regional enforcement resources. This particular issue does not apply in Puerto Rico, which combines the Corrective Action program with Enforcement. However, some staff in the Puerto Rico office noted a difference of opinion with the mainland about the use of streamlined orders, which the Puerto Rico office is interested in trying.

Level of Enforcement Activity in Region 2

Question 3 asks whether there are identifiable delays or cases of non-compliance that could have been prevented by the issuance of an order or other enforcement action. Although we cannot answer this question with any certainty, we asked experts and stakeholders in Region 2, EPA Headquarters, and outside the Agency about the level of enforcement activity in the Region.[47]

The interviews identified differences of opinion within and across Region 2 regarding the adequate level of enforcement activity. Region 2 division directors, managers, and RPMs indicated that the current level of enforcement is appropriate, and added that most sites that are "good candidates" for enforcement are already under an order. In contrast, other interviewees (internal and external to EPA Region 2) stated that enforcement activity in the Region is lower than it could be. They indicated that, in at least two cases, the Region has not taken enforcement action at sites that are good candidates.[48]

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[47] Question 3 considers the level of enforcement activity by EPA Region 2. It does not cover enforcement activity in New York and New Jersey. We understand that New York has been relatively active with enforcement; however, we did not have the data or the mandate to explore New York's enforcement activities in depth.

[48] We do not know whether these two sites are currently under a state order.

Some respondents perceived reluctance on the part of Region 2's Corrective Action program to refer non-compliant facilities to the Enforcement division, particularly when facilities are in violation of their schedules.

We consulted the *Assessment of the National Enforcement Strategy for RCRA Corrective Action* (September 2012) for objective data on the level of enforcement activity since the NESCA was issued. The NESCA Assessment found a notable increase in the number of enforcement actions issued in FY 2010 and 2011, following the dissemination of the NESCA in April 2010. During FYs 2010 and 2011, EPA issued 43 orders that addressed Corrective Action. The report does not provide a breakdown of orders by region; however, taking the simple average across the 10 regions suggests that ***each region issued four to five Corrective Action orders, on average, during FY 2010-11. In contrast, Region 2 issued only one Corrective Action order during this two-year period***. The one order that Region 2 issued was not entirely "new," rather it modified an existing order at a facility in Puerto Rico to reflect new site conditions. More recently, Region 2 issued one Corrective Action order in early FY 2013, and planned to issue a second order by September 2013.[49]

To summarize, the interviews suggest that opinion is mixed about the use of enforcement. While no one suggested that Region 2 should dramatically increase its enforcement activities, interviewees cited two specific cases that they felt would be good candidates for enforcement. The interviews further indicated that in any given year, there may be a few cases that would merit active consideration for enforcement.

Enforcement for Corrective Action in Region 5

Next, we look beyond Region 2 to the experience in Region 5. OSRE and Region 2 identified Region 5 as a leader in enforcement, both in terms of the volume of enforcement actions taken and in using innovative enforcement approaches. We interviewed Region 5 program managers and legal counsel to understand the Region's approach to enforcement. The rest of this section summarizes Region 5's experience, highlighting lessons that may be useful for Region 2.

Region 5 uses a performance-based model order; this differs from most other regions (including Region 2's older orders) which tend to focus on schedule and production of key investigations and reports, rather than achievement of site remediation goals. The Region developed the original version of the order in 1999 as a streamlined, performance-based order. Specifically, Region 5's model 3008(h) order was meant to avoid "reinventing the wheel" every time the Region negotiated an order. The model order included more streamlined language and fewer penalties than a traditional order, and was simpler to negotiate and execute. The model order emphasized performance over administrative process. In addition, it enabled Region 5 to modify various components of the scope of work later on without reopening the entire order to negotiation. Although the order could be issued at any point in the Corrective Action process, it proved easier to issue a *new* order than to amend existing orders. Region 5 identified the following factors affecting the Region's decision to pursue a streamlined order:[50]

- Compliance/enforcement history of the facility

[49] These orders are *not* for the two cases that other interviewees identified as good enforcement candidates.

[50] *Corrective Action Streamlined Consent Orders*, Power Point presentation by Bob Greaves and Deb Goldblum (Region 3) and Tom Kruger (Region 5), undated. Region 3 borrowed and adapted Region 5's streamlined order.

- Status of Corrective Action/investigative activity at the facility
- Cooperativeness, technical capability, and financial capability of the company
- Complexity of the facility
- Motivation of the facility to move forward quickly
- Assessment of how much of the process can be expedited
- State acceptance
- Litigation risk of conventional approach
- Public interest
- Other factors

According to Region 5, the order was successful in helping some sites progress through the process faster than under other approaches. At the same time, however, the Region has learned from its experience with a variety of facilities over the course of more than a decade. In 2012, Region 5 revised its model order based on its experience. The new model order is still performance-based, but is less streamlined than the previous version. Specifically, the new model order makes three changes from the previous streamlined order:

- **Requires Agency review and approval, and public participation, for interim measures.** Like Region 2, Region 5 found that interim measures often become the final remedy. Therefore, the Region seeks to ensure adequate Agency review and public participation for IMs. The new model order assures formal Agency involvement in determining IMs, and requires public participation for large or otherwise significant IMs.
- **Clarifies EPA's approval authority and enhances enforceability.** The new model order includes a section describing EPA's review and approval authority. It includes more enforceable language and strengthens the overall enforceability of the order, which is in keeping with the NESCA guidance.
- **Requires financial assurance earlier in the process.** Region 5 found that some companies incurred significant costs on the investigation and interim remedies, and might not have had adequate financial assurance if financial difficulties surfaced during the final remedy design/construction stage. The new model order requires an estimate of financial assurance earlier in the process.

In addition to its performance-based order, Region 5 uses other enforcement authorities, as warranted, depending on the nature of each facility. Although the Region prefers to use AOCs, it has issued a few unilateral orders. Region 5 has also used CERCLA authorities to address issues at some Corrective Action sites. Overall, Region 5's experience highlights EPA's flexibility to use innovative enforcement tools to accomplish Corrective Action cleanups. It also points to tradeoffs that Region 2 may wish to consider as it assesses its own enforcement activities.

Central File Reviews

We examined the project files for any additional insights that may not have been captured in RCRAInfo or reported in interview sessions. We did not find any instances where sites outright refused to comply

with requirements, although we did identify delays as noted in Question 1C above. In keeping with the NESCA's definition of a "stuck" site, we paid particular attention to sites with gaps in documentation of three years or longer.[51] As discussed in Question 1C above, at half the sites that we reviewed (10 of 20 sites), we found instances where was there was no documentation for at least three years. However, as also noted above, the absence of documentation for three years does *not* prove that sites failed to make meaningful progress. Progress may have been made but not documented, or documented in a less formal manner (e.g., email) that did not make its way into the filing system. Also, the majority of interactions between RPMs and facilities (and associated files) are likely occurring at the state level; particularly in New York, it may be the case that EPA's oversight role limits the extent of the correspondence and documentation in EPA's central file. We also found multiple instances where EPA granted extensions to deadlines. Unfortunately for enforcement purposes, limited documentation is problematic regardless of the cause. Poor documentation of facility non-compliance – or information in the files showing that EPA let the facility extend the schedule – constrains EPA's ability to make a strong case for enforcement.

To summarize the findings for Question 3, our analysis suggests that Region 2 is weighing a variety of positive and negative considerations about when and how to use enforcement for Corrective Action. While enforcement is not appropriate in every situation, the interview results suggest there are several cases that would be good candidates for federal enforcement, either to support state efforts or in absence of them. To do this, Region 2 would need to address issues pertaining to adequate documentation and approved extensions. Region 5's experience with enforcement provides insights that may be useful to Region 2 as it considers how to exercise its enforcement authority.

[51] The NESCA directs EPA to consider using enforcement at facilities that have not made any meaningful progress over the past three years. In calculating the three-year statistic, we looked for sites where there was a *complete* lack of documentation for three years or more. We did not attempt to make a subjective determination as to whether the existing documentation evidenced "meaningful" progress.

QUESTION 4: BENCHMARKING WITH OTHER REGIONS: HOW DOES THE EFFICIENCY OF REGION 2'S PROGRAM COMPARE TO OTHER REGIONS?

This evaluation question focuses on the performance of Region 2's Corrective Action program in the national context. While sites and state programs vary considerably across EPA regions, it can be informative to consider how Region 2's program compares to other regions in identifying potential areas for improvement.

IEc addresses this question in two parts. We first use existing data collected by ORCR to examine Region 2's performance in a number of key metrics relative to other regions. This provides a clear and simple overall comparison of Region 2 to all other EPA regions.

To supplement this general assessment, we also examine information from the Lean workshop and streamlining effort undertaken by Regions 3 and 7 to improve the Corrective Action process as it is implemented in those regions. This includes attendance by IEc at the Region 3 and 7 Lean Event, as well as follow-on discussions and data collection with Region 3 and 7 representatives, and information from interviews with Region 2 staff.

Together the findings provide an overview of Region 2's performance and may help determine whether region-specific conditions or broader program structure might be the best focus for any efforts to improve the program.

Summary of Key Findings for Question 4

- Regional benchmarking data show that Region 2 appears to have a profile or result that is similar to the other regions, or that falls somewhere in the middle of the distribution with respect to features of the program (e.g., number of GPRA 2020 sites) and progress.
- The processes, challenges, and site features identified through the Lean Event activities confirm that Region 2's overall experience is consistent with that of Regions 3 and 7.
- The forthcoming results of the Lean implementation effort – including the Corrective Action Facility Agreement, the incentive structure, outreach materials, and updated permit/order language – may provide insights that could be relevant to Region 2's efforts.

General Benchmarking Data: Region 2 and other EPA Regions

With the assistance of staff in EPA's ORCR, IEc reviewed a number of internal documents that present the structure and performance of Corrective Action programs at a regional level, focusing on the GPRA 2020 universe of facilities. While the data are not yet publicly available and cannot be presented in detail, they are structured from several ORCR analyses of RCRAInfo data and GPRA reporting information. Overall, the data provided demonstrate that Region 2 does not appear to be a significant outlier in any of the key metrics considered. Specifically, the data examined:

- The number of facilities in the GPRA 2020 universe;
- The distribution of sites by size;

- The years in which current sites were added to the 2020 universe;
- The distribution of sites by industry sector;
- The urban/rural site breakdown;
- The number and distribution of sites achieving key milestones (e.g., CA 725, or human exposure environmental indicator; CA 550, or remedy construction complete; and CA 900/CA999, or cleanups completed); and
- Time intervals in achieving key metrics such as human exposure environmental indicators.

While the results are preliminary and we cannot provide the detailed findings, for each of these metrics, ***Region 2 appears to have a profile or result that is similar to the other regions, or that falls somewhere in the middle of the distribution. This is true both for metrics that examine features of the program (e.g., number of GPRA 2020 sites) and for metrics examining progress.*** Only in the percentage of urban facilities does the Region appear to be higher than all other regions, though even in this the overall distribution of urban and non-urban facilities is fairly even across regions.

In short, our review of the regional data provided by ORCR did not reveal any specific areas in which Region 2 appears to be very different from other EPA regions. This suggests that the experiences and challenges that Region 2 has had with its Corrective Action program are similar to the experiences and challenges encountered by other regions, and that region-specific factors are not creating notable differences between Region 2 and other regions. The data is consistent with qualitative information gleaned in interviews with Headquarters ORCR and EPA Region 2 senior management, who stated that the issues facing Region 2's Corrective Action program are not unique to the Region.

Specific Regional Activities: Regions 3 and 7 Lean Event and Related Streamlining Efforts

In February 2013, Regions 3 and 7 conducted a Lean Event in Washington, DC that brought together EPA Headquarters staff, regional staff, state program staff, and representatives of states, responsible parties, and consultants. The event was developed to address a concern by Regions 3 and 7 that the Corrective Action process, particularly during the RFI and CMS stages, is taking too long to complete. The goal of this effort was to map the RFI and CMS processes for these two regions, and to identify options for streamlining the RFI phase. The Lean Event produced a number of recommended actions that are currently being piloted in the two regions. IEc staff attended the Lean Event and, in June 2013, spoke with staff from Regions 3 and 7 who are charged with implementing the recommendations of the event. Below we summarize the Corrective Action profiles in Regions 3 and 7, present key results and activities of the Lean Event, and discuss the extent to which findings may be relevant to Region 2.

Like Region 2, Regions 3 and 7 include a mix of authorized and unauthorized states. The number of GPRA 2020 Corrective Action sites in Region 2 falls between Region 7 (which has fewer sites) and Region 3 (which has more sites). In terms of progress, the percentage of sites in Region 2 that have achieved their human exposure and groundwater EIs are roughly in line with the percentages in Regions 3 and 7:

- EPA Region 3 includes Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia. Delaware, Virginia, and West Virginia are fully authorized to conduct Corrective Action; Maryland, Pennsylvania and the District of Columbia are not authorized. Region 3 has 588 facilities in its 2020 Corrective Action Universe, compared to 332 facilities in

Region 2. Currently, 79 percent of Region 3's sites have met the human exposure EI and 72 percent have achieved the groundwater EI. By way of comparison, approximately 73 percent of Region 2's sites have met the human exposure EI and 64 percent have met the groundwater EI. By the end of FY 2012, 41 percent of sites in Region 3 had completed remedy construction, compared to 31 percent in Region 2.

- EPA Region 7 includes Iowa, Kansas, Missouri, and Nebraska. Missouri is the only state in Region 7 authorized to implement the Corrective Action program. Region 7 has 205 facilities in its 2020 Corrective Action universe, making it smaller than Region 2. Currently, 76 percent of Region 7's sites have reached the human exposure EI and 70 percent have reached the groundwater EI. We did not find any publicly available data on the number of sites in Region 7 that have constructed a remedy.

In February 2013, Regions 3 and 7 held a Lean Event to streamline the Corrective Action process, particularly the RFI phase. The central finding of the Lean Event was that the Corrective Action process in Regions 3 and 7 is slowed by the need for extensive (sometimes multiple) reviews by EPA and resubmissions by the responsible party for each product in the RFI and CMS. This is often driven by differing and evolving expectations and differences in tolerance for uncertainty among all parties. These findings were echoed in interviews conducted for the Region 2 evaluation, including: long (sometimes multiple) review processes, an overly "process-heavy" approach, and a risk-averse Agency culture.

The Lean Event participants agreed that the need for revisions to RFI work plans and studies could be reduced by early agreement on clean-up objectives and site investigation approaches among EPA, states, and responsible parties, and on better tools for tracking and sharing information throughout the process. Recommended actions stemming from the Lean Event include the following:

- **Develop and pilot-test a Corrective Action Facility Agreement (CAFA).** A CAFA is designed to begin the Corrective Action process, but could be introduced at any stage. It is currently under development, but is anticipated to be a short agreement, signed by representatives of EPA, states, and responsible parties, which will document the key parameters of the site investigation and the general goals for site remediation. This will reduce uncertainty about the extent of investigations and proposed remediation later in the process, though the agreement will be crafted to adapt to new findings (e.g., discovery of new contamination). The CAFA will be negotiated at a "CAFA meeting" involving the RPM, state counterpart, facility, legal counsel (if needed), technical experts (hydrologists, toxicologists), and potentially EPA management.
- **Formalize model permit/order language to increase effectiveness.** Coupled with the CAFA, the regions agreed that more standard and well-crafted language in permits and orders could help guide the process; general or vague permit language often contributes to uncertainty in the process by failing to establish accountability for quality projects and clear schedules.
- **Introduce incentives to speed the process.** The regions are tasked with proposing and testing incentives to help encourage a shift toward the CAFA and streamlined site management. These are not final, but could include reallocating the workload for project managers that prepare the CAFA; this recognizes that the CAFA will require significant time and planning in the initial stages. Participants also noted that a broader cultural change will have to occur in their regions to ensure that project managers embrace the new process.

Regions 3 and 7 are currently in the process of designing the CAFA and crafting the communication and implementation processes to accompany the new structure. In interviews regional staff noted that they are focusing on clarifying the relationship between CAFAs and enforcement tools. The CAFA itself is not an enforceable document as conceived, but instead provides a record of agreement to guide actions by all parties. Regional staff also noted that interest in the process is very high among responsible parties who want to move quickly on site completion, and that they are developing criteria to identify sites that would benefit most from the process. Finally, a key implementation step will be working with states to adopt the process. Both delegated and work-share states in the two regions must separately agree to integrate the CAFA into their methods to ensure its success.

Both the Lean Event itself and subsequent activities by Regions 3 and 7 provide several insights relevant to the benchmarking effort for Region 2:

- The processes mapped at the Lean Event demonstrated the variability and complexity of the Corrective Action process; data collected from Region 2 portray a similar complexity, with many of the same issues extending schedules (e.g., lack of clear permit language, need for technical review, and staff turnover).
- While the Lean Event did not assess the variability of site progression and timing (the event aimed instead to characterize a "75th-percentile" site in the regions), the data and discussions at the event, supported by data from ORCR, indicate that Region 2's experience with the time required for site cleanup is similar.
- Participants at the Lean Event noted that enforcement can either speed or slow progress at a site, and only a subset of sites are "good candidates" for enforcement. The event specifically excluded discussion of enforcement efforts to limit the complexity of the process map.
- Coordination with states (both delegated states and states with work-share agreements) is a key management priority both in the current process and in successfully implementing the CAFA.

In general, the processes, challenges, and various site features identified through the Lean activities confirm that Region 2's overall experience is consistent with that of Regions 3 and 7. This suggests that the forthcoming results of the CAFA implementation effort, including the CAFA itself, the incentive structure, outreach materials, and updated permit/order language, may provide insights that could be relevant to Region 2's efforts to improve site efficiency.

QUESTION 5: IS THE REGION'S SELECTION OF INTERIM CORRECTIVE MEASURES AND FINAL REMEDIES CONSISTENT WITH NATIONAL GUIDELINES AND DIRECTIVES? IS THE REGION CONSIDERING INTERIM OR FINAL REMEDIAL ALTERNATIVES BEYOND THOSE PROPOSED BY FACILITIES (E.G., AN INTERIM MEASURE DIFFERENT FROM THE ONE PROPOSED BY THE FACILITY, A FINAL REMEDY DIFFERENT THAN THE FACILITY'S PREFERRED FINAL REMEDY, OR ENHANCEMENTS TO THE FACILITY'S PREFERRED FINAL REMEDY), AS NECESSARY?

This question aims to understand whether Region 2 and the RPMs are following a process that truly evaluates what is needed to protect human health and the environment, rather than approving sites' proposed remedies by default. RCRAInfo does not include an event code for when EPA rejects a proposed interim or final remedy. Therefore, we obtained this information from other data sources, including guidance documents, interviews, and file reviews.

We note also that the Lean Event with Regions 3 and 7 identified a tension between process efficiency and extensive or repeated review cycles during the RFI and CMS stages. We were therefore attentive both to the concern about the appropriateness and stringency of final remedies, and to the potential impact of additional remedies and review cycles on the efficiency of the process as identified in Question 1.

Summary of Key Findings for Question 5

- EPA guidance emphasizes environmental protectiveness, while noting the need to balance environmental concerns with cost, feasibility, and land-use considerations.
- Region 2 is focused on protecting human health and the environment. Interviews with stakeholders in and outside the Agency found mixed opinion about the remedy selection process.
- We found general agreement on the effectiveness of interim measures in addressing the most pressing environmental conditions at sites. EPA guidance stresses that interim measures should be stringent enough to become the final remedy, although it can take years to determine the final remedy after the IMs are achieved.
- EPA Region 2, New York, and New Jersey often follow a process that effectively selects the remedy before the CMS stage begins: Region 2 and New York emphasize interim measures, and New Jersey seeks to emphasize presumptive remedies.
- Some community stakeholders and facilities feel that Region 2 has focused on environmental stringency and has not given adequate consideration to other priorities, including anticipated site use and economic needs in the community.
- The project files suggest that EPA frequently "pushes back" on deliverables; it does *not* appear that Region 2 is "rubber stamping" facilities' studies and proposals.

Guidance Documents

As a first step in answering this question, we consulted Agency guidance for selecting remedies. We looked primarily at the 1996 *Advanced Notice of Proposed Rulemaking*. To document any changes that may have taken place in the guidance since 1996, we also reviewed the 2009 *Getting to YES* training manual. Although the two documents were prepared 13 years apart, the basic principles for selecting interim and final remedies have stayed fairly constant for more than a decade. ***Overall, the guidance***

highlights the need for environmental stringency, balanced by considerations about feasibility, reliability, cost, and process time.

Key principles include:

- RCRA and CERCLA should operate consistently and result in similar environmental solutions when faced with similar circumstances.
- Use treatment, engineering controls, and institutional controls (in this order) to address contamination, but balance environmental stringency against efficiency and cost-effectiveness.
- Consider threshold criteria and balancing criteria in selecting remedies.
    - *Threshold criteria* include: (1) protect human health and the environment; (2) attain media cleanup standards; (3) control the source of releases to eliminate (to the extent practicable) further releases that might threaten human health and the environment; and (4) comply with waste management standards.
    - *Balancing criteria* include: (1) long-term reliability and effectiveness; (2) reduction of toxicity, mobility, or volume of waste; (3) short-term effectiveness; (4) feasibility; and (5) cost.
- Use interim measures as early in the process as possible to stabilize site conditions.
- Presumptive remedies[52] should be used at all appropriate sites to help ensure consistency in remedy selection and implementation, and to reduce cost and time at similar types of sites. Consider presumptive remedies developed under the Superfund program as potential remedies at appropriate RCRA Corrective Action facilities.
- In cases where EPA has identified a presumptive remedy, the purpose of the CMS should be to confirm that the presumptive remedy is appropriate to facility-specific conditions. In cases where EPA or a state is using performance standards or a similar approach, the Agency might not require submission or approval of a formal CMS at all.
- The CMS and RFI may be combined for: (1) "low risk" facilities, (2) facilities that have proposed removal remedies; (3) facilities with straightforward remedial solutions or where presumptive remedies can be applied; (4) facilities where few remedial options are available; and (5) facilities where the remedy is phased.
- Consider using innovative technology that offers comparable or superior performance, less adverse impact, or lower costs for acceptable levels of performance.
- Consider the site's anticipated future use, and consider updating the remedy over time as the use changes, or as more-effective solutions become available.

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[52] "Presumptive remedies are preferred technologies for common categories of sites, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation. The Agency expects that presumptive remedies will be used at all appropriate sites, including RCRA facilities, to help ensure consistency in remedy selection and implementation and to reduce the cost and time required to investigate and remediate similar types of sites." *Notice of Proposed Rulemaking for RCRA Corrective Action Regulations*, May 1, 1996.

The guidance further underscores the importance of taking timely interim measures to address serious threats to human health and the environment. It also underscores the flexibility inherent in the process – for example, by combining the CMS and RFI, eliminating the CMS phase, and/or using presumptive remedies. ***Further, the guidance encourages remedies that reflect the anticipated use of the site and respond to changing site uses and/or new technologies.*** In the following section, we summarize the interview findings about whether Region 2's remedy decisions are consistent with the guidance.

Interviews

We interviewed EPA Region 2 senior management, division directors, program managers, and RPMs; state program managers; community stakeholders; and facilities about Region 2's remedy selection process. Key interview findings include the following:

- **EPA Region 2 is focused on protecting human health and the environment.** Region 2 division directors and managers are focused on the environmental stringency of remedies. Although the process may take a long time, they noted that environmental protectiveness is their primary goal. Some community stakeholders suggested that Region 2 provides greater oversight, and seeks more protective remedies, than the states.

- **Opinions on the remedy selection process are mixed.** Some respondents are comfortable that the program is achieving quality remedies, but others expressed concerns that lack of technical resources and overall resource constraints may be preventing the Agency from achieving remedies that are fully protective. This may be a particular concern in the Puerto Rico office, which has a mix of experienced and newer staff. Across EPA Region 2, a consequence of this concern is that the Agency spends significant time reviewing technical studies and proposed remedies to ensure they are not "missing something."

  Opinions about the effectiveness of remedies at the state level also vary. Some community stakeholders indicated that remedies at state-lead sites were not stringent enough; others voiced concerns about the level of oversight and technological sophistication – in particular, concerns that the Agency was slow to respond to vapor intrusion (VI) problems.[53] Finally, several community stakeholders expressed concerns that they did not have substantive input into remedy selection decisions. As discussed in Question 6 below, public notice and comment typically occur at the end of the CMS phase, after completion of the site investigation and corrective measures study. For their part, RPMs noted the need for balancing efficiency concerns with public participation, which can delay the process of approving a final remedy.

- **Region 2 has emphasized interim measures; approaches to the CMS vary at the federal and state level.** EPA Region 2 program managers indicated that IMs are the most effective part of the cleanup process, and are in some ways even more important than cleaning up sites for final use. The use of IMs is consistent with Agency guidance, which calls for taking action as soon as possible to stabilize site conditions. Region 2's guidance is that IMs should be sufficiently protective that they could ultimately become the final remedy. New York has also made

[53] The issue of VI is complicated by advances in technology. It appears that at some sites, concerns that the Agency should have addressed VI problems more quickly may be valid, but the science on VI has evolved in recent years. Older IMs and final remedies that predate the more-recent knowledge about VI need to be revised, but they were not necessarily the "wrong" remedies at the time they were selected.

significant use of interim measures, although some sites that began the process decades ago have not yet reached a final remedy decision. New Jersey has focused on presumptive remedies and has deemphasized the CMS as part of its process; however, GPRA 2020 sites are receiving enhanced state scrutiny per agreement with Region 2. EPA Region 2 has not been comfortable with presumptive remedies, although this option seems to fit within existing Agency guidance.

- **Some community stakeholders and facilities feel that Region 2 has focused on environmental stringency, and has not given adequate consideration to other priorities, including anticipated land use and economic needs in the community.** As discussed in greater detail under Question 6 below, some community and facility stakeholders expressed concerns that EPA and state agencies have not given due consideration to the community's preferences and/or the economic interests of the site developer, and generally have not taken a holistic long-term view of the site's anticipated use. One respondent suggested that EPA accepted a less-than-ideal remedy proposed by the initial site owner, and was not amenable to adopting a newer and more effective remedy that would help achieve the new owner's vision for the site.

Central File Review

The file review indicates how often the lead agency comments on documents and plans proposed by the facilities. Of the 232 documents that we reviewed in which the lead agency commented on a document provided by the RP, the agency approved just 58, or 25 percent, without comment.[54] Many of these instances were documents that already went through one or more rounds of comment. Of the remaining 174 occurrences in which the lead agency provided comment, the lead agency provided minor comments or approved the document contingent upon one or more comments 28 times. In the remaining 146 instances, or approximately 63 percent of the total opportunities for review, the lead agency provided comments and would not approve the document until the comments were incorporated. ***Thus, it is clear that the lead agency does not typically "rubber stamp" facilities' studies and proposals.***

While this analysis provides some indication on how frequently agencies push back on facilities, it does not necessarily speak to the actual stringency of the IMs and final remedies. It may be that agency comments are typically minor tweaks to the same basic remedies proposed by the facilities, or that the comments are administrative in nature. A more detailed analysis of Region 2's files would be necessary to gauge whether the lead agencies are substantially affecting the stringency of IMs and final remedies through their review of facility plans. Moreover, repeated rounds of review and feedback may reflect the absence of upfront agreement on key objectives for the site, RPM turnover, or lack of shared understanding between the facility and the agency.

Overall, the findings suggest that EPA Region 2 is paying close attention to the quality of remedy decisions, particularly in light of concerns about the program's technical capacity and resources. At the same time, EPA Region 2 needs to balance environmental stringency with efficiency, technical feasibility, land-use consideration, and the needs of communities. Interim measures support pressing environmental objectives and short-term efficiency, and frequently become the final remedy – although it can take years or even decades to issue a final remedy decision. However, interim measures are typically not as strong

[54] We did not limit our analysis exclusively to IMs and final remedies, but also considered other instances where EPA was in a position to approve or reject deliverables. Limiting the analysis solely to proposed IMs and final remedies would have significantly reduced the number of data points in our analysis, and therefore would have limited our ability to draw conclusions based on the data.

on public participation, and may not reflect a clear vision for returning the site to its anticipated use. Question 6 below provides additional insight into community stakeholders' perceptions of the Corrective Action program.

QUESTION 6: WHAT IS THE OPINION OF VARIOUS STAKEHOLDERS ON THE EFFECTIVENESS OF THE RCRA CORRECTIVE ACTION PROGRAM? WHAT ARE THEIR VIEWS ON PUBLIC PARTICIPATION?

Question 6 addresses opinions about the effectiveness of the program and views on public participation. As a first step in answering Question 6, we turn to EPA's guidance on public participation, and the Corrective Action process map, which illustrates when the program typically conducts public outreach activities. Our assessment of the quality of public participation is primarily qualitative, drawing on interviews with non-governmental organizations (NGOs), public officials in communities with Corrective Action sites, facilities, EPA managers and public affairs staff, and state program managers. In addition, we summarize relevant preliminary findings from IEc's separate evaluation of EPA's Community Engagement Initiative (CEI), which included a number of interviews with Corrective Action stakeholders in Region 2 and EPA's nine other regions. Finally, we consult the project files for additional insight into the nature and extent of community outreach.

Guidance

As a first step in answering Question 6, we consulted EPA's *RCRA Public Participation Manual: 1996 Edition*. The manual includes requirements as well as recommended practices. As noted elsewhere throughout this chapter, Corrective Action can proceed by permit action or administrative order; public outreach is *required* for the former but not the latter, although the Agency strongly encourages public outreach in either case. In Region 2, EPA conducts public outreach for both sites with permits and sites with orders. Under the permit process, public participation is required in at least two cases: when the schedule of compliance is added to the permit, and when the permit is modified at the end of the Corrective Action process. Under both an order and permit, ***the public should be allowed to comment prior to a final remedy decision being issued.*** In addition, the guidance encourages the Agency to provide opportunities for public input throughout the Corrective Action process, starting in the facility assessment and investigation phases. The *Manual* also suggests tailoring public participation based on the complexities of individual sites and the needs of surrounding communities.

Process Map

Exhibit 3-1, presented at the beginning of this chapter, illustrates the Corrective Action process in Region 2. Exhibit 3-1 also identifies the steps in the process where public participation typically occurs. As shown in the process map, public notice and comment typically occur at the end of the CMS phase, prior to the final remedy approval. This is consistent with the requirements described in the *RCRA Public Participation Manual*. The process map also illustrates where public participation does *not* typically occur – i.e., during the investigation phase and prior to selecting IMs. ***IMs can occur at any time in the process, and although they often become the final remedy retroactively, there is not usually the same level of public involvement for selecting IMs as for approving the final remedy.*** If IMs are designated retroactively as the final remedy, the measures would typically be raised for public comment near the end of the CMS phase. However, it may take years or even decades after the IM was implemented to reach this point in the process. For unusually complex or highly visible sites, EPA Region 2 conducts additional outreach throughout the process, which is also in keeping with the guidance to tailor community outreach to the needs of the community. However, this more-intensive outreach is an exception to the norm.

Summary of Key Findings for Question 6

- EPA Region 2 is meeting, and in some cases exceeding, the basic requirements for public participation.
- The majority of Corrective Actions, including public participation, are conducted by the states.
- Most public outreach occurs at the end of the CMS phase, after the remedial investigation and corrective measures study, and before approving the final remedy.
- Interim measures, which can occur at any time during the process, may or may not involve public comment, depending on the nature of the IM and the potential impact on the affected community. Although IMs are often determined to be the final remedy retroactively, it may take years or even decades before IMs are raised for public comment at the end of the CMS phase.
- The interview findings for Region 2 suggest that, while a few Corrective Action sites generate very high levels of public interest, the vast majority of sites generate little or no interest. Most public outreach is conducted in response to concerns voiced by the public.
- Even in communities where the program has conducted significant public outreach efforts, communities do not feel they have had substantive input into the decision-making process. Community members expressed concerns that they were not engaged earlier in the process, such as during the site investigation and remedy selection phase; by the time they were brought into the process near the end of the CMS phase, the scope of the investigation and potential remedies were already effectively decided. Others stated the community's priorities did not always align with the objectives of the lead environmental agency (EPA or state agency).
- Preliminary findings from IEc's separate evaluation of EPA's Community Engagement Initiative found similar issues relating to public participation in Region 2 and EPA's other nine regions. The CEI evaluation found that communities hold mixed opinions on the quality of the technical assistance that they received. Most interview respondents in the CEI evaluation cited limited resources as a barrier to meeting community technical assistance needs within the RCRA Corrective Action program – an observation echoed by Region 2.
- Our file review suggests that EPA and state-lead agencies adhere to the requirement to issue public notices. Beyond what is required or otherwise performed by the agencies at major milestones, the facilities conducted most of the public outreach at the sites that we reviewed.

While the Corrective Action process is basically the same at the federal and state level, we did notice some differences in the relative emphasis that EPA, New York, and New Jersey give to public participation. New York's emphasis is similar to Region 2's; however, with the recent merger of New York's Corrective Action and Superfund programs, the state is conducting more initial outreach (which is more typical of the Superfund program) at sites where they anticipate significant public interest. New Jersey has a different focus. As discussed under Question 1A, New Jersey has sought to deemphasize the CMS phase, focusing instead on presumptive remedies that meet the state's threshold for environmental stringency. Deemphasizing the formal CMS phase reduces opportunities for public participation, because

public outreach typically occurs at the end of the CMS. However, New Jersey's program does aim to communicate with communities early in the process in cases that are likely to generate significant interest.

Interviews

We consulted EPA Region 2 managers and staff, state program managers, and community and business stakeholders in Region 2. Looking across the interviews, we offer the following insights about public participation and the perceived effectiveness of the program in Region 2:

- **While a few Corrective Action sites generate very high levels of public interest, the vast majority of sites generate little or no interest.** A few sites have generated very high levels of public interest, and EPA has devoted significant public affairs resources to these communities. This has included establishing community advisory groups and conducting regular public meetings, along the lines more typical of the Superfund program. However, this is not typical for Corrective Action. Several interview respondents stated that most RCRA Corrective Action sites do not generate any public interest. Most interview respondents noted that communities are only interested in sites when they perceive a threat to their health and well-being; typically this occurs with offsite groundwater contamination, vapor intrusion, and plume migration. When issues are contained within the boundaries of the site, or when the site is in a heavy industrial area, communities tend to be less interested.

  Region 2 uses a variety of public outreach methods, including fact sheets, press releases, public meetings, and Twitter updates. In addition, as discussed under Question 7 below, transferring most of the Caribbean Corrective Action sites from the New York office to the Puerto Rico office resulted in the assigned Corrective Action staff being closer to the local community. Overall, however, the Region reports that even where it has tried to conduct substantial public outreach, uptake has been limited. In one community, for example, EPA organized a public meeting with simultaneous translation, and only two members of the public attended.

  Some NGO stakeholders suggested that the public would be more interested if they were more fully aware of the environmental issues in their communities. They noted that Corrective Action is a very complicated, and not well-understood, program, which poses barriers for effective public participation. Because the program is relatively unknown, Corrective Action sites typically generate less community interest than designated Superfund sites – even though the contamination at Corrective Action sites may be equally serious. Some stakeholders suggested that if the communities were better-informed about the situation, they would take a more active interest in the cleanup process. Many (though not all) interview respondents felt that EPA was forthcoming with information; in contrast, they expressed frustration about their difficulties obtaining relevant information from state environmental agencies.

- **At the regional level, most public outreach is conducted in response to concerns voiced by the public; Region 2 does not usually conduct the initial outreach typical of Superfund.** Most interview respondents, including staff in the EPA Region 2 office, stated that public affairs efforts for Corrective Action sites are generally reactive. That is, EPA conducts public outreach in response to interest expressed by the communities. Large community engagement efforts are driven by environmental groups and concerned citizens, or by the facilities themselves. This can largely be explained by the fact that there are no resources allocated for EPA Region 2 to conduct public outreach at RCRA sites. EPA depends in large part on the states to conduct public

outreach at the sites for which it has the lead, and pulls from limited staff resources to engage in full and meaningful public engagement at sites with significantly affected communities. The situation is somewhat different in New York, where the program is more able to conduct outreach in response to anticipated public interest.

- **Even in communities where the program has conducted significant public outreach efforts, communities do not feel they have had substantive input into the decision-making process.** We interviewed several community members – including concerned citizens, NGOs, and public officials – in communities that have received significant public outreach from EPA and/or state environmental agencies. While the interview respondents acknowledged the sustained high level of engagement by these agencies, nearly all felt that the community's input did not substantively affect the decision-making process. Specifically, community members felt that information and decisions flowed from the environmental agency to the community, but not from the community to the agency. Community stakeholders expressed concerns that they were not engaged earlier in the process, during the site investigation and remedy selection phase, and by the time they were brought into the process, the scope of the investigation and potential remedies were already decided. Some community members also expressed concern that EPA and the states deliberately used IMs to circumvent the need for public input. They stated that these interim measures were negotiated "behind closed doors" by the lead agencies and the facility, and felt that subsequent public outreach was perfunctory. In this regard, it should be noted that Region 5 has recently required facilities to conduct public outreach during the IM stage as part of its revised model order. Similarly, New York expressed interest in conducting outreach during the RFI stage, which would be consistent with the Superfund approach.

  Moreover, some interview respondents reported that their community's priorities did not always align with the lead agency's priorities. For example, one individual noted that remedial actions taken in her community "devastated" the town's landscape and character, and that the "cure" was worse than the environmental problems it was meant to address. The remedy required soil removal at homes in the surrounding community; however, the lead agency consented to allow homeowners to choose whether or not to accept the remedy, following strong public expressions of dissatisfaction. This particular community also did not agree with the state environmental agency's focus on returning the groundwater on the industrial site to drinking water-level standards. Similarly, a facility owner in another community reported that the "stigma" of being on a contaminated site had prevented investment and job creation in the community.

  Overall, community stakeholders indicated a higher level of satisfaction with EPA than with state environmental agencies. However, they felt that EPA frequently deferred to the state agencies, and in some cases, to facilities. This perception may also help explain why relatively few communities express interest in the process: According to several interview respondents, the perception that public input will not influence the Agency's decisions in a meaningful way may discourage citizens from getting or staying involved in the Corrective Action process.

- **Resource constraints limit Region 2's ability to conduct more comprehensive public outreach.** Several interview respondents commented on the lack of available staff and resources for public engagement, both at the regional and state level. EPA Region 2 public affairs staff make themselves available to assist with outreach efforts whenever they are asked, but they do

not often receive requests; moreover, existing resources would not support intensive public outreach efforts at more than a small number of communities. Region 2 also does not have any Environmental Justice staff dedicated full time to RCRA Corrective Action sites.

Having summarized the interview comments in Region 2, we turn next to IEc's separate evaluation of EPA's Community Engagement Initiative (CEI). The preliminary results of the CEI evaluation indicate that other regions face similar issues in terms of public participation and Corrective Action. The interviews also provide some insight into steps that might be taken to enhance community engagement.

CEI Evaluation

IEc is conducting a formative evaluation of OSWER's Community Engagement Initiative (CEI). The evaluation focuses on CEI's goals to improve technical assistance and information dissemination practices across OSWER's cleanup programs. As part of the CEI evaluation, IEc interviewed community engagement representatives from Superfund, RCRA Corrective Action, and Brownfields in the ten EPA regions and EPA Headquarters. For Corrective Action, we also interviewed six community engagement representatives in state environmental agencies, including New York. Finally, we conducted nine satisfaction interviews with RCRA Corrective Action community members in communities that have received technical assistance from state agencies.

IEc has completed the initial interviews and preliminary findings summary. We informed regional, state, and community contacts that we would not attribute individual findings to them. The RCRA Corrective Action interview respondent from Region 2 agreed to be cited directly for this report, but we cannot attribute statements by New York staff or communities within Region 2 to these interviewees directly.

Regional and Delegated State Staff

Regional stakeholders confirmed that the Corrective Action program is required by statute to issue public notices and provide public comment periods during key phases of the RCRA process – namely, during the CMS phase at the point when the final remedy is selected. All regional and state staff interviewed indicated that they comply with these requirements. EPA Region 2 produces a community newsletter for select (high-profile) sites as an additional method of informing the public.

However, Corrective Action regional and delegated staff stated that there are no requirements for technical assistance at Corrective Action sites. Technical assistance involves two-way communication between a technical advisor and community members, as opposed to one-way information dissemination between the agency (or facility) and the community. Although not required, technical assistance is conducted on a site-by-site basis. Regions and states administering the RCRA Corrective Action program make decisions about where to offer specific technical assistance based on community requests and staff assessments of need. Every region and state interviewed, including Region 2, holds public meetings at select RCRA Corrective Action sites with high levels of community interest. All six delegated states contacted, and four of the ten regions (not including Region 2), mentioned that they have publicly-available websites for some RCRA Corrective Action sites.

Most interviewees in the CEI evaluation stated that resource limitations are a barrier to meeting community technical assistance needs within the RCRA Corrective Action program. Eight of the ten regions interviewed, and EPA Headquarters, cited resource limitations as the reason that RCRA Corrective Action technical assistance is not as extensive as it could be.

Community Representatives

IEc asked nine individuals in RCRA Corrective Action communities nationwide that had received technical assistance from state environmental agencies about their level of satisfaction with the technical assistance they received. ***These satisfaction interviews asked interviewees to rate their level of satisfaction, on a scale from one to six, with their technical advisor. The scores provided by interviewees were mixed.*** On a scale of one to six from very dissatisfied to very satisfied, the average among RCRA Corrective Action community members was 4.2. The majority of the interviewees (seven of nine) gave at least a score of four out of six, but two communities gave scores of one, meaning they were "very unsatisfied" overall with the technical assistance that they received. The two interviewees that provided these low scores offered the following reasons:

- Too much control is put in the hands of the responsible party;
- States claim to have inadequate manpower to tackle problems; and
- The delegated state agency does not listen to the community, other agencies, or EPA.

Together, the CEI interviews and the Region 2 Corrective Action evaluation interviews highlight a variety of issues relating to public outreach and Corrective Action. In the remainder of this section, we examine the project files for selected sites to explore some of the issues that were raised in the interviews.

Central File Review

We consulted the project files for information that would confirm or challenge selected topics that were raised in the interviews. In particular, we looked for evidence that lead agencies are meeting their public participation requirements, and we tried to understand who is "driving" the public outreach process:

- **It appears that the lead agencies adhere to the requirement to issue public notices.** For example, the file for one site that we reviewed had newspaper records indicating that public notices were issued in 2001 for a permit issuance, 2002 for another permit issuance, and 2005 for the closure of a SWMU. These public notices were issued in both English and Spanish. At another site that we reviewed, public notices were issued in 2001, 2002, 2004, 2006, 2008, and 2010 for permit modification requests.
- **Beyond what is required or otherwise performed by the agencies at major milestones, the facilities conducted most of the public outreach efforts at the sites that we reviewed.** For example, at four sites that we reviewed, the responsible party organized and led public meetings. At one site, the company had a community relations plan in the early 1990s; the plan stated that the company would maintain an information repository, identify relevant contacts, make routine contact with local officials, prepare and issue fact sheets, hold public comment periods, hold open house meetings, prepare responsiveness summaries, and develop a mailing list.

Overall, the file reviews, interview findings, and process map indicate that Region 2 is meeting and in some cases exceeding the Agency's requirements for public participation. However, the findings also point to issues concerning limited initial public outreach, the use of IMs without public comment, opportunities for substantive participation, and resource challenges for conducting more-extensive community engagement.

QUESTION 7: SHOULD THE REGION IMPLEMENT ANY CHANGES TO IMPROVE COMMUNICATION WITH EXTERNAL STAKEHOLDERS FOR HIGH PROFILE FACILITIES OR FACILITIES LOCATED IN COMMUNITIES WITH ENVIRONMENTAL JUSTICE CONSIDERATIONS?

The findings for Question 7 follow from the results of Question 6. Question 7 explores what changes Region 2 could implement to improve communication with external stakeholders, in light of the findings for Question 6. Question 7 also addresses communication with external stakeholders for high profile facilities or facilities located in environmental justice (EJ) areas. Our primary methods for addressing Question 7 are the Region 2 interviews and the preliminary findings from the CEI evaluation.

Summary of Key Findings for Question 7

- The Region 2 interviews indicate that EPA Region 2 gives active consideration to EJ issues. While Region 2 should continue to focus on EJ issues, a more immediate concern may be to enhance the level of satisfaction with public participation across all types of RCRA Corrective Action communities.
- The interviews point to several steps that Region 2 could consider to improve communication with external stakeholders, including: conducting initial public outreach early in the process; increasing transparency by making information publicly available and easily accessible; focusing on providing meaningful opportunities for public participation; and considering, if and when budget allocations allow, dedicating an FTE to RCRA Corrective Action.
- The CEI evaluation finds that successful community engagement consists of tailoring materials to community needs and ensuring that communities are satisfied with the information provided. The CEI evaluation proposes that each community that receives technical assistance from EPA or a delegated state receive a satisfaction survey.

Interviews

The interviews indicate that EPA Region 2 gives active consideration to EJ issues.[55] As discussed in Question 6 above, EPA translates fact sheets and hires simultaneous translation for public meetings in communities with large non-English speaking populations. Also, transferring most of the Caribbean Corrective Action sites from the New York office to the Puerto Rico office resulted in the assigned Corrective Action staff being closer to local issues. However, the findings also suggest that the level of public interest in EJ communities and in Puerto Rico has been limited. Program managers noted that the nature of each site and the level of community interest – *not* whether the site is located in an EJ community – dictate the extent of public outreach.[56] Those (atypical) communities with high profile facilities receive technical assistance more typical of the assistance offered under the Superfund program.

While Region 2 should continue to focus on EJ issues, ***perhaps a more immediate concern is enhancing overall satisfaction with public participation across all types of RCRA Corrective Action communities***.

[55] We also found this to be true in New York.

[56] Region 2 staff also noted that they consider *all* sites that pose serious environmental hazards to the surrounding community as "EJ" sites, regardless of the demographics of the community.

The interview findings from this study and the CEI evaluation suggest mixed satisfaction with public outreach activities. This finding holds for communities that receive intensive technical assistance, as well as those that receive less intensive outreach. The interviews point to several steps that Region 2 could consider to improve communication with external stakeholders, including stakeholders for high profile facilities or facilities located in communities with EJ considerations:

- **Conduct initial public outreach early in the process**. The evaluation results suggest that by the time the process is nearing the end of the CMS phase, it is too late to engage the public in a meaningful way. EPA Region 2, and state agencies, could consider conducting initial public outreach at the start of the RFI phase, allowing the public to provide input on the scope of the investigation and potential remedies. Similarly, some community stakeholders suggested the lead agency could issue public notices and take public comment during the IM selection process. This would also provide earlier opportunities for meaningful public input, and might ultimately shorten the time required during the CMS phase. While EPA Region 2 notes that it already conducts public outreach during the IM phase at selected sites, external stakeholders stated that more outreach could be conducted earlier in the process. It may be instructive to see how the process unfolds in Region 5, which is beginning to require enhanced community engagement during the IM stage as part of its new model order.
- **Increase transparency by making information publicly available and easily accessible**. Some stakeholders expressed concerns about information that they felt was withheld or provided too late in the process. EPA – as well as state agencies – could consider making more information publicly available earlier in the process. This could involve establishing or updating a website with relevant studies and other documentation, and/or conducting targeted community outreach (e.g., public meetings or fact sheets) during the RFI phase. This would enhance the transparency of the process and allow for more informed and meaningful public dialogue. This would also be consistent with the Administration's focus on transparent governance.
- **Focus on providing opportunities for meaningful public participation.** The interviews found that, even in communities where EPA and/or state agencies have provided extensive community outreach, community members feel they have not been able to contribute to the process in a meaningful way. Taking the steps outlined in this section could help address this concern.
- **Consider allocating public affairs FTE for Corrective Action.** In Region 2 and nationwide, interview respondents identified lack of technical resources for community engagement as a key barrier to effective public outreach in the Corrective Action program. While Superfund has dedicated community engagement staff throughout the process, the Corrective Action program has not committed full-time staff for public outreach. Dedicating one or more FTE to focus on high profile Corrective Action sites might help improve communication with external stakeholders. However, given the current budget situation, careful consideration would need to be given to balancing the benefits of additional Corrective Action FTE with other priorities.

Overall, EPA is giving due consideration to EJ issues and communities with high profile facilities. However, some external stakeholders have expressed concerns about various aspects relating to community engagement. The interview findings suggest steps that the Region could take to enhance communication with external stakeholders.

CEI Evaluation

As discussed in Question 6 above, the CEI evaluation identified similar concerns as those voiced in Region 2. As part of the CEI evaluation, IEc asked interview respondents three questions that are relevant to Question 7:

- What do you consider to be successful technical assistance and/or information dissemination?
- What current metrics do you use to track community engagement?
- What other metrics might help assess the extent to which the technical assistance and/or information dissemination efforts conducted by EPA are successful?

For the RCRA Corrective Action program, the most common opinion of successful technical assistance and/or information dissemination (offered by four of ten regions, including Region 2) was that ***successful community engagement consists of tailoring materials to community needs and/or ensuring the community is satisfied with the information provided.*** Two regions reported tracking some output metrics of community engagement, such as the number of public meetings held or the number of individuals on mailing lists. However, regions across programs stated that these metrics were not helpful for improving community engagement activities. ***The most common response by RCRA Corrective Action interviewees (four of ten regions, but not Region 2) was that RCRA Corrective Action could conduct satisfaction interviews with community groups or individuals that had received technical assistance*** regarding a RCRA Corrective Action site.

The CEI evaluation will propose several potential output and outcome measures for the RCRA Corrective Action program to track and improve information dissemination and technical assistance. The output measures proposed by the CEI evaluation include:

- The proportion of RCRA Corrective Action communities that were recommended by a region for technical assistance, but have not received assistance, and
- The proportion of RCRA Corrective Action communities that have asked a state or region for any form of assistance, but have not received assistance.

These measures would give EPA management an indication of the additional resources required to address the needs of specific communities. ***In addition, the CEI evaluation proposes that each community that receives technical assistance from EPA or a delegated state receive a satisfaction survey.*** The proposed long-term outcome measures associated with these surveys are:

- The proportion of communities that have received a satisfaction survey and are satisfied with the information provided by EPA or the state throughout the cleanup process, and
- The proportion of communities that have received a satisfaction survey and are satisfied with the assistance provided by a technical advisor.

Overall, the interviews conducted for this study and the CEI evaluation identified steps that Region 2 could take to improve communication with Corrective Action communities, and metrics that EPA could use to track community satisfaction.

CHAPTER 4 | CONCLUSIONS AND RECOMMENDATIONS

Based on our analysis of the data collected from RCRAInfo, EPA guidance and Region 2 Corrective Action site files, and extensive interviews with a range of stakeholders, we offer the following conclusions and recommendations for consideration. We believe that implementing these recommendations could help Region 2 take steps to align resources and activities in the Corrective Action program to focus on key management objectives, including timely site cleanups, effective use of enforcement, and responsive public participation.

CONCLUSIONS

Two central conclusions provide important context for more specific conclusions, and also for recommendations. First, as noted in Chapter 3, the challenge of managing sites with limited resources and an array of competing management priorities is a theme that threads through the findings. In addition, as we discuss at the end of this section, a number of recent changes in management and structure both at EPA and in the states provide a platform for future improvement efforts. Major conclusions include:

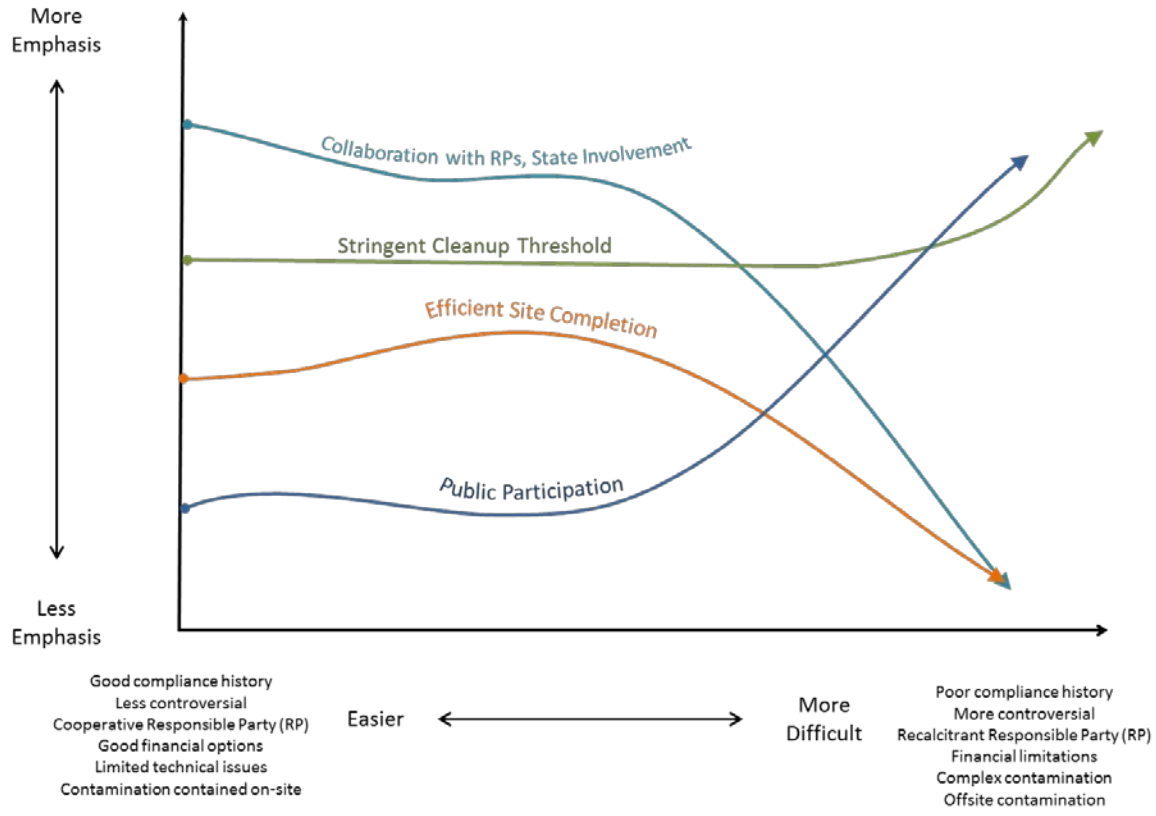
- **Competing management priorities complicate site management and, in the context of limited resources, can affect the program's efforts to make efficient progress at sites.** While stakeholders agree that many sites take longer to remediate than would be ideal, we did not identify any other systematic or structural elements of the Region 2 program that appear to cause delays across sites. Site management priorities within EPA, however, have historically varied both across sites and over time. This suggests several different "Corrective Action processes" that may be appropriate at different types of sites (Exhibit 3-2). When management priorities are not clearly aligned with site objectives, this can complicate efforts to enhance overall timeliness of either decision-making or broader site remediation.
    - While interview respondents universally agree that some sites do not move efficiently through the Corrective Action process, they also note a number of reasons for slow progress that do not directly result from Region 2's program. These include the delegated structure of the RCRA program and EPA's oversight role (particularly in New York and New Jersey) – which limits EPA's direct influence over many state-lead sites – and the need to forego speed to ensure public involvement and the development of stringent site cleanup standards at highly visible and/or technically complex sites.
    - One reason cited for the slow pacing at some sites is the EPA RCRA program's emphasis on solid waste management units (SWMUs) and localized cleanup, rather than site-level remediation objectives (in contrast to Superfund's site-wide emphasis). This marks a key difference in emphasis between EPA and the state governments in New York and New Jersey, which are focusing on site-wide anticipated use goals in their cleanup programs.

Interview respondents note that the unit-level approach can result in repetition of project steps that could potentially be addressed concurrently.

- Although the strategic emphasis and approaches differ across jurisdictions (e.g., SWMU vs. site-wide emphasis), the RCRA Corrective Action process is broadly similar at both the federal and state level. Our statistical analysis of site progress to date found no significant differences in the full duration of the Corrective Action process, or the time required to achieve environmental indicators, between EPA-lead and state-lead sites. Factors affecting site progress appear to be largely independent of jurisdiction and existing program structure.
- Interviews and file reviews suggest that meeting site cleanup schedules is difficult, and that delays beyond initial schedules are common. In some cases patterns of delay result from old permit language or long-established relationships among Responsible Parties (RPs), states, and EPA, where EPA is strictly in an oversight role.
- Metrics and goals, when they reflect management priorities, are critical tools. In all contexts, *meaningful, well-targeted* metrics and goals, including GPRA goals, seem to motivate progress at sites. Though some interview respondents complained about "counting beans," most complaints arose where metrics were not aligned correctly with management priorities for specific sites.

Exhibit 4-1 provides a conceptual diagram showing how different management priorities might be emphasized at different types of sites.

EXHIBIT 4-1. RELATIONSHIP BETWEEN MANAGEMENT OBJECTIVES AND SITE COMPLEXITY



- **Resources are not adequate to support the full range of management priorities outlined in guidance, GPRA requirements, and as described by staff in interviews.** Extensive resources are needed to ensure progress across multiple and sometimes conflicting priorities for site remediation, such as rapid site completion, meaningful public involvement, and effective working relationships that recognize state authority. Instead, Region 2's budget allocation for the RCRA Corrective Action program is declining. Furthermore, the recent transfer of 16 RCRA Corrective Action sites to the Superfund Division has not relieved resource constraints due to requirements involving cross-charging and overhead related to Superfund resources. The overall budget situation requires Region 2 to develop and communicate clear management priorities that may not address all policy objectives with the same level of urgency at every site.
- **Enforcement has traditionally been a lower management priority for Region 2's RCRA Corrective Action program than negotiated approaches.** This is due in part to historical management decisions, in part to Region 2's structure in which enforcement is separate from the permitting function of RCRA, and in part to the structure of the RCRA statute itself and EPA guidance, which has traditionally emphasized permitting and negotiation. In addition, the delegated structure of the RCRA program has meant that New Jersey and New York have traditionally taken the lead on enforcement for many sites. As a result, EPA Region 2 does not have an integrated "enforcement culture" in its RCRA program. The evaluation findings suggest that an emphasis on enforcement might in some cases be appropriate for certain sites, but site history and relationships with states and RPs may also suggest an alternative approach. The evaluation findings suggest that a commitment to significant increases in enforcement actions would require a realignment of enforcement resources to the regional Corrective Action program such that, similar to the Superfund program, the remedial project managers' responsibilities would include an enforcement component. The integration of programmatic and enforcement resources would ensure that sufficient resources are available to integrate enforcement actions and Corrective Action requirements, including oversight.
- **Region 2's RCRA Corrective Action program is not notably different from programs in other regions.** Our benchmarking effort found that rates of progress at sites in the Region 2 RCRA Corrective Action program are similar to those in other regions, and that in general, the region is near the center of the distribution in terms of the number and characteristics of Corrective Action sites. Interviews with EPA Headquarters and Regions 3, 5, and 7 confirm that other regions face similar challenges in prioritizing activities and achieving site goals.
- **Region 2's selection of interim corrective measures and final remedies does *not* appear to be a "rubber-stamping" exercise.** Information from guidance, interviews, and file reviews indicates that Region 2 reviews potential remedies and provides detailed comments on remedial options. Resource constraints, including lack of access to technical expertise, may in some cases limit the depth of technical review that can be performed in a timely manner for specific sites; management priorities are important determinants for how sites would proceed in these cases, since additional review and presentation of new options conflicts with an emphasis on more rapid site progress. In addition, the Region does not emphasize the use of presumptive remedies, even though this is a recommendation in EPA guidance. Overall, we could find no information that suggests that the Region is not thoroughly considering the remediation options and alternatives

presented by the RPs, but in some cases it is possible that resource constraints may affect the quality of EPA review.

- **Stakeholders generally feel that RCRA Corrective Action sites would benefit from more meaningful public participation opportunities.** While the RCRA statute and policy require formal public meetings only when taking a permit action or at the final remedy selection stage, many stakeholders noted that additional, "two-way" public participation opportunities are necessary for the effective management of the sites. EPA has for many sites conducted additional public outreach, but interview respondents noted a lack of meaningful opportunities to provide input. Notably, third-party respondents, even when dissatisfied, appear to prefer to work with EPA rather than with state agencies and RPs, who often have lead roles in public outreach.

In the context of examining these specific questions, we also examined how respondents viewed the current operations of the program as a whole, and found that while specific issues are problematic, respondents also expressed some optimism. In general, all respondents emphasized that the Corrective Action program is constrained by the statutory structure that emphasizes an oversight role for EPA, by a long history of evolving site management practices at many sites, and, more recently, by increasingly constrained resources. Respondents and data suggest that the largest challenges facing Region 2's program are generally the same as those experienced across the country. However, in spite of recent budget constraints, interview respondents with many different perspectives also noted that program management, communication, and coordination across EPA, state agencies, and some other communities have seen several improvements in recent years. This appears to be at least in part a result of EPA's reorganization of the program to establish the Caribbean office and reconfigure the program branches, along with parallel changes in structure and personnel in both New York and New Jersey's Corrective Action programs. This general theme of cautious optimism in financially difficult times informs the various recommendations we lay out below.

RECOMMENDATIONS

Based on the conclusions presented above, we offer the following recommendations to Region 2 to address issues of efficiency and effectiveness related to the RCRA Corrective Action program.

Recommendation: Define management's highest priorities for every site in the Corrective Action program, and focus resources and metrics accordingly.

As shown in Exhibit 3-2 in the preliminary findings chapter and Exhibit 4-1 above, management has set several objectives for the RCRA Corrective Action program: efficient site completion; collaboration with states and RPs; public participation; and stringent cleanup thresholds. Resource limitations necessitate tradeoffs across these competing priorities. We recommend that Region 2 undertake a review of Corrective Action sites in the Region and take several steps to more effectively align limited resources with site management priorities:

- **Differentiate between different types of sites:** Facilities fall somewhere along a spectrum, from unwilling and unable RPs at high profile sites, to willing and able RPs at lower profile sites. For each, clearly articulate which objective(s) will receive highest priority, second priority, or are not feasible within the current budget environment. For sites with high profile, complex contamination and difficult RPs, an enforcement-based approach may be appropriate; in contrast,

Region 2 management should consider more flexible approaches for facilities with simple contamination, strong state presence, and cooperative RPs.

- **Allocate resources according to priority:** Consistent with the priorities identified for each site, we recommend that Region 2 develop and communicate strategies to ensure that resources are allocated appropriately to address the highest priorities. The relative emphasis across priorities may vary depending on the nature of the site, but RPMs and other regional staff should be aware of site priorities and should emphasize activities that further these.
- **Develop and apply metrics and goals:** For each management priority, develop a limited number of meaningful metrics and goals and employ these to measure success at relevant sites. To ensure consistent focus in a context of limited resources, we recommend that Region 2 track metrics for only one or two priorities at each site.
- **Develop a strategy for lower priority sites and non-GPRA sites:** Region 2 is working with national counterparts to develop a plan for clearing non-GPRA sites. We recommend that Region 2 continue these efforts, and work towards finalizing a regional strategy for the lower priority and non-GPRA sites.

We recognize that budget constraints may prevent Region 2 from structuring this effort as a one-time comprehensive review of all sites. It may be optimal to adopt this recommendation in stages.

Recommendation: In developing and implementing management priorities, build on existing efforts and momentum in states and other regions to optimize resource use.

Several efforts are underway to improve the Corrective Action process both in EPA's regions and in Region 2 states. Specifically, Regions 3 and 7 are implementing revisions to their processes based on the outcomes of a recent Lean Event, and Region 5 recently developed a new model order for Corrective Action. At the state level, New York has recently refocused its RCRA program to be integrated with its Superfund program, and New Jersey has implemented a requirement that all sites complete their RCRA facility investigation by May 2014. In addition, recent reorganizations within Region 2 itself appear to have improved relationships among key stakeholders. All of these efforts are still in the early stages of implementation, but in the next calendar year significant new data should emerge about the progress under these efforts. We recommend that Region 2, in developing management priorities, consult carefully with states and other regions and, if appropriate, allow time for existing efforts to mature before identifying final management priorities or metrics at sites affected by these efforts.

Recommendation: Encourage efficient site completion by adopting a long-term strategy for Corrective Action sites that emphasizes site-wide progress rather than process-based milestones.

The findings suggest that RCRA's traditional SWMU-based focus may be a factor in delaying site schedules. We suggest that management:

- Work with the states and facilities to identify options for focusing on site-wide objectives for remedies, anticipated use, and schedules;
- Consider developing a policy for presumptive remedies that could potentially be used for different types of sites;
- Continue to focus on performance metrics that emphasize cleanup progress and goals rather than reports; and

- Consider updating remedies based on new information, new technology, and/or new anticipated use.

Recommendation: Enhance enforcement capabilities to support appropriate use of enforcement authority at sites that EPA and states identify as strong candidates for federal enforcement.

EPA's enforcement authority for Corrective Action has not been a historical emphasis for Region 2, though it is important to note that *states* may in many cases be leading enforcement. The evaluation findings, however, indicate that the Region's enforcement authority may be underutilized at a limited number of sites, and that better integrating enforcement capabilities into site management at some RCRA sites may be effective. Particularly for sites where enforcement appears to be a viable option, we recommend that Region 2 management:

- Update site files to ensure that physical and electronic files are complete and accessible;
- Establish and adhere to a compliance schedule for each facility;
- Work with RPMs at sites with high enforcement potential to ensure that correspondence and other efforts are formal and "enforcement-ready";
- Enhance coordination and communication with states regarding the use of enforcement to ensure that EPA is leveraging state efforts;
- Align enforcement resources in the Region to better support the RCRA program; and
- Evaluate the potential to use CERCLA authorities where appropriate to pursue cleanup actions at Corrective Action sites.

Recommendation: At sites with strong public interest or potentially high impact, strengthen opportunities for meaningful, two-way public participation earlier in the process.

Region 2 is meeting and in some cases exceeding the requirements for public participation. However, a number of community stakeholders have expressed concerns about some aspects of the process. We recommend that Region 2 management:

- Conduct initial public outreach earlier in the Corrective Action process, before the end of the CMS phase, including the interim remedy selection phase;
- Emphasize a "two-way" process with transparent, accessible information and opportunities for meaningful public participation; and
- Align public affairs staff, as resources allow, to high-priority Corrective Action sites.

APPENDIX A. BIBLIOGRAPHY

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APPENDIX B. LIST OF SITES REVIEWED

STATE	FACILITY NAME - LOCATION	EPA ID NO.
NJ	DuPont – Pompton Lakes	NJD002173946
NJ	Amerada Hess – Port Reading	NJD045445483
NJ	Chemtura/DBA Anderol – East Hanover	NJD002160208
NJ	Exxon Bayway – Linden	NJD062037031
NJ	Novartis – East Hanover	NJD002147023
NJ	Inmont – Hawthorne	NJD002165371
NJ	Merck – Rahway	NJD001317064
NJ	Jersey Plating – Boonton	NJD002202885
NY	FMC – Middleport	NYD002126845
NY	General Electric – Hudson Falls	NYD002080075
NY	US Army Watervliet Arsenal – Watervliet	NY7213820940
NY	IBM – Endicott	NYD002233039
NY	IBM/Tech City – Kingston	NYD001359694
NY	Eastman Kodak – Rochester	NYD980592497
PR	Puma/CAPECO – Bayamon	PRD000632182
PR	Penuelas Technology Park/Union Carbide – Penuelas	PRD980594618
PR	Chevron Philips Chemical – Guayama	PRD991291972
PR	Bristol Myers Squibb, Humacao, PR	PRD090021056
PR	U.S. Army Fort Buchanan – Guaynabo	PR1210099999
VI	HOVENSA	VID980536080

APPENDIX C. LIST OF INTERVIEWS

NAME	TITLE	ORGANIZATION
Sonya Sasseville	Associate Director, Program Implementation and Information Division	EPA Office of Resource Conservation and Recovery
David Hockey	Chief, Cleanup Programs Branch	EPA Office of Resource Conservation and Recovery
Tom Tyler	Environmental Protection Specialist	EPA Office of Resource Conservation and Recovery
Bill Schoenborn	Environmental Scientist	EPA Office of Resource Conservation and Recovery
Sara Rasmussen	Program Analyst	EPA Office of Resource Conservation and Recovery
Barbara Foster	Environmental Protection Specialist	EPA Office of Resource Conservation and Recovery
Matthew Sander	Policy and Guidance Branch Chief	EPA Office of Site Remediation Enforcement
Peter Neves	RCRA Cleanup Team Leader	EPA Office of Site Remediation Enforcement
Judith Enck	Regional Administrator	EPA Region 2
John Filippelli	Director, Clean Air and Sustainability Division	EPA Region 2
Jose Font	Director, Caribbean Environmental Protection Division	EPA Region 2
Walter Mugdan	Director, Emergency and Remedial Response Division	EPA Region 2
Bonnie Bellow	Director, Public Affairs Division	EPA Region 2
Ariel Iglesias	Deputy Director, Clean Air and Sustainability Division	EPA Region 2
Teresita Rodriguez	Deputy Director, Caribbean Environmental Protection Division	EPA Region 2
Adolph Everett	Chief, Clean Air and Sustainability Division, Hazardous Waste Programs Branch	EPA Region 2
Ramon Torres	Chief, Caribbean Environmental Protection Division, Response and Remediation Branch	EPA Region 2
Phil Flax	Chief, Corrective Action Section	EPA Region 2
William Sawyer	Chief, Office of Regional Counsel, Air, Waste and Toxic Substances Branch	EPA Region 2

NAME	TITLE	ORGANIZATION
Donald Pace	Comptroller	EPA Region 2
Joel Golumbek	RCRA Compliance Branch (retired)	EPA Region 2
Betsy Lopez	Environmental Protection Specialist	EPA Region 2
Michael McGowan	Chief, Intergovernmental and Community Affairs Branch	EPA Region 2
Mike Basile	Public Affairs Specialist, Buffalo Field Office	EPA Region 2
Pat Seppi	Community Involvement Coordinator, Public Affairs Division	EPA Region 2
John Brogard	Remedial Project Manager, Base Program Management Section, RCRA Corrective Action Program	EPA Region 2
Samuel Ezekwo		
Ernst Jabouin		
Robert Jean		
Andy Park		
Ellen Stein		
Sameh Abdellatif	Remedial Project Manager, Corrective Action Section, RCRA Corrective Action Program	EPA Region 2
Clifford Ng		
Wilfredo Palomino		
Sadira Robles		
Alan Straus		
Mike Infurna	Remedial Project Manager, Emergency and Remedial Response Division	EPA Region 2
Carol Stein		
Sin-Kie Tjho		
David Cuevas	Remedial Project Manager, Caribbean Environmental Protection Division, Response and Remediation Branch	EPA Region 2
Eduardo Gonzales		
Zolymar Luna		
Rosana Caballer		
Socorro Martinez		
Luis Negron		
Jesse Aviles		
Khrystian Vazquez		
Angel Salgado		
Robert Schick	Division Director, Division of Environmental Remediation	New York State Department of Environmental Conservation
Michael Ryan	Assistant Division Director, Division of Environmental Remediation	New York State Department of Environmental Conservation
Steve Maybury	Chief, Bureau of Case Management, Remediation Oversight Element	New Jersey Department of Environmental Protection

NAME	TITLE	ORGANIZATION
Phil Cole	RCRA Remediation Coordinator, Site Remediation Program	New Jersey Department of Environmental Protection
Wayne Naylor	Deputy Director, Land and Chemicals Division	EPA Region 3
Becky Weber	Director, Air and Waste Management Division	EPA Region 7
Don Lininger	Chief, Waste Remediation and Permitting Branch	EPA Region 7
Jose Cisneros	Chief, Remediation and Reuse Branch, Land and Chemicals Division	EPA Region 5
Tammy Moore	Remediation and Reuse Branch	EPA Region 5
Ignacio Arrazola	Office of Regional Counsel	EPA Region 5
Anne Rabe	Campaign Coordinator	Center for Health, Environment & Justice
Bill Wolfe	Director	New Jersey Public Employees for Environmental Responsibility
Julia Maedl	Mayor (former)	Office of the Mayor, Village of Middleport, New York
Alan Ginsberg	Owner	TechCity/IBM Kingston
Timothy King	President	Penuelas Technology Park LLC
Russ Bowen	Consultant	Penuelas Technology Park LLC

APPENDIX D. INTERVIEW GUIDES

DISCUSSION GUIDE FOR EPA REGION 2 SENIOR MANAGEMENT

STATUS OF RCRA CORRECTIVE ACTION IN REGION 2

- This study is designed to evaluate the effectiveness and efficiency of Region 2's RCRA Corrective Action program.
    - What are your overall impressions of the program, in terms of its effectiveness in achieving its goals, and the efficiency of the process?
- How would you characterize the remedy decisions to date in the RCRA Corrective Action program?
    - To what extent do you think the RCRA Corrective Action program is selecting remedies, including Interim Measures, that are protective of human health and the environment?
- To what extent do you think the program is reaching decisions in a timely manner?
- What aspects of the program do you think are working well?
- What concerns, if any, do you have about the program?
- What improvements would you like to see in the program?
    - Do you have any specific ideas or suggestions for how the Region might go about making those improvements?

EVALUATION GOALS AND PRIORITIES

- What are your goals and priorities for this evaluation?
- Do you have any thoughts or plans about how you will use the evaluation findings?

ARE REGION 2'S ISSUES UNIQUE?

- Do you have any sense as to whether your concerns and the issues the Region faces are unique to Region 2?
- Do you know if your colleagues in other regions have similar concerns?
- Do you know what actions, if any, other regions have taken to address these issues?
- Do you have any thoughts or suggestions about EPA Headquarters' (OSWER) role in the RCRA Corrective Action program?

PREVIOUS STUDIES AND IMPROVEMENT EFFORTS

- What particular factors have influenced your perspective on and approach to the RCRA Corrective Action program?
- Are you aware of any previous studies or efforts in the Region to make improvements in the program?
    - If yes, what were the key takeaway messages or results?
- We understand that some sites were transferred from the Division that implements RCRA Corrective Action to the Division that manages Superfund. Can you tell us more about that decision? What made these sites good candidates for being transferred to the Superfund Division?

    - What role, if any, did resource factors play in this decision?
- Would you anticipate using this strategy in the future for other sites?
    - Why or why not?

ADMINISTRATIVE ORDERS AND ENFORCEMENT ACTIONS

- What are your impressions about Region 2's experience with using administrative orders and enforcement actions for RCRA Corrective Action sites?
- Do you have any opinions about the use of administrative orders and enforcement actions to compel cleanup, as compared to relying on the RCRA permit modification process?
- What effect, if any, do you think use of administrative orders or enforcement actions would have on remedy decisions, both in terms of remedy selection and the efficiency of the process?

STATE ROLES

- How would you characterize EPA's relationship with the Region 2 States and Territories under this program?
- Do you have any sense as to what similarities and differences exist between the federal-lead versus state-lead sites, particularly regarding remedy selection and timing of the process?
- Do you have any suggestions regarding how EPA and the States and Territories should improve their collaboration to achieve the program's goals?

PUBLIC PARTICIPATION

- Do you have any thoughts or suggestions about the Region's or States' engagement with stakeholders and local communities within the RCRA Corrective Action program?

INTERVIEW GUIDE FOR EPA HEADQUARTERS RCRA AND ENFORCEMENT

STATUS OF RCRA CORRECTIVE ACTION PROGRAM

- We understand that the RCRA Corrective Action program does not have the same regulatory/statutory structure as other, similar programs (e.g. Superfund), but relies heavily on non-statutory guidance and Agency policy.
    - Do you agree with this assessment?
        - If yes, how if at all does the structure of the program affect how the process is implemented…
            - Across regions?
            - Across sites *within* a region?
        - If yes, how if at all does the structure of the program affect the environmental stringency of remedy decisions?
- There seems to be a perception that it takes too long for the RCRA Corrective Action program to reach final remedy decisions.
    - Do you agree with this perception? Why or why not?
        - If yes, is this a new or longstanding concern?
            - Has it evolved over time?
        - If yes, what do you see as the root causes of the delays?
- To what extent do you think the RCRA Corrective Action program is reaching remedy decisions that are environmentally protective?
- How familiar are you with the RCRA Corrective Action process in Region 2?
    - *[If somewhat or very familiar:]* Are you aware of any specific issues in Region 2 that may be affecting the efficiency and effectiveness of the process in the Region?
    - One question we are examining is the difference between state-lead and EPA-lead sites.
        - We understand that EPA sometimes leads, or co-leads, sites in delegated states. How is it decided when EPA will lead?
        - How, if at all, does the RCRA Corrective Action process differ between federal-lead sites and state-lead sites?
        - What is the role of EPA in state-lead sites?
        - Do you have any insights into the effectiveness and efficiency of state-lead sites compared to EPA-lead sites?

PROCESS MAP

- The attached diagram shows a simplified, stylized process map for RCRA Corrective Action. ***[Attach diagram]*** We understand that not every site follows the same sequence of events, and some sites may not even have all events; still, we are trying to capture the key elements of the process both to understand where delays occur and as a communication tool. With this context in mind…
    - To what extent does the RCRA Corrective Action process actually follow the process shown in the diagram?
    - We understand that the process can be initiated by permit modification or administrative order.
        - How does EPA decide which method to use (permit or order)?
        - At what other stages of the process would EPA modify a facility's permit?
    - Are we missing any important steps in the process map?
        - If yes, please identify the step(s) and where it belongs on the map.
    - Are any steps shown out of order?
        - If yes, please identify the step(s) and indicate the correct order.
    - Where in the process do things tend to get significantly delayed or stuck?
        - Please identify the step(s), and explain.
    - We understand that RCRA Corrective Action can proceed through *permit*, *administrative order*, or *voluntary agreement*.
        - What difference does this make, if any, in how the process is implemented and the efficiency of the process?
    - How does the sequence of events and efficiency of the process differ between *federally-managed sites* versus *state-managed sites*?
    - What other factors affect the efficiency of the process?
    - Do you have any other comments or suggestions on the process map?

IMPROVING THE PROCESS

- At the HQ level, what has been done to improve the RCRA Corrective Action process? *[Prompts:]*
    - Guidance
    - Enforcement strategies
    - Other – please specify
        - *[For each item mentioned:]* How did it work?
- Where do things stand with Regions 3 and 7 implementing recommendations from the Lean Event?
    - Do you think these actions, if implemented, will help improve the efficiency of the process?
    - Are you aware of any challenges in Regions 3 and 7 that might be applicable to Region 2?

- Are you aware of any regions other than Regions 3 and 7 that have conducted Lean events or taken similar steps to document and/or streamline the RCRA Corrective Action process?
    - If yes, which regions?
    - If yes, what was the result?
- What actions are available under current authority and guidance to improve the efficiency and effectiveness of the process?
    - *[For each action identified:]* Are you aware of regions that have taken these actions?
        - If yes, what was the result?
        - Are there specific regions/individuals that you suggest we talk to?
- Where do you see the biggest potential for improvement in the RCRA Corrective Action process?
    - *[For each item identified:]* How much impact would this change have on:
        - New sites?
        - Existing sites?
        - Specific stages of the process?
        - Low priority sites?
        - Specific types of contamination?
        - Enforcement options?
        - Specific sectors?
- We understand the Region 2 recently transferred some of its RCRA Corrective Action sites to the Division that manages Superfund.
    - In general, why would sites be moved from the RCRA Corrective Action division to the division that manages Superfund?
    - How, if at all, are the enforcement tools different under the two programs?
    - What benefits and obstacles would a transfer like this would bring to the projects?

ADMINISTRATIVE ORDERS AND ENFORCEMENT ACTIONS

- What are the major differences between *administrative orders* versus *enforcement actions* under the RCRA Corrective Action program?
    - When does EPA use administrative orders versus enforcement actions?
    - Who issues administrative orders and enforcement actions?
    - Do administrative orders versus enforcement actions have different penalties for non-compliance?
    - Does the use of an administrative order versus an enforcement action have implications for the timing of the Corrective Action process?

- How has the Agency's position on the use of administrative orders and enforcement actions for RCRA Corrective Action sites evolved?
    - What is the Agency's current position?
- Are you aware of regions that have used administrative orders and enforcement actions in an attempt to speed up the RCRA Corrective Action process?
    - If yes, which regions?
    - If yes, what actions or orders did they use?
    - If yes, what effect if any did the use of administrative orders or enforcement actions have on the process schedule and timing of RCRA Corrective Action work?
- What other enforcement actions and administrative orders are available to the regions to address cases of non-compliance?
    - *[For any identified:]* Under what circumstances do you think these would promote the efficient cleanup of RCRA Corrective Action sites?

PRIORITY SITES

- What are the current selection criteria for high priority sites?
- How have the criteria evolved?
- What are the key differences between high priority sites and sites not judged to be high priority?
    - Do high priority sites tend to get resolved more or less quickly than sites that are not judged to be high priority?
    - Are the factors that affect the speed of the process and the stringency of the selected remedy different for high priority sites vs. sites that are not judged to be high priority?
        - If yes, what are the key differences?

PROGRAM RESOURCES

- EPA's *Corrective Action Program: Workload Report*, March 2013 draft, concludes that "in terms of reaching the 2020 goals, additional efficiency improvements alone will be unable to overcome the pace and size of recent resource reductions and other challenges."
    - Did your analysis look specifically at data for Region 2?
        - If yes, can we get the data broken out for Region 2?
- What guidance would HQ offer the Regions for managing their RCRA Corrective Action work in light of scarce and declining resources?
- Do you have any insights into whether Regions have improved Corrective Action program performance by more effectively allocating resources across sites?
    - Do you have any thoughts on the distribution of resources in Region 2 and whether this could be improved?

COMMUNITY ENGAGEMENT

- How does HQ communicate and/or promote community participation with the Regions?
- Do you have any concerns about community participation in RCRA Corrective Action cases nationally, or in Region 2 in particular?

INTERVIEW GUIDE FOR REGION 2 PROGRAM MANAGERS

STATUS OF RCRA CORRECTIVE ACTION IN REGION 2

- What aspects of the RCRA Corrective Action program are working well?
- What concerns do you have about the program?
- There seems to be a perception that it takes too long to reach a final remedy decision for RCRA Corrective Action sites.
    - Do you agree with this perception? Why or why not?
- To what extent do you think the RCRA Corrective Action program is reaching remedy decisions that are environmentally protective?
- How, if at all, does the Region 2 structure (New York, New Jersey, Puerto Rico, and U.S. Virgin Islands) affect the RCRA Corrective Action process and outcomes (e.g.., remedy decisions)?
    - What are the major differences in how the RCRA Corrective Action program is implemented by EPA, New York, and New Jersey?
    - Are there any special considerations for how EPA implements the Corrective Action program in Puerto Rico and the U.S. Virgin Islands?
    - How do these differences affect the efficiency of the process?
    - How do these differences affect RCRA Corrective Action outcomes (e.g., remedy decisions)?

CURRENT PROCESS

- The attached diagram shows a simplified, stylized RCRA Corrective Action process map. ***[Attach diagram]*** We understand that not every site follows the same sequence of events, and some sites may not even have all events; still, we are trying to capture the key elements of the process both to understand where delays occur and as a communication tool. With this context in mind…
    - To what extent does the RCRA Corrective Action process actually follow the process shown in the diagram?
    - Are we missing any important steps in the process map?
        - If yes, please identify the step(s) and where it belongs on the map.
    - Are any steps shown out of order?
        - If yes, please identify the step(s) and indicate the correct order.
    - Where in the process do things tend to get significantly delayed or stuck?
        - Please identify the step(s), and explain.
    - The Lean Event for Regions 3 and 7 suggested that internal review at EPA accounts for a large part of the delay.
        - Is this true in Region 2?
    - We also heard that site switches (RPM turnover) delays cleanup progress.

        - Is this true in Region 2?
    - We understand that RCRA Corrective Action can proceed through *permit, administrative order,* or *voluntary agreement*.
        - What difference does this make, if any, in how the process is implemented and the efficiency of the process?
    - Do you have any other comments or suggestions on the process map?
- We understand that it is frequently the facility's responsibility to propose interim corrective measures and final remedies, subject to Agency oversight and approval.
    - In general, how adequate or inadequate are the interim corrective measure proposals and final remedy proposals submitted by facilities?
    - In general, do you think that the Region is considering interim or final remedial alternatives beyond those proposed by facilities, as necessary?
        - Why or why not?
    - Are you aware of any specific cases where the Region has suggested remedial alternatives different than the facility's preferred alternative, or more stringent than the facility's proposed alternative?
        - If yes, which site(s)?
        - If yes, what was the facility's preferred alternative and what was the Region's position?
        - If yes, what was the outcome of the interim corrective measure or remedy that was ultimately implemented?

IMPROVING THE PROCESS

- What actions has Region 2 considered to improve the efficiency of the RCRA Corrective Action process?
- Are you aware of any sites that have implemented these actions?
    - If yes, were these actions effective in speeding up the process?
        - Why or why not?
    - If no, do you think the proposed actions have the *potential* to speed up the process?
        - Why or why not?
- Where do you see the biggest potential for improvement in the RCRA Corrective Action process?
    - *[For each item identified:]* How much impact would this change have on:
        - New sites?
        - Existing sites?
        - Specific stages of the process?
        - Low priority sites?

        - Specific types of contamination?
        - Enforcement options?
        - Specific sectors?
- The Lean Event for Regions 3 and 7 focused on streamlining the RFI phase. A major recommendation from the Lean Event was to reach agreement on the scope and objectives of the investigation upfront, with official signoff from EPA senior managers early in the process.
    - Would this be helpful in Region 2?
    - Would this be feasible in Region 2?
- In fiscal year 2010, EPA Headquarters initiated a three-year strategy – the Integrated Cleanup Initiative – to manage EPA's land cleanup programs in an integrated manner, accelerate cleanup progress, and put sites back into productive use.
    - Are you familiar with the Integrated Cleanup Initiative? *If yes:*
        - Is Region 2 participating in this Initiative? If yes, how is the Region participating and what has been your experience with the Initiative?
        - Are you aware of any strategies that were developed for the Integrated Cleanup Initiative that could be useful for cleaning up RCRA Corrective Action sites in Region 2?
        - Are you aware of other regions that have taken steps to manage their cleanup programs in an integrated manner? If yes, which regions?
- We understand that Region 2 recently transferred some of its RCRA Corrective Action sites to the Superfund Division.
    - Why were these particular sites moved from RCRA Corrective Action to the Superfund Division?
    - Do you think this move was helpful (why or why not)?
    - Do you think that other sites could, or should, be shifted to the Superfund Division?

ADMINISTRATIVE ORDERS AND ENFORCEMENT ACTIONS

- What is Region 2's experience with using administrative orders and enforcement actions for RCRA Corrective Action sites?
    - What have been the outcomes of administrative orders and enforcement actions on process timing and schedule when used to address past cases of non-compliance?
- Looking back, can you think of cases where enforcement actions might have prevented non-compliance or accelerated the process of reaching a remedy decision?
- Stakeholders at the Lean Event stated that enforcement actions delay the process.
    - To what extent do you agree or disagree with this statement?
    - When do you think enforcement actions would be helpful in Region 2?
    - Are certain types of sites better candidates for enforcement action?

        - If yes, please explain.
- Have you considered other enforcement actions or administrative orders that you have not pursued?
    - If yes, please explain.
- Overall, do you think that increasing the use of administrative orders and enforcement action in RCRA Corrective Action cases would speed up or slow down the process? Please explain.

WORKLOAD AND RESOURCES

- How many sites do your RPMs typically manage at one time?
- How often do sites "change hands" between RPMs?
- Why do you reassign sites from one RPM to another?
- Has the workload of RPMs increased, decreased, or stayed the same?
- In your opinion, do RPMs' workloads affect the efficiency of the Corrective Action process (how)?
- Is the level of effort required to manage a site consistent from the beginning to the end of the process, or do some steps require more time and effort than others?
- How does the level of effort required to manage non-priority sites compare to the level of effort required to manage priority sites?
- Do you have any thoughts on distribution of resources in Region 2 across sites and whether this could be improved?

GPRA VS. NON-GPRA SITES

- Our evaluation focuses on GPRA sites. However, we would like to understand to what extent we can generalize our findings to non-GPRA sites.
    - Are there major differences between the facility characteristics of GPRA and non-GPRA sites?
        - If yes, please explain.
    - Are there major differences in the issues and challenges that you encounter in RCRA Corrective Action cases and GPRA and non-GPRA sites?
        - If yes, please explain.
    - Would your recommendations to improve the efficiency and effectiveness of the RCRA Corrective Action program be different for GPRA sites and non-GPRA sites?
        - If yes, please explain.

COMMUNITY ENGAGEMENT

- Why do some sites receive a lot of public attention while others receive little or no attention?
    - Is there a pattern to the sites that generate the most public interest?
- How does the Region account for Environmental Justice considerations in the RCRA Corrective Action process?

- Does the Region provide public notice at every RCRA Corrective Action site?
    - If not, what are the key factors in determining whether there is an opportunity for public comment?
- Does the Region hold public meetings to address the community's concerns at every RCRA Corrective Action site?
    - If not, what are the factors in deciding whether to hold public meetings?
- How do you track community involvement activities within RCRA Corrective Action?

INTERVIEW GUIDE FOR STATE PROGRAM MANAGERS

BACKGROUND

- What aspects of the RCRA Corrective Action program are working well?
- What concerns do you have about the program?
- There seems to be a perception that it takes too long to reach a final remedy decision for RCRA Corrective Action sites.
    - Do you agree with this perception? Why or why not?
- To what extent do you think the RCRA Corrective Action program is reaching remedy decisions that are environmentally protective?
- What do you think are the major differences between how the RCRA Corrective Action process is implemented by EPA compared to how your state implements the program?
    - How do these differences affect the efficiency and effectiveness of the process?
- Are there any special considerations regarding the RCRA Corrective Action process that are unique to your state?
    - If yes, please explain.

CURRENT PROCESS

- The attached diagram shows a simplified, stylized RCRA Corrective Action process map. ***[Attach diagram]*** We understand that not every site follows the same sequence of events, and some sites may not even have all events; still, we are trying to capture the key elements of the process both to understand where delays occur and as a communication tool. With this context in mind…
    - To what extent does the RCRA Corrective Action process actually follow the process shown in the diagram?
    - Are we missing any important steps in the process map?
        - If yes, please identify the step(s) and where it belongs on the map.
    - Are any steps shown out of order?
        - If yes, please identify the step(s) and indicate the correct order.
    - Where in the process do things tend to get significantly delayed or stuck?
        - Please identify the step(s), and explain.
    - We have heard that internal review (within EPA or the State implementing Authority) can be a major source of delays.
        - Is this true in your state?
    - We also heard that site switches (RPM turnover) delays cleanup progress.
        - Is this true in your state?

- We understand that RCRA Corrective Action can proceed through *permit modification*, *administrative order*, or *voluntary agreement*.
    - What difference does this make, if any, in how the process is implemented and the efficiency of the process?
- Do you have any other comments or suggestions on the process map?

IMPROVING THE PROCESS

- What actions has your state considered to improve the efficiency of the RCRA Corrective Action process?
- Are you aware of any sites that have implemented these actions?
    - If yes, were these actions effective in speeding up the process?
        - Why or why not?
    - If no, do you think the proposed actions have the *potential* to speed up the process?
        - Why or why not?
- Where do you see the biggest potential for improvement in the RCRA Corrective Action process?
    - *[For each item identified:]* How much impact would this change have on:
        - New sites?
        - Existing sites?
        - Specific stages of the process?
        - Low priority sites?
        - Specific types of contamination?
        - Enforcement options?
        - Specific sectors?
- We have heard from RCRA Corrective Action stakeholders in other EPA regions (outside of Region 2) that steps to improve the Corrective Action process should start with streamlining the RFI phase – specifically, the suggestion was to reach agreement on the scope and objectives of the investigation upfront, with official signoff from senior managers early in the process.
    - Would this be helpful in your state?
    - Would this be feasible in your state?
- We understand that Region 2 recently transferred some of its RCRA Corrective Action sites to the Superfund Division.
    - Were any of these sites in your state?
    - *[For New York:]* We understand that New York State recently transferred RCRA Corrective Action sites to the same unit that manages Superfund.
        - What was the impetus for this decision?

        - What has been New York State's experience with this consolidation?
    - Can you think of (other) situations where it would be helpful to transfer sites from RCRA Corrective Action to the unit implementing the Superfund program?
        - If yes, what types of sites would be good candidates for moving to the Superfund unit?
        - If no, why not?

ADMINISTRATIVE ORDERS AND ENFORCEMENT ACTIONS

- What is your experience with using administrative orders and enforcement actions for RCRA Corrective Action sites?
    - What have been the outcomes of administrative orders and enforcement actions on process timing and schedule when used to address past cases of non-compliance?
- Looking back, can you think of cases where enforcement actions might have prevented non-compliance or accelerated the process of reaching a remedy decision?
- We have heard from stakeholders outside of Region 2 that enforcement actions often delay the process.
    - To what extent do you agree or disagree with this statement?
    - When do you think enforcement actions would be helpful in your state?
    - Are certain types of sites better candidates for enforcement action?
        - If yes, please explain.
- Have you considered other enforcement actions or administrative orders that you have not pursued?
    - If yes, please explain.
- Overall, do you think that increasing the use of administrative orders and enforcement action in RCRA Corrective Action cases would speed up or slow down the process? Please explain.

WORKLOAD AND RESOURCES

- How many sites do your RPMs typically manage at one time?
- How often do sites "change hands" between RPMs?
- Why do you reassign sites from one RPM to another?
- Has the workload of RPMs increased, decreased, or stayed the same?
- In your opinion, do RPMs' workloads affect the efficiency of the Corrective Action process?
    - If yes, how?
- Is the level of effort required to manage a site consistent from the beginning to the end of the process, or do some steps require more time and effort than others?
- In your opinion, what role does the level of funding awarded to states by EPA play in the state's ability to achieve timely clean-up decisions at RCRA Corrective Action sites?

- Do the states use any of the funds to cover consulting services?

- How does the level of effort required to manage non-priority sites compare to the level of effort required to manage priority sites?
- Have you worked with Region 2 to update or optimize the distribution of resources across sites to improve efficiency?
  - If yes, please explain.

GPRA VS. NON-GPRA SITES

- Our evaluation focuses on GPRA sites. However, we would like to understand to what extent we can generalize our findings to non-GPRA sites.
  - Are there major differences between the facility characteristics of GPRA and non-GPRA sites?
    - If yes, please explain.
  - Are there major differences in the issues and challenges that you encounter in RCRA Corrective Action cases and GPRA and non-GPRA sites?
    - If yes, please explain.
  - Would your recommendations to improve the efficiency and effectiveness of the RCRA Corrective Action program be different for GPRA sites and non-GPRA sites?
    - If yes, please explain.

COMMUNITY ENGAGEMENT

- Why do some sites receive a lot of public attention while others receive little or no attention?
  - Is there a pattern to the sites that generate the most public interest?
- How does the state account for Environmental Justice considerations in the RCRA Corrective Action process?
- Does the state provide public notice at every RCRA Corrective Action site?
  - If not, what are the key factors in determining whether there is an opportunity for public comment?
- Does the state hold public meetings to address the community's concerns at every RCRA Corrective Action site?
  - If not, what are the factors in deciding whether to hold public meetings?
- How do you track community involvement activities within RCRA Corrective Action?

INTERVIEW GUIDE FOR REMEDIAL PROJECT MANAGERS

BACKGROUND

- How long have you been an RPM for RCRA Corrective Action sites?
- What sectors or geographic areas do you focus on?
- How many sites do you currently manage?
    - How long have you managed these specific sites?

CURRENT STATUS AND PROCESS

- There seems to be a perception that it takes too long to reach a final remedy decision for RCRA Corrective Action sites.
    - Do you agree with this perception? Why or why not?
- Thinking about the sites that you manage, what factors explain why some sites take a long time to reach a final remedy decision? *[Prompts:]*
    - Groundwater contamination
    - Vapor intrusion problem
    - Soil contamination
    - Other media contaminated
    - Offsite contamination
    - Bankruptcy
    - Change in ownership
    - Under a federal or state enforceable instrument
    - Lack of cooperation by the facility
    - Determined to be in legal non-compliance with the Corrective Action process
    - Other – please specify
- Do priority sites and non-priority sites have similar issues?
    - If no, what are the key differences?
- The attached diagram shows a simplified, stylized RCRA Corrective Action process map. ***[Attach diagram]*** We understand that not every site follows the same sequence of events, and some sites may not even have all events; still, we are trying to capture the key elements of the process both to understand where delays occur and as a communication tool. With this context in mind…
    - To what extent does the RCRA Corrective Action process actually follow the process shown in the diagram?
        - Do you manage any sites that have followed the process exactly as depicted in the stylized version (if yes, which sites)?
    - Are we missing any important steps in the process map?

        - If yes, please identify the step(s) and where it belongs on the map.
    - Are any steps shown out of order?
        - If yes, please identify the step(s) and indicate the correct order.
    - Where in the process do things tend to get significantly delayed or stuck *in general*?
        - Please identify the step(s), and explain.
    - Thinking about your *most challenging* sites, where in the process do you encounter difficulties?
    - We heard from other Regions that internal review at EPA accounts for a large part of the delay.
        - Is this true for the sites that you manage?
    - We also heard from other Regions that site switches (RPM turnover) delays cleanup progress.
        - Has this been an issue at the sites that you manage?
    - We understand that RCRA Corrective Action can proceed through *permit*, *administrative order*, or *voluntary agreement*.
        - What difference does this make, if any, in how the process is implemented and the efficiency of the process?
    - Do you have any other comments or suggestions on the process map?
- We understand that it is frequently the facility's responsibility to propose interim corrective measures and final remedies, subject to Agency oversight and approval.
    - In general, how adequate or inadequate are the interim corrective measure proposals and final remedy proposals submitted by facilities?
    - Have there been any cases where you have suggested remedial alternatives different than the facility's preferred alternative, or more stringent than the facility's proposed alternative?
        - If yes, which site(s)?
        - If yes, what was the facility's preferred alternative and how did you respond?
        - If yes, what was the outcome on the interim corrective measure or remedy that was ultimately implemented?

IMPROVING THE PROCESS

- What actions has Region 2 considered to improve the efficiency of the RCRA Corrective Action process?
- Have you implemented any of these actions at the sites that you manage?
    - If yes, were these actions effective in speeding up the process?
        - Why or why not?
    - If no, do you think the proposed actions have the *potential* to speed up the process?

        - Why or why not?
- Where do you see the biggest potential for improvement in the RCRA Corrective Action process?
    - *[For each item identified:]* How much impact would this change have on:
        - New sites?
        - Existing sites?
        - Specific stages of the process?
        - Low priority sites?
        - Specific types of contamination?
        - Enforcement options?
        - Specific sectors?

ADMINISTRATIVE ORDERS AND ENFORCEMENT ACTIONS

- Thinking about the most challenging sites that you have managed (now or in the past), were enforcement actions considered?
    - If yes, were they used?
        - If yes, which sites? What were the results?
        - If no, do you think that enforcement actions could have helped speed up the process? Why or why not?
- Do you think that increasing the use of administrative orders and enforcement action in RCRA Corrective Action cases would speed up or slow down the process? Please explain.

WORKLOAD AND RESOURCES

- How many sites do you typically manage at one time?
- How often do sites "change hands" between RPMs?
- In the time that you have been an RPM, has your workload increased, decreased, or stayed the same?
- How do you think an RPM's workload affects the efficiency of the Corrective Action process. i.e., the time it takes for individual sites to move through the process?
- Is the level of effort required to manage a site consistent from the beginning to the end of the process, or do some steps require more time and effort than others?
- How does the level of effort required to manage non-priority sites compare to the level of effort required to manage priority sites?
- Do you have any thoughts on distribution of resources in Region 2 across sites and whether this could be improved?

GPRA VS. NON-GPRA SITES

- Our evaluation focuses on GPRA sites. However, we would like to understand to what extent we can generalize our findings to non-GPRA sites.
    - Are there major differences between the facility characteristics of GPRA and non-GPRA sites?
        - If yes, please explain.
    - Are there major differences in the issues and challenges that you encounter in RCRA Corrective Action cases and GPRA and non-GPRA sites?
        - If yes, please explain.
    - Would your recommendations to improve the efficiency and effectiveness of the RCRA Corrective Action program be different for GPRA sites and non-GPRA sites?
        - If yes, please explain.

COMMUNITY ENGAGEMENT

- Have you managed any sites with a high level of public interest?
    - If yes, which site(s)?
- Why do some sites receive a lot of public attention while others receive little or no attention?
    - Is there a pattern to the sites that generate the most public interest?
- Does the Region provide public notice at every RCRA Corrective Action site?
    - If not, what are the key factors in determining whether there is an opportunity for public comment?
- Does the Region hold public meetings to address the community's concerns at every RCRA Corrective Action site?
    - If not, have you held public meetings to address the community's concerns at any of the sites that you manage?
        - If so, please provide examples of sites for which you held public meetings, and provide the key factors in deciding whether to hold public meetings.
- In your experience, is public participation adequate?
    - Why or why not?
    - To what extent do you think it adds value to the process?
    - What impact does public participation have on process efficiency, i.e., the time it takes a facility to move through the process?
- What recommendations would you offer to improve the effectiveness of public participation?

INTERVIEW GUIDE FOR MAYORS

BACKGROUND AND STATUS

- Which site(s) in your jurisdiction were involved in the RCRA Corrective Action process?
    - What were the key issues at these sites?
    - How, if at all, was your Office involved in the case?
    - Were there delays in the process?
        - If yes, what caused the delays?
    - Were the site(s) located in Environmental Justice communities?
        - If yes, how well did EPA or the state implementing authority account for and address environmental justice considerations?
    - Where do things currently stand in the process?
    - Has the pace of the investigation and cleanup met your expectations?
        - Why or why not?
    - *[If applicable:]* Were you satisfied with the remedy decision/environmental outcome?
        - Why or why not?
- Do you have any concerns about the RCRA Corrective Action process?
    - If yes, please explain. *[Prompt: Are concerns about timing? Remedy selection?]*
- Have you heard any concerns voiced by your constituents about the RCRA Corrective Action process?
    - If yes, please explain.
- Have you had any Superfund sites in your jurisdiction?
    - If yes, what were the major similarities and differences between RCRA Corrective Action and Superfund in terms of …
        - Public participation?
        - Efficiency?
        - Adequacy of the remedy decision?

COMMUNITY ENGAGEMENT

- Have you or your staff participated in public meetings for any RCRA Corrective Action sites? *If yes*:
    - Which sites?
    - How did you learn about the meetings being held?
    - Who organized the meeting (e.g., EPA, state, or industry)?
    - Did you or your staff attend the meetings?

        - If yes, what was your role in the process?
    - What was your opinion of the community engagement process?
    - Other than public meetings, were there other opportunities for public participation? *If yes:*
        - What were these activities?
        - How if at all did you participate?
    - Overall, do you feel that public participation was adequate? Why or why not?

FEDERAL VS. STATE LEAD

- *[If involved with more than one RCRA Corrective Action site:]* Were the sites led by a state or by EPA?
    - *[If a combination of state and federal lead:]* Did you notice any difference in the efficiency or effectiveness of the process based on whether it was led by the state or by EPA?
        - If yes, please explain.

PERMIT VS. ADMINISTRATIVE ORDER

- *[If involved with more than one RCRA Corrective Action site:]* Was the process driven by permit or by administrative order?
    - *[If a combination of permit and administrative order:]* Did you notice any difference in the efficiency or effectiveness of the process based on whether it went through the permitting process or administrative order?
        - If yes, what was the effect of the administrative order on the schedule and timing of RCRA Corrective Action at the site?

ADMINISTRATIVE ORDERS AND ENFORCEMENT ACTION

- Do you think expanding the use of administrative orders and enforcement actions would accelerate the time required to reach a remedy decision?
    - Why or why not?

LOOKING AHEAD

- What recommendations would you offer to improve the RCRA Corrective Action process?

INTERVIEW GUIDE FOR NON-GOVERNMENTAL ORGANIZATIONS

BACKGROUND AND STATUS

- How have you been involved in the RCRA Corrective Action process?
    - What sites have you been involved with?
        - How did you become involved with these sites?
        - What were the key issues?
        - Did you encounter any delays in the process?
            - If yes, what caused the delays?
            - Were any of these sites located in Environmental Justice communities?[57]
            - If yes, how well did the RCRA Corrective Action process account for and address environmental justice considerations?
        - Where do things currently stand in the process?
        - Has the pace of site investigation and cleanup met your expectations? Why or why not?
        - *[If applicable:]* Were you satisfied with the remedy decision/environmental outcome?
            - Why or why not?
- Have you participated in any cases involving Superfund sites?
    - If yes, what were the major similarities and differences between RCRA Corrective Action and Superfund in terms of …
        - Public participation?
        - Efficiency?
        - Adequacy of the remedy decision?
- Do you have any other concerns about the RCRA Corrective Action process?
    - If yes, please explain. *[Prompt: Are concerns about timing? Remedy selection?]*

[57] EPA defines "environmental justice" as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work." http://www.epa.gov/environmentaljustice/

COMMUNITY ENGAGEMENT

- Have you participated in public meetings for any RCRA Corrective Action sites? *If yes*:
    - Which sites?
    - How did you learn about the meetings being held?
    - Who organized the meeting (e.g., EPA, state, or industry)?
    - What was your role in the process?
    - What was your opinion of the community engagement process?
        - Were you and other stakeholders given sufficient opportunity to comment?
        - Were your comments given due consideration?
    - Other than public meetings, were there other opportunities for public participation?
        - If yes, what were they?
        - If yes, (how) did you participate?
    - Do you feel that public participation was adequate? Why or why not?

FEDERAL VS. STATE LEAD

- *[If involved with more than one RCRA Corrective Action site:]* Were the sites led by a state or by EPA?
    - *[If a combination of state and federal lead:]* Did you notice any difference in the efficiency or effectiveness of the process based on whether it was led by the state or by EPA?
        - If yes, please explain.

PERMIT VS. ADMINISTRATIVE ORDER

- *[If involved with more than one RCRA Corrective Action site:]* Was the process driven by permit or by administrative order?
    - *[If a combination of permit and administrative order:]* Did you notice any difference in the efficiency or effectiveness of the process based on whether it went through the permitting process or administrative order?
        - If yes, please explain.

LOOKING AHEAD

- What recommendations would you offer to improve the RCRA Corrective Action process?

INTERVIEW GUIDE FOR INDUSTRY

BACKGROUND AND STATUS

- How was the RCRA Corrective Action process initiated at your site(s)?
    - Who initiated the process?
    - Was the process driven by permit, administrative order, or voluntary agreement?
    - What were the key environmental issues?
    - Did the site generate any significant public interest – if yes, what were the key issues?
- Did you encounter any delays in the RCRA Corrective Action process?
    - If yes, what caused the delays?
    - If yes, could the regulatory agencies have done something to accelerate the process? Please explain.
- What stage(s) of the process were easiest or smoothest? Please explain.
- What stage(s) of the process were most difficult? Please explain.
- Where do things currently stand at your site(s)?
    - *[If applicable:]* Were you satisfied with the remedy decision/outcome at your site(s)?
        - Why or why not?
- What is your overall assessment of the effectiveness of the RCRA Corrective Action process?

COMMUNITY ENGAGEMENT

- Have you participated in public meetings related to the RCRA Corrective Action process at your site(s)? *If yes:*
    - Who organized the meeting (e.g., your facility, EPA, or the state)?
    - What was your role in the process?
    - What was your opinion of the community engagement process?
        - Were you and other stakeholders given sufficient opportunity to comment?
        - Were your suggestions and concerns given due consideration?
    - Other than public meetings, did you undertake or participate in any other community engagement activities related to the RCRA Corrective Action process? *If yes:*
        - What were the activities?
        - How did you participate?

FINANCIAL REFORMS AND RCRA CORRECTIVE ACTION

- Recent emphasis on transparent financial reporting (e.g., Sarbanes-Oxley Act of 2002, and various sustainability efforts) has changed how some companies consider environmental liabilities in some contexts.

- Do you know of any companies (including yours) that have changed strategies for dealing with RCRA Corrective Action sites in response to Sarbanes-Oxley or other recent changes in reporting emphasis?
    - Is there a greater emphasis on rapid cleanup?
        - If yes, please explain.
    - Has there been any recent change in companies' preferred method for implementing the RCRA Corrective Action process? (e.g., voluntary agreement, permitting process, or administrative order)
        - If yes, please explain.

LOOKING AHEAD

- What recommendations would you offer to improve the RCRA Corrective Action process?

INTERVIEW GUIDE FOR OTHER REGIONAL PROGRAM MANAGERS

CURRENT PROCESS

- Do you have a process map for RCRA Corrective Action specific to your Region?
    - *If yes:* Please provide a copy of the process map and walk us through the steps. [IF YES, SKIP THE NEXT QUESTION AND GO TO THE FOLLOWING QUESTION.]
    - *If no:* IF NO, GO TO THE NEXT QUESTION.
- The attached diagram shows a simplified, stylized RCRA Corrective Action process map. ***[Attach diagram]*** We understand that not every site follows the same sequence of events, and some sites may not even have all events; still, we are trying to capture the key elements of the process both to understand where delays occur and as a communication tool. With this context in mind…
    - To what extent does the RCRA Corrective Action process in your region follow the process shown in the diagram?
    - Are we missing any important steps in the process map?
        - If yes, please identify the step(s) and where it belongs on the map.
    - Are any steps shown out of order?
        - If yes, please identify the step(s) and indicate the correct order.
    - Where in the process do things tend to get significantly delayed or stuck?
        - Please identify the step(s), and explain.
- Has your region conducted a Lean Event or another initiative to identify delays and streamline the process?
    - *If yes:*
        - Can you send us the data (e.g. time between steps)?
        - What did you identify as the major delays?
        - What were the key recommendations to address the problem?

        [IF YES, SKIP THE NEXT QUESTION AND GO TO THE FOLLOWING QUESTION.]
    - *If no:* IF NO, GO TO THE NEXT QUESTION.
- Regions 3 and 7 conducted a Lean Event where they identified major causes of delay, including.
    - Internal review within EPA
    - RPM turnover at RCRA Corrective Action sites
        - Are these issues causing delays in your region?
        - What other factors do you believe are causing delays?
- We understand that RCRA Corrective Action can proceed through *permit modification, administrative order or other enforcement action,* or *voluntary agreement*.

- What difference does this make, if any, in how the process is implemented and the efficiency of the process?

- Overall, do you think the RCRA Corrective Action process is reaching remedy decisions in a timely manner in your region?
  - If no, please explain.
- Overall, do you think the RCRA Corrective Action process is reaching remedy decisions that are environmentally protective in your region?
  - If no, please explain.

IMPROVING THE PROCESS

- What actions has your region considered to improve the efficiency of the RCRA Corrective Action process?
- Are you aware of any sites that have implemented these actions?
  - If yes, were these actions effective in speeding up the process?
    - Why or why not?
  - If no, do you think the proposed actions have the *potential* to speed up the process?
    - Why or why not?
- Where do you see the biggest potential for improvement in the RCRA Corrective Action process?
  - *[For each item identified:]* How much impact would this change have on:
    - New sites?
    - Existing sites?
    - Specific stages of the process?
    - Low priority sites?
    - Specific types of contamination?
    - Enforcement options?
    - Specific sectors?
- The Lean Event for Regions 3 and 7 focused on streamlining the RFI phase. A major recommendation from the Lean Event was to reach agreement on the scope and objectives of the investigation upfront, with official signoff from EPA senior managers early in the process.
  - Would this be helpful in your region?
  - Would this be feasible in your region?
- We understand that Region 2 recently transferred some of its RCRA Corrective Action sites to the Superfund Division.
  - Has this been done in your region?
    - If yes, was it helpful?

        - If no, under what circumstances (if any) do you think it might be helpful?

ADMINISTRATIVE ORDERS AND ENFORCEMENT ACTIONS

- What is your experience with using administrative orders and enforcement actions for RCRA Corrective Action sites?
    - What enforcement tools and administrative orders have you used?
    - What have been the outcomes of administrative orders and enforcement actions on process timing and schedule when used to address past cases of non-compliance?
- Looking back, can you think of cases where enforcement actions might have prevented non-compliance or accelerated the process of reaching a remedy decision?
- Stakeholders at the Lean Event for Regions 3 and 7 stated that enforcement actions delay the process.
    - To what extent do you agree or disagree with this statement?
    - When have enforcement actions been helpful in your region?
    - Are certain types of sites better candidates for enforcement action?
        - If yes, please explain.
- Have you considered other enforcement actions or administrative orders that you have not pursued?
    - If yes, please explain.
- Overall, do you think that increasing the use of administrative orders and enforcement action in RCRA Corrective Action cases would speed up or slow down the process? Please explain.

WORKLOAD

- How many sites do your RPMs typically manage at one time?
- How often do sites "change hands" between RPMs?
- Why do you reassign sites from one RPM to another?
- Has the workload of RPMs increased, decreased, or stayed the same?
- Is the level of effort required to manage a site consistent from the beginning to the end of the process, or do some steps require more time and effort than others?
- How does the level of effort required to manage non-priority sites compare to the level of effort required to manage priority sites?

GPRA VS. NON-GPRA SITES

- Our evaluation focuses on GPRA sites. However, we would like to understand to what extent we can generalize our findings to non-GPRA sites.
    - Are there major differences between the facility characteristics of GPRA and non-GPRA sites?
        - If yes, please explain.

- Are there major differences in the issues and challenges that you encounter in RCRA Corrective Action cases and GPRA and non-GPRA sites?
    - If yes, please explain.
- Would your recommendations to improve the efficiency and effectiveness of the RCRA Corrective Action program be different for GPRA sites and non-GPRA sites?
    - If yes, please explain.

COMMUNITY ENGAGEMENT

- Why do some sites receive a lot of public attention while others receive little or no attention?
    - Is there a pattern to the sites that generate the most public interest?
- How does the region account for Environmental Justice considerations in the RCRA Corrective Action process?
- Does the region provide public notice at every RCRA Corrective Action site?
    - If not, what are the key factors in determining whether there is an opportunity for public comment?
- Does the region hold public meetings to address the community's concerns at every RCRA Corrective Action site?
    - If not, what are the factors in deciding whether to hold public meetings?
- How do you track community involvement activities within RCRA Corrective Action?

APPENDIX E. DETAILED RCRA INFO ANALYSIS

QUESTION 1B: WHAT ARE THE DIFFERENCES IN EFFICIENCY BETWEEN FEDERALLY-MANAGED SITES VS. STATE-MANAGED SITES?

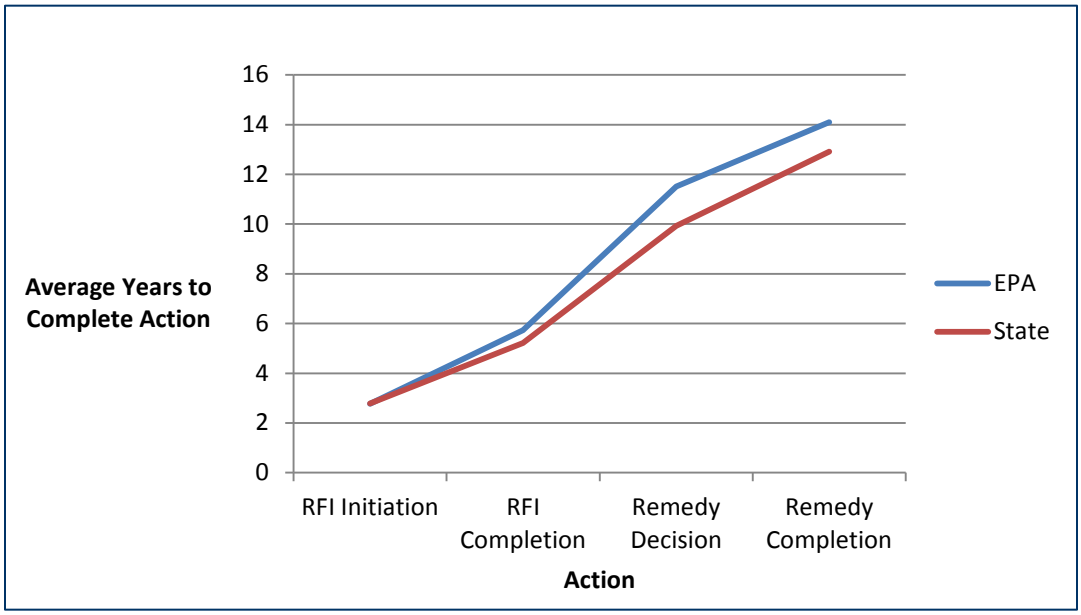
RCRAInfo

We drew extensively on RCRAInfo data to address this evaluation question.

Of the 310 Region 2 sites for which RCRAInfo lists a lead agency, 210 are state-lead and 100 are EPA-lead. This evaluation question seeks to determine whether the efficiency of the Corrective Action process differs across these state-lead and EPA-lead sites.

An initial glance at data gleaned from RCRAInfo suggests that a discrepancy in RCRA Corrective Action process times may in fact exist between state and EPA-lead sites. Using the methodology outlined in the Methodology Document, IEc calculated the process times required to complete key phases of the RCRA Corrective Action process for each site in Region 2. Exhibit E-1 displays the average number of years required for sites to reach key actions for both state-lead and EPA-lead sites, measured from the initiation of the Corrective Action process.

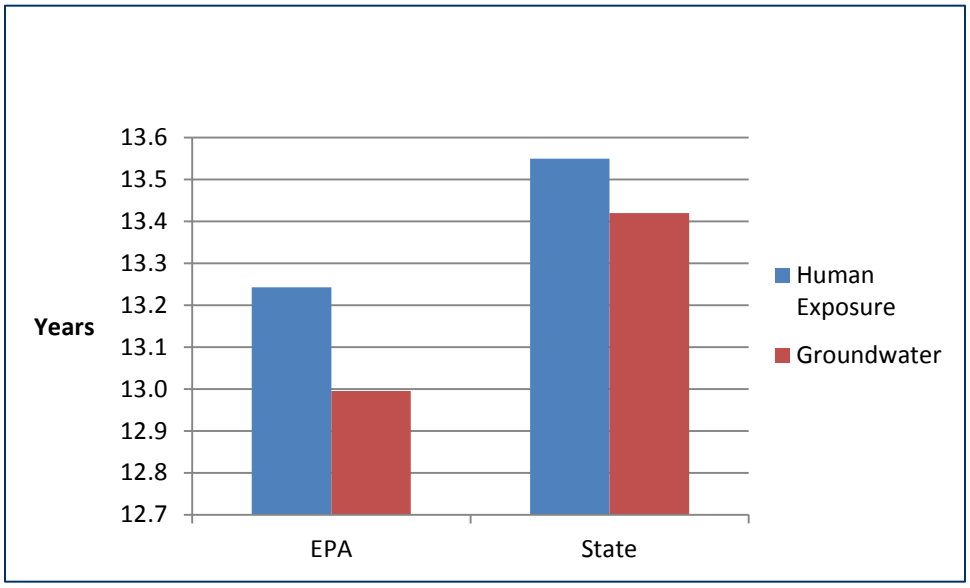
EXHIBIT E-1: YEARS FROM START DATE TO KEY ACTIONS AT EPA-LEAD VS. STATE-LEAD SITES



These data reveal that, on average, ***EPA-lead sites take slightly longer to complete site investigations, remedy decisions, and remedy construction, as measured from the start of the Corrective Action process.*** Overall, EPA-lead sites require an average of 14.1 years to progress through these phases, while state-lead sites require an average of 12.9 years.

Exhibit E-2 illustrates that, ***by contrast, state-lead sites take slightly longer, on average, to achieve key environmental indicators as compared to EPA-lead sites.***

EXHIBIT E-2. TIME NEEDED TO REACH EI'S AT EPA-LEAD VS. STATE-LEAD SITES



While these statistics provide a useful snapshot of Region 2's sites, a more rigorous analysis is required to determine the extent to which process times are associated with lead agency. To investigate the apparent differences in process times for EPA-lead versus state-lead sites, we perform simple t-tests to determine whether the differences are statistically significant.[58] These tests use the sample size and magnitude of process time differences between EPA-lead and state-lead sites to determine whether these differences are likely caused by chance, or by inherent characteristics of these sites. To quantify these differences we divide all sites based on whether they have completed a given phase within one standard deviation above the mean number of years for all sites.[59] We use "one standard deviation above the mean" as a cutoff point beyond which sites require significantly more time than average to complete any given process.[60] We then create a ratio of sites that meet this condition to those that do not. The statistical test compares these ratios between EPA-lead and state-lead sites. Exhibit E-3 summarizes the results of the t-tests.

[58] Since skewness/kurtosis statistical tests determined that site process times were not distributed normally for key Corrective Action phases, t-tests could not be performed using process times as a dependent variable. However, since the assumptions for conducting t-tests using binary variables are less stringent than those using continuous variables, t-tests could be performed based on a binary indicator of site process times.

[59] For this analysis, we only used sites that have had the opportunity to complete the phase in this time frame. For example, if the mean and standard deviation for a specific phase were five years and two years, respectively, sites that have not had at least seven years to complete this phase were not included in the analysis.

[60] This construction of the dependent variable produces a counterintuitive result: By definition a majority of sites should fall below one standard deviation above the mean. However, our variable indicates that a majority of sites fall above this threshold for most phases. This discrepancy is possible because only sites that have completed a phase can be used to calculate the mean and standard deviation for that phase. This outcome could indicate one of two phenomena. First, it may be that sites that have not reported an end date for a phase actually tend to require more time to complete the phase. In this case, the calculated mean for our sample will be lower than it should be, as it was calculated using only sites that have completed a phase. Alternatively, this result could reflect the fact that many sites are not required to report an end date for certain phases. In this case our estimated mean may or may not be correct, but the number of sites falling above the "mean + standard deviation" threshold will be higher than it should be.

EXHIBIT E-3. T-TEST COMPARISON OF EPA-LEAD VS. STATE-LEAD SITES

		FEDERAL		STATE		
ACTION	NAME OF ACTION	# OF SITES IN SAMPLE	% SITES ABOVE MEAN + 1 STD. DEV.	# SITES IN SAMPLE	% SITES ABOVE MEAN + 1 STD. DEV.	P-VALUE
CA200	Site Investigation Complete	76	59%	168	45%	**0.0432**
CA350	Corrective Measures Study Complete	75	87%	166	73%	**0.0183**
CA400	Remedy Decision	66	77%	159	53%	**0.0009**
CA550	Remedy Construction Complete	50	54%	114	37%	**0.0405**
CA725	Human Exposure Under Control	79	13%	189	8%	0.2904
CA750	Groundwater Contamination Under Control	75	23%	183	16%	0.1938
CA999	Corrective Action Process Terminated	38	68%	77	77%	0.3461

Key: shading = statistically significant at a 95% confidence level

Results are based on t-tests for independent samples.

The results for the CA725, CA750, and CA999 variables indicate that ***no significant difference could be found between the full duration of the Corrective Action process, or the time required to achieve environmental indicators, at EPA-lead versus state-lead sites.*** For CA725 and CA750 (EIs), the close proximity of the ratios across groups seem to have prevented the test from detecting a statistically significant difference between EPA-lead versus state-lead sites. For CA999 (Corrective Action process terminated), the result seems to be driven primarily by the small number of sites that have terminated the Corrective Action process.

In contrast, we find a statistically significant difference between EPA-lead sites versus state-lead sites for the other phases of the process that we tested (CA200, CA350, CA400, and CA550), with EPA-lead sites likely to take longer. This result implies that some characteristic of EPA-lead sites – whether relating to the lead agency, the sites themselves, or some other factor – slows down the Corrective Action process at these sites. For example, the interviews with Region 2 indicate that EPA often assumes responsibility for sites that are inherently difficult or complex for states to manage. If true, this could explain why EPA-lead sites take longer than state-lead sites.

To investigate *why* EPA-lead sites sometimes take longer than state-lead sites, IEc conducted a number of Ordinary Least Squares (OLS) and probit regressions. These regressions are designed to isolate the individual significance of sites' lead agency on site process times, while controlling for the effects of

other site characteristics.[61] Although we ran a number of regressions using different variables, only one regression's results are statistically significant at the 95 percent confidence level. Specifically, a probit regression using the remedy decision as the dependent variable assigns a statistically significant and positive coefficient to the binary variable denoting EPA-lead sites. This indicates that EPA-lead sites are less likely to reach a remedy decision in less than one standard deviation above the mean of all sites, as compared to state-lead sites. In every other iteration of the probit analysis that we conducted, statistical significance is not consistently assigned to the agency leading sites' cleanups. ***This suggests that observed differences in process times between EPA-lead and state-lead sites are likely attributable to characteristics of sites themselves, rather than the means by which each agency deals with site cleanups.***

QUESTION 1C: ARE DECISIONS MADE IN A TIMELY MANNER?

RCRA INFO

Overview

IEc calculated summary statistics on the percentage of sites and time required to complete key steps in the Corrective Action process, measured from the initiation of the Corrective Action process through the completion of each step. The results are shown in Exhibit E-4.

EXHIBIT E-4. SUMMARY STATISTICS OF RATES AND TIMES TO COMPLETE KEY ACTIONS

ACTION	# SITES[1]	% SITES[1]	MEAN YEARS[2]	MEDIAN[2]	STANDARD DEVIATION[2]
Site Investigation Imposed	243	73%			
Site Investigation Initiated	195	59%			
Site Investigation Complete	156	47%	5.0	4.0	4.6
Corrective Measures Study Initiated	39	12%	2.8	1.4	3.2
Corrective Measures Study Complete	68	21%	5.3[3]	4.3	4.1
Remedy Selected	136	41%	10.2	9.8	6.5
Remedy Construction Complete	133	40%	13.1	14.5	6.7
Human Exposure Under Control	242	73%	13.5	14.0	4.5
Groundwater Contamination Under Control	212	64%	13.4	14.1	4.6
Corrective Action Process Terminated	44	13%	10.0	13.6	9.2

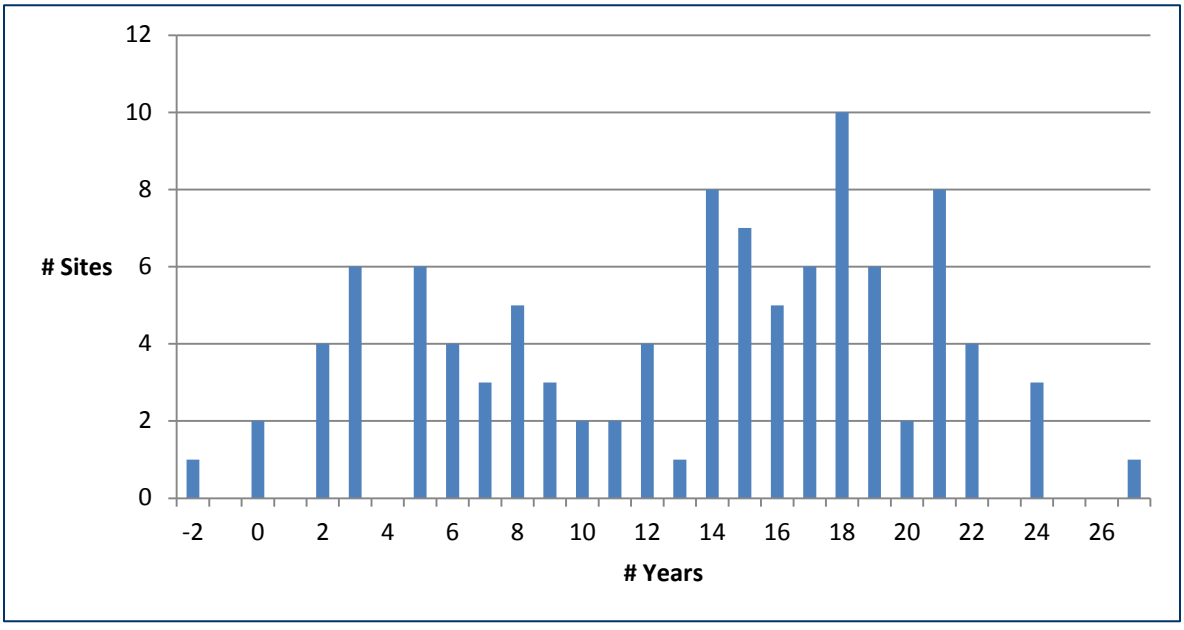
(1) Considers all sites that have completed the specified action.
(2) Considers only sites that have recorded both the specified action and a start date for the corrective action process.
(3) Some facilities reported the CMS start date and end date on the same day, which pulls down the average time required to complete the CMS. This could occur if an Interim Measure was retroactively adopted as the final remedy; alternatively, the result could simply reflect how data was reported in RCRAInfo.

[61] For a more thorough description of regressions run, variables included, and results, see the discussion in 1C.

Overall, from the start of the RCRA Corrective Action process, sites that have completed the process took 5.0 years on average to complete the RFI, 10.2 years to select a remedy, and 13.1 years to construct a remedy. Notably, the averages do not include sites that are still in process; the averages will likely increase over time as these "lagging" sites reach completion. On the other hand, the large standard deviations suggest that outliers (sites that progressed especially slowly) may be pulling up the averages. It has taken sites about 13.5 years to meet environmental indicators, but as explained later in this chapter, that has more to do with when sites were added to the GPRA 2020 baseline than when they started the RCRA Corrective Action process.[62] ***Notably, many more sites have met each environmental indicator than have constructed, or even selected, a remedy.*** Approximately 73 percent and 64 percent of sites have met the human exposure and groundwater indicators, respectively, while only 41 percent of sites have selected a remedy.

Visual representations of this same data further illustrate trends relating to the times required to complete various steps in the Corrective Action process. Exhibit E-5 shows the number of years from the initiation of the Corrective Action process to the construction of a final remedy. Exhibit E-5 displays data for all sites that have reported a date for both the start of the Corrective Action process and the completion of a final remedy.[63] ***These sites, which account for 24 percent of all sites in Region 2's GPRA universe, have a mean of 13.1 years and a median of 14.5 years to completion.*** Within this timeframe, most sites will have completed an initial RCRA facility investigation and corrective measures study, and constructed a remedy. Distributions for these intermediate phases are shown in Exhibits E-6 through E-8.

EXHIBIT E-5. YEARS NEEDED FOR REMEDY CONSTRUCTION AFTER INITIATING CORRECTIVE ACTION



[62] Further data limitations are outlined at the conclusion of this section.

[63] Note that 81 sites have recorded both a corrective action start date and remedy construction. This differs from the 133 sites (shown in Exhibit 8 above) that have recorded the completion of final remedy construction.

EXHIBIT E-6. YEARS REQUIRED TO COMPLETE THE SITE INVESTIGATION PHASE

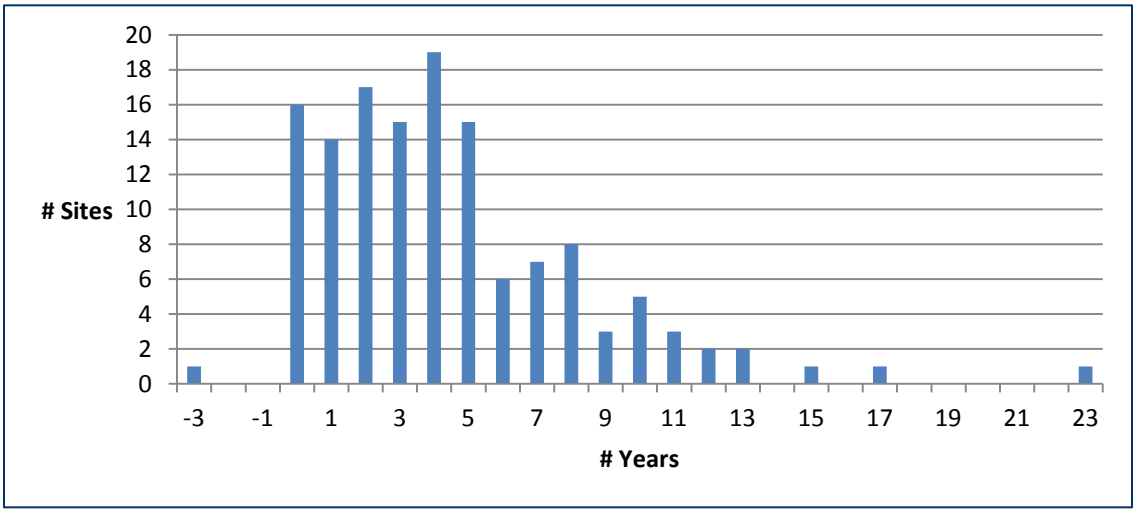


EXHIBIT E-7. YEARS REQUIRED TO COMPLETE THE CORRECTIVE MEASURES STUDY PHASE

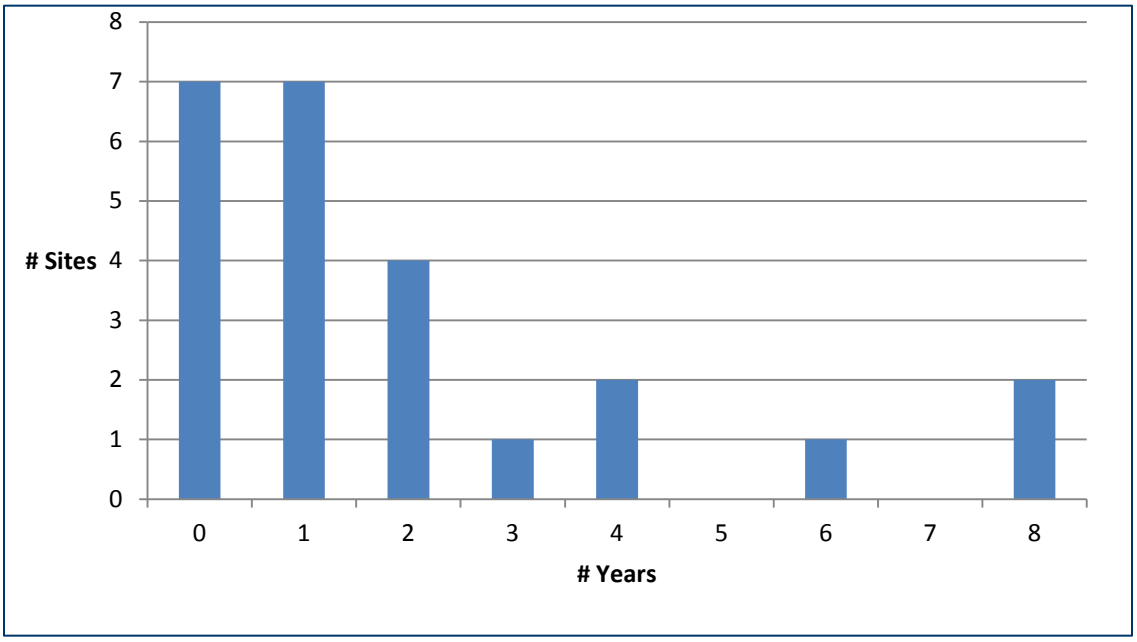
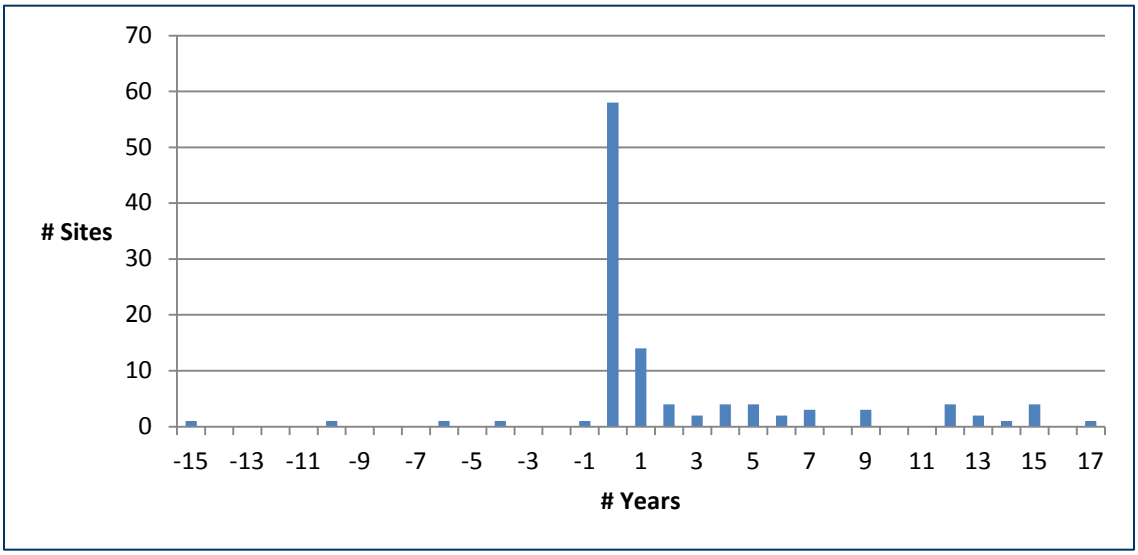


EXHIBIT E-8. YEARS NEEDED TO CONSTRUCT A REMEDY, ONCE A REMEDY HAS BEEN SELECTED



As shown in Exhibit E-5 above, the analysis reveals a bimodal trend whereby sites tend to construct a remedy in five years, or in 18 years, but are less likely to construct a remedy closer to the overall mean of 13 years. Since none of the intermediate three phases mirror this bimodal trend, ***it is likely that sites that complete one phase of the process slowly are likely to complete other phases of the process slowly.***

Similar distributions are also presented for the attainment of each environmental indicator in Exhibits E-9 and E-10.

EXHIBIT E-9. YEARS NEEDED TO MEET EI'S, ONCE A SITE INVESTIGATION HAS BEEN IMPOSED

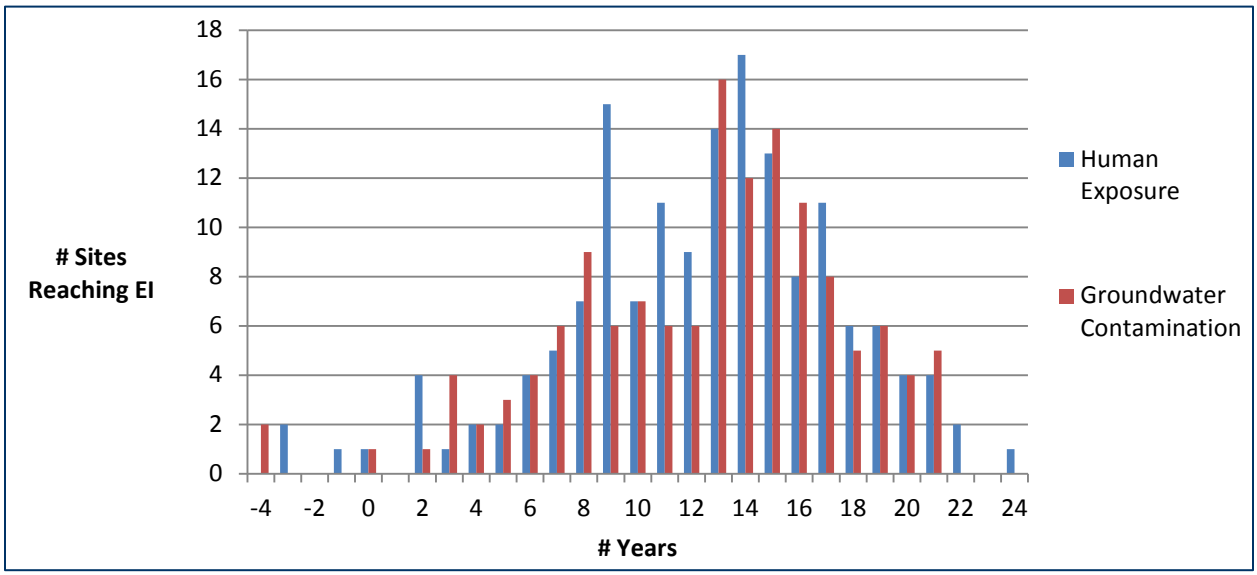
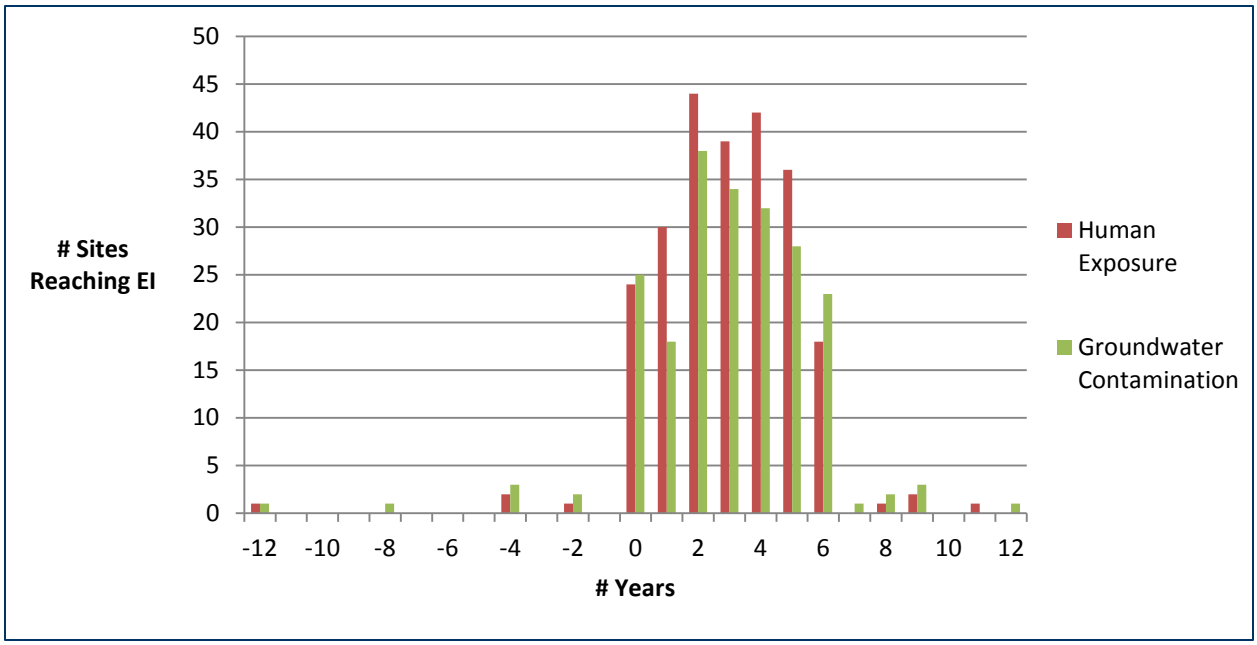


EXHIBIT E-10. YEARS NEEDED TO MEET EI'S, ONCE ADDED TO GPRA UNIVERSE



Exhibits E-9 and E-10 suggest that ***GPRA goals may be quite effective at prompting the completion of each environmental indicator.*** Whereas the first exhibit reveals a wide range of years required for sites to meet these goals since initiating Corrective Action, the second shows that the vast majority of sites reach these goals within six years of GPRA designation. Note that a larger distribution of times is expected in the first graph, since many sites initiated the Corrective Action process long before the creation of the GPRA universe in 1999. However, had these sites already controlled human exposure and groundwater contamination, the GPRA process time in the second graph would be recorded as zero or negative. Instead, we see that most sites met the GPRA goals shortly after GPRA designation. This could suggest that their inclusion in the GPRA universe prompted an efficient effort leading to the completion of the GPRA goals. Alternatively, sites may have met these environmental goals prior to their inclusion in the GPRA universe, but recorded this fact several years later their designation.

Outlier analysis

We hypothesize that site characteristics are related to the time required to complete the process. To test for a correlation between slow-moving sites and various site attributes, IEc conducted an outlier analysis based on the following process times:

- RCRA Facility Investigation
- Corrective Measures Study
- Remedy Construction
- Investigation Imposition to Remedy Selection

- Investigation Imposition to Remedy Construction
- Investigation Imposition to Corrective Action Process Terminated

Sites that fall within the slowest 25th percentile for each of these phases are aggregated, and characteristics of sites that fall within the slowest 25th percentile of sites for four or more phases (11 sites in total) are compared against characteristics of all Region 2 sites. As shown in Exhibit E-11, compared to the characteristics of all sites in Region 2, these 11 sites were disproportionately more likely to:

- Have been added to the GPRA universe in 1999 (rather than in 2006 or 2009)
- Be state-lead
- Have contaminated groundwater and soil
- Be given a high priority National Corrective Action Priority System (NCAPS) ranking.

EXHIBIT E-11. CHARACTERISTICS OF SLOWEST SITES (IN FOUR OR MORE KEY PHASES)

SITE (1)	STATE	PRIORITY	GPRA YEAR	ORDER?	AGENCY	CONTAMINATION TYPE			
						AIR	GROUND WATER	SOIL	SURFACE WATER
1	NJ	High	1999	No	State	No	Yes	Yes	No
2	NJ	High	1999	No	State	Yes	Yes	Yes	Yes
3	NJ	High	1999	No	State	No	No	No	No
4	NJ	High	1999	No	EPA	No	Yes	Yes	No
5	NJ	High	1999	No	State	No	Yes	No	No
6	NY	High	1999	Yes	State	No	Yes	Yes	No
7	NY	Medium	1999	Yes	State	No	Yes	Yes	Yes
8	NY	High	1999	No	State	No	Yes	Yes	No
9	NY	Medium	2009	Yes	EPA	No	Yes	Yes	No
10	NY	Medium	2006	No	State	No	Yes	Yes	Yes
11	NY	High	1999	No	State	Yes	Yes	Yes	Yes

Notes: (1) Site names have been redacted for confidentiality reasons.

Due to the small number of sites that fall within the slowest 25th percentile, we were not able to conduct statistical analysis to determine whether these factors are statistically significant. Therefore, the results should be treated more as anecdotal information than general conclusions about factors that influence cleanup times.

Regression analysis

Approach

While the outlier analysis described above suggests several site characteristics that may slow down the Corrective Action process, a more rigorous regression analysis is helpful in evaluating these correlations in a more systematic way.[64] In particular, a regression analysis can isolate the impact of individual site characteristics on site process times by controlling across many other characteristics. In addition to the sites' lead agency and use of administrative orders, other variables could impact the duration of process times at a site, including the type of contamination, extent of contamination, site size, location, priority within GPRA, and use of intermediate remedial measures. Exhibit E-12 provides descriptive statistics for primary explanatory variables included in our regressions.

EXHIBIT E-12. SUMMARY OF CHARACTERISTICS OF SITES EVALUATED

BINARY VARIABLES	# SITES[1]	% TOTAL
New York	174	52.57%
New Jersey	106	32.02%
Puerto Rico	51	15.41%
High Priority NCAPS Ranking	142	42.90%
Medium Priority NCAPS Ranking	95	28.70%
Low Priority NCAPS Ranking	94	28.40%
EPA-lead	100	30.21%
State-lead	210	63.44%
Orders or Decrees Used	93	28.10%
Air Release Indicated	48	14.50%
Groundwater Release Indicated	208	62.84%
Soil Release Indicated	226	68.28%
Surface Water Release Indicated	103	31.12%
Continuous Variables	**Mean**	**Median**
Site Size (acres)	671.5114	25

Notes:
(1) - Note that the present analysis considers only sites that have reported one or more of the key steps in the Corrective Action process. The exhibit describes the number of sites that have a given characteristic and have completed one of these key actions, and expresses this value as a percentage of all GPRA sites in Region 2.

Additional variables were also included for:

- The number of multiple instances of a single action type
- The number of interim remedy decisions made
- The number of interim remedy constructions completed

[64] For a description of the methodology used in the regression analysis, please see the methodology section of this report.

Furthermore, an additional set of regressions was run including the following variables:

- Number of final remedies constructed at a sub-sitewide level
- Number of interim measures decisions made at a sub-sitewide level
- Number of interim measures constructed at a sub-sitewide level

Variables listed in Exhibit E-12 above are treated as constant over the lifetime of each site. In the rare cases where the agency lead, priority, or some other variable changed for a given site, this analysis attributes the most recent action or attribute to the site as a whole. By contrast, variables relating to interim measures or sub-sitewide remedy construction are treated as dynamic variables across the lifetime of each site. That is, each regression counts only instances of the action that occur during the phase being measured.

These explanatory variables are applied in two sets of regressions. Dependent variables used in the first set of regressions consist of the time required, in years, to complete phases of the Corrective Action process. This approach allows the dependent variable to be continuous, and therefore allows regression results to express the impact of site characteristics in terms of changes in the duration of key Corrective Action phases,[65] given any site characteristic. However, this approach also produces a limited sample of sites, consisting only of sites that have completed both the beginning and end of the specified process.

To increase the sample of sites that falls within the scope of this analysis, IEc ran probit regressions using a different dependent variable. Rather than expressing the duration of any phase, this new variable captures simply whether or not a site requires more than the mean of all sites plus one standard deviation to complete the specified phase. This variable is therefore binary, rather than continuous, and takes on a value of "1" if the condition stated above holds. Sites that have not completed a phase are assigned a "1" if the same amount of time has passed since the initiation of the phase. If a sufficient amount of time has not passed to place the site above this threshold, the site is not considered in the sample. While this approach therefore is not able to consider every site within Region 2, it expands the sample size of this analysis significantly.

Each regression is analyzed to determine the joint and individual significance of variables in explaining the two dependent variables discussed above. To do so, these analyses consider a range of statistics indicating the predictive strength of each explanatory variable and each model as a whole. A confidence interval of 95 percent is applied, so that OLS regressions with F-statistics outside this confidence interval (above 0.05) are ignored as having too little explanatory power. Similarly, explanatory variables with t-statistics outside of this confidence interval are insignificant. The same confidence intervals are applied to the chi-squared and z-statistics values of probit regressions and their variables, respectively.

Findings

As anticipated, the probit regression models are statistically significant more often than the OLS regressions. Whereas one-third of OLS regressions are significant, two-thirds of the probit regressions are significant. Since the variables included in these regressions are constant across analogous regressions,

[65] See previous section for a description of the construction and limitations of this dependent variable.

this greater rate of significance is likely due to the greater sample sizes made possible by the binary variable used in the probit regressions.

Significant OLS regressions are listed in Exhibit E-13 along with associated p-values and R^2 values.

EXHIBIT E-13. STATISTICALLY SIGNIFICANT OLS REGRESSIONS

DEPENDENT VARIABLE	SUBSITE VARIABLES?[1]	P-VALUE	R^2 VALUE
Remedy Decision	No	0.0433	0.2625
Remedy Construction (from start)	No	0.0217	0.3343
Corrective Action Terminated	No	0.0423	0.9327
RCRA Site Investigation Initiated	Yes	0.0002	0.2945
Remedy Decision	Yes	0.0052	0.3523
Remedy Construction (from start)	Yes	0.0094	0.3961
Groundwater Release Controlled	Yes	0.0211	0.1419

Notes:

(1) Includes subsite remedy construction, and subsite interim remedial measure decisions and constructions

R^2 values were also tracked across significant regressions, which ranged from 0.14 to 0.93. In other words, the model with the highest R^2 value explains around 93 percent of the variation in the dependent variable (Corrective Action terminated).

Looking beyond the significance of the model as a whole, very few individual variables were consistently determined to be statistically significant. For various reasons outlined in the "limitations" section below, this finding may be due largely to limitations in the data we were able to acquire. However, it is worth discussing what few variables were in fact deemed significant in our model.

Most notably, **multiple instances of a single event code *were often determined to have a significant and* negative *effect on the process times observed across sites.*** Specifically, at least one such variable was found to be significant in regressions using remedy decisions, remedy constructions, and Corrective Action process terminated as dependent variables. This finding could indicate that within a facility, different SWMUs or parcels moved through the process on different tracks. The results might also indicate that sites that have had to revisit portions of the Corrective Action process multiple times have become more efficient in these processes, or have revisited phases with progressively less contamination needing to be addressed. Alternatively, this result could simply reflect shortcomings inherent in the nature of the present analysis. As previously discussed, the non-linearity of the Corrective Action process allows sites to cycle back through stages of the process. While this practice is generally viewed positively, and allows sites flexibility in dealing with cleanups, it creates a challenge in measuring the precise start and end dates for each phase of the cleanup process. Thus, the significance assigned to the variable for multiple event codes may in fact reflect the difficulty our model has in properly measuring each phase, rather than the efficiency with which each site is able to complete that phase.

Other variables that were significant at the 95% level for select models include:

- EPA-lead, which tended to decrease the time required to reach Corrective Action terminated
- Surface water contamination, which tended to decrease the total duration of the Corrective Action process
- Subsite interim measure decisions, which tended to increase the time required to complete the RCRA site investigation
- Subsite remedy constructions, which tended to increase the amount of time required to reach a final remedy decision
- Use of orders or decrees, which tended to increase the time required to control groundwater contamination at sites

As stated above, explanatory variables are assigned statistical significance with far more consistency by probit models as opposed to the OLS regressions described above. Significant probit models and associated indicators of significance are shown in Exhibit E-14.

EXHIBIT E-14. STATISTICALLY SIGNIFICANT PROBIT REGRESSIONS

DEPENDENT VARIABLE	SUBSITE VARIABLES?[1]	P-VALUE	PSEUDO R^2 VALUE[2]
RCRA Site Investigation Complete (from Corrective Action start date)	No	0.0024	0.1217
Corrective Measures Study Complete (from Corrective Action start date)	No	0.0000	0.2951
Remedy Decision	No	0.0000	0.2554
Remedy Construction (from start)	No	0.0000	0.5454
Remedy Construction (Phase)	No	0.0002	0.2627
RCRA Site Investigation Complete (from start)	Yes	0.0011	0.1414
Corrective Measure Study Complete (from start)	Yes	0.0000	0.3627
Remedy Decision	Yes	0.0000	0.2758
Remedy Construction Complete (from start)	Yes	0.0000	0.5603
Remedy Construction (phase)	Yes	0.0000	0.3415
Groundwater Contamination Under Control	No	0.0001	0.1911
Human Exposure Under Control	Yes	0.0325	0.1829
Groundwater Contamination Under Control	Yes	0.0003	0.2027

Notes:

(1) Includes subsite remedy construction, and subsite interim remedial measure decisions and constructions

(2) This value provides a measure of how well the model's predictions match actual observations. Pseudo R^2 values can range from 0 to 1, where greater values denote greater predictive strength of the model.

As with the OLS regressions, continuous variables capturing ***multiple entries of the same event code at a site are statistically significant*** with greater consistency than any other type of variable. Moreover, every significant probit regression has at least one such variable deemed significant within the model. Interestingly, the explanatory variable counting multiple instances of the action directly preceding the end of the given phase is always found to be significant, usually with a negative estimated coefficient. These findings mirror those from comparable OLS regressions, and can therefore be interpreted similarly. For example, sites that have re-visited a phase multiple times may have become more efficient at dealing with the contamination, or may have returned to the phase in order to deal with less and less complex contamination. Alternatively, these results could reflect our analysis' inability to accurately measure phase durations.

Interim measure decisions are also found to have a significant and negative (i.e., time-reducing) effect on process times with a fair degree of consistency within probit regressions.[66] This result is consistent across process times for corrective measure studies, remedy decisions, and remedy constructions. ***This finding suggests that using interim measures generally decreases the time required to reach remedy decisions and construction. For regressions involving remedy construction, this result may reflect the fact that sites will often retroactively determine a previously-constructed interim measure to be sufficient as the final remedy for a site.*** In this case, data from RCRAInfo may yield a negative process time, or a process time of zero. While the sign of the estimated coefficient should remain negative in this case, these discrepancies in data entry cause estimated coefficients to be more negative than they otherwise would have been.

Regarding sites' geographic jurisdiction, New York and New Jersey were assigned statistically significant and negative coefficients in probit regressions involving the RCRA site investigation. Since these variables are binary, the signs of their coefficients therefore indicate the relative efficiency of these phases as compared to sites in Puerto Rico. ***This result therefore suggests that sites in Puerto Rico may complete site investigations at a slower rate than sites elsewhere in Region 2. By contrast, New Jersey was assigned a statistically significant and positive coefficient in probit regressions involving groundwater contamination, indicating the New Jersey sites may be slower to achieve the groundwater EI than Puerto Rico.*** The latter could be due, at least in part, to New Jersey's relatively stringent water standards. However, as discussed below, these findings may also reflect unobserved characteristics of sites in particular geographic jurisdictions, rather than the agency or means used during site cleanups.

Other variables that were found to be significant in select probit models include:

- Soil contamination, which tended to increase the likelihood that a site reached a remedy decision and remedy construction in less than one standard deviation above the mean process time. (Process times measured from the Corrective Action start date)
- Medium priority, which tended to decrease the probability that a site was able to construct a final remedy in less than one standard deviation above the mean process time, as compared to sites with low priorities. (Result held for the remedy construction phase and remedy construction as measured since the start of the Corrective Action process)

[66] Note this finding is different than the results of the OLS regression discussed above. The OLS regression suggested that sub-site interim measures *increase* the time required to complete the site investigation. The probit analysis indicates that interim measures *decrease* the time required to reach remedy decision and construction.

- Use of orders and decrees, which tended to decrease the likelihood that a site constructed a final remedy in less than one standard deviation above the mean process time (Process times measured from the Corrective Action start date)
- Financial assurance requirements, which tended to decrease the likelihood that a site completed remedy construction in less than one standard deviation above the mean process time. (Result held for the remedy construction phase and remedy construction as measured since the start of the Corrective Action process)
- EPA-lead, which tended to decrease the likelihood that a site reached a remedy decision in less than one standard deviation above the mean process time for all sites.
- Groundwater contamination, which tended to decrease the likelihood that a site reached a remedy decision in less than one standard deviation above the mean for all sites.
- High priority, which tended to decrease the likelihood that a site constructed a final remedy in less than one standard deviation above the mean for all sites. (Process time measured from the Corrective Action start date)

Caveats and limitations

The exhibits in the previous sections illustrate the strengths and limitations of the existing data. For example, sites are not required to report key actions such as the completion of a site investigation, or the initiation or completion of the corrective measures study. Phase statistics can therefore only be calculated using dates from the sample of sites that have reported a date for both the start and end action of each process. As such, the statistics presented above may not align in a manner one would expect. For example, the average time needed to construct a remedy is actually greater than the average time required to complete the entire Corrective Action process. Similarly, more sites have reported completing a corrective measures study than have reported initiating one.

Other measurement difficulties arise due to the non-linearity of the Corrective Action process. During this process, sites may complete a given phase, only to return to this phase at a later date. Alternatively, sites could complete a phase such as an interim remedial measure, only to retroactively define this measure to be the final remedy at a later date. These types of reporting patterns may create discrepancies between the phase durations that this evaluation measures and those that actually take place. For example, sites may appear to have completed the final action in a phase before initiating the phase.

It is important to keep in mind the limitations of the data when interpreting the regression analyses. For example, although ideally sites should have every applicable event code on the Corrective Action process entered into RCRAInfo, this is not always the case. Specifically, the completion of a site investigation, the imposition or completion of a corrective measures study, or any actions relating to interim measures are not always consistently recorded in the database. This observation may be due to a variety of reasons, including duplication with state tracking systems such as NJEMS, and Region 2 staff reassignment without full accounting of site activities. Consequently, these omissions have the potential to introduce sample selection bias into our regression analysis. For example, if sites that have such specific event code information in RCRAInfo as just described also tend to complete stages of the Corrective Action process

at a faster rate, our estimated process times will be biased downwards in a way that is not representative of the entire Region 2 Corrective Action universe.

While limited data can bias the dependent variables included in our analysis, it can also bias the significance assigned to the explanatory variables included in our analysis. Most notably, our analysis was not able to include data related to the financial stability of a site, the experience of the project manager, extent of contamination and types of contaminants, or community involvement in site processes. Each of these factors has the potential to effect the duration of time required to complete a given phase of the Corrective Action process. Thus, our inability to capture them in our regressions could potentially introduce omitted variable bias, whereby the significance of the omitted variable could be incorrectly attributed to another variable that was included in the regressions. For this to occur, the omitted variable would have to be correlated with the included variable. For example, if EPA sites (an observed characteristic) are more likely to have greater levels of contamination (an unobserved characteristic), our analysis may determine that EPA's direction of the cleanup process causes sites to progress slower, while in reality EPA sites could move slower due simply to the greater complexity of contamination.

Our analysis was also not able to capture the effects of many time-sensitive variables. Such variables include changes in site priority, GPRA designation, priorities of EPA and state agencies, and the general state of the national economy and political climate. To the extent that such factors affect Corrective Action process times differently across time, our results will be biased accordingly. For example, we have learned through interviews that EPA has focused more on meeting EIs in recent years. This may quicken the rate at which sites reach EIs, but may slow the rate at which they progress through other aspects of the RCRA CA process during this time. Our analysis was not able to account for dynamic effects such as this.

Despite these limitations associated with the data, we believe the analysis provides useful insight for the program.

QUESTION 3: ARE THERE IDENTIFIABLE DELAYS IN THE PROJECTS OR IDENTIFIABLE NON-COMPLIANCE THAT MIGHT HAVE BEEN PREVENTED BY THE ISSUANCE OF A RCRA CORRECTIVE ACTION ORDER OR BY TAKING SOME OTHER ENFORCEMENT ACTION?

RCRAInfo

To address this question, we first used RCRAInfo data to compare Region 2 facilities with and without the use of orders or decrees. Of the 332 GPRA sites in RCRA Region 2, 113 have implemented at least one instance of corrective action under an order or decree, rather than a permit modification or on a voluntary basis.[67] After further focusing the analysis only on sites completing certain key actions at a site-wide level, we are left with 93 facilities that have used orders or decrees. This analysis seeks to determine whether these orders or decrees resulted in faster cleanup times across facilities.

An initial glance at data from RCRAInfo suggests that there may be a slight difference between process times at sites have used these orders and decrees as compared to those that have not. Exhibits E-15 and E-16 show the process times for key stages, and years to achieve EIs at sites with and without orders or decrees.

[67] This includes consent orders and consent decrees.

EXHIBIT E-15: PROCESS TIMES AT SITES WITH AND WITHOUT ORDERS OR DECREES

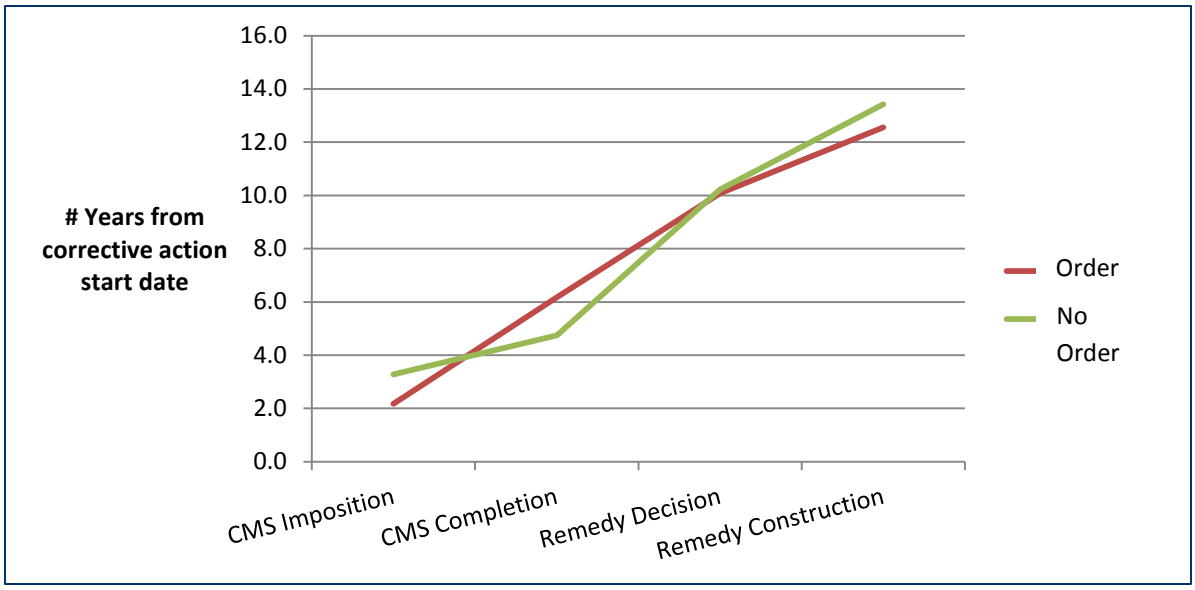
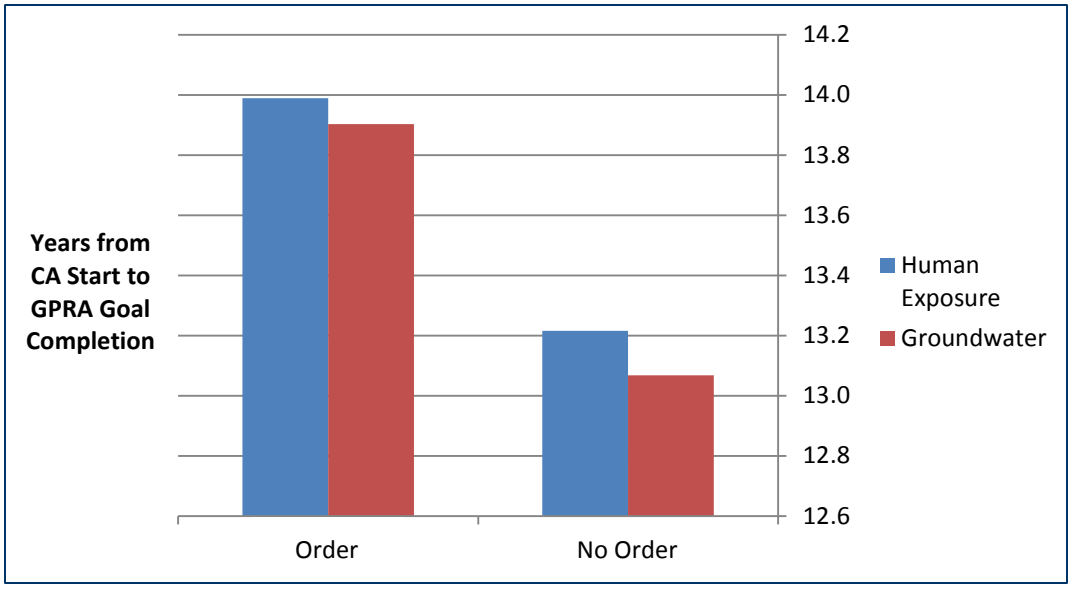


EXHIBIT E-16: YEARS TO ACHIEVE EI'S AT SITES WITH AND WITHOUT ORDERS OR DECREES



These data show that facilities that have used orders or decrees take an average of 0.8 years longer to achieve each environmental indicator, as compared to sites that have never used orders or decrees. By contrast, sites that have used orders or decrees take an average of 0.8 fewer years to construct a final remedy (as measured from the start of the corrective action process), when compared with process times for sites that have not used these authority types.

We conducted t-tests to determine whether differences in process times between these two types of facilities are statistically significant. As with the analogous tests run for the EPA-lead variable described in Question 1 above, these tests are based on a binary variable that indicates whether a site required more

than one standard deviation above the mean process time for any given phase of RCRA Corrective Action. The t-test results are displayed in Exhibit E-17 below.

EXHIBIT E-17: T-TEST FOR DIFFERENCES BETWEEN SITES WITH AND WITHOUT ORDERS OR DECREES

		ORDERS OR DECREES		NO ORDERS OR DECREES		
ACTION	NAME OF ACTION	# SITES IN SAMPLE	% SITES ABOVE MEAN + STD. DEV.	# SITES IN SAMPLE	% SITES ABOVE MEAN + STD. DEV.	P-VALUE
CA200	Site Investigation Complete	81	50%	163	46%	0.1128
CA350	Corrective Measures Study Complete	81	74%	160	79%	0.4139
CA400	Remedy Decision	80	55%	145	63%	0.2148
CA550	Remedy Construction Complete	57	46%	107	40%	0.5026
CA725	Human Exposure Under Control	86	9%	182	10%	0.8794
CA750	Groundwater Contamination Under Control	84	19%	174	15%	0.4926
CA999	Corrective Action Process Terminated	33	85%	82	70%	0.0902

Unlike the EPA-lead variable, these t-tests indicate that at a 95 percent confidence interval, ***we cannot reject the null hypothesis that the two sets of sites have the same distributions of process times.*** In other words, these results suggest that the likelihood that a facility completes any phase of the corrective action process in more than one standard deviation from the sample mean is the same for sites that have used orders and decrees as for sites that have not used these authorities. This finding could reflect a number of different phenomena. Most significantly, it could indicate that the use of orders or decrees has no effect on the duration of key phases in the corrective action process. Alternatively, orders or decrees could shorten the amount of time required for key phases, but be implemented most frequently at facilities where key phases are already more likely to take longer. Put another way, sites that use orders and decrees may be inherently more complex and difficult than sites that do not use orders and decrees. The available data do not indicate whether such sites would have progressed *even faster* or *even slower* without the use of an order or decree.

To isolate the effect of using orders and decrees while controlling across other facility characteristics, we ran OLS and probit regressions using a binary variable indicating the use of these authority types. We ran several versions of the regression model, controlling for the effects of contamination type, lead agency, priority level, and other characteristics. This binary variable was assigned statistical significance with very little consistency across the regressions. Specifically, only one OLS regression found that the use of orders or decrees has a statistically significant effect: The test showed that an order/decree tends to increase the amount of time required to control groundwater contamination by 0.96 years. In another

probit regression, the use of these authority types was found to significantly decrease the probability that facilities construct a remedy in less than one standard deviation above the mean for all sites. Thus, ***in both instances where this variable was found to be significant, it was also found where process times experienced at facilities were longer. This effect may or may not indicate that orders and decrees are inherently slower mechanisms for implementing corrective action processes.*** Several interviews suggested that administrative orders and related authorities were more time consuming to draft and enforce, due largely to the lengthy negotiation processes often involved in doing so. It is important to note, however, that our regressions are not able to account for other facility characteristics such as the extent of contamination. We are therefore not able to determine whether such facilities may have taken even longer to complete a phase in the absence of an order or decree.

In general, the failure of regressions to consistently assign statistical significance to this variable largely coincides with the findings of the t-tests outlined above. Results from these two sets of investigations can therefore be interpreted similarly. ***For most phases considered, orders or decrees could have no effect on site process times, or they could reduce process times at sites that would have otherwise taken even longer to complete a given phase. The RCRAInfo analysis alone is not sufficient to answer this question.*** In the rest of this section, we turn to interviews, and to a lesser extent, file reviews for additional insight. These data sources suggest that the effects of enforcement actions depend on the specific context in which these authorities are used.