



**Resource Conservation and
Recovery Act Facilities Investigation
Remedy Selection Track**
A Toolbox for Corrective Action

May 20, 2016

RCRA FIRST

Disclaimer

This Toolbox and its attachments are intended to provide guidance to EPA personnel on implementing the RCRA Subtitle C program. As indicated by the use of non-mandatory language such as “guidance,” “may,” “should,” and “can,” these materials identify policies and provide suggestions and do not create any new legal obligations or limit or expand obligations under any federal, state, tribal, or local law. It is important to note that this Toolbox itself is not a legally binding document and does not create new legal obligations or limit or expand obligations under any federal, state, tribal or local law. This Toolbox is also not a substitute for a permit or order. This Toolbox may only alter legal obligations when it is explicitly incorporated or referenced in a new permit (or order, for interim status facilities) or through a permit or order modification (or order modification for interim status facilities). Thus (unless so incorporated or referenced) the obligations in a permit or order would control over any conflicting Toolbox provisions. Therefore, to maximize the usefulness of this Toolbox, parties should be careful to either work within the scope of any existing obligations contained in any permit(s) and/or order(s) when conducting corrective action or to modify the permit consistent with the requirement in 40 CFR sections 270 and 124.

In addition, under RCRA, states may apply to EPA for, and receive from EPA, authorization of a state program to operate in lieu of the federal RCRA hazardous waste program. These state programs may be broader in scope or more stringent than EPA’s RCRA regulations, and requirements can vary from state to state. Members of the regulated community are encouraged to contact their state agencies for the requirements that apply to them.

Foreword

This Toolbox is for all of the overworked Resource Conservation and Recovery Act (RCRA) corrective action project managers and supervisors, whether you are in a regional or state RCRA program. If you've been around awhile, you know how long it can take to guide a facility through the RCRA Facility Investigation (RFI) and the Corrective Measures Study (CMS) or remedy selection process. In fact, the *average* RFI takes 10 years, with some taking up to 19 years. In addition, while the RFI process usually constitutes up to 80 percent of the time in a given cleanup, remedy selections are taking an average of six years and up to eight years (according to Region 3 and 7 RCRAInfo analysis). So, a facility starting RCRA Corrective Action in 2015 might not begin remedy construction until 2031!

EPA Regions 3 and 7 are unique in that they are direct implementers of RCRA corrective action for the majority of their 2020 universes—nearly 500 facilities. Region 7 proposed that Region 3 join it in an examination of the corrective action process using Lean Six Sigma techniques. Our goal was to address the time-intensive nature of the corrective action process to uncover the causes for delay and improve the efficiency of the program. After all, both Regions are largely directly responsible for meeting their 2020 Government Performance and Results Act (GPRA) goals, so both Regions were highly motivated to improve process efficiency. Throughout this document, the pronouns “we” and “our” refer to the Regions 3 and 7 corrective action programs.

EPA created this Toolbox based on experiences and lessons from two separate “Lean events”—an RFI event in February 2013 and a CMS event in May 2014. These events included project managers from Region 3, Region 7, authorized states, and representatives from EPA headquarters as well as industry and consultant participants. Both events were led by a facilitator with expertise in Lean techniques. The goals of these events were to identify root causes of delay in the current approach and to develop tools for project managers to avoid or overcome these obstacles. Modifications to later versions of the Toolbox were made based on lessons from a mini-Lean event with the state of Ohio in December 2015.

We named the resulting approach to RCRA corrective action the RCRA Facilities Investigation Remedy Selection Track (FIRST). This Toolbox offers corrective action project managers and supervisors a set of tools created by the Lean teams to implement RCRA FIRST, provides examples of this approach, and other advice for efficient implementation of corrective action. There are many tools currently in use to facilitate efficient corrective action cleanups, and we believe this Toolbox can be a valuable addition. References to the “RCRA FIRST team” in this document refer to individuals from EPA Region 3, Region 7, and the Office of Land and Emergency Management, Office of Resource Conservation and Recovery who worked together to develop the RCRA FIRST approach and this Toolbox.

A few pilot facilities have successfully tried out the RCRA FIRST tools, and these tools are appropriate for use by all regions and states. Early results in Regions 3 and 7 are highly encouraging. Case studies are underway now to provide you with examples of early successes using these tools and lessons learned thus far.

If your regional or state program is taking more than five years to complete RFIs and/or more than two years to select a final remedy, we urge you to give these tools a try.

Acronyms and Abbreviations

AOC	Area of Concern
ANPR	Advanced Notice of Proposed Rulemaking
CA	Corrective Action
CAF	Corrective Action Framework
CAO	Corrective Action Objective
CEI	Compliance Evaluation Inspection
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
COC	Constituent of Concern
COPC	Constituent of Potential Concern
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
FIRST	Facilities Investigation Remedy Selection Track
GPRA	Government Performance and Results Act
LNAPL	Light Non-Aqueous Phase Liquid
MCL	Maximum Contaminant Level
NDEQ	Nebraska Department of Environmental Quality
NPDES	National Pollutant Discharge Elimination System
POC	Point of Contact
QAPP	Quality Assurance Project Plan
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RSL	Regional Screening Levels
RSP	Remedy Selection Process
RSPD	Remedy Selection Process Document
SOPs	Standard Operating Procedures
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene
VOC	Volatile Organic Compound

RCRA FIRST Toolbox

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SECTION I: Introduction and Overview

Introduction to RCRA FIRST

The Resource Conservation and Recovery Act (RCRA) Facilities Investigation Remedy Selection Track (FIRST) approach is designed to improve the efficiency of RCRA facility investigations and remedy selection. The FIRST approach:

- Addresses the root causes of delay (also see Appendix B):
 - Unclear or non-specific investigation or cleanup objectives
 - Lack of specific opportunity to elevate differences among stakeholders early in the process
- Starts with multi-party understanding of the objectives in investigation and remedy selection phases
- Enhances communication among project stakeholders
- Promotes the principle of “done right the first time” and avoids re-do loops
- Advances critical decision-making through rapid elevation to resolve disputes
- Stays within the technical or regulatory framework of the corrective action program

Purpose of This Toolbox

The purpose of this Toolbox is to help EPA Regions and their partners to take advantage of the efficiency and quality gains from the RCRA FIRST approach. The Toolbox includes how-to guidance, process flow maps, and tools and templates to make it easier to complete different parts of the FIRST approach and monitor its effectiveness. These resources also can be customized to meet each region or state’s specific needs. EPA users will be able to download these tools individually via the EPA website.

Benefits of RCRA FIRST

The RCRA FIRST tools can have numerous benefits to EPA, states, and communities. These include:

- Reducing the time and costs needed to complete the facility investigation and remedy selection (see sidebar)
- Accelerating the positive environmental results for affected communities
- Providing a roadmap with process metrics to drive continuous improvements

Calculated Savings from RCRA FIRST in Regions 3 and 7

The RCRA FIRST Toolbox has the potential to yield the following savings:

- Cut the time for RCRA Facility Investigation (RFI) from an average of 10 years to a projected 5.1 years or less (49% reduction).
- Reduce the time for the remedy selection process (RSP) from an average of 6 years to a projected 1–2 years (75% reduction).

- Enhancing communication throughout the process
- Ensuring all stakeholders have a clear understanding of the steps needed to achieve site remedy selection and construction completion.

Overview of RCRA FIRST

The RCRA FIRST approach is anticipated to provide a time savings of 50 percent or more, which can translate to years of time saved. Keep in mind that RCRA FIRST is an approach to *managing* RCRA corrective action projects. The legal and technical foundation of the program remains the same.

As you begin to use this new approach, start out by understanding that the overall sequence of core activities in the RCRA corrective action program—from investigating the contamination at facilities to selecting a remedy and documenting the decision—remains the same as the RCRA Corrective Action Plan and EPA’s RCRA Corrective Action Training, *Getting to Yes! Strategies for Meeting the 2020 Vision* (see text box for resource links).

There are four key improvements to the existing corrective action approach that are designed to save time, simplify the process, and avoid or resolve potential issues, as follows.

- **Early Understanding of Goals and Expectations:** The RCRA FIRST approach shifts critical discussions to the front of the corrective action process. Prior to an investigation, the lead agency, supporting agency, regulated facility, and stakeholders clarify the objectives and expectations for the RCRA corrective action during one or more Corrective Action Framework (CAF) meetings.
- **Understanding of Corrective Action Objectives Prior to Remedy Selection:** The RCRA FIRST approach also involves an initial Remedy Selection Process (RSP) meeting at the start of remedy selection. This meeting is designed to provide clear Corrective Action Objectives (CAOs) on which decision-makers and stakeholders agree.
- **Elevation of Issues When Needed and Engagement of Stakeholders at Key Points:** The RCRA FIRST approach identifies points in which participants are encouraged to jointly elevate issues quickly to resolve them if they are not able to reach resolution among themselves. The approach also provides opportunities for the lead and supporting agencies to maintain an open dialog with stakeholders at key points in the project lifecycle.
- **Three Paths for Remedy Selection:** In the RCRA FIRST approach, there are three possible paths for a site: (1) no Corrective Measures Study (CMS) (where there is a presumptive remedy or interim measures in place), (2) a limited CMS (where some additional data collection or pilot studies are needed), or (3) a full CMS (where traditional alternative remedy options are evaluated).

Key Corrective Action Resources

- **RCRA Corrective Action Plan:**
www.epa.gov/osw/hazard/correctiveaction/resources/guidance/gen_ca/rcracap.pdf
- **RCRA Corrective Action Training: Getting to Yes! Strategies for Meeting the 2020 Vision:**
www.epa.gov/osw/hazard/correctiveaction/training/vision/index.htm

These changes seek to identify and resolve critical issues early in the investigation process and then use the investigation to select a remedy. Along with these changes, the RCRA FIRST team of EPA Region 3, Region 7, and headquarters managers and staff also identified metrics and target timelines for key milestones in the RCRA FIRST approach to include in this Toolbox. Having the roadmap and target timeframes for the RCRA FIRST approach is anticipated to help users drive improvements and identify choke points in the lifecycle of corrective action projects. It could also help EPA regions and states to establish a clear understanding amongst stakeholders about expectations for the flow and timeline of corrective action projects.

What Are the Most Important Techniques to Improve Efficiencies?

The RCRA FIRST Toolbox should help project managers improve communication between regulating agencies and the facility. The primary cause of inefficiency, in most cases, is the failure by all parties to understand a coherent set of *written* objectives for the task at hand.¹ It is essential that these objectives be established early in the process and that they are appropriate for the facility conditions and circumstances. This Toolbox presents tools to help project managers create an effective agenda for an early meeting of all participants. The purpose of this meeting is to agree on site-specific objectives and *write them down*. These objectives then form a framework that guides workplan development, data collection, and decision-making. Everyone starts on the same page.

Top “Root Causes of Delay” in the Existing RCRA Corrective Action Program

1. No common understanding upfront on objectives with respect to site cleanup
2. Lack of an effective means to elevate issues to determine streamlined options

Ineffective communication—especially when a dispute arises—also can be a significant cause of delay. Currently many RCRA corrective action projects do not include an easy and transparent set of conditions where disputes can be elevated and quickly resolved. In fact, the RCRA FIRST team learned that many of those involved in corrective action projects view elevating problems to higher management as a sign of failure. Wrong! Elevation is the best way to keep projects moving forward. The tools in this Toolbox include explicit points along the project path where elevation is the immediate response to a dispute. Elevation of issues is an essential technique used to facilitate progress throughout the RCRA FIRST approach.

The techniques in the RCRA FIRST approach directly address key causes of delays, errors, and unnecessary processing in the corrective action program. See Appendix B for a list of key root causes of delay in RCRA corrective action projects.

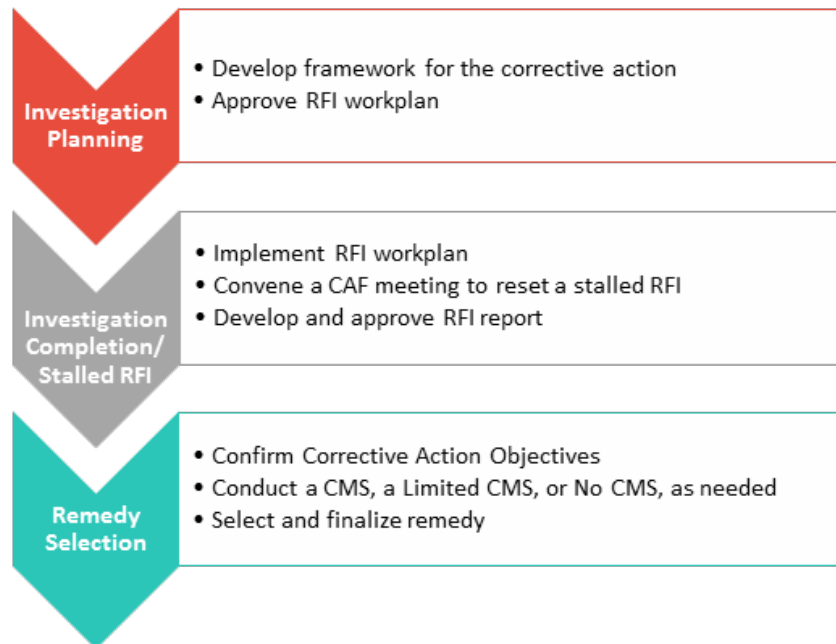
¹ The Lean event identified 12 root causes of delay in the corrective action process. It is the RCRA FIRST team’s conclusion from individual input during the Lean events that vague objectives and the inability to quickly elevate problems were the primary root causes of delay. The full list of root causes discussed is included in Appendix B.

RCRA FIRST Toolbox Contents

The tools contained in this Toolbox will help project managers overcome inefficiencies within the RCRA corrective action program. The tools are organized according to the three phases:

- **Investigation Planning (Section II)**, where you will meet with the facility to establish a mutual understanding of investigation objectives and a framework for the path forward.
- **Investigation Completion (Section III)**, where you will work with the facility to ensure that its data collection is sufficient, and you review and approve the RFI workplan.
- **Remedy Selection (Section IV)**, during which there are three paths: to conduct no CMS, to conduct a limited CMS, or to conduct a full CMS; and select and finalize a remedy.

Figure 1.1 RCRA FIRST Approach: Three Phases



For each phase, the section includes an overview of the activities that need to be performed and a flow chart illustrating the sequence of activities. **Appendix A** contains tools to support implementation and process management. Where possible, we have also included examples of how EPA regions and states have used the tools with facilities to implement aspects of the RCRA FIRST approach (e.g., example agendas). These tools are designed to address the root causes of delay and inefficiency in the RCRA corrective action process, which are summarized in **Appendix B**.

The Toolbox also contains resources related to the RCRA FIRST tools as a whole:

- **Metrics (Section V)** explains the way Region 3 and Region 7 plan to measure our efforts, tracking the amount of time needed to complete each step, and ultimately to determine if we are meeting our improvement goals.
- **Best Practices (Section VI)** provides guidance and tips on how to use the overall RCRA FIRST approach and includes a list of frequently asked questions about the RCRA FIRST approach.
- **Process Management (Section VII)** provides tools to project managers and supervisors with monitoring and maintaining RCRA FIRST processes occurred across many individual projects to track where efficiency gains have been made as well as where further improvements may be needed.
- The **Conclusion (Section VIII)** offers summary observations and invites you to share your feedback and experiences.
- **Case Studies (Appendix C)** show how the RCRA FIRST approach has helped improve results at facilities.

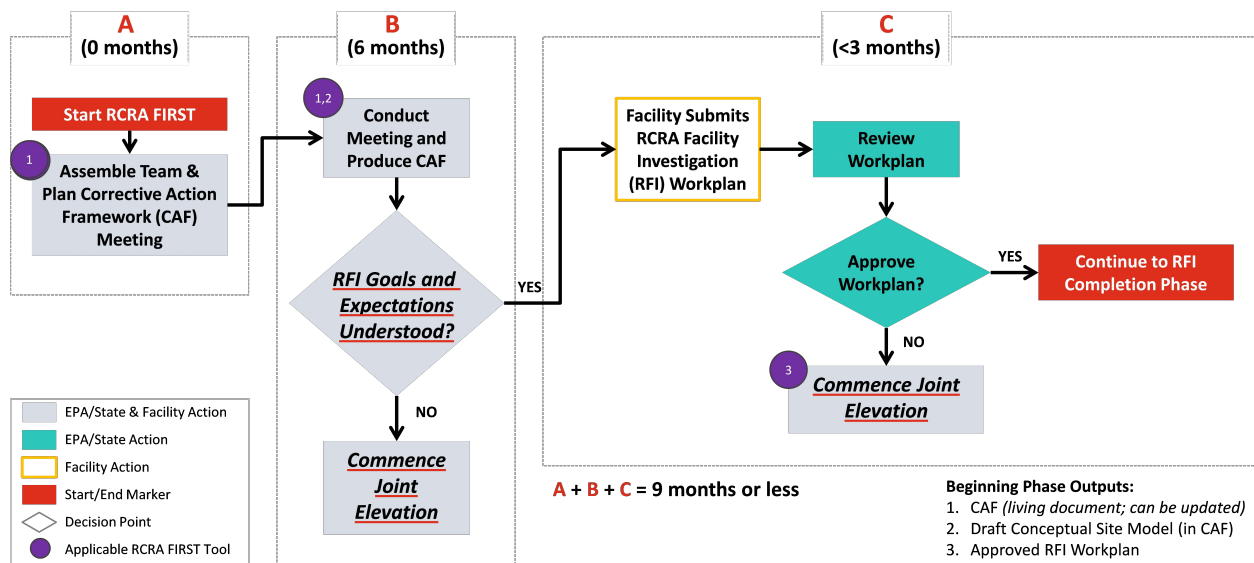
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SECTION II: RCRA FIRST Tools for the Investigation Planning Phase

Overview of the Investigation Planning Phase

During the first phase of the RCRA FIRST approach, you will set the framework for corrective action and plan for the RFI, as shown in the flowchart below. This phase will help get your corrective action process started efficiently and eliminate problems down the road. In this phase, all parties understand objectives for the RFI during a well-planned CAF meeting. At the CAF meeting, all parties discuss what is known about contamination at the facility and develop a common understanding of the objectives for the investigation. These objectives serve as a framework for developing, approving, and implementing a workplan for the RFI. By the end of this phase, you will have an approved RFI workplan, or you will jointly elevate the issue for resolution. At the CAF meeting, parties should also designate who within each organization will participate in the joint elevation process, if needed. (For example, in Regions 3 and 7 the RCRA Division director would attend an elevation meeting).

Figure 2.1 RCRA FIRST Investigation Planning Phase



Investigation Planning Phase Tools

The tools associated with this phase are designed to help regulators and facilities understand a set of objectives that will become the framework for the RFI. A brief summary of each tool and a link to its location in Appendix A is included below.

1 Tool 1: Corrective Action Framework Meeting Agenda (5 pages)

This tool provides a menu of topics to help you develop your CAF meeting agenda. Pick and choose, or make up your own! This is a useful check to make sure that the project team has an opportunity to discuss the difficult issues up front. The “expected outcomes” section is also very helpful. Remember, each meeting will be unique, so feel free to add, subtract, or improvise your agenda for conditions or concerns specific to a facility.

2 Tool 2: Corrective Action Framework Template (10 pages)

This tool provides a “getting started” template that helps you take the results of the CAF meeting and create a framework that will guide the course of the investigation. Here, you will find instructions and examples to develop a site-specific blueprint that will guide the workplan approval step and the subsequent investigation. As with the agenda, feel free to pick and choose those parts you find most helpful. There is also a useful fill-in-the-form for developing a Conceptual Site Model to share with the facility at the meeting. It might help you prevent any facility-specific delays for your project.

- **Example Corrective Action Framework for a New RFI (10 pages)**

This example illustrates a completed CAF for a facility.

3 Tool 3: RCRA FIRST Elevation Process (3 pages)

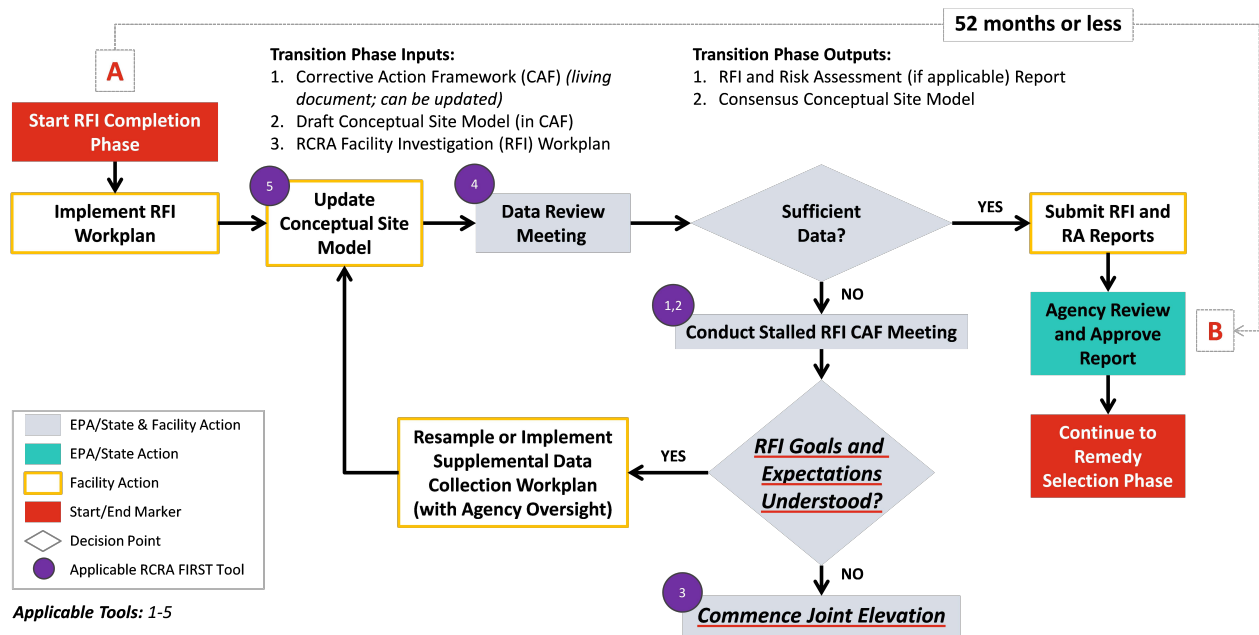
This tool outlines the step-by-step process for conducting the RCRA FIRST *elevation* step. The tool was developed from input of the participants in a mini-Lean event in Ohio in December 2015. It includes a form required to begin elevation.

SECTION III: RCRA FIRST Tools for the Investigation Completion/Stalled RFI Phase

Overview of the Investigation Completion/Stalled RFI Phase

During this phase, you will put into action the RFI workplan the facility developed and the regulatory agencies approved during the planning phase. The facility will collect data, with oversight from regulatory agencies, and everyone will meet and review whether or not the data are sufficient. If re-sampling is not necessary, then it is time for EPA or the state to review and approve the RFI and Risk Assessment (RA) (if applicable) reports. If both parties understand more sampling is needed for proper characterization, then proceed with additional sampling. If there is a lack of understanding regarding the amount or extent of sampling completed and what additional steps might be required for proper characterization, then commence the joint elevation process discussed in the CAF template (by this point parties in each organization who will participate in the joint elevation process should be identified from the initial CAF meeting). The flowchart below shows the steps you will follow in this phase.

Figure 3.1 RCRA FIRST: Investigation Completion/Stalled RFI Phase Flowchart



Investigation Completion/Stalled RFI Tools

Regions 3 and 7 have found that the CAF tools are also helpful to refocus investigations that are stuck. If you are engaged in multiple revisions of the RFI workplan, or cannot approve an RFI report, you may want to hold a CAF meeting to clarify objectives or elevate the issue(s).

We have found that re-setting a project through the use of the CAF tools is a great way to uncover the cause of delays and get progress started again. The **CAF Agenda** and **CAF Template** tools from the first section can be a big help if you are stuck somewhere past RFI workplan approval. Appendix A includes an example of a CAF Agenda that project teams created to reset projects in the middle of the RFI.

At the RFI Lean Event, individual participants provided input on the RFI process, and it was noted that taking another round of samples can be a compromise response to more fundamental problems. Vague understanding about the extent of contamination or differing opinions on where the threats are coming from led the Lean teams to develop two tools to help project managers get out of neutral. **Evaluating RFI Data Sufficiency** and completing a **Conceptual Site Model Iterative Evaluation** may be of help in your situation. Note that the **CAF Template** in the Investigation Planning Phase contains a useful fill-in-the-form tool for developing a draft conceptual site model.

The tools associated with this phase are described and linked to their location in Appendix A below.

4 Tool 4: RCRA Facility Investigation Data Sufficiency Evaluation (2 pages)

This tool can help you to assess whether the RFI data that the facility has collected is sufficient, using a series of qualitative assessment questions. Use this tool to decide whether further sampling is needed, or whether you are ready to hold the supplemental framework meeting.

5 Tool 5: Conceptual Site Model Iterative Evaluation/Update Tool (2 pages)

This tool can help as you assess the validity of the facility's data. Use the series of qualitative assessment questions to examine the current Conceptual Site Model and identify any data gaps.

- **Example Corrective Action Framework Meeting Agenda for a Stalled RFI (2 pages)**

This example CAF meeting agenda illustrates how you and the facility can return to the CAF tools (from the Investigation Planning Phase) in order to restart a stalled RFI. The facility and the regulatory agencies used this CAF meeting to revisit shared objectives and move forward with completing the RFI.

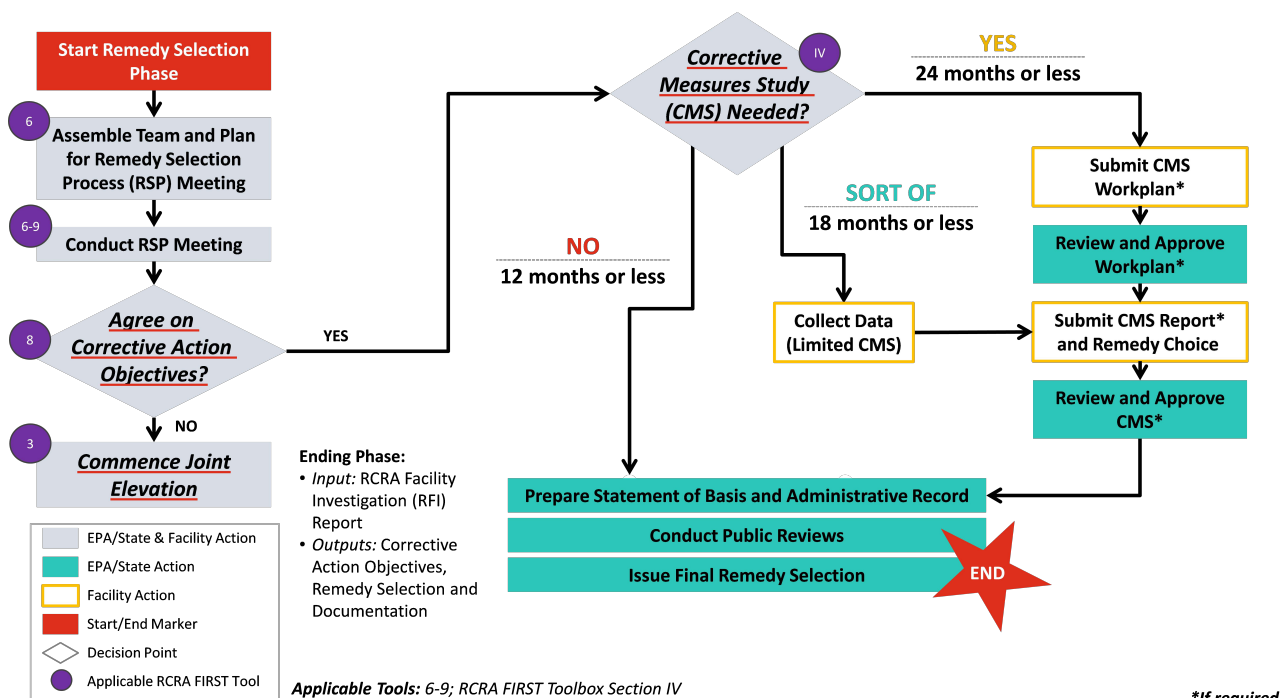
SECTION IV: RCRA FIRST Tools for the Remedy Selection Phase

Overview of the Remedy Selection Phase

The RCRA FIRST team set a goal of reducing the average time for remedy selection from a baseline of 60 months to six months. From a project manager’s perspective, this means moving from an approved RCRA facility investigation to remedy selection in 180 days. Can this be done? By focusing on the aspects central to remedy selection and only completing a CMS when necessary, these efficiency gains are possible.

During this phase, you are to reach a common understanding on CAOs for the project (or elevate the issue through the joint elevation step), and then proceed on one of three paths for additional analysis for remedy selection: (1) no CMS, (2) limited CMS, or (3) full CMS. You will then finalize the proposed remedy and supporting documents through the traditional public review process for the Statement of Basis. These steps are shown in the flowchart below. By the end of this phase, either return to the CAF in the beginning phase (if the RFI does not fully support the remedy selection), commence joint elevation (if the team cannot agree on a remedy approach and objectives), or issue the draft remedy selection for public comment through the Statement of Basis. Remember to discuss at the RSP meeting who in each organization will participate in any joint elevation activities.

Figure 4.1 RCRA FIRST: Remedy Selection Phase Flowchart



When Is a Corrective Measures Study Really Needed?

Our analysis of Region 3 and 7 RCRAInfo data suggests that the CMS workplan-review-approval part of remedy selection takes nearly six years—the vast majority of the time for remedy selection. At the CMS event, the RCRA FIRST team discovered that an approved CMS report required 79 steps to complete.

Given those findings, do you always need to do a CMS? No! The only time a full CMS is useful is when the regulatory agencies must choose among alternative remedies. In those cases, a CMS is a necessary part of the administrative record to support the final decision.

However, regulations and policy *do not require* that a CMS be completed. Current EPA guidance and policy state that a CMS is not mandatory.² In fact, the May 1, 1996 Advanced Notice of Proposed Rulemaking (ANPR) on Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities includes an extensive discussion on RCRA remedy selection *without* a CMS.³

The ANPR (p. 19447) includes the following examples where a CMS is not likely to be needed:

1. Low risk facilities
2. Excavation/removal remedies
3. Presumptive remedies/proven effective remedies in similar cases

In Section IV of the ANPR, titled “Corrective Action Priorities” (p. 19455), EPA states:

“f. Avoid unnecessary procedural steps whenever feasible (e.g. eliminate the CMS if a desirable remedy can be identified without one...”

EPA’s RCRA Corrective Action Training, “Getting to Yes! Strategies for Meeting the 2020 Vision” (November 2009) contains entire chapters devoted to the flexible management of remedy selections and cleanups under RCRA, including the flexibility to proceed directly to remedy selection from an approved RFI report. Module 7 of the training, “Selecting and Approving a Protective Remedy,” has at least a dozen examples where certain reviews and approvals may not be necessary to properly select a remedy.

“A formal corrective measures study document is not necessary to select a final remedy” (Module 7, slide 4)

Threshold Criteria All Cleanup Options Must Meet

1. Remedy must protect human health and the environment, based on reasonably anticipated land use
2. Attain media cleanup objectives
3. Control sources of release(s)

² Under RCRA, states may apply to EPA for, and receive from EPA, authorization of a state program to operate in lieu of the federal RCRA hazardous waste program. These state programs may be broader in scope or more stringent than EPA’s RCRA regulations, and requirements can vary from state to state. Members of the regulated community are encouraged to contact their state agencies for the requirements that apply to them.

³ See the remedy selection discussion starting on p. 19447 of the Federal Register Notice, Advanced Notice of Proposed Rulemaking on Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities, May 1, 1996, available at <http://www.gpo.gov/fdsys/pkg/FR-1996-05-01/pdf/96-9707.pdf>.

If you don't need a CMS, why is one required so often? Some project managers or facilities think a full CMS is always required. It is not. In fact, lack of mutual goals and understanding of those goals could lead to a lot of rework in the remedy selection process. If you have clear objectives understood in the RFI process, you can expect a much easier and straightforward remedy selection process. Discuss the need for a CMS at the RSP meeting.

The RCRA FIRST approach incorporates meetings to understand the **Corrective Action Objectives (CAOs)** – just like the CAF meetings in the Investigation Planning Phase – and replaces the review/revise loops with a joint elevation process to elevate issues to management and resolve conflicts. Remember, a RCRA corrective action remedy must meet three threshold criteria⁴ (see sidebar, above), including attaining the cleanup objectives or CAOs.

A tool to improve efficiency in the remedy selection process of the RCRA FIRST approach is a **Remedy Selection Process Meeting Agenda Template** designed to develop mutually understood CAOs. At the RSP meeting, the regulatory agency and facility will reach an understanding on the path the remedy selection will follow.

There are three paths in the RCRA FIRST approach:

1. **No CMS.** This path is the most direct. You have a final, approved RFI Report, you have clear CAOs, and you move straight to the remedy selection process. This is a likely outcome when interim measures are suitable for the final remedy, when post-closure will include provisions for corrective action, or when the only additional requirements are institutional controls.
2. **Limited CMS.** Sometimes the proposed remedy is clear to everyone, but there is consensus that additional fieldwork or pilot testing is needed to support the final decision. No problem. RCRA FIRST includes a path for additional study without requiring a full CMS. Workplan development and review/approval steps are optional and should be discussed at the RSP meeting.
3. **Full CMS.** Finally, the classic CMS report preparation process remains in the Toolbox. We highly recommend that it be used only when more than one viable alternative meets the threshold criteria. Try to avoid creating alternatives (like no action) just to create a comparison. For your convenience, the balancing criteria are listed in the sidebar at right.

Balancing Criteria for Evaluating Cleanup Options

1. Long-term effectiveness
2. Reduction in waste volume, mobility, and/or toxicity
3. Short-term effectiveness
4. Implementability
5. Cost
6. Community acceptance
7. State acceptance

⁴ The threshold criteria are found in Module 7, "Selecting and Approving a Protective Remedy," of EPA's RCRA Corrective Action Training, *Getting to Yes! Strategies for Meeting the 2020 Vision* (November 2009). Available online at <http://www3.epa.gov/epawaste/hazard/correctiveaction/training/vision/mod7.pdf>

Remedy Selection Tools

The tools described below will help the regulatory agency and the facility to conduct an RSP meeting and arrive at a mutual understanding of the CAOs; and then determine the path to follow for remedy selection, whether it involves no CMS, a limited CMS, or a full CMS. The RSP tools are available in Appendix A; click on the links in the titles below for quick access.

6 Tool 6: Remedy Selection Process Meeting Agenda Template (4 pages)

The RSP Meeting Agenda Template helps project managers and facility representatives target expected outcomes quickly. Its structure makes sure the correct supporting information for remedy selection is discussed, including how the proposed remedy will facilitate the correct cleanup levels at the correct compliance points (where those levels will be measured), to ensure the easiest path forward.

The remainder of the RSP Meeting Agenda Template includes reminders to discuss any document or sampling data needed to complete the project administrative record. If more extensive work is required, the regulatory agency and facility should decide together if a workplan approval process is needed to get that work done or if you can be more informal in how that work is designed and approved.

- **Example RSP Meeting Agenda Including Interim Measures (2 pages)**

This example shows how one RCRA FIRST team created an agenda for their RSP meeting for project managers and facility representatives to discuss CAOs and an approach to remedy selection.

7 Tool 7: Developing Corrective Action Objectives (5 pages)

Reaching agreement on specific, meaningful cleanup objectives can be a stumbling block and source of delay in the remedy selection process. This tool defines CAOs and the role of objectives in facility investigation and remedy selection. It also provides guidance and examples for how to develop objectives that are effective and will reduce the chance of delay later in the process.

8 Tool 8: RCRA Post-Remedial Care Considerations (3 pages)

Regions 3 and 7 have found that the long-term reliability of corrective action remedies can have a huge impact on the remedy selection process. We have included this outline of post-remedial care considerations with links to current EPA guidance. Included are guides to institutional controls, engineering controls, GIS considerations, and long-term stewardship approaches.

9 Tool 9: Remedy Selection Process Document (RSPD) Template (5 pages)

The RSPD captures the outcomes of meeting discussions. The RSPD Template provides a handy way to record and organize this information on paper—from remedy concepts to details about deliverables and logistics. Regions 3 and Region 7 have found the template useful in discussions with facilities. Keep in mind that you may want to share this document to start the community involvement process for the future remedy comment period. If there are known community concerns, plan to invite the community to the RSP meeting or hold a meeting to discuss the RSPD as soon as you can.

SECTION V: Metrics for Measuring Performance of the RCRA FIRST Approach

The RCRA FIRST approach and its associated tools are designed to improve the efficiency of the corrective action process in a measurable way. In Regions 3 and 7, existing approaches took up to 19 years for the RCRA facility investigation and up to eight years for remedy selection (ten and six years on average for the RFI and RSP, respectively). The RCRA FIRST approach has the potential to reduce these times to just over 5 years or less for the RFI report and one to two years for remedy selection. Overall, Regions 3 and 7 are setting a goal to reduce the time any facility is in the active pipeline by 73 percent.

These are impressive numbers, but they are estimates. We want to know whether the changes in the RCRA FIRST approach as discussed in this Toolbox—the up-front Corrective Action Framework, the three paths for remedy selection, etc.—make it possible to achieve these results. *Can corrective action programs demonstrate that the new approach is more efficient?* Here is where monitoring and measurement come in.

This section of the Toolbox explains one example of a system for tracking the time for RCRA corrective action projects based on existing RCRAInfo codes as well as several new “locally defined codes.” We encourage regions and states to utilize the tracking system that will work best for them. These projects need to be tracked closely so that delays and choke points can be identified and then fixed. While a project manager could do this on a spreadsheet, it is important for all of the RCRA FIRST projects to be tracked consistently. So, if you or your region or state wants to track RCRA FIRST projects outside of RCRAInfo, feel free. For consistency across the RCRA program, we recommend that you build the steps in this chapter into your tracking system.

Measuring Performance of the New Toolbox in RCRA Facility Investigation

The RCRA FIRST approach to RCRA facility investigation includes the Investigation Planning Phase and the Investigation Completion Phase from this Toolbox. Key changes in the RCRA FIRST approach for the RFI include the development of a CAF, and the use of the written objectives in the CAF to guide the development and implementation of the RFI workplan.

The RCRA FIRST team proposes that we use the existing RCRAInfo codes for the RFI (CA100 through CA200) as the backbone of the RCRA FIRST tracking system. We use nine existing codes and have added three new ones as “locally defined codes” (see tables below). These new codes will help us track whether the CAF meetings and the problem elevation steps are working to speed things up. We will also track “review loops” and workplan and report iterations. These data will demonstrate whether the new RCRA FIRST approach has truly addressed the root cause of the agonizing pace of most RFIs.

Measuring Performance of the New Toolbox in Remedy Selection

The RCRA FIRST approach updates the RSP from start to finish, and uses data from the investigation to determine whether selecting a proposed remedy requires a CMS or something more limited.

In the RCRA FIRST approach, there are three potential paths to choose a proposed remedy after completing the RFI, as follows. The expected timeframe for each path is indicated in parentheses.

1. No CMS (12 months or less)
2. Limited CMS: A data-gathering or pilot test study (18 months or less)
3. Full CMS (24 months or less)

Where there are disputes in the RCRA FIRST approach, the parties are encouraged to jointly elevate the issues for resolution. The RCRA FIRST RSP is expected to generate a Statement of Basis in under two years. Of course, data will be required to support it.

To track the RSP for RCRA FIRST projects, we will use existing RCRAInfo codes for the CMS (CA200 through CA400) as the backbone of remedy selection tracking. We use ten existing codes and have added two new “locally defined codes” for each of the possible remedy selection tracks (see tables below). The new codes will track whether the CAF and RSP meetings are effective in moving corrective action projects more efficiently. In addition, we will track elevation in the notes field to determine which areas of the process are being disputed, which may suggest steps where further analysis is warranted.

Timeline for the RCRA FIRST Toolbox

As benchmarks to evaluate your progress with the RCRA FIRST Toolbox, we have identified seven key milestones:

1. CAF completed
2. RFI workplan approved
3. RFI report submitted
4. RFI objectives met and RFI report approved
5. CAOs and remedy selection path determined
6. Remedy selection administrative record developed
7. Proposed remedy issued

The chart below illustrates the anticipated timeline for achieving these milestones, with different times noted for the three possible paths for remedy selection. The tables that follow detail the RCRAInfo codes (including locally defined codes), the associated milestones and timeframes, and notes about how to track progress during the RFI and RSP stages of a corrective action project.

Figure 5.1 RCRA FIRST Toolbox Timeline

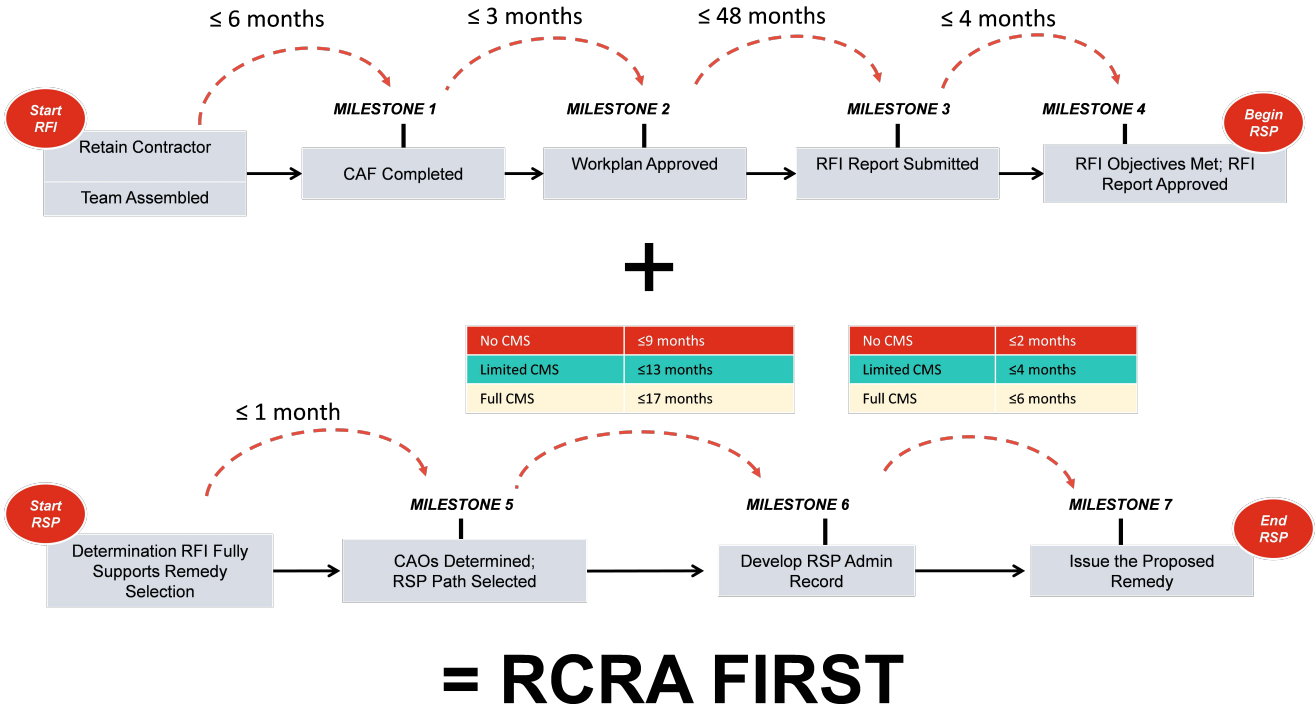


Table 5.1 RCRA FIRST Approach Metrics Tracking: RCRA Facility Investigation

Time Goal (Months)	RCRA FIRST Milestone	FIRST Process Step (RFI)	RCRAInfo Event Code	RCRAInfo Code Description	Notes
6	1	Start RFI Process	CA100	Investigation Imposition	Make sure the CA100 date is a real, documented date (e.g. documented on the order, permit, etc.) We want to start the clock when the project is active and both parties are working on the RFI.
		CAF Meeting Prep			
		Conduct CAF Meeting	<i>CAF101</i>	CAF meeting held	
		CAF Developed	<i>CAF102</i>	Corrective Action Framework (CAF)	It is non-binding to keep legal issues to a minimum. It is the mutual understanding that is important.
3	2	Workplan Received	CA110	Investigation workplan received	This is an existing RCRAInfo code
		Workplan Approved	CA150	Investigation workplan approved	This event marks the second milestone: the implementation phase. Current goal is three months from CAF final date. (CAF102)
≤48	3	Workplan Implemented	CA180	Investigation implementation begun	This event is an existing RCRAInfo code. We're trying to measure workplan approval to field mobilization time.
		Data Meeting	CAF181	Meeting to discuss data sufficiency prior to RFI Report submission	This is an optional, but recommended meeting. The goal is to determine whether data are sufficient to support the remedy. May determine the RSP
		RFI Report Submitted	<i>CA190</i>	Investigation implementation completed	This event is the "end" of the fieldwork phase. The point here is to see how much time is spent gathering data, drilling wells, etc. In some ways, the average of all the RFIs going through the process will represent a fixed time cost for fieldwork completion.
≤4	4	RFI Approved	CA200	Investigation complete	Time required for start-to-finish RFI = CA200 date minus CA100 date

Time for Facility Investigation: 61 months (5.1 years) or less

Notes:

1. Elevations, at any step, should be recorded in the notes field in the RCRAInfo that corresponds to the event where differences occurred.
2. RCRAInfo Event Codes in italics are new, locally-defined codes.

Table 5.2 RCRA FIRST Approach Metrics Tracking: Remedy Selection Process

	Total Time (Years)	Milestone Time (Months)	RCRA FIRST RSP Milestone	FIRST Process Step (RSP)	RCRAInfo Event Code	RCRAInfo Code Description	Notes
NO CMS	1	1	5	RFI Approved	CA200	Approved RFI Report	RFI report should be approved and both parties agree that the investigation is sufficient to develop a remedy or remedy options that will achieve mutual acceptable CAOs.
				RSP Meeting Prep	CAF201		When choosing the "no CMS" path, both parties should already agree on the most logical and efficient path forward. Examples include interim measures becoming final, presumptive remedies, or no further action declarations.
		9	6	Conduct RSP Meeting	CAF202	Date of the meeting	The RSP "meeting" may actually be a phone call or part of the RFI approval process for this path.
				RSP Finalized	CAF203	"No CMS" acknowledged	CAF203 tracks the "no CMS" decision. A meeting on the remedy selection is optional.
		2	7	Public Notice Statement of Basis	CA380	Date of public notice/comment	Begin drafting remedy documents and preparing administrative record, public notice, comment period, response to comments. Existing RCRAInfo code.
				Final Remedy Decision	CA400	Final remedy issued by state/EPA	
Limited CMS	1.5	1	5	RFI Approved	CA200	Approved RFI Report	RFI report should be approved and both parties agree that the investigation is sufficient to develop a remedy or remedy options that will achieve mutual acceptable CAOs.
				RSP Meeting Prep	CAF201		
		13	6	Conduct RSP Meeting	CAF202	Date of the meeting	Purpose of meeting is to agree on the purpose of the additional study and to align the study with the CAOs. Schedule for completion should be discussed.
				RSP Finalized	CAF203	Parties agree on scope of additional work	CAF203 tracks the "additional data/study" decision. The RSP meeting should have two outcomes: (1) We agree on the remedy; (2) We have a shopping list for additional support items that must be developed.
		4	7	Supplemental info received	CA310	Additional info received	State/Agency receives additional information agreed to in the RSP meeting.
				Data approved	CA320	Data study report approved	This step tracks the approval of the additional data study and should be recorded even if no workplan was required. The study fills the data gaps identified in the RSP meeting.
				CMS Approved/ Completed	CA350		Represents the start of the Statement of Basis stage.
				Public Notice Statement of Basis	CA380	Date of public notice/comment	Begin drafting remedy documents and preparing administrative record, public notice, comment period, response to comments. Existing RCRAInfo code.
				Final Remedy Decision	CA400	Final remedy issued by state/EPA	

	Total Time (Years)	Milestone Time (Months)	RCRA FIRST RSP Milestone	FIRST Process Step (RSP)	RCRAInfo Event Code	RCRAInfo Code Description	Notes
Full CMS	2	1	5	RFI Approved	CA200	Approved RFI Report	RFI report should be approved and both parties agree that the investigation is sufficient to develop a remedy or remedy options that will achieve mutual acceptable CAOs.
				RSP Meeting Prep	CAF201		This option represents the full CMS in which alternatives are analyzed against the selection criteria and an alternative is proposed by the facility. Because of their complexity, these studies typically require a workplan/review/approval step. Nationally, these studies take an average of six years to complete. Meeting prep is highly critical to a successful RSP meeting.
		17	6	Conduct RSP Meeting	CAF202	Date of the meeting	Participants should agree on the number of alternatives to be included in the CMS. Participants should be specific about the corrective action objectives and reject options before the CMS if possible. Cost considerations and other remedy balancing criteria should be discussed in detail.
				RSPD Finalized	CAF203	Parties understand scope of additional work	CAF203 tracks the mutual understanding of the CAOs for the full CMS. The number of alternatives to be considered should be established. The nature of any additional study should be outlined. The nature of the review and approval process should be established and a formal acknowledgement should be produced.
		6	7	CMS Workplan Received	CA260	Existing RCRAInfo	
				CMS Workplan Modified	CA270	Optional	
				CMS Workplan Approved	CA300	Existing RCRAInfo	
				CMS Report Submitted	CA340	Existing RCRAInfo	
				CMS Report Approved	CA350	Existing RCRAInfo	
				Develop Statement of Basis	CA380	Date of public notice/comment	Begin drafting remedy documents and preparing administrative record, public notice, comment period, response to comments. Existing RCRAInfo code.
				Final Remedy Decision	CA400	Final remedy issued by state/EPA	

Time for Remedy Selection Process:

- **No CMS** = 12 months or less
- **Limited CMS** = 18 months or less
- **Full CMS** = 24 months or less

Note: Elevations, at any step, should be recorded in the notes field that corresponds to the event where the problem occurred.

SECTION VI: Best Practices for the RCRA FIRST Toolbox

RCRA FIRST Best Practices

To transfer knowledge and facilitate ongoing, continuous improvement for RCRA's processes, this section of the Toolbox addresses best practices for the RFI and RSP, lessons learned from sites using the RCRA FIRST approach, and mitigations for potential issues that may arise.

Best Practices for the RCRA FIRST Toolbox

- Convene the right people.
- Multiple meetings may be necessary.
- Conduct a pre-meeting with internal agency staff before the CAF meeting with the facility. Elevation is okay here, too.
- Do not avoid difficult issues. The Lean events showed unaddressed issues to be the root cause of inefficiency in corrective action. Obtain management support at the meeting, if necessary.
- This is a non-binding process. Plan to reach out to stakeholders. Provide the facility with your thoughts ahead of the meeting.
- Jointly develop the CAF meeting agenda with the facility representatives and tailor the agenda and CAF template to the specific needs of each project.
- Everyone should inform and involve their management. Elevation of obstacles is encouraged.
- Establish open lines of communication.
- Involve known stakeholders from the beginning. Avoid waiting until public comment periods to inform the community or invite new stakeholders.
- Invite the facility to use the RCRA FIRST approach even if they have already started the RFI process.
- Think about your position on the critical agenda and template items. Go over the agenda with your technical team before the meeting. (Note: this takes longer than you think!)
- Both the regulator and the facility should have the remedy in mind during the RFI. Think about setting up an RSP meeting as soon as it makes sense (you may not need to wait until the investigation is complete).

RCRA FIRST Frequently Asked Questions

What is RCRA FIRST?

The RCRA Facility Investigation Remedy Selection Track (FIRST) is a streamlined approach to managing corrective action projects. EPA Region 3 and Region 7, in partnership with the Office of Resource

Conservation and Recovery (ORCR), developed the approach based on the outcomes of two Lean events that identified root causes of delay in the RCRA Facility Investigation (RFI) and Remedy Selection/Corrective Measures Study (CMS) processes. RCRA FIRST divides corrective action into three phases:

1. **The Investigation Planning Phase** where a Corrective Action Framework (CAF) meeting shifts critical discussions to the front of the RFI process, and all parties discuss and agree on measurable objectives before development, submission, review, and approval of the RFI workplan;
2. **The Investigation Completion Phase** where the facility implements the RFI work plan, updates the Conceptual Site Model, and meets with all parties to review data and determine whether the data are sufficient prior to submitting the RFI and Risk Assessment reports, and;
3. **The Remedy Selection Phase** where all parties agree on the Corrective Action Objectives for the facility in a Remedy Selection Process (RSP) meeting, and determine whether a CMS is needed prior to preparing a Statement of Basis for public review. Pathways exist for no, partial, and full CMS.

The **RCRA FIRST Toolbox** packages key elements into standard templates and tools (e.g., template meeting agendas), accompanied by how-to guidance, process flow maps, and case studies from pilot projects.

Why use the RCRA FIRST approach for corrective action?

The RCRA FIRST approach offers several benefits for facilities subject to corrective action, including:

- Reduced time and costs needed to complete the facility investigation and remedy selection
- Accelerated positive environmental results for affected communities
- A roadmap with process metrics to drive continuous improvements
- Enhanced communication throughout the process
- A structure to ensure all stakeholders have a clear understanding of the steps to select a remedy and complete construction

RCRA FIRST is designed to help project managers avoid the root causes of delay. If widely adopted, RCRA FIRST could cut RFI and Remedy Selection time in half. Additionally, RCRA FIRST has the potential to reduce remedy selection times by 75 percent from an average of 6 years to an anticipated 1–2 years.

Pilot projects in Region 7 realized an 80 percent reduction in RFI workplan approvals. Region 3 has re-started stalled RFI (10 or more years) and got the RFI report approved within 1 year.

How can RCRA FIRST reduce time in the RCRA corrective action process?

RCRA FIRST prevents delays in the corrective action program with four key improvements and an overall process monitoring system:

1. Early agreement on goals and expectations before workplan development.
2. Understanding of Corrective Action Objectives prior to remedy selection

3. Elevation of issues at critical decision points for quick resolution
4. Emphasis of three paths to remedy selection: (1) no CMS (where there is a presumptive remedy or interim measures in place), (2) a limited CMS (where some additional data collection or pilot studies are needed), or (3) a full CMS (where traditional alternative remedy options are evaluated). Identifying where a full CMS is not necessary can reduce the time to remedy selection by 6 months to 1 year;
5. Measuring the process to identify and to take action on bottlenecks.

How do I get started with RCRA FIRST?

The bullets below provide a general outline of how to get started using RCRA FIRST.

- First, do not send the facility an RFI Scope of Work, ask for a workplan in 90 days, and expect the process to move efficiently! Many of us have experienced the frustration, delays, and flawed workplans that result from that approach.
- Call your facility and explain to them you would like to meet to discuss a mutual set of objectives for the facility investigation (or next phase of investigation, or to talk about remedy options, as applicable to your project). Request to have the meeting at the facility if possible. Tell the facility that the purpose of the meeting is to establish objectives for the RFI (or CMS, as applicable) that are mutually understood, attainable, and measurable.
- Send the facility a meeting agenda template developed for the meeting's purpose.
- Work with the facility prior to the meeting to add facility specific items to the agenda. Make the agenda available to all attendees, with links to reference materials. Explain to the facility you would like to have their team, including a manager, attend the meeting, and that you would like to have the meeting within the next 45-60 days.
- If you don't already have a current conditions report, ask the facility to provide you with one or its equivalent. Meet with your team (including your manager) and provide them with an overview of what you know about the site to prepare for the meeting. Have your team members review each item on the agenda with you, looking to develop objectives to take with you to the meeting. Encourage the facilities to do the same.
- Meeting preparation and team discussion should take 60 days or less, and the meeting should result in a Corrective Action Framework or Corrective Action Objectives that all parties agree to.
- The facility's goal is to submit an RFI/CMS workplan in 60 days or less after the CAF/RSP meeting. Your goal is to approve this workplan in 60 days or less. Maintain open communications throughout your review by clarifying confusing sections or statements right away with a phone call or email. Everyone's goal should be to achieve an approvable workplan with a minimum of formal submission/comment review cycles.

Who should participate the CAF and RSP meetings?

At a minimum, the lead agency project manager, lead agency supervisor, facility project manager, and facility supervisor should participate in the CAF and RSP meetings. Other staff from the facility and lead and support agencies are also recommended, including:

- Lead Agency Technical Support (hydrogeologist, risk assessor, etc.)
- Lead Agency Legal
- Facility Technical Support (hydrogeologist, risk assessor, etc.)
- Facility Legal
- Support Agency Representative

Who is responsible for completing the CAF and RSP documents?

The agency and facility should discuss early on who will have the role of drafting the CAF and RSP documents. While one person may need to have ultimate responsibility for completing the documents, the content should be determined through a joint effort between the agency and the facility involved. All parties should coordinate and reach an understanding on what goes into the CAF and RSP documents.

What is Elevation?

The elevation process replaces the oft-used “comment and response redo loops” as the way to resolve technical or policy issues that crop up during the facility investigation and remedy selection. The elevation process is encouraged in RCRA FIRST to streamline how a team can work through pain points. It also makes *management* responsible for the solution. Project managers are encouraged to think of elevation as a tool to resolve serious issues in a less stressful and more effective manner.

In RCRA FIRST, RCRA project team members are given the explicit permission to engage decision makers early in the RFI process, if needed. The process can be initiated by any project team member when an obstacle to resolving an issue in a timely manner is first identified (for more information, see RCRA FIRST Tool 3: Elevation Process in Appendix A).

Is RCRA FIRST required?

Using the RCRA FIRST approach is **not a requirement** of the RCRA Corrective Action program. RCRA FIRST represents one approach to managing RCRA corrective action projects. RCRA FIRST and the RCRA FIRST Toolbox do not create any new legal obligations or limit or expand obligations under existing federal, state, tribal, or local law (see “Disclaimer” on page ii for more information). When using RCRA FIRST, the legal and technical foundation of the RCRA Corrective Action program remains the same, including the overall sequence of core activities in the program—from investigating the contamination at facilities to selecting a remedy and documenting the decision.

Is the CAF a living document?

Yes; the CAF is a living document and is subject to change in light of new information or data as the facility investigation is completed. The CAF is a tool to summarize the goals and expectations of the regulatory authority and responsible party in RCRA corrective action. It should document any discussions that took place during the CAF meeting and subsequent meetings, and any materials exchanged.

Can I use RCRA FIRST with facilities already in the corrective action process?

Yes. Region 3 uses the CAF meeting to refocus on-going facility investigations that are stalled. The meeting provides an opportunity for all parties to clarify objectives and expectations for the RFI, and identify where resampling or supplemental data collection work is needed. If an understanding cannot be reached in the CAF meeting, the RCRA FIRST approach encourages parties to commence the joint elevation process.

SECTION VII: Process Management

This toolbox was primarily designed to help individual project managers use the RCRA FIRST tools to manage individual projects. However, the Corrective Action process is comprised of hundreds of individual projects. How does RCRA FIRST help manage the process?

This section includes four RCRA FIRST Tools developed to assist project managers and supervisors with monitoring and maintaining RCRA FIRST *processes*. These tools were informed by the Lean practices learned at the two original Lean events on the RFI and CMS processes for measuring and controlling the workflow within a process. Each tool is described and linked to its location in Appendix A below.

RCRA FIRST Process Management Tools

10 **Tool 10: RCRA FIRST Control Plan (6 pages)**

The Control Plan is a tool that rolls up the metrics collected from individual projects into a format where overall process performance can be monitored. It works by designating certain key milestones in the RFI and Remedy Selection process and measuring actual versus desired completion times. The version attached here is the “front page” containing all the key points and designating when investigation and corrections to the process should be made.

Region 3 and Region 7 are working on a spreadsheet to support the control plan so that project metrics will automatically populate the control plan. The automated control plan will be available mid-to-late January 2016.

11 **Tool 11: RCRA FIRST Communication Plan (3 pages)**

The Communication Plan provides a reference to the key points in the process where planned communication between the State/EPA and the Facility is expected (CAF meeting, etc.) and who is responsible for setting up and executing the communications

12 **Tool 12: RCRA FIRST Project Manager Transition Checklist (1 page)**

Participants in the Lean events identified project manager transition as a root cause of delay. Since the first Lean even in 2013, Region 3 has measured the effect of project manager transition on progress and found it creates a 6 month delay based on current data.

This tool provides a checklist to effectively transition project managers and bring the incoming project manager up to speed within 30 days of assignment.

SECTION VIII: Conclusion

RCRA FIRST Highlights and Next Steps

As noted earlier in this Toolbox, the RCRA FIRST approach is expected to help EPA Regions, states, and their partners dramatically reduce the time and costs needed to complete corrective action and accelerate environmental results to affected communities. The RCRA FIRST Toolbox is designed to help eliminate root causes of delay and inefficiency in the facility investigation process. Additionally, the up-front communication in this new approach could shorten the remedy selection process.

The key principles behind the RCRA FIRST Toolbox that will help make these efficiency improvements possible include the following:

- Shift critical discussions to the front of the corrective action process for early mutual understanding of goals and expectations during a CAF meeting.
- Confirm CAOs prior to remedy selection at the remedy selection process meeting.
- Maintain open communication with the facility and engage decision-makers and stakeholders at key points.
- Elevate issues quickly to resolve disputes.
- Use one of the three paths for the remedy selection process and only complete a full CMS when necessary.

We hope the tools, templates, flow charts, guidance, metrics, and case studies enclosed in this Toolbox will help you to implement the RCRA FIRST approach with your corrective action projects, and by doing so, realize the savings that the RCRA FIRST teams have predicted. We plan to revise this Toolbox as data are generated and more project managers implement RCRA FIRST, so we encourage you to share success stories, examples, or other feedback that would improve this Toolbox and help other regions and states complete corrective action projects more quickly and effectively.

We welcome your feedback from implementing the RCRA FIRST approach and using this Toolbox. For more information or to share examples or success stories, please contact:

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Appendix A: RCRA FIRST Tools

This appendix contains tools developed to help guide you through the RCRA FIRST Toolbox, serving as a launching point for your newly-efficient corrective action efforts.

- **TOOL 1: Model Corrective Action Framework Meeting Agenda**
- **TOOL 2: Corrective Action Framework Template**
 - *Example: Corrective Action Framework for a New RFI*
- **TOOL 3: Joint Elevation Process**
- **TOOL 4: RCRA Facility Investigation Data Sufficiency Evaluation Tool**
- **TOOL 5: Conceptual Site Model Iterative Evaluation/Update Tool**
 - *Example: CAF Meeting Agenda for a Stalled RFI*
- **TOOL 6: Template Agenda for Remedy Selection Process Meeting**
 - *Example: RSP Meeting Agenda for Remedy Selection including Interim Measures*
- **TOOL 7: Developing Corrective Action Objectives**
- **TOOL 8: RCRA Post-Remedial Care Considerations**
- **TOOL 9: Remedy Selection Process Document Template**
- **TOOL 10: Control Plan**
- **TOOL 11: Communication Plan**
- **TOOL 12: Project Manager Transition Checklist**

RCRA FIRST TOOL 1: Model Corrective Action Framework

Meeting Agenda

Introduction

The CAF Meeting Agenda is the most important tool in the Toolbox. This is the initial entry to the RCRA FIRST process and the measurable RFI objectives that come from this meeting will anchor all subsequent activity and define the successful completion of the RFI.

It is critical that both the State/EPA and the facility do their homework prior to the meeting. This tool starts with a list of documents that should be exchanged at least 30 days prior to the meeting. Communication among the parties prior to the meeting is encouraged to verify that everyone is working with the same, most up-to-date versions of each document.

The meeting preparation, meeting, and development of a final CAF is expected to occur in 180 days or less.

Supporting Documents

Recommended Documents from Facility:

- Background information (items usually included in the Current Conditions Report)
- Stakeholder analysis with clear roles and responsibilities (e.g., facility, technical support, public facilitator, other)
- Closure information/post-closure information
- Relevant data from other programs

Recommended Documents from Lead Agency:

- Stakeholder analysis with clear roles and responsibilities (e.g., lead agency, support agency, technical support, public, facilitator, other)
- RCRA Facility Assessment
- Environmental indicator assessment
- Solid Waste Management Unit (SWMU) calling letter
- Permit/order
- Closure information/post-closure information
- Finalized summary of the CAF meeting and schedule of deliverables

Agenda Template

Corrective Action Framework (CAF) Meeting Agenda

Time & Date

Location

Participants

- Lead Agency Project Manager*
- Lead Agency Supervisor*
- Lead Agency Technical Support (hydrogeologist, risk assessor, etc.)
- Lead Agency Legal
- Facility Project Manager*
- Facility Supervisor*
- Facility Technical Support (hydrogeologist, risk assessor, etc.)
- Facility Legal
- Support Agency

* *Suggested minimum participants*

Identification of Roles and Responsibilities

- *Lead Agency* – Provides legal and technical oversight of investigation to ensure facility is adequately characterized and approves workplans/reports.
- *Support Agency* – Provides technical guidance, represents support agency interests, and supports Lead Agency in formulating goals and expectations to obtain final concurrence.
- *Facility* – Collects and analyzes data, recommends path forward through process.

Topics for Discussion

- I. Introductions
- II. Reaffirm goals and objectives for CAF meeting and CAF process
- III. Discuss any permits or orders at the facility and remind all participants that the CAF process is not legally binding or intended to alter any legal requirements at the site unless the permit (or order, for interim status facilities) expressly incorporates the CAF
 - a. Discuss the dispute resolution process
- IV. Discuss Project Communication Plan
- V. Identify Roles and Responsibilities, including the elevation point of contact
- VI. Site Tour
 - a. Overview of facility/surrounding properties/environmental characteristics
 - b. Areas of Concern (AOCs)/SWMUs
 - c. Previous releases
 - d. RCRA regulated history

- e. Other permitted activities (e.g., NPDES, Stormwater, Air)
 - f. Receptors
 - g. Access or physical constraints
 - h. Other potential areas of investigation based on site history
 - i. Other
- VII.** Site Conceptual Model
- a. History
 - b. Current operations (e.g., facility and neighboring properties)
 - c. Current and reasonably-expected future site use
 - d. AOCs and SWMU description
 - e. Human health and ecological receptors
 - f. Exposure pathways
 - g. Constituents of concern/constituents of potential concern
 - h. Extent of known impacts
 - i. Discussion of unknowns and uncertainty with respect to current conditions
- VIII.** Goals and Expectations
- a. Land use/reasonably-expected further use in relation to characterization and remediation
 - b. Existing background conditions and consideration in RFI process
 - c. Use of historical data
 - d. Use of presumptive remedies
 - e. Expected groundwater use/process for addressing groundwater contamination including state, federal, and local requirements
 - f. Coordination with other programs
 - g. Potential facility process/land use/owner changes
 - h. Toxicity value/criteria changes
 - i. Expected risk range issues (target cancer risk and non-cancer hazard index)
 - j. Expected process for addressing remediation
 - i. Unknown sources
 - ii. Source removal vs. source control (containment)
 - iii. Use of risk based or pathway elimination approach
 - iv. Potential for determination of technical impracticability (TI)
 - v. Identification of areas with corrective action obligation
 - vi. Use of institutional controls and engineering controls
 - k. Other issues
- IX.** Discussion of interim measures
- a. Immediate interim measures
 - b. Future potential interim measures
- X.** Discussion of Items that may be included in the RFI workplan
- a. Elements of framework (e.g., Corrective Action Objectives)
 - b. Site conceptual model
 - c. Screening levels
 - d. Adaptive approach

- e. Quality Assurance Project Plan (QAPP)
 - i. Data quality objectives
 - ii. Standard operating procedures
- f. Modeling
- g. Use of historical data
- h. Background conditions
- i. Health and safety plan
- j. Community involvement and environmental justice
- k. Sampling approach/design
- l. Sample analysis
- m. Elements of RFI report
- n. Workplan implementation schedule
- XI.** Other Potential Issues
 - a. Schedule of deliverables (e.g., RFI workplan)
 - b. Format for data/information exchange/submissions
 - c. Interim submission
 - d. Elements of RFI
 - e. Risk assessment
- XII.** Summary of Framework Meeting (brief written document by the end of the meeting)

Expected Session Outcomes

Expected outcomes correspond with Roman numerals in topic for discussion outline.

- I-V.** Common understanding of the roles and responsibilities of the regulatory authority (EPA and/or state) and facility as well as understanding the CAF process/meeting objectives
- VI.** Common understanding of the physical setting and constraints
- VII.** Common understanding of current conditions and site conceptual model (including data gaps)
- VIII.** Discussion and identification of goals and expectations for the regulatory authority (EPA and/or state) and facility including identifying methods to address any differences
- IX.** Common understanding of planned interim measures and/or a process to address interim measures that may be needed
- X-XI.** Common understanding of RFI workplan tasks with the goal of creating an approvable document with no revisions
- XII.** Finalized summary of the CAF meeting and schedule of deliverables (e.g., workplan)

RCRA FIRST TOOL 2: Corrective Action Framework Template

Introduction

For regulators and facilities wishing to utilize an RFI FIRST approach this model CAF Template⁵ may be used as a tool for drafting the facility-specific CAF. The CAF is a tool generally intended to summarize the goals and expectations for the RFI process. A key principle of an RFI Lean approach is that the regulatory authority works with the facility through preliminary discussions early on in the RFI process to set up a CAF Meeting and then to develop the CAF.

As part of an RFI Lean approach the regulatory authority or facility representatives usually develop the CAF. This party should be selected during the CAF meeting and coordinate closely with all participants during development. EPA expects that much of the work in developing a CAF will occur during and immediately after the CAF meeting.

Attention to permit and/or order obligations is warranted. Such obligations should be considered in developing all aspects of the CAF, not just where explicitly mentioned.

CAF Template

Corrective Action Framework

[Facility name]

[EPA ID]

[Address]

The Corrective Action Framework (CAF) is a tool intended to summarize the goals and expectations of the [regulatory authority] and the [Responsible Party, facility, or Representative] that will facilitate the RCRA Facility Investigation (RFI) at the [facility name]. The CAF is not a legally binding document and does not alter any legal requirements under any permit or order applicable to the facility. Nor is the CAF a substitute for a permit or order. Only where the CAF is expressly incorporated into a new permit (or order, for interim status facilities) or incorporated through a modification to an existing permit (or order for interim status facilities) will the CAF become an enforceable condition of the permit (or order for interim status facilities). The CAF is also not expected to address every technical or administrative aspect or detail of the RFI. Rather, the CAF describes the discussions that took place during the CAF meeting or any subsequent meetings (e.g., elevation to management for resolution of differences to avoid delay).

⁵ This document is intended to provide guidance to EPA personnel on implementing the RCRA Subtitle C program. As indicated by the use of non-mandatory language such as “guidance,” “recommend,” “may,” “should,” and “can,” it identifies policies and provides recommendations and does not impose any legally binding requirements. This document is not a rule or regulation, may not apply to a particular situation based upon the circumstances, does not change or substitute for any law, regulation, or any other legally binding requirement and is not legally enforceable. While EPA has made every effort to ensure the accuracy of the discussion in these documents, the obligations of the regulated community are determined by statutes, regulations or other legally binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling. In addition, under RCRA, states may apply to EPA for, and receive from EPA, authorization of a state program to operate in lieu of the federal RCRA hazardous waste program. These state programs may be broader in scope or more stringent than EPA’s RCRA regulations, and requirements can vary from state to state. Members of the regulated community are encouraged to contact their state agencies for the requirements that apply to them.

The CAF also documents material exchanged during the CAF meeting(s) which are necessary for the RFI to efficiently commence. Note that this CAF is a “living document” and is subject to change in light of new information or data.

[The sections below should be included as appropriate, to address the CAF goals for the specific facility.]

I. CAF Meeting Participants

[Provide a list of meeting attendees, including name, title, employer, and contact information]

II. Site Characterization

[Provide a brief overview of the types of facility characteristics discussed in the CAF meeting, primarily focusing on the historical and current operational characteristics of the facility.]

- a. Overview of facility/surrounding properties
[Provide a description of the uses of the facility and surrounding properties, including land uses.]
- b. Environmental characteristics
[Briefly discuss key environmental characteristics of the facility and surrounding properties that are relevant to the RFI and evaluation of exposure pathways. This may include facility hydrogeology, groundwater characteristics/usability, presence of streams and rivers, etc. EPA recommends these discussions be drafted with appropriate technical experts present (e.g., hydrogeologists).]
- c. Areas of Concern (AOCs)/ Solid Waste Management Units (SWMUs) descriptions
[Provide a list the AOCs, SWMUs, and wastes handled at those locations. It is crucial that the list be consistent with the facility’s Permit, Order, and/or RCRA Facility Assessment (RFA). Describe any discussions between the regulatory authority and facility on the SWMUs/AOCs needing or not needing additional investigation. This discussion may address, as appropriate, contamination beyond the facility boundary.]
- d. Previous releases
[Provide a description of any previously-documented and suspected releases.]
- e. RCRA regulatory history
[If applicable, summarize the facility’s RCRA regulatory history (e.g., compliance orders, closures, etc.) that could affect the investigation’s scope.]
- f. Other permitted activities
[If applicable, summarize the discussion of the facility’s non-RCRA permits (e.g., stormwater, NPDES, air) which could affect the RFI, and interpretation and evaluation of facility data (e.g., does the facility have a permitted storm water discharge upstream of a SWMU?).]
- g. Access or physical constraints
[Summarize physical and/or operational characteristics of the facility that limit and/or prevent access to contamination. Describe how these physical and/or operational

characteristics may affect sampling and current exposures. The discussion should clearly indicate the exact locations of any access limitations.]

- h. Other potential areas of investigation based on facility history
[Describe any facility investigations which may not necessarily be tied to the defined SWMUs/AOCs and releases discussed above (e.g., new areas of contamination).]
- i. Other
[If necessary, provide a summary of the facility's characteristics and history that are not covered under the above headings (e.g., CERCLA or State cleanup actions).]

III. Conceptual Site Model

The following sections describe the *[facility name]* Conceptual Site Model (CSM). The CSM is based on information currently available for the facility and surrounding areas. This information may be updated based on new data or information that is generated during the investigation.

[It is envisioned that the regulatory authority and facility would complete a tabularized or text CSM or both. An example of a tabularized CSM is provided in Enclosure 1. Human health and ecological risk assessors should be consulted during the development of the CSM.]

- a. Sources and extent of known contamination
[Provide a list of sources of contamination (e.g., tanks, landfill, AOCs etc.), their location, and extent of known impacts for all environmental media within and beyond the facility boundary. Consider specifying the types of contaminants/constituents of potential concern (COPCs) for all sources and contaminated media.]
- b. Contamination transport/migration pathways
[For all sources of contamination, identify key migration pathways, such as soil leaching, vapor intrusion, groundwater discharge into surface water, and inter-aquifer exchange.]
- c. Tentative exposure pathways
[Describe current and future exposure pathways for all known and/or suspected contaminated media. Note that because the exposure pathways evaluation is being performed prior to the completion of the investigation, the exposure pathways would typically be considered tentative (and the CAF drafted accordingly) until the investigation is completed and the complete pathways can be confirmed. The tentative exposure pathways may need to be broken out according to individual or groups of SWMUs/AOCs or other defined exposure units. Consider having the exposure pathway evaluation and identification of units be performed by or in consultation with human health and ecological risk assessors.]
- d. Exposure receptors
[Summarize the current and future human and ecological receptors within and beyond the facility boundary. This may include the receptor population(s) (residential, commercial, recreational, etc.) and receptor age(s) (child/adolescent/adult). Provide a description of current operations and current land uses for the facility and neighboring properties, as well as the reasonably-expected future land use for the facility and surrounding properties.]

- i. Exposure point and exposure medium
[Document the point of potential human and ecological contact with the contaminated medium (e.g., soils, water, or air). The contaminated medium (exposure medium) may include the source itself or other media impacted by releases from the source.]
- ii. Exposure routes
[Document the routes of exposure (e.g., ingestion, inhalation, or dermal contact) at each exposure point.]
- e. Discussion of unknowns and uncertainty
[Discuss data gaps and how these gaps will be addressed (e.g., sampling).]

IV. RFI Workplan

[Discuss the key elements that the parties anticipate including in the RFI workplan.]

- a. Scope and objectives of the investigation
[Summarize the scope and key objectives of the RFI. This may also include a discussion of the performance objectives of the RCRA process (e.g., Corrective Action Objectives).]
- b. Screening levels
[Specify the source of the risk-based screening levels that should be used for each environmental media (e.g., use of EPA's residential soil RSLs for screening soils and sediments beyond the facility boundary).]
- c. Adaptive approach
[During the CAF process, the administrative authority and facility may identify flexible and adaptable sampling approaches (e.g., iterative sampling) that could improve the efficiency and timeliness of the investigation by reducing the number of field mobilizations and/or exchanges between the parties during phases of the investigation. This section should summarize these approaches.]
- d. Quality Assurance Project Plan (QAPP)
[Describe the key elements and special conditions of the QAPP]
- e. Data quality objectives
[Summarize the data quality objectives for the investigation.]
 - i. Standard Operating Procedures
[Summarize discussion pertaining to Standard Operating Procedures used to conduct sample and data analysis.]
- f. Modeling
[Summarize how modeling will be used to evaluate the facility, such as appropriate use and expectations for initial and ongoing calibration and validation.]

- g. Sampling approach/design
[Provide a summary of sampling methods and approaches to be implemented during the investigation, which may include, but is not limited to, soil sampling depth intervals, well locations, and sampling schemes (e.g., random).]
- h. Sample analysis
[Provide a summary of the COPCs to be analyzed in each environmental medium and/or SWMU/AOC, as well as required detection limits (e.g., below 10⁻⁶ cancer screening levels), etc.]
- i. Use of historical data
[Provide a brief summary of how historical data will be used to scope the investigation (e.g., whether data is adequate and reliable enough that a particular location need not be resampled). Also, consider discussing the use of historical data in risk assessments.]
- j. Background
[Provide a brief summary on how background will be derived, evaluated, and used in risk assessments. This will likely include the locations and amount of background sampling to be performed.]
- k. Health and Safety Plan
[Provide a brief discussion on any special circumstances pertaining to the facility's Health and Safety Plan of which both parties should be aware, including those that could affect the investigation, such as overhead power lines, railroads, and high-hazard processes within an operating facility.]
- l. Community involvement and environmental justice
[Summarize any discussion pertaining to community involvement and environmental justice issues/concerns that could influence the project.]
- m. Workplan implementation schedule
[Provide a schedule of the RFI activities, including a schedule of sampling activities, notifications, and interim deliverables (if necessary). It is crucial for the scheduling to be consistent with the facility's Permit or Order requirements.]

V. Interim Measures

[This section should briefly summarize any proposed or planned interim measures (IMs) at the facility and any discussion on IMs between the regulatory authority and owner/operator. This could include a description of the IM, its scope and objectives, and schedule for its implementation.]

- a. Immediate IMs
[Identify and summarize the implementation of immediate IMs. Consider including a discussion on the use of immediate IMs that may be part of the overall facility remedy.]
- b. Future potential IMs

[Summarize any discussion on SWMUs/AOCs where IMs may be considered in the future, but immediate action is not necessary (e.g., a discussion on the use of IMs to facilitate cleanup in advance of a final remedy).]

VI. Goals and Expectations

Prior to and during the CAF meeting, the *[regulatory authority]* and facility identified the following goals and expectations. Each goal and expectation is summarized below.

[Goals and expectations can be thought of as key project management or risk management issues requiring resolution specific to the RFI and ultimately Corrective Action at the facility. The examples below may or may not be relevant for a specific facility. It may be useful to identify as goals and expectations in this section, key elements of other discussions in the CAF, such as elements of the site characterization, CMS, and/or RFI workplan discussions identified in Sections II, III, and IV above, respectively.]

- Land use/reasonably-expected future land use related to characterization and remediation
- Existing background conditions and consideration in RFI process
- Use of historical data
- Use of presumptive remedies
- Expected groundwater use/process for addressing groundwater contamination including state, federal, and local requirements
- Coordination with other programs
- Potential facility process/land use/owner changes
- Toxicity/criteria changes
- Expected risk range issues (Target Cancer Risk and Non-Cancer Hazard Index)
- Expected process for addressing remediation
 - Unknown sources (if source cannot be found)
 - Source removal vs. source control (containment)
 - Use of risk based or pathway elimination approach
 - Potential for determination of technical impracticability
 - Use of institutional and engineering controls

VII. Other Potential Issues

- a. Format for data/information exchange/submissions
[Describe the format of electronic data and reports to be submitted to the administrative authority. This may also include the methods and ground rules for routine correspondence and updates, such as communications between the administrative and facility's technical experts. It is crucial to be consistent with the facility's Permit or Order requirements.]
- b. Interim submissions approaches
[A CAF need not address every technical or administrative detail of the RFI, such as modeling parameters or exposure factors. However, should the regulatory authority and facility identify approaches or submissions on technical or administrative issues that can improve project efficiency, the parties may wish to document these for future reference.]

For example, the parties may identify a preferred procedure for information exchange, that is consistent with permit or order requirements.]

c. Schedule of deliverables (e.g., RFI workplan)

[This section should summarize the schedules of any action items generated as a result of CAF meeting. Additionally, this section should describe when and how often the CAF will be revisited for updates and/or revisions.]

d. Elements of RFI

[List the elements, and associated materials, necessary for a complete RFI.]

e. Risk Assessment

[Summarize the scope of the Risk Assessment, such as whether it is a baseline risk assessment or streamlined risk evaluation. This may also include any discussion on interim submissions, such as a Risk Assessment workplan.]

Enclosure I

[Depending on the size and complexity of the facility, a table may need to be completed for individual or groups of SWMUs/AOCs or other defined exposure unit.]

Table A.1 Initial Conceptual Site Model*

Contaminant Source/ Contaminated Media ⁶	Transport/ Migration Pathway (e.g., leaching to groundwater, volatilization, plant uptake, fugitive dust emissions, runoff)	Scenario Timeframe (current or future)	Exposure Medium (contaminated media)	Exposure Point (the point of contact with exposure medium)	Within or Beyond the Facility Boundary	Receptor Population (e.g., resident, commercial, industrial)	Receptor Age (child/adult)	Exposure Route (ingestion, inhalation, dermal contact)

*Guidance on how to complete this table is can be found in the EPA Risk Assessment Guidance for Superfund (RAGS) including, but not limited to RAGS Parts A and D.

⁶ The contaminant source/contaminated media can include the sources of releases (e.g., tanks, spills, landfills, lagoons, etc.), as well as the media directly impacted by those releases.

Example: Corrective Action Framework for a New RFI

Corrective Action Framework

Facility Name
Address
City, State
EPA ID: XXXXXXXX

The CAF is a tool intended to summarize the goals and expectations of the U.S.EPA and the facility that will facilitate performance of a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at the captioned site. The CAF is not a legally binding document and is not a substitute for a permit or order. The CAF is not expected to address every technical or administrative aspect or detail of the RFI. Rather, the CAF summarizes the discussions that took place during the CAF meeting conducted at the facility on August 7, 2014. It is noted that the CAF is a “living document” and is subject to change in light of new information or data.

I. CAF Meeting Participants

The CAF meeting was attended by:

- *[participant names have been removed from this example]*

II. Site Characterization

a. Overview of facility/surrounding properties

The facility is a secondary iron casting foundry situated on approximately 10 acres of land in Lincoln, Nebraska. The site has been in operation as a foundry since 1964. The facility is surrounded primarily by commercial/industrial properties to the north, east, southeast, south, and southwest and open fields or agricultural property to the northeast, west, and northwest with industrial property beyond. Adjacent to the western boundary of the site is a soccer field. This soccer field is on property owned by the neighboring industrial facility and is used infrequently (i.e., less than two months of the year) as a practice field for a local team. The field is not open to the public for general recreational use. A site layout is included as Figure 1.

b. Environmental characteristics

Key environmental characteristics of the facility and surrounding properties that are relevant to the RFI and evaluation of exposure pathways were identified in an investigation report. No drinking water wells are present on the facility property. Additionally, no drinking water wells were identified within a 1-mile radius of the facility. Public water supply wells for the City of Lincoln are located along the Platte River near Ashland, Nebraska,

approximately 15 miles to the northeast of the city. Groundwater flow beneath the facility is generally from south to north/northwest at a depth of more than 25 feet.

c. Areas of Concern (AOCs)/Solid Waste Management Units (SWMUs)

A summary of AOCs and SWMUs identified in the 2002 Draft RCRA Facility Assessment (RFA) is presented as Table 1.

d. Previous releases

A site investigation conducted in 2011 by the consultant (on behalf of U.S. EPA Region 7) evaluated SWMUs and AOCs identified in the Draft RFA. The intent of the investigation was to determine whether historical or current facility practices have resulted in environmental contamination. The results of this investigation are detailed in a sampling investigation report. The report recommended the following:

- Supplemental surface soil sampling beyond the western boundary of the site (analysis for volatile organic compounds (VOCs) and metals);
- Supplemental sampling to define the lateral and vertical extents of groundwater impact at the facility (analysis for VOCs and metals);
- Establishment of a monitoring well network to evaluate the extent of groundwater impact;
- Based on the presence of VOCs in groundwater, an evaluation to determine the potential for vapor intrusion;
- Establishment of long-term preventive measures to protect the health and safety of visitors, facility workers, drillers, and construction workers in areas where elevated concentrations of metals are documented and to ensure the ongoing integrity of the surface cover if it is employed as a means to prevent exposure to identified areas of contamination.

The report also included some recommendations related to the Stormwater Management Plan for the site, but it was agreed during the CAF meeting that the facility would address potential stormwater related issues with the Nebraska Department of Environmental Quality (NDEQ) under the existing permit and not as part of the RFI.

e. RCRA regulatory history

A summary of the RCRA regulatory history was presented in a sampling investigation report. A brief overview of the facility's regulatory history is as follows:

Year	Regulatory History Milestone
June 1987	Nebraska Department of Environmental Control (NDEC) conducted an inspection of the facility and noted water and fines were discharged from the cupola furnace scrubber to an unlined, on-site surface impoundment.
February 1991–April 1991	A former employee complained to the Lincoln-Lancaster County Health Department of a valve leak on a toluene tank. The facility indicated it had replaced the leaking valve.
June 1991	NDEC conducted a RCRA compliance inspection and issued a Letter of Warning indicating the facility had failed to determine if a solid waste was a hazardous waste.
October 1991	The facility submitted waste determination information for most waste streams.
November 1991	NDEC issued a Letter of Warning identifying a hazardous waste release, and requiring a Step 6 site assessment, a closure plan for the surface impoundment, and financial assurance information.
December 1991	A Step 6 groundwater investigation of the facility was completed under Nebraska Title 118.
February 1992	EPA issued a 3008(a) Complaint, Compliance Order, and Notice of Opportunity for Hearing with financial penalty for failing to make hazardous waste determinations, disposing of hazardous waste onsite without notification, failing to have a closure plan, failing to implement a groundwater monitoring program, failing to obtain financial assurance, and operating a hazardous waste land disposal facility without a permit.
November 1992	The facility submitted a Step 7 Groundwater Investigation Report to Nebraska Department of Environmental Quality (NDEQ) (formerly NDEC).
June 1993	EPA conducted a RCRA compliance inspection and issued a Notice of Violation.
September 1994 –August 1995	NDEQ conducted a Comprehensive Groundwater Monitoring Evaluation of the facility, and issued a Letter of Warning specifying issues relating to the monitoring wells on the property.
July 1995–August 1995	The facility submitted the Final Closure Plan for the RCRA surface impoundment. NDEQ approved the plan and a modification.
April 1996	NDEQ conducted a RCRA compliance inspection and issued a Notice of Violation regarding failure to keep groundwater monitoring wells secured, failure to mark the manifest document number on the land disposal restriction notification, and failure to maintain a copy of a manifest that had been signed by the receiving facility.
May 1996	The facility submitted the Final Closure Report and closure certification for the RCRA surface impoundment.
August 1996	The facility submitted a request to NDEQ to discontinue groundwater detection monitoring and abandon groundwater monitoring wells associated with surface impoundment closure.
December 1996	NDEQ issued a Notice of Violation regarding improper facility surface impoundment closure activities.

Year	Regulatory History Milestone
June 1997	NDEQ issued a Consent Decree with financial penalty for issues regarding hazardous waste treatment. NDEQ acknowledged receipt of closure certification for the surface impoundment but required an EPA RCRA Facility Assessment (RFA) prior to formal termination of interim status. NDEQ authorized termination of the Irrevocable Standby Letter of Credit for the facility. NDEQ reviewed and approved the RCRA Closure Report for the surface impoundment. NDEQ authorized abandonment of the surface impoundment detection monitoring wells. NDEQ approved the waste pile characterization Sampling Plan and requested a closure/contingent post-closure plan for the foundry sand waste piles.
August 1997	EPA conducted a Preliminary Assessment, Preliminary Review, and Visual Site Inspection of the facility.
September 1997	EPA directed Olsson Environmental Services to collect two samples of surficial sediment upgradient of two stormwater outfalls (outfalls #1 and #3).
December 1997	EPA requested additional information from the facility to complete the final RFA report. The facility's consultant responded. EPA representatives conducted a Compliance Evaluation Inspection at the facility and documented no RCRA violations.
September 1999	NDEQ requested a closure plan for all areas where hazardous wastes had been stored for greater than 90 days.
June 2000	NDEQ granted the facility approval to proceed with implementation of closure activities.
October 2000	NDEQ acknowledged receipt of closure certification for the hazardous waste storage areas and determined the site clean closed. NDEQ released the facility from the requirements of 40 Code of Federal Regulations (CFR) 264.142, 264.143, and 264.147 in accordance with 40 CFR 264.143(h) and 264.147(e).

f. Other permitted activities

The site currently operates under a Class II Synthetic Minor Air Operating Permit and a general NPDES stormwater permit. As agreed during the CAF meeting, stormwater-related issues will not be addressed as part of the RFI, but will be managed, as necessary, by NDEQ under the general stormwater permit.

g. Access or physical constraints

Site access may be obtained through coordination with the facility manager. Work within the facility building will be limited to third shift and the presence of equipment and infrastructure may limit accessibility to some areas. Based on initial review of proposed sampling locations, these access limitations do not appear to pose a significant obstacle to site characterization.

h. Other potential areas of investigation based on facility history

None.

i. Other

There does not appear to be any other information, reports, or agreements (e.g., CERCLA or state cleanup actions) related to the characteristics and history of the site that are not covered under the above headings. This section may be amended in the future if additional information, reports, or agreements become available.

III. Conceptual Site Model (CSM)

A graphical CSM is presented as Figures 2 and 3. These figures compile relevant site characteristics and will be subject to further development as additional data is available. The CSM illustrates the following:

- Site stratigraphy and general hydrogeology:
 - Variable thickness of fill material consisting of silty clay and some residual foundry materials (e.g., slag, foundry sand, scrap iron, etc.)
 - Silty clay underlying the fill to a depth of approximately 15 feet below grade
 - Sand and silty sand underlying the silty clay unit to a depth of approximately 60 feet below grade. Groundwater occurs within this sand and silty sand unit under unconfined conditions. Groundwater flow direction is estimated to be to the northwest
 - Silty clay underlying the sand and silty sand aquifer
- Current and future site land use (Industrial)
- Current and future surrounding property land use (industrial and limited recreational)
- Areas of materials handling

a. Sources and extent of known contamination

The known extent of soil and groundwater impact was summarized in the sampling investigation report and is presented graphically in Figure 4.

SWMUs and AOCs are summarized in Table 1. In previous documents, the presence of VOCs in groundwater was attributed to SWMU 14 (small scale parts washing operation). Sufficient data is not currently available to conclusively link the groundwater impacts to SWMU 14. Therefore, it was agreed during the CAF meeting to handle site groundwater as a separate AOC (AOC 2). The separation from SWMU 14 can be revisited in the future if site data identifies a connection.

b. Contamination transport/migration pathways

Migration pathways identified during the CAF meeting included:

- Migration to groundwater (soil leaching)
- Groundwater flow
- Potential vapor intrusion (it was agreed during the CAF that the necessity for evaluating potential vapor intrusion will be addressed based on the results of groundwater investigation to be conducted during the RFI)

c. Tentative exposure pathways

i. *Exposure Receptors*

Tentative exposure receptors agreed to during the CAF meeting included:

- On site: Industrial site workers
- Off site: Industrial site workers and limited recreational receptors
- It was agreed during the CAF Meeting that on-site and off-site ecological receptors were not currently a concern.

ii. *Exposure point and exposure medium*

Tentative exposure point agreed to during the CAF meeting included:

- Soil direct contact

iii. *Exposure routes*

Tentative exposure routes agreed to during the CAF meeting included:

- Dermal contact
- Inhalation of fugitive dust
- Accidental ingestion

It is noted that institutional or engineering controls may be employed to prevent exposure by any of these potential exposure routes.

d. Discussion of unknowns and uncertainty

The delineation of constituents of potential concern (COPCs) is currently ongoing, so Section 3 of the CAF may be amended. Phase 2 of the RFI will delineate the horizontal and vertical extent of COPCs on site. Phase 3 will delineate the horizontal and vertical extent of COPCs offsite and fill data gaps from the Phase 2 investigation.

IV. RFI Workplan

a. Scope and objectives of the investigation

Scope and objectives of the investigation include characterization of the nature and extent of COPCs to fill CSM data gaps. Characterization will include horizontal and vertical delineation of COPC-impacted soil and groundwater.

No vapor intrusion investigation of VOCs is currently planned, but may be re-visited based on results of future investigations

b. Screening levels

Site investigations will include sampling sufficient to define the vertical and horizontal extent of COPC-impacted soil and groundwater to EPA Regional Screening Levels (RSLs). COPC impacts will be delineated to residential land use criteria, but any corrective actions will consider actual land use (i.e., industrial, on site) and may incorporate institutional/engineering controls.

c. Adaptive approach

Site characterization will include the following three phase approach:

- i. Phase 1 – Tetra Tech 2011 investigation
- ii. Phase 2 – On-site investigation with limited investigation immediately adjacent to west. Proposed sampling locations are depicted on Figure 4 (A through K) with a sampling rationale included in Table 2. In general, the sampling rationale includes the following:
 - Horizontal and vertical delineation of metals above RSLs
 - Screening data for VOCs in groundwater
 - Sampling at specific SWMUs
- iii. Phase 3 – Off-site investigation and on-site data gap filling to be defined by results of Phase 1 and 2
 - Installation and sampling of permanent monitoring wells

d. Quality Assurance Project Plan (QAPP)

i. *Data Quality Objectives (DQO)*

EPA guidance documents describing data quality objectives will assist in understanding the basic structure of EPA's Quality System. DQO will be included in the QAPP accompanying the RFI workplan.

ii. *Standard Operating Procedures*

Any Standard Operating Procedures to be used will be included with the RFI workplan for review and comment.

e. Modeling

It is not anticipated that any modeling will be required. However, if the facility chooses to use modeling, the type of modeling, assumptions used, and the proposed use of the output will be discussed with the EPA prior to conducting the modeling.

f. Sampling approach/design

Site characterization for COPCs will include the following sample approach:

i. *Soil Characterization for metals to include sampling of:*

- Fill—not aggregate (if present)
- First native soil (upper 0.5 feet)
- Subsurface soil (highest photoionization detector reading or directly above capillary fringe, if all PID readings are zero)

g. Sampling analysis

Site characterization will include analysis for the following COPCs:

- Soil: Pb, Cd, As, VOCs (specifically chlorinated solvents)
- Groundwater: Pb, Cd, As, VOCs (specifically chlorinated solvents)
- Grab groundwater samples will include both filtered and unfiltered metals to evaluate potential contribution from suspended solids in the samples.

h. Use of historical data

As agreed during the CAF meeting, existing data from the “Sampling Investigation Report” is of sufficient quality to be used as part of the site characterization.

i. Background

No background study of arsenic is expected. Arsenic remains a COPC and will be evaluated against other site sampling and literature values for background.

j. Health and Safety Plan

During the CAF meeting, no special circumstances pertaining to the Health and Safety Plan that could affect the investigation were observed, other than the overhead power lines. Any other hazards or special circumstances, such as high hazard processes within the facility, will be discussed in the Health and Safety Plan accompanying the RFI workplan.

k. Community involvement and environmental justice

Community involvement is expected to be limited and will be addressed at the time of the Statement of Basis. This issue may be re-visited if conditions change or there is significant public inquiry.

l. Workplan

Schedule

- CAF due September 22, 2014 (45 days after the CAF meeting on August 7, 2014)
- EPA response 15 days from receipt of CAF
- RFI Phase 2 workplan due December 1, 2014 (115 days after the CAF meeting on August 7, 2014)
 - RFI workplan will include a schedule based on EPA approval

Implementation

- RFI Report Process:
 - RFI Phase 2 with data package reporting results
 - Agree to scope for Phase 3 investigation
 - Brief addendum to RFI workplan
 - RFI Phase 3 with data package reporting results
 - Agree to proceed to RFI
- RFI to include:
 - Characterization of nature and extent of soil and groundwater
 - Interim action results (if applicable)
 - Use default EPA threshold requirements and balancing criteria to provide sufficient detail regarding corrective measures strategy to justify proposed remedy
 - Other materials necessary to proceed to statement of basis
 - CMS only if needed to address more complex remedial issues (i.e., on-site chlorinated solvent source)

V. Interim Measures

- a. Identified Interim Measures
No interim measures are identified at this time, but may be implemented with EPA consent if deemed necessary.
- b. Future Potential Interim Measures
Any future potential interim measures will be discussed with EPA based on the data collected during the Phase 2 and 3 of the RFI.

VI. Goals and Expectations

Prior to and during the CAF meeting, the U.S. EPA Region 7 and the facility identified the following goals and expectations.

- a. Land use/reasonably-expected future use in relation to characterization and remediation
Future land use expected to be limited to Industrial.
- b. Existing background conditions and consideration in RFI process background
No background study of arsenic is expected. Arsenic remains a COPC and will be evaluated against other site sampling and literature values for background.
- c. Use of historical data

Existing data from the “Sampling Investigation Report” was agreed during the CAF meeting to be of sufficient quality for use as part of site characterization.

d. Groundwater use/process for addressing groundwater contamination, including state, federal, and local requirements

No drinking water wells are present on the facility property. Additionally, no drinking water wells were identified within a 1-mile radius of the facility. The RFI and any corrective measures will consider actual and potential future groundwater use in the area including, but not limited to, off-site sources of contamination and local use restrictions.

e. Coordination with other programs

Stormwater will be managed on a separate track with the state and not as part of the RFI.

f. Risk range issues (target cancer risk and non-cancer hazard index)

Based on the CAF meeting, off-site sample screening will be based on a target cancer risk of 10^{-6} and a non-cancer hazard index of 1.0. On-site sample screening will be based on a target cancer risk between 10^{-4} and 10^{-5} .

g. Expected process for addressing remediation

- Unknown sources (if source cannot be found) may potentially exist for observed chlorinated solvents and may not be related to the site. RFI will include investigation to sufficiently characterize residual chlorinated solvents to determine presence or absence of an on-site source.
- Source removal versus source control will depend on locations of impacts
 - On-site COPCs in soil will likely involve source control (metals)
 - Off-site COPCs in soil will likely involve source removal (metals)
 - Insufficient data to make determination regarding chlorinated solvents
- Pathway elimination approach is likely to be employed to address on-site metals impacts.
- Use of institutional and/or engineering controls is expected to prevent exposure. Institutional controls may include soil management plan—plan only applies to areas above industrial criteria.

RCRA FIRST TOOL 3: Elevation Process

Background

The current (“As-Is”) RFI/CMS process does not include an explicit opportunity to use an *informal* process to raise an impasse to the next level of management for resolution. Participants in both RFI and CMS Lean events identified this as a root cause of inefficiency in the RFI/CMS process. If a problem arises, both parties might agree to “come back to it later” or decide to perform another round of sampling that may make the decision easier, which can delay the facility investigation and remedy selection process. Problems need to be resolved as they occur, before they affect downstream process steps.

The RCRA FIRST approach addresses this root cause by planning multiple points at which failure to reach consensus at a decision step *requires an elevation* to the next level of management. This tool provides the steps required to engage in an elevation and lays out nine specific points in the process where it should be used. The specific process steps where elevation may occur are marked on the RFI and Remedy Selection/CMS process flow diagrams included as an attachment to this Toolbox.⁷

Points Where Elevation is the Response to Impasse

The following decision points provide examples of where elevation should be *the* response to a failure to reach consensus during the facility investigation and remedy selection/CMS processes.

RCRA Facility Investigation

1. CAF meeting fails to generate RFI objectives
2. State or Agency disapproves RFI workplan
3. RFI Data Review Meeting result is “insufficient data to proceed to remedy selection or to support risk assessment”
4. RFI Data Review Meeting result is no CMS path selected
5. State or Agency disapproves RFI report or risk assessment results

Remedy Selection/CMS

1. RSP Meeting fails to agree on a Corrective Action Objectives
2. RSP Meeting fails to agree on Remedy Approach (e.g., no CMS, etc.)
3. State or Agency disapproves CMS or data collection workplan
4. State or Agency disapproves CMS or data collection report

⁷ Note: This process was an outcome of original RFI and CMS Lean events held in 2013 and 2014. Participants at a mini-Lean event in Ohio in December 2015 provided additional input to further improve the process.

Navigating the Elevation Process: Key Questions

How is Elevation Initiated?

Elevation is automatic at any decision point where a consensus cannot be reached.

What are the steps required for Elevation?

A one-page form (see “Elevation Form” below) can be completed to initiate the elevation process. The co-chairs for both parties are responsible for completing this form together. The first section calls for a description of the issue written by both co-chairs. The remainder of the form contains a section for each party to describe their position. The form also includes a section to describe the resolution of the issue or outline the next steps resulting from the elevation.

The prepared form is provided to the individuals named at the CAF/RSP meeting as the elevation point of contact (POC). Both teams brief the elevation POC and the meeting co-chairs schedule a conference call or meeting to resolve the issue.

How long should Elevation take?

Elevation should occur within a period of 30 to 60 days.

What if Elevation does not resolve the issue?

If the elevation step does not resolve the issue, the next step should be a formal proceeding chosen from those already available in the RCRA program.

Principles of Elevation

The joint elevation process as defined in the facility-specific CAF/RSP should take into account the following principles:

- The elevation process can be initiated by any project team member if they have encountered an obstacle to resolving an issue in a timely manner. The co-chairs of the CAF/RSP are responsible for implementing the elevation.
- The elevation process is intended to increase awareness on the part of the project team members of their ability to engage decision makers early in the CAF/RSP process when needed.
- The elevation process does not invoke formal dispute resolution procedures such as the procedures found in permits and orders.
- While decision makers may be called upon to resolve concerns or issues encountered during the CAF/RSP process, the parties are aware that no action or decision by the EPA or State, including those of decision makers, constitutes a final agency action.
- The joint elevation process does not alter in any way the lead agency’s (EPA or State) requirement to propose a remedy for public comment, respond to public comments, and potentially consider other remedial alternatives than the one proposed.

Elevation Form

The co-chairs complete the following form to initiate the elevation process.

RCRA FIRST ELEVATION: SUMMARY OF ISSUES

Date:

Scheduled for Resolution by *(within 30-60 days of form date):*

Date of Scheduled Meeting or Call:

Problem Statement (only one statement permitted):

Description of Agency or State Position:

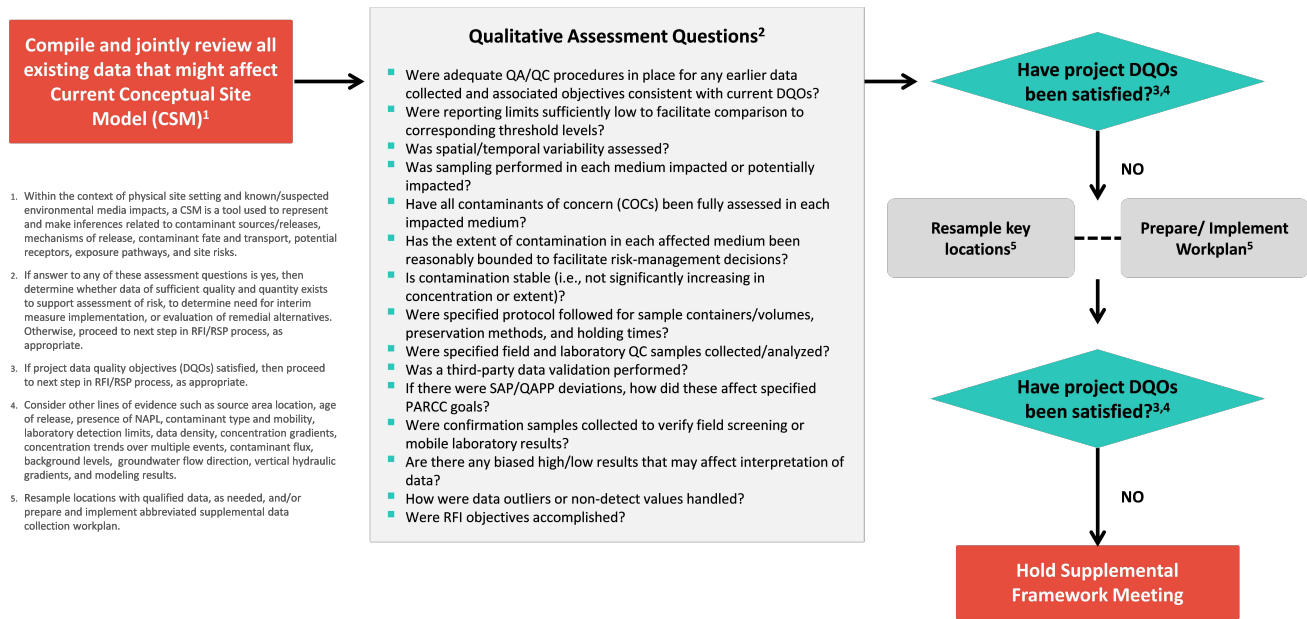
Description of Facility Position:

Resolution/Next Step:

Anticipated Date:

RCRA FIRST TOOL 4: RCRA Facility Investigation Data Sufficiency Evaluation

Figure A.4 RCRA Facility Investigation Data Sufficiency Evaluation Flow Chart



1. Compile and jointly review all existing data that might affect Current Conceptual Site Model (CSM)⁸

2. Consider Qualitative Assessment Questions. If answer to any of these assessment questions is yes, then determine whether data of sufficient quality and quantity exists to support assessment of risk, to determine need for interim measure implementation, or evaluation of remedial alternatives. Otherwise, proceed to next step in RFI/RSP process, as appropriate.

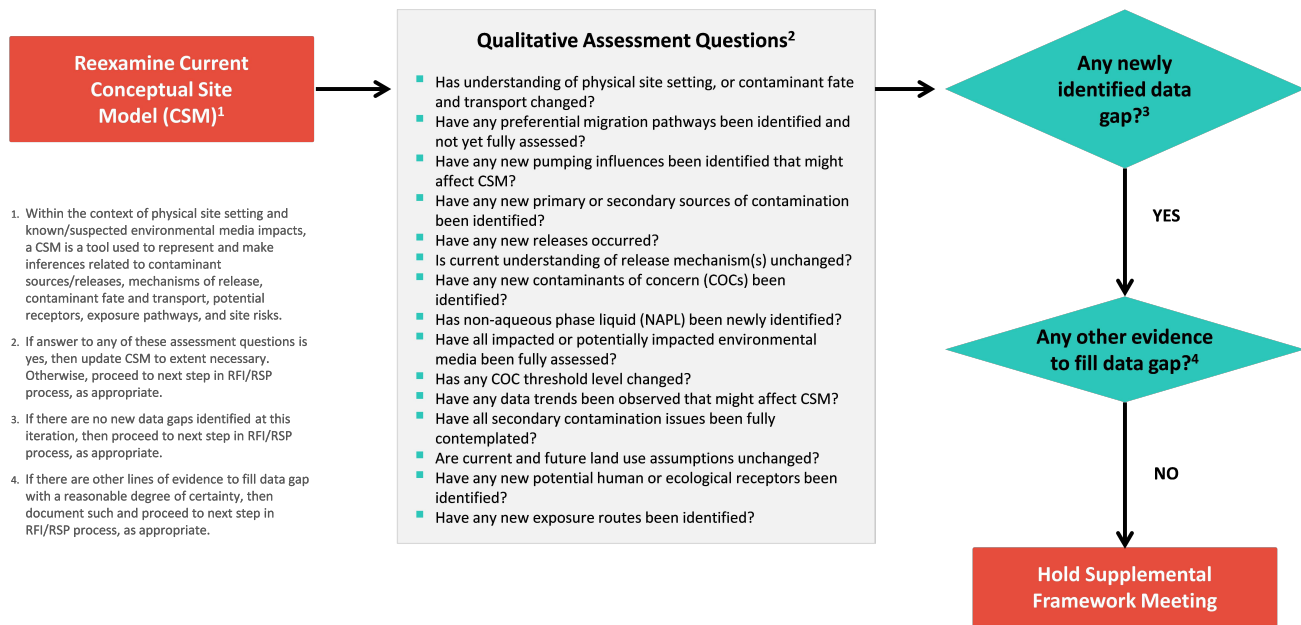
- Were adequate QA/QC procedures in place for any earlier data collected and associated objectives consistent with current DQOs?
- Were reporting limits sufficiently low to facilitate comparison to corresponding threshold levels?
- Was spatial/temporal variability assessed?
- Was sampling performed in each medium impacted or potentially impacted?
- Have all contaminants of concern (COCs) been fully assessed in each impacted medium?
- Has the extent of contamination in each affected medium been reasonably bounded to facilitate risk-management decisions?

⁸Within the context of physical site setting and known/suspected environmental media impacts, a CSM is a tool used to represent and make inferences related to contaminant sources/releases, mechanisms of release, contaminant fate and transport, potential receptors, exposure pathways, and site risks.

- g. Is contamination stable (i.e., not significantly increasing in concentration or extent)?
 - h. Were specified protocol followed for sample containers/volumes, preservation methods, and holding times?
 - i. Were specified field and laboratory QC samples collected/analyzed?
 - j. Was a third-party data validation performed?
 - k. If there were SAP/QAPP deviations, how did these affect specified PARCC goals?
 - l. Were confirmation samples collected to verify field screening or mobile laboratory results?
 - m. Are there any biased high/low results that may affect interpretation of data?
 - n. How were data outliers or non-detect values handled?
 - o. Were RFI objectives accomplished?
3. **Have project DQOs been satisfied?**
- a. Consider other lines of evidence such as source area location, age of release, presence of NAPL, contaminant type and mobility, laboratory detection limits, data density, concentration gradients, concentration trends over multiple events, contaminant flux, background levels, groundwater flow direction, vertical hydraulic gradients, and modeling results.
 - b. **If no**, resample locations with qualified data, as needed, and/or prepare and implement abbreviated supplemental data collection workplan.
 - c. **If the DQOs cannot be satisfied**, hold a supplemental corrective action framework meeting

RCRA FIRST TOOL 5: Conceptual Site Model Iterative Evaluation/Update Tool

Figure A.5 Conceptual Site Model Iterative Evaluation/Update Tool



1. **Reexamine the current Conceptual Site Mode (CMS)⁹**
2. **Consider the following qualitative assessment questions.** If answer to any of these assessment questions is yes, then update CSM to extent necessary. Otherwise, proceed to next step in RFI/RSP process, as appropriate.
 - a. Has understanding of physical site setting, or contaminant fate and transport changed?
 - b. Have any preferential migration pathways been identified and not yet fully assessed?
 - c. Have any new pumping influences been identified that might affect CSM?
 - d. Have any new primary or secondary sources of contamination been identified?
 - e. Have any new releases occurred?
 - f. Is current understanding of release mechanism(s) unchanged?
 - g. Have any new contaminants of concern (COCs) been identified?
 - h. Has non-aqueous phase liquid (NAPL) been newly identified?
 - i. Have all impacted or potentially impacted environmental media been fully assessed?
 - j. Has any COC threshold level changed?
 - k. Have any data trends been observed that might affect CSM?
 - l. Have all secondary contamination issues been fully contemplated?
 - m. Are current and future land use assumptions unchanged?

⁹ Within the context of physical site setting and known/suspected environmental media impacts, a CSM is a tool used to represent and make inferences related to contaminant sources/releases, mechanisms of release, contaminant fate and transport, potential receptors, exposure pathways, and site risks.

- n. Have any new potential human or ecological receptors been identified?
 - o. Have any new exposure routes been identified?
3. **Any newly identified data gap?**
- a. If there are **no new data gaps** identified at this iteration, then proceed to next step in RFI/RSP process, as appropriate.
 - b. If there **is a new data gap**, assess whether there is other evidence to fill the gap.
 - c. If there are **other lines of evidence to fill the data gap** with a reasonable degree of certainty, then document such and proceed to next step in RFI/RSP process, as appropriate.
 - d. If there are **no other lines of evidence** to fill the data gap within a reasonable degree, hold a supplemental corrective action framework meeting.

Example: Corrective Action Framework Meeting Agenda for a Stalled RFI

Example Corrective Action Framework Meeting Agenda for Restarting a Stalled RFI

Topics for Discussion

- I. Introductions/References
- II. Objectives for Meeting
 - a. Agree on the scope of remaining sampling to support a final remedy decision
 - b. Agree on Constituents of Concern (COCs)
 - c. Agree on approach to complete Facility Investigation
 - d. Agree on schedule to complete Facility Investigation
- III. Discussion of Corrective Action Objectives by media
- IV. Current conceptual Model
- V. Objectives for Investigation Workplan
 - a. COCs
 - i. **Groundwater:** *Acetone, Xylenes, Acenaphthylene, Benzene, Phenol, Anthracene, Curnene (Isopropylbenzene), 2-Methylphenol, Fluorene, Ethylbenzene, 4-Methylphenol, 2-Methylnaphthalene, Toluene, 2,4-Dimethylphenol, Naphthalene, DNAPLs, PAHs, LNAPLs*
 - ii. **Soil:** *Naphthalene Crystals, Naphthalene, Phenol, Cumene, Alpha-methyl styrene, Benzene (BTEX), Other PAHs, LNAPL soils*
 - b. Groundwater:
 - i. Define extent of groundwater contamination (to maximum contaminant levels [MCLs] in shallow and deep aquifer)
 - c. Soil (for surface and subsurface):
 - i. Define extent of soils where COCs exceed EPA industrial screening levels
 - ii. Define extent of soils offsite where COC levels exceed EPA residential screening levels
 - iii. Determine and define COC levels
 - d. Vapor intrusion:
 - i. Use data from a and b to determine if vapor intrusion evaluations are needed
 - ii. Are on-site offices, etc. impacted (Is there a Health and Safety Issue?)?
- VI. Data gaps
 - a. Shallow Groundwater:
 - i. Benzene plume
 - b. Deep Groundwater
 - i. DNAPL extent
 - ii. Deep aquifer groundwater flow direction
 - c. Surface Soil
 - i. Additional data for some areas
 - ii. Provide soil data in a readable format for metals
 - d. Subsurface Soil
 - i. Napthalene crystal layer extent

VII. Specific

- a. Documents
 - i. Provide map/figure with all the groundwater wells and recovery wells (indicating which wells are deep wells)
 - ii. What is known about subsurface infrastructure that may impact groundwater flow or present pathways—particularly off-site pathways
 - 1. Cross-sections with infrastructure shown
- b. QAPP (do we need to renew or have a renewed one on file)
- c. Other
 - i. Electronic format (PDF, Word, CD, Excel, etc.) is preferred for deliverable
 - ii. Provide GIS data for property
 - iii. Provide data comparison to EPA Regional Screening Levels
 - iv. Assimilate everything into one report
- d. Timeline
- e. Communication
 - i. When Field work is being conducted
 - 1. EPA attendance to some events
 - 2. Routine calls?

RCRA FIRST TOOL 6: Template Agenda for Remedy Selection Process Meeting

Agenda for Remedy Selection Process (RSP) Meeting

Date:

Location:

Purpose

The RCRAFIRST Remedy Selection Process (RSP) Meeting has two objectives:

1. The participants all must agree on a set (or sets) of Corrective Action Objectives (CAOs) that guide the proposed remedy(ies) for all contaminated media or other areas identified in the RFI and the Site Conceptual Model. These CAOs must be measurable and, when the remedy is fully implemented, provide for the appropriate level of protection for human health and the environment.
2. The participants must choose an approach to the development of the proposed remedy among the following: no CMS, modified CMS, or full CMS.

To facilitate the most effective RSP meeting possible, meeting participants exchange all relevant documents within 60 days of the RFI approval and the RSP meeting must be held within 120 days of the RFI approval. A list of potential documents for exchange follows.

While EPA expects that the regulatory authority (EPA and/or State) and facility will already have the same documentation, careful planning can help identify the most recent revisions to documents or documents missing entirely. Advance discussions between the participants can help identify other relevant information.

For more information about the RSP Meeting and the resulting RSP document (RSPD), please see the RCRA FIRST Toolbox, section IV.

Recommended Documents From Facility:

- Proposed Corrective Action Objectives
- Stakeholder analysis with clear roles and responsibilities (e.g., facility, technical support, public facilitator, other)
- Closure information/post-closure information
- Relevant data from other programs
- RFI Report (or draft RFI)
- Interim Measures (if implemented), workplans, performance monitoring, trend analysis, or other relevant reports
- Results from pump tests
- Pilot Study data, if implemented

Recommended Documents From Lead Agency:

- Proposed Corrective Action Objectives
- Stakeholder analysis with clear roles and responsibilities (e.g., lead agency, support agency, technical support, public, facilitator, other)
- Permit/order requirements
- Closure information/post-closure information/post remedial care
- Presumptive remedy guidance/examples

Participants

- Lead Agency Project Manager*
- Lead Agency Supervisor*
- Lead Agency Technical Support (hydrogeologist, risk assessor, etc.)
- Lead Agency Legal
- Facility Project Manager*
- Facility Supervisor*
- Facility Technical Support (hydrogeologist, risk assessor, etc.)
- Facility Legal
- Support Agency (state VCP/EPA)
- Support Agency (USCOE, Stormwater, Soil Conservation)

**Suggested minimum participants*

Roles and Responsibilities

Lead Agency – Provides legal and technical oversight of remedy selection process.

Support Agency – Provides technical guidance, represents support agency interests, and supports Lead Agency in formulating goals and expectations to obtain final concurrence.

Facility – Facilitates RSP meeting, evaluates remedy alternatives, collects and analyzes data (if necessary), recommends path forward through process.

All Participants – Responsible for identifying first and second level individuals for elevation.

Topics for Discussion

- I. Introductions
- II. Reaffirm goals and objectives for RSP meeting and remedy selection process (reach mutual understanding on approaches for selecting the final remedy)
- III. Discuss any permits or orders at the facility and remind all participants that the RSP process is not legally binding or intended to alter any legal requirements at the site unless the permit (or order, for interim status facilities) expressly incorporates the RSP.
- IV. Discuss project communication plan
- V. Identify roles and responsibilities

- VI.** Summary and review and confirm the RFI, risk assessment, and the site conceptual model as it pertains to remedy selection
- VII.** Develop Corrective Action Objectives
 - a. Point of Compliance
 - b. Media Cleanup Standards (list of impacted media at the site, data averaging, background)
 - c. Aquifer use classifications
 - d. Land use/reasonably expected future use in relation to characterization and remediation
 - e. Timeframes for achieving cleanup objectives
 - f. Long-term stewardship/exit strategy
- VIII.** Remedial Strategy (including risk management approach and suite of potential remedial alternatives)
 - a. Discussion of the three required threshold criteria
 - i. Protect human health and the environment
 - ii. Attain media cleanup standards
 - iii. Control source(s) of the release
 - b. Discussion of how the seven balancing criteria are to be applied:
 - i. Long-Term Effectiveness
 - ii. Toxicity, Mobility, and Volume Reduction
 - iii. Short-Term Effectiveness
 - iv. Implementability
 - v. Cost
 - vi. Community acceptance
 - vii. State/EPA acceptance and compliance with other applicable laws
 - c. Identify alternative(s) to be considered
 - i. Current interim measures, appropriate for final remedy?
 - ii. Presumptive remedies
 - iii. Media-specific remedies
 - iv. SWMU/AOC/Unit-specific remedies
 - v. Institutional controls and their implementability
 - vi. Engineering controls and post-implementation care
 - d. Identify data gaps or needs to evaluate and/or support remedial alternatives
 - i. Pump tests
 - ii. Pilot studies/bench scale tests
 - iii. Additional investigation, delineation/characterization
 - iv. Research
- IX.** Identify Remedy Selection path
 - a. No CMS needed—Go to Statement of Basis
 - i. Will a presumptive remedy meet the CAOs?
 - ii. Is there a single dominant alternative?
 - iii. Does the single remedy achieve the three threshold criteria?
 - iv. Is remedy reasonable with regards to balancing criteria?

- v. List documents needed (may be Region-specific) for Agency to prepare Statement of Basis
 - b. CMS needed, but not CMS workplan required; RSP document sufficient
 - i. Confirm all final alternatives being considered meet the three threshold criteria
 - ii. Develop consensus on how balancing criteria will be applied.
 - iii. Determine if workplans are necessary for additional data collection
 - c. CMS needed and CMS workplan necessary
 - i. Identify why CMS workplan is necessary in addition to RSP document
 - ii. Confirm all final alternatives being considered meet the three threshold criteria
 - iii. Develop consensus on how balancing criteria will be applied
 - iv. Determine if workplans are necessary for additional data collection
- X. Scope CMS workplan (if necessary, Agency review required)
- XI. Scope data collection workplan (if necessary)
 - a. Determine whether Agency review and approval required
- XII. Scope CMS Report
- XIII. Other potential issues
 - a. Sustainability/greener cleanups
 - b. Schedule of deliverables (e.g., CMS Report)
 - c. Format for reports, data/information exchange/submissions
 - d. Interim submissions (e.g., Pilot Study Report)
 - e. Financial assurance expectations
 - f. Stakeholder considerations (if any)
 - g. Community engagement planning
- XIV. Draft Summary of RSP meeting (brief written document by the end of the meeting)
- XV. Preparation of final RSP document by the facility for agency and facility acceptance

Expected Session Outcomes

Expected outcomes correspond with roman numerals in topic for discussion outline.

- I-V. Common understanding of the roles and responsibilities of the regulatory authority (EPA and/or state) and facility as well as understanding the RSP process/meeting objectives
- VI. Common understanding of current conditions and site conceptual model
- VII-VIII. Identification and concurrence of Corrective Action Objectives for the site including point of compliance and risk based management strategy
- IX. Common understanding of remedy selection process including need for CMS Report, CMS workplan or need for additional data collection, and identification of site-specific remedial alternatives for consideration
- X-XI. Common understanding of scope of reports, and workplans if necessary, to be prepared with the goal of creating approvable documents with the goal of no revisions
- XII. Summary of the RSP meeting and a finalized RSP document with a schedule of deliverables

Example: RSP Meeting Agenda for Remedy Selection including Interim Measures

Topics for Discussion

- I. Introductions
 - a. Objectives of meeting
 - i. Agree on the scope of remaining sampling to support a final remedy decision
 - ii. Agree on approach to complete Facility Investigation
 - iii. Agree on schedule to complete Facility Investigation actions
 - iv. Discuss possible CAOs and site clean-up plan
 - b. Mechanism
 - i. ACT II/One Cleanup
 - c. Goals and Expectations Discussion
 - i. Land use:
 - 1. Prefer non-residential (environmental covenant will be needed)
 - 2. Potential facility process/land use/owner changes
 - a. Selling? Redevelopment
 - ii. Use of historical data
 - 1. Can use to determine progress at site
 - iii. Expected groundwater use/process for addressing groundwater contamination including state, federal, and local requirements
- II. Objectives for investigation workplan
 - a. Groundwater:
 - i. Current extent of groundwater contamination to MCLs in shallow and deep aquifer
 - b. Soil (for surface and subsurface):
 - i. Define extent of soils where COCs exceed EPA industrial screening
 - c. Vapor intrusion:
 - i. Evaluated neighboring properties to determine if vapor is impacting neighboring properties
 - d. Site conceptual model
 - i. What is the current site conceptual model
 - 1. Source—has this been addressed?
 - 2. Soils—?
 - 3. Groundwater—on-site pumping and off-site extent
 - 4. VI—on-site and off-site
 - 5. Surface water—?
 - e. Data gaps/questions
 - i. Vapor intrusion
 - 1. EPA and PADEP differ on _____ (what should standards be)
 - ii. Synoptic gauging of all wells to understand the downgradient groundwater flow direction (discuss with Dave)
 - iii. Clean up standards (discuss with Dave)
 - f. CAO discussion
- III. Future of the site
 - a. Timeline

- i. Act 2 reporting
 - ii. Cleanup plan
 - b. Community involvement
- IV.** Discuss Project Communication Plan
 - a. Digital copies
 - b. Set to PADEP and EPA
- V.** Summary of Framework Meeting (brief written document by the end of the meeting)

RCRA FIRST TOOL 7: Developing Corrective Action Objectives

What are Corrective Action Objectives?

RCRA FIRST addresses two phases of corrective action: facility investigation and remedy selection. The goal of a facility investigation is to determine the impact of a facility on human health and the environment. During remedy selection, the goal is to identify an effective remedy to protect human health and the environment. EPA, states, and facilities should work together to develop objectives for each of the two phases to meet these goals, consistent with EPA regulation, policy, and guidance. Objectives for facility investigation may initially be more generic and open-ended, as less is known about the specific environmental conditions prior to investigation; however, the findings of the investigation will form the basis for establishing the Corrective Action Objectives (CAOs) for remedy selection.

What Should Objectives for RFI Include?

Objectives for RFI should:

1. Determine nature and extent of contamination in all media
2. Identify current and potential routes of exposure
3. Identify current and potential receptors, human and ecological
4. For contaminated groundwater in an aquifer used or potentially used as a source of drinking water, determine the horizontal and vertical extent to a concentration less than maximum contaminant levels (MCLs), or tap-water based regional screening tables (RSLs).
5. For contaminated soil, determine extent to a concentration less than residential soil RSLs.
6. Identify and delineate contaminant source areas
7. Determine whether vapor intrusion from contaminated soil or groundwater is occurring or could occur in the future

What are Corrective Action Objectives for Remedy Selection?

CAOs for remedy selection are medium-specific or unit-specific goals that a cleanup alternative must achieve to protect human health and the environment. These objectives should be as specific as possible, but not so specific that the range of alternatives that can be developed is unduly limited. For example, here are two objectives developed for a site with lead contaminated soil:

1. Remove all soil contaminated with lead > 400 mg/kg
2. Prevent residential exposure to lead in soils > 400 mg/kg

The first unnecessarily limits the remedial actions only to how the soil would be removed. The second allows the consideration of other remedies, such as capping and land use restrictions.

CAOs should specify the following:

1. The contaminant(s) of concern
2. The exposure route(s) and receptor(s)
3. An acceptable contaminant level or range of levels for each exposure route

CAOs are developed from:

- EPA law, policy, and guidance
- Threshold criteria: Protect HH&E, Achieve Media Cleanup Objectives, Control Sources
- Conceptual Site Model
- Current uses and exposures
- Reasonably-expected future uses and exposures
- Resource values (ecological, groundwater, etc.)

Although current exposures often will have the highest priority for corrective action, CAOs should also address reasonably-expected future uses and exposures as well as resource values and environmental protection. For example, a site with a Trichloroethylene (TCE) groundwater contaminant plume that extends offsite and impacts private wells could have the following CAOs, all of which need to be addressed by the remedy (or specific components of the remedy):

1. Prevent current and future human drinking water exposure to TCE in groundwater > 5.0 ug/l (the MCL)
2. Prevent current and future vapor intrusion exposure to TCE in groundwater
3. Return the contaminated aquifer to maximum beneficial use (TCE < 5.0 ug/l) throughout the contaminant plume

A single remedy would not necessarily address all three of these objectives in a reasonable timeframe. A groundwater pump and treat system, for example, might be able to return the aquifer to drinking water use eventually, but may not address current drinking water or vapor intrusion exposures. Future exposures could occur if new wells or homes were constructed prior to cleanup of the groundwater. Providing treatment for impacted wells would address current exposures, but would not restore the groundwater for future drinking water use.

How Should Corrective Action Objectives Be Documented?

Remember that the outcome of the Remedy Selection Process (RSP) meeting is for all parties to agree on the Corrective Action Objectives. It is important to carefully work through and consider all the contaminated media, sources, exposure pathways, and receptors evaluated during the RFI (which should have been memorialized in an updated Conceptual Site Model). You can use the following worksheet as a basis for discussion to document those media/source/pathway/receptor combinations that are relevant, and to record the specific Corrective Action Objectives for each. Note that it is also important to agree to and record those media/source/pathway/receptor combinations that are not at issue for your facility. For example, if everyone agrees that the remedy does not need to consider human health or ecological exposures to surface water (because the site has not impacted surface

water), then that decision should be documented with “not applicable” rather than leaving the space blank. Also note that, although the most common media/source/pathway/receptors are listed in the table, your facility may need to develop objectives for specific units, sources, media, pathways, or receptors not listed. Develop a table specific to your facility with as much detail as needed to address all concerns.

Corrective Action Objectives Worksheet

The following table provides a format to document corrective actions objectives based on the environmental media, sources, pathways, and receptors relevant to a facility. Each objective statement should include the contaminant, acceptable concentration (or performance metric), and a time frame (or priority) for action.

Table A.2 Corrective Action Objectives Worksheet

Environmental Media	Human Health Residential	Human Health Non-Residential	Ecological Receptors	Cross-media Transfer	Resource Restoration
Groundwater					
Soil					
Surface Water					
Air					
Waste					
Other					

Example Worksheet

The following table presents example CAOs for an active industrial facility with TCE in waste, soil, and groundwater on site; TCE in soil and groundwater in a residential area off site; and no impacts to surface water.

Table A.3 Corrective Action Objectives Worksheet Example

Priority/Time Frame: 1 = Short-term; 2 = Intermediate; 3 = Long-term final cleanup; 4 = existing control in place
(MCL = maximum contaminant level, TR = carcinogenic target risk)

Environmental Media	Human Health Residential	Human Health Non-Residential	Ecological Receptors	Cross-media Transfer	Resource Restoration
Groundwater	Prevent drinking water exposure to TCE above 5 ug/l (the MCL). Timing: 4 (well treatment in place)	Prevent future drinking water exposure to TCE above 5 ug/l (the MCL). Timing: 2 or 3 (GW not currently used on site)	Not applicable (NA)	Prevent vapor intrusion from TCE in groundwater to occupied buildings (see Air for levels). Timing: 1	Attain 5 ug/l TCE or less in all groundwater downgradient of surface impoundment boundary Timing: 3
Soil	Prevent direct exposure to TCE > 0.94 mg/kg (10^{-6}) in offsite area Timing: 1 (current exposures)	Prevent direct exposure to TCE > 6 mg/kg (10^{-6}) for onsite workers Timing: 1 (current exposures)	Not applicable (no eco-exposures identified)	Prevent TCE in soils from leaching and impacting GW > MCLs (develop soil cleanup level in CMS) Timing: 2	NA (no sensitive soil resource identified)
Surface Water	NA – surface water and sediments not contaminated with TCE	NA	NA	NA	NA
Air (Indoor)	Prevent exposure to TCE > 0.48 ug/m ³ (10^{-6}) in living space Timing: 1 (current exposures)	Prevent exposure to TCE > 3 ug/m ³ (10^{-6}) in office space of occupied buildings Timing: 1 (current exposures)	NA	NA	NA

Environmental Media	Human Health Residential	Human Health Non-Residential	Ecological Receptors	Cross-media Transfer	Resource Restoration
Waste (TCE sludge impoundment)	NA (no waste off-site)	Prevent direct exposure to TCE waste in surface impoundment Timing: 1	Prevent direct exposure to TCE waste in surface impoundment Timing: 1	Prevent migration of TCE from surface impoundment to groundwater > MCL Timing: 2	NA
Other	NA	NA	NA	NA	NA

Additional Resources for Developing Corrective Action Objectives

- EPA provides additional discussion of groundwater cleanup objectives in the “Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action,” available at: <http://www.epa.gov/epawaste/hazard/correctiveaction/resources/guidance/gw/gwhandbk/index.htm>
- Additional discussion of CAOs for remedy selection is available in Chapter 4 of “Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA.” The guidance document describes how to develop Remedial Action Objectives—the Superfund equivalent to RCRA CAOs. Available at: <http://semspub.epa.gov/src/document/HQ/174075>
- Federal Register Notice, Advanced Notice of Proposed Rulemaking on Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities, May 1, 1996, available at <http://www.gpo.gov/fdsys/pkg/FR-1996-05-01/pdf/96-9707.pdf>

RCRA FIRST TOOL 8: Post-Remedial Care Considerations

Introduction

The purpose of this document is to provide project managers with a summary of RCRA Post-Remedial Care policy, tools, and examples that can bear on establishing Corrective Action Objectives (CAOs) during the Remedy Selection Process Meeting.

What is RCRA Post-Remedial Care?

RCRA Post-Remedial Care is the name given for activities undertaken at sites following remedy construction. Region 3 and Region 7 concluded from the individual input provided at the Lean event in May 2014 that land use restriction and post-remedy-construction maintenance should be part of the discussion when developing CAOs. RCRA Post-Remedial Care is almost always required when the anticipated land use used to develop CAOs is not residential or unrestricted use.

Activities may include operation and maintenance of engineering controls, financial assurance, reporting requirements, and enforceable land use limitations.

Why is this important?

As of August 2014, more than 40 percent of the sites on the RCRA CA 2020 List were declared “construction complete.” Many of these sites have, or will have, remedies that require combinations of engineering and institutional controls to prevent human and environmental exposures. In Region 3, (as of August 2014) 33 percent of the 322 final remedies require post-remedial care. Many of these sites have groundwater contamination that requires ongoing remediation over many years to achieve the CAOs. RCRA Post-Remedial Care activities will help ensure that the selected remedy will perform as intended to meet the CAOs and protect human health and the environment.

Background

The Remedy Selection Criteria are the framework for all remedies selected in the RCRA program. The Statement of Basis is the document that demonstrates how the selected remedy meets the threshold criteria (protect human health and the environment, achieve media cleanup objectives, and remediate the source(s) of release(s)). CAOs are proposed in the Statement of Basis with an explanation of how these CAOs will achieve the threshold criteria. In addition, EPA has established seven balancing criteria that the Agency expects project managers to address either: (1) to select among remedy options, or (2) to demonstrate the soundness of a selected remedy.

This FIRST tool is designed to help project managers discuss with facilities how Post-Remedial Care contributes to achieving the CAOs—most notably the threshold criteria, the long-term effectiveness, and the community acceptance balancing criteria.

Discussion Points for the RSP Meeting

If the chosen CAOs reflect unrestricted use for all pathways identified in the approved Site Conceptual Model, then you can put this document away.

In most circumstances, RCRA post-remedial care will be a necessary discussion at the RSP Meeting regardless of which of the three remedy selection paths are chosen. Remember that post-remedy institutional controls may be necessary, even if the CAOs reflect unrestricted use at some future date.

This section of the tool can be used to aid RSP meeting discussions. See *RSP Agenda Template (Tool 9), Section VIII, a-c*.

Some Statements of Basis contain specific requirements for RCRA Post-Remedial Care, while some describe the general features of the RCRA Post-Remedial Care with implementation contingent on an approved plan to be submitted after the final remedy selection occurs. Examples of both approaches are provided. Plans can be required for things such as: institutional control implementation, groundwater pump and treat operations, remedy inspection and maintenance, financial assurance, post-remedy soil management and other, site-specific needs.

Stakeholder Awareness and Long-Term Stewardship

Long-term stewardship is a term frequently used to describe the range of activities necessary to maintain remedy effectiveness. Stakeholder awareness describes Agency/state and facility actions to inform and update communities and local officials of remedy features that must remain in place for a long time and may impact redevelopment or sale of the subject property or nearby properties. References for ways to address long-term stewardship and stakeholder communication are included in the section below.

References

- *Guidance for Evaluating the Technical Impracticability of Ground Water Restoration*, September 1993.
- *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action and Underground Storage Tank Sites*, April 21, 1999.
- *Handbook for Groundwater Protection and Cleanup Policies for RCRA Corrective Action*, September 2001.
- *A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites*, December 2012.
- *A Guide to Preparing Institutional Control Implementation and Assurance Plans at Contaminated Sites*, December 2012.
- *Superfund Post Construction Completion: An Overview*, June 2001.
- *Memorandum: Final National strategy to Manage Post Construction Completion Activities at Superfund Sites*, October 2005.
- *Final Implementation of the National strategy to Manage Post Construction Completion Activities at Superfund Sites*, February 2012.
- *Region 3 RCRA Corrective Action Long-Term Stewardship Approach*, June 2015.

RCRA FIRST TOOL 9: Remedy Selection Process Document (RSPD) Template

Introduction

For regulators and facilities wishing to utilize the RCRA FIRST approach to remedy selection, this model Remedy Selection Process Document (RSPD) Template¹⁰ may be used as a tool for drafting the facility-specific RSPD. The RSPD is a tool generally intended to summarize the site-specific goals and process to be used for remedy selection. A key component to a successful Lean approach to remedy selection is coordination between the regulatory authority and the facility to determine that the RFI is sufficient and the conceptual site model is valid prior to, or at the beginning of the RSP Meeting and before development of the RSPD.

For the RSP Lean approach, it is typically more beneficial for facility representatives to facilitate the RSP meeting and develop the RSPD. This is because the facility is typically responsible for evaluating the remedial alternatives, collecting and analyzing any data necessary to support the remedy, and proposing the selected remedy to the agency. Preparation for the RSP meeting should still involve close coordination between all participants to insure the meeting is as productive as possible.

EPA anticipates that the level of detail included in each RSPD may vary based on which selection path will be used at the site. More complete discussions may be necessary in the RSPD if a CMS report and/or CMS workplan will not be prepared for the facility. This is because the RSP meeting and RSPD will essentially function as an abbreviated CMS. The user should also keep in mind that the elements included in the model RSPD Template are intended as suggestions, and may not be appropriate for their particular situation. Users are encouraged to identify elements for inclusion in their RSPD that will assist in selection of a recommended remedial alternative for use at their facility, and adapt this model as appropriate.

Template

Remedy Selection Process Document

[Facility name]

[EPA ID]

[Address]

¹⁰ This document is intended to provide guidance to EPA personnel on implementing the RCRA Subtitle C program. As indicated by the use of non-mandatory language such as “guidance,” “recommend,” “may,” “should,” and “can,” it identifies policies and provides recommendations and does not impose any legally binding requirements. This document is not a rule or regulation, may not apply to a particular situation based upon the circumstances, does not change or substitute for any law, regulation, or any other legally binding requirement, and is not legally enforceable. While EPA has made every effort to ensure the accuracy of the discussion in these documents, the obligations of the regulated community are determined by statutes, regulations or other legally binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling. In addition, under RCRA, states may apply to EPA for, and receive from EPA, authorization of a state program to operate in lieu of the federal RCRA hazardous waste program. These state programs may be broader in scope or more stringent than EPA’s RCRA regulations, and requirements can vary from state to state. Members of the regulated community are encouraged to contact their state agencies for the requirements that apply to them.

The Remedy Selection Process Document (RSPD) is a tool intended to summarize the process and goals of the [regulatory authority] and the [responsible party, facility, or representative] that will facilitate RCRA remedy selection at the [facility name]. The RSPD is not a legally binding document and does not alter any legal requirements under any permit or order applicable to the facility. Nor is the RSPD a substitute for a permit or order. Only where the RSPD is expressly incorporated into a new permit (or order, for interim status facilities) or incorporated through a modification to an existing permit (or order for interim status facilities) will the RSPD become an enforceable condition of the permit (or order for interim status facilities). The RSPD is also not expected to address every technical or administrative aspect or detail of remedy selection. Rather, the RSPD records the discussions and process selected and developed by the [regulatory authority] and the [responsible party, facility, or representative] during the RSP meeting or any subsequent meetings. The RSPD also documents the Corrective Action Objectives (CAOs) discussed during the RSP meeting which the selected remedial alternative(s) should be able to attain. Note that this RSPD is a “living document” and is subject to change in light of new information or data.

[The sections below should be included as appropriate, to address the RSP for the specific facility.]

I. RSP Meeting Participants

[Provide a list of meeting attendees, including name, title, employer, and contact information]

II. RFI Summary

a. Summary of the findings of the RFI

[Provide a brief overview of the key findings of the RFI as pertinent to remedy selection.]

b. Confirm the objectives of the RFI for this facility have been met

[Typically the objectives of an RFI are to determine the nature, extent (vertical and horizontal) and rate of migration of contaminant releases; identify the source(s) of contamination; and provide sufficient information and data to choose appropriate response actions. Both the regulatory authority and facility should concur that the RFI is sufficient.]

c. Identify any data gaps that must be filled to proceed with the remedy selection process

[List data needs and how they are proposed to be filled. Include necessary deliverables and timeframes.]

III. Conceptual Site Model Summary

a. Summary of the conceptual site model (CSM) as refined by the RFI

[Provide an overview of the CSM with particular focus on the aspects pertinent to remedy selection.]

- b. Confirm the validity of the CSM for the purpose of remedy selection
[Typically the CSM should address the following issues: sources and extent of known contamination; contamination transport/migration pathways; tentative exposure pathways; exposure receptors; exposure point and exposure medium; and exposure routes.]
- c. Identify any issues or concerns about the CSM with respect to remedy selection

IV. Development of Corrective Action Objectives (CAOs)

[Include discussion of the general objectives, (e.g., protect human health and the environment; achieve media cleanup standards; and control the sources of contamination) and more specific objectives, as necessary.]

- a. Point of compliance
- b. Aquifer use classifications
[Include all aquifers present]
- c. Current land use and reasonably expected future land use
- d. Media cleanup standards
[Include each impacted media at the site, with the cleanup standard and background level.]
- e. Timeframes for achieving CAOs
- f. Exit strategy

V. Remedial Strategy

[This section should address all information below that will be taken into consideration in Section VI to select the site-specific path to be used.]

- a. Identify the suite of potential remedial alternatives to be considered
 - i. *Current interim measures and whether they are appropriate for final remedy*
 - ii. *Pertinent presumptive remedies*
 - iii. *Media-specific remedies*
 - iv. *SWMU/AOC/unit-specific remedies*
 - v. *Institutional controls and their implementability*
 - vi. *Engineering controls and post-implementation care*
- b. Discuss the three required threshold criteria with regards to the remedial alternatives
 - i. *Protect human health and the environment*
 - ii. *Attain media clean-up standards*
 - iii. *Control of contaminant source(s)*

- c. Discuss how the seven balancing criteria will be applied to the remedial alternatives.
[If there is only a single remedial alternative that meets the threshold criteria, this section should discuss it that remedy is reasonable with respect to these criteria.]
 - i. *Long-term effectiveness*
 - ii. *Reduction of toxicity, mobility or volume of contaminants*
 - iii. *Short-term effectiveness*
 - iv. *Cost*
 - v. *Implementability*
 - vi. *Community acceptance*
 - vii. *State acceptance*

- d. Identify data gaps or data needs to evaluate and/or support remedial alternatives
 - i. *Pump tests*
 - ii. *Pilot studies*
 - iii. *Additional investigation, delineation/characterization*
 - iv. *Research*

VI. Identify the Site-Specific Remedy Selection Path

*[Identify which of the following remedy selection paths below was selected for use at [facility name]
 Provide the information indicated below and any additional rationale or supporting information for the path selected]*

- a. No CMS - Move on to Statement of Basis preparation
 - i. *List the single dominant alternative and state why*
 - ii. *Discuss whether the single alternative meets all three threshold criteria adequately*
 - iii. *Discuss whether the single remedy is reasonable with respect to the balancing criteria*
 - iv. *List any documents needed by the regulatory authority to prepare the Statement of Basis [e.g., site figure, remedy costs]*

- b. Limited CMS - No workplan required
 - i. *Document that all final alternatives being considered meet the three threshold criteria*
 - ii. *Document the consensus on how the balancing criteria will be applied to the alternatives*
 - iii. *Discuss whether additional data is necessary to evaluate the alternatives, and if so whether a workplan for collection of the additional data is necessary.*

- c. Full CMS
 - i. *Identify why a CMS workplan is necessary in addition to this RSPD*
 - ii. *Document that all final alternatives being considered meet the three threshold criteria*
 - iii. *Document the consensus on how the balancing criteria will be applied to the alternatives*

- iv. *Discuss whether additional data is necessary to evaluate the alternatives, and if so whether a workplan for collection of the additional data is necessary.*

VII. Scope of Deliverable Documents

[Discuss the scope of each of the documents listed below if required or any other documents determined to be deliverables during the RSP meeting.]

- a. Scope of the CMS workplan, if necessary
- b. Scope of the additional data collection workplan(s), if necessary
- c. Scope of the CMS report, if necessary

VIII. Other Potential Issues

- a. Schedule of deliverables (e.g., CMS Report)
[This section should summarize the schedules of any action items generated as a result of the RSP meeting.]
- b. Format for reports/data/information exchange/submissions
- c. Interim submissions (e.g. Pilot Study Report)
- d. Financial assurance expectations and timing
- e. Stakeholder considerations, if any
- f. Community engagement plan

RCRA FIRST TOOL 10: Control Plan

The following table outlines a Control Plan to track process improvements with RCRA FIRST. The control plan outlines the metric for each step in the facility investigation and remedy selection processes, the unit of measure for tracking, and the target measure of performance. Project managers can track progress in the “Current Quarter Status” column and take the suggested recovery actions where necessary.

RCRA FIRST CONTROL PLAN

Process:
RCRA Facility Investigation and
Remedy Selection Processes

Prepared by:
Approved by:
Owner:
Revision #:

Prepared Date:
Approved Date:
Revision Date:

Table A.4 RCRA Facility Investigation Control Points

Control Point ID	Metric	Unit of Measure	Target Measure of Performance	Current Quarter Status	Recovery Action
1	% of Facilities with signed CAF at CAF meeting adjournment	% of Facilities	20%		ID what part of CAF meeting is ineffective and repair
2	% of Facilities with signed CAF within 3 weeks of meeting adjournment	% of Facilities	25%		ID what part of CAF meeting is ineffective and repair
2a.	% of Facilities where initial CAF disagreement results in 1 st level escalation	% of Disagreements	5%		ID what part of CAF meeting is ineffective and repair
3	% of total RFI Workplans that achieve approval on first submission	% of Workplans	75%		ID which areas of the RFI Workplan required rework and repair process
3a.	% RFI Workplans requiring elevation to be approved	% of Workplans	5%		ID the areas of common disagreement and repair process
4	% approved RFI Workplan submitted in accordance to schedule established in CAF	% of RFI Workplans	95%		ID root cause(s) of why schedules are not adhered to and repair process
5	Field data approved/deemed adequate during “Field Review Meeting”	# of Approval Decisions			ID root cause(s) of why approval decisions cannot be made and repair process

Control Point ID	Metric	Unit of Measure	Target Measure of Performance	Current Quarter Status	Recovery Action
5a.	Field data approved/deemed adequate through elevation	# of approval decisions			ID root cause(s) of why approval decisions cannot be made and repair process
6	% total RFI Reports that achieve approval on first time submission	# RFI Reports; % of total RFI Reports	75%		ID most common reason(s) RFI Report is not approved and repair process
6a.	% of total RFI Reports approved requiring elevation	# RFI Reports; % of total RFI Reports	5%		ID most common reason(s) RFI Report is not approved and repair process
7	# of RFI Reports submitted in accordance to initial schedule	# RFI Reports	95%		ID root cause(s) of why schedules are not adhered to and repair process
8	% RFI Report approvals that include site conceptual model	% of time agreement reached with no revisions			ID root cause(s) of why approval decisions cannot be made and repair process
9	% of Facilities that # of days between RFI imposed until CAF agreement (CAF102-CA100) was less than or equal to 180 days	% of Facilities	180 days		ID root cause(s) of why schedules are not adhered to and repair process
10	% of Facilities that # of days between CAF agreement until RFI Workplan approval (CA150-CAF102) was less than or equal to 90 days	% of Facilities	90 days or less		ID root cause(s) of why schedules are not adhered to and repair process
11	% of Facilities that # of days between RFI Workplan approval until RFI Report Submitted (CA190-CA150) was less than or equal to 1440 days	% of Facilities	1440 days or less		ID root cause(s) of why schedules are not adhered to and repair process

Control Point ID	Metric	Unit of Measure	Target Measure of Performance	Current Quarter Status	Recovery Action
12	% of Facilities that # of days between RFI Report submitted until RFI Report approval (CA200-CA190) was less than or equal to 120 days	% of Facilities	120 days or less		ID root cause(s) of why schedules are not adhered to and repair process
13	% of Facilities that # of days between RFI Imposed until RFI Report approval (CA200-CA100) was less than or equal to 1830 days	% of Facilities	1830 days or less		ID root cause(s) of why schedules are not adhered to and repair process

Table A.5 Remedy Selection Process Control Points

Control Point ID	Metric	Unit of Measure	Target Measure of Performance	Current Quarter Status	Recovery Action
14	# of total facilities with RSP finalized				
15.a	% of total facilities with RSPs not requiring a CMS	% of each type of facility			
15.b	% of total facilities with RSPs requiring a limited CMS				
15.c	% of total facilities with RSPs requiring a full CMS				
16	% of facilities that # of days between <i>RFI Report approval</i> until <i>RSP Finalized (CAF203 - CA200)</i> was less than or equal to 10 mo./300 days	% of Facilities	10 mo./300 days		ID root cause(s) of why schedules are not adhered to and repair process
17	% of facilities that require joint elevation at time of the Remedy Selection Framework meeting	% of facilities			

Control Point ID	Metric	Unit of Measure	Target Measure of Performance	Current Quarter Status	Recovery Action
18	% of total # of facilities that require joint elevation at time of CMS Workplan approval	% of facilities			
19	% of total # of facilities that require joint elevation at time of <i>CMS approval</i>	% of facilities			
20	% of facilities that # of days between RSP Finalized (CMS Agreed Upon) to Issues Proposed Remedy for Facilities without CMS (CA350 - CAF203) was less than or equal to 60 days	% of facilities	60 days		ID root cause(s) of why schedules are not adhered to and repair process
21	% of facilities that # of days between RSP Finalized (CMS Agreed Upon to CMS Approval) for Facilities with limited CMS (CA350-CAF203) was less than or equal to 390 days	% of facilities	390 days		ID root cause(s) of why schedules are not adhered to and repair process
22	% of Facilities that # of days between RSP Finalized (CMS Agreed Upon to CMS Approval) for Facilities with Full CMS was less than or equal to 510 days	% of facilities	510 days		ID root cause(s) of why schedules are not adhered to and repair process
23	% of facilities that # of days between CMS Approval to Final Remedy Selection (CA400-CA350) was less than or equal to 180 days	% of facilities	180 days maximum		ID root cause(s) of why schedules are not adhered to and repair process

Control Point ID	Metric	Unit of Measure	Target Measure of Performance	Current Quarter Status	Recovery Action
24	% of facilities that # of days between RFI Report Approval to Final Remedy Selection for Facilities without CMS (CA400-CA200) was less than or equal to 12 mo./365 days	% of facilities	12 mo./365 days		ID root cause(s) of why schedules are not adhered to and repair process
25	% of facilities that # of days between RFI Report Approval to Final Remedy Selection for Facilities with limited CMS (CA400-CA200) was less or equal to 18 mo./547 days	% of facilities	18 mo./547 days		ID root cause(s) of why schedules are not adhered to and repair process
26	% of facilities that # of days between RFI Report Approval to Final Remedy Selection for facilities with Full CMS (CA400-CA200) was less or equal to 24 mo./730 days	% of facilities	24 mo./730 days		ID root cause(s) of why schedules are not adhered to and repair process

Business Rules

1. When comprehensive agreement cannot be reached, then the issues are elevated to the next level of management
2. Development of RFI Workplan cannot ensue until full consensus is achieved by all parties
3. All sites doing RFI (new) will proceed to RSP
4. Sites needing CMS will go through RSP
5. PM will submit 1-page case study to EPA HQ ORCR within 30 days of RFI approval
6. Consider # and capability of resources when establishing RFI target goals, which must be between 1 and 4 years
7. A site will go through the new Remedy Selection Process in the following situations:
 - If the site has completed the new RFI process
 - If the site has not started or is already in the old CMS process but no CMS Workplan has been developed

RCRA FIRST TOOL 11: Communication Plan

The following table outlines a step-by-step communications approach for the RCRA Facility Investigation and Remedy Selection processes, including the purpose of each meeting, the participants, the documents needed in advance, and applicable RCRA FIRST Tools. The Step # refers to the steps in the RFI and RSP full process maps, which are separate attachments not included in this Toolbox. Requests for copies of these process maps can be made by emailing Paul Gotthold (gotthold.paul@epa.gov) and Don Lininger (Lininger.Don@epa.gov).

RCRA FIRST Communication Plan

<p>Process/Focus Area: RCRA Facility Investigation Process and Remedy Selection Process</p>	<p>Prepared by: Approved by: Revision #: Process Owner:</p>	<p>Prepared date: Approved date: Revision date:</p>
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Table A.6 RCRA Facility Investigation Communications

Communication	Purpose	Participants/ Recipients	Documents Needed in Advance	Step # in Process	RCRA FIRST Tool(s)
A) Corrective Action Framework Meeting	Agree on RFI Objectives, framework of Investigation, Potential IMs, and CAF for the facility	CO-CHAIR: STATE/EPA PM and FACILITY PM (PM manager, tech support (e.g., hydrogeologist, toxicologist); State (PM manager, tech support); Facility PM manager, o/o?)	Background documents (CCR/DCC/RFA); current and future land use; receptors; aquifer designation; community concerns; permit; map; graphical description of data	3,4	<ul style="list-style-type: none"> ■ Corrective Action Framework Meeting Agenda ■ Corrective Action Framework Template ■ Elevation Tool
B) Workplan Dialogue and Information Exchange	Clarify issues as they appear in workplan development, identify and record decisions made	STATE/EPA PM and FACILITY PM; Technical Support	Facility-specific CAF (and background documents)	6-9	<i>Facility-specific</i> Corrective Action Framework

Communication	Purpose	Participants/ Recipients	Documents Needed in Advance	Step # in Process	RCRA FIRST Tool(s)
C) RFI Progress Dialogue and Information Exchange	Assess changing site conceptual model as data developed; impacts to investigation objectives and interim measures.	CO-CHAIR: STATE/EPA PM and FACILITY PM Agency and Facility PMs, Technical Support	Facility specific CAF (and background documents and approved workplan including schedule	10-11	<ul style="list-style-type: none"> ■ RCRA FIRST Data Evaluation tool ■ Conceptual site Model Iterative Evaluation Tool
D) Field Data Review Meeting - Chair to provide agenda and data presentation	Assess data, review updated site conceptual model, and agree on path forward with regard to risk (i.e., risk screening, full risk assessment, or presumptive remedy)	CHAIR: FACILITY PM Agency and Facility PMs; consultants; hydrogeologist; risk assessor	Technical memo; tabulated lab results; updated site conceptual model; baseline risk assessment	19	<ul style="list-style-type: none"> ■ <i>Facility-Specific</i> Corrective Action Framework ■ RCRA FIRST Data Evaluation tool ■ Conceptual site Model Iterative Evaluation Tool ■ Elevation Tool
E) RFI Report and Risk Assessment Approval Meeting	Gain consensus on remaining issues impacting approval of draft RFI Report	CO-CHAIR: STATE/EPA PM and FACILITY PM Agency and Facility PMs; consultants; hydrogeologist; risk assessor	Draft RFI Report and Preliminary Risk Assessment from facility	22	<ul style="list-style-type: none"> ■ <i>Facility-Specific</i> Corrective action Framework ■ Elevation Tool

Table A.7 Remedy Selection Process Communications

Communication	Purpose	Participants/ Recipients	Documents Needed in Advance	Step # in Process	RCRA FIRST Tool(s)
A) Remedy Selection Process (RSP) Meeting - CMS Workplan or Data Collection Workplan Meeting* (at same time or separate)	Reach agreement on corrective action objectives and CMS approach for selecting the proposed remedy	CO-CHAIR: STATE/EPA PM and FACILITY PM State/EPA and Facility Supervisors; Agency and Facility Technical Support (hydrogeologist, risk assessor, etc.); outside stakeholders**	Final RFI Report, final site conceptual model, and RFI summary; appropriate guidance on remedy selection, engineering and institutional controls	4,5	<ul style="list-style-type: none"> ■ RSP Meeting Agenda ■ RSP Template ■ RCRA FIRST Toolbox Section IV ■ Developing Corrective Action Objectives Tool ■ RCRA Post-Remedial Care Tool
B) RSP Process Dialogue and Information Exchange	Define scope of CMS Workplan or Data Collection Workplan	STATE/EPA PM and FACILITY PM; State/EPA and Facility technical advisors	Same as above, new data developed since Final RFI Report	7-10	<i>Facility-specific RSP Document</i>
C) Remedy Selection Meeting	Select the preferred alternative	STATE/EPA PM and FACILITY PM; first line managers;	Draft CMS Report, Remedy selection criteria, Facility-specific RSP	12-14	<i>Facility-specific RSP Document</i>

*CMS Workplan or Data Collection Workplan may not be needed, in which case corresponding meeting would not be held

**Other Stakeholders (if warranted)

***Outside Stakeholder involvement may be desired at this time or in parallel fashion

RCRA FIRST TOOL 12: Project Manager Transition Checklist

This transition checklist defines the steps and associated activities needed to facilitate seamless on-boarding and/or transition of a new RCRA corrective action project manager within the EPA, Industry, and Consultants. The plan is specific to RCRA corrective action and is not inclusive of other on-boarding activities unrelated to corrective action.

RCRA Project Manager Transition Plan

Step 1: Receive RCRA FIRST Orientation

- Standardized Process
- RCRA FIRST Tools (most up to date RCRA FIRST Toolbox)
- Communications Plan
- Control Plan

Timeframe: To be completed within **1-7 business days** from the first day in the position and must be completed prior Step 2

Step 2: Provide electronic files for review and permanent reference to include:

- Executive Summary (with specific references to documents (e.g., page, table, etc.))
- Regulatory drivers, order permit
- Enforcement history
- Key decisions to date
- Monthly and quarterly reports
- Team members' names, RCRA-specific roles, and contact information

Timeframe: To be completed within **7-10 business days** from the first day in the position

Step 3: Conduct a formal transition meeting with the following discussion items in the agenda:

- Executive Summary:
 - Current status
 - Stakeholders
 - Goals
 - Field schedule
 - Concise and graphical Conceptual Site Model (area specific):
 - Investigation results
 - Problems identified; risks
 - Gaps in decision support
 - Outstanding issues
 - Complete exposure pathways and reception
 - RCRAInfo codes
 - Latest and/or current deliverable in which expected to pursue
 - Outstanding technical issues
- Community outreach

- Political landmines
- Opportunity to enter the standardized process via Corrective Action Framework (CAF)

Notes:

- Transition Meeting is to take place at the site
- Preceding Project Manager is to attend via conference if unable to attend in person
- The direct supervisor of the RCRA Project Manager is to chair the meeting

Timeframe: To be completed within **14-30 business days** from the first day in the position

APPENDIX B: Root Causes of Delay in RCRA Corrective Action

The Lean events exposed twelve root causes that may lead to undue delay in completing projects. Out of the twelve, two represented the primary causes of process delays: no mutual vision of the investigation and cleanup objectives, and no way to objectively discuss a path forward when differences arise.

This Toolbox addresses these two key root causes. We have listed the other possible causes in this appendix for your information. Most of us have experienced one or more of these situations in our projects. If you are stuck somewhere on the path to remedy selection, take a look at this list and see if any of these issues characterize your situation.

1. No common, up-front understanding on investigation or remedy selection objectives
2. No simple way to elevate issues for resolution
3. Projects require too many approval steps
4. Overall strategies are not discussed early in the process
5. Project manager changeover (all parties) requires revisiting decisions
6. No one person is responsible for project quality
7. Poor documentation and recordkeeping
8. Poorly defined data quality objectives
9. Site conceptual model misunderstood by either party
10. Competing objectives among parties
11. Tolerance for uncertainty is not discussed
12. Lack of defined product standards

APPENDIX C: Case Studies

This section contains case studies of facilities that have completed RCRA corrective action using the tools in the RCRA FIRST Toolbox to provide context and demonstrate potential results.

The following case studies are included in this section:

- Solvay Case Study: RCRA FIRST Supplemental RFI
- Honeywell Chesterfield Case Study: RCRA FIRST Stalled RFI
- Region 7 Case Study: RCRA FIRST Remedy Selection Process

Solvay Case Study: RCRA FIRST Supplemental RFI

This case study describes one facility's experience with a new approach to Resource Conservation and Recovery Act (RCRA) Corrective Action, called RCRA Facilities Investigation Remedy Selection Track (FIRST). For more information about RCRA FIRST, see:

http://www.epa.gov/epawaste/hazard/correctiveaction/lean_effort.htm

Background

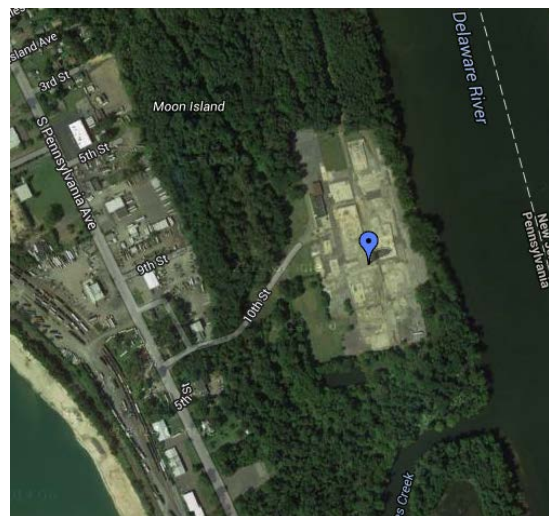
The Solvay Facility is located in Falls Township, Bucks County, Pennsylvania and occupies approximately 40 acres of a larger 89-acre property. The facility produced inorganic chemicals, primarily phosphoric acid, from 1948 until December 2001. Solvay's predecessor discontinued operations at the facility in late 2001 and began to demolish the buildings. Certain wastes from the production process were treated and disposed in on-site acid-waste ponds and landfills from 1948 through 1979.

Region 3 met with Solvay representatives in March 2013, shortly after the RFI Lean event. Solvay agreed to use the RCRA FIRST approach to address issues in an RCRA Facility Investigation (RFI) report that was then under review by the Region. We all agreed that further delineation was necessary to fully delineate the extent of arsenic-contaminated soils above non-residential screening levels.

RCRA FIRST Toolbox Benefits at Solvay

- Saved a total of approximately 48 months (four years)
- Due to more focused and coordinated data gathering for the site, the RFI's overall cost was decreased, and no CMS was determined to be needed
- EPA and Pennsylvania DEP project managers were able to focus on other sites

Figure C.1 Solvay Facility



Corrective Action Approach

Normally, Region 3 practice has required a supplemental RFI workplan, with EPA review comments and a meeting to discuss the comments and agree on the changes to the workplan. Under this practice, Solvay would then revise the RFI workplan and submit it for approval.

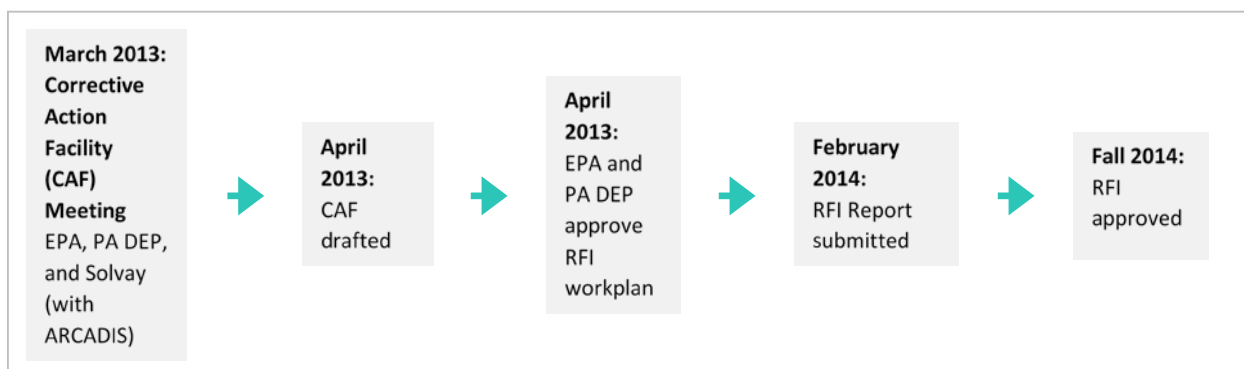
Using the RCRA FIRST approach, EPA and Solvay sought to achieve a more accurate delineation of arsenic- contaminated soils that exceeded non-residential health standards. During the Corrective Action Framework (CAF) meeting, EPA explained to Solvay, with the support of the Pennsylvania Department of Environmental Protection, why RCRA could not use the “no-use aquifer” determination, and that additional parameters for soil sampling were needed.

The team walked the site and EPA pointed out the data gaps that remained. EPA used additional sampling “step outs” to more accurately determine the dimensions of areas with arsenic levels above non-residential standards and to complete an ecological assessment of a small wetland-creek area that drained a closed disposal area.

The stakeholders agreed that a new RFI workplan was unnecessary because Solvay understood what was needed to complete the characterization and was willing to forgo workplan approval in order to simply begin the sampling effort. This approach not only streamlined the Solvay project, it also allowed EPA project managers to work on other projects.

Solvay carried out the site investigation through 2013. The time saved by not preparing, reviewing, and rewriting two supplemental workplans is approximately 12 months. The supplemental work completed the RFI and had the added benefit of allowing Solvay to define areas of the property suitable for future residential use. Because the supplemental work was consistent and used the RCRA FIRST approach, the facility did not need a Corrective Measures Study (CMS), saving approximately an additional 36 months, for a total of four years saved. EPA expects to move to remedy selection in early 2015 and the project should be completed in Q1 FY 2015. The Region 3 project management database had projected this site for a September 2018 completion, which is an estimated savings of 36 months.

Figure C2. Solvay RCRA FIRST Process Timeline



Lessons Learned

1. The creation of a CMS workplan, and a review and revision process, is not always necessary when both parties agree on the goals of the investigation. The goal of the Solvay investigation was met more quickly without the CMS workplan review process.
2. The use of standard guidance for the ecological assessment was adequate to generate sufficient data to show that the wetland-creek area was free of impacts.
3. In forgoing the CMS workplan, both EPA and Solvay took a risk that the resulting data could be insufficient to define the problem. However, that risk exists even when a CMS workplan approach is used, and the CMS approach would have cost six months of wait time.

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Honeywell Chesterfield Case Study: RCRA FIRST Stalled RFI

This case study describes one facility's experience with a new approach to Resource Conservation and Recovery Act (RCRA) Corrective Action, called RCRA Facilities Investigation Remedy Selection Track (FIRST). For more information about RCRA FIRST, see: http://www.epa.gov/epawaste/hazard/correctiveaction/lean_effort.htm

Background

The Chesterfield Facility is located at 4101 Bermuda Hundred Road (State Road 827), Chester, Chesterfield County, Virginia. The facility encompasses approximately 522 acres of land, of which approximately half is undeveloped. The property is located at the confluence of the James and Appomattox Rivers, which form the southern property boundary. Surrounding land uses include a Philip Morris facility located immediately north across Bermuda Hundred Road, agricultural fields and scattered residences to the east, and undeveloped vegetated land to the west. The facility currently manufactures Nylon 6 resin; manufacturing operations of fiber ceased in 2004. Historically, no other product line has been manufactured at the facility.

EPA Region 3 met with Honeywell representatives in March 2013 to discuss a deadlock on the groundwater under control environmental indicator.

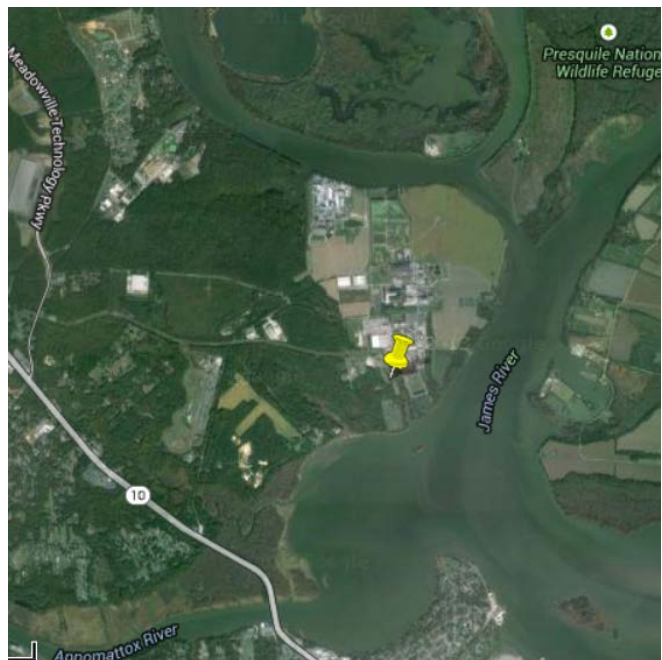
Corrective Action Approach

Before RCRA FIRST, Honeywell had pursued multiple phases of an RFI investigation. Although the RFI reports were approved and a groundwater environmental indicator had been submitted, EPA found issues with the Conceptual Site Model (CSM). After 9-plus years of investigation and EPA approval of each phase of RFI, a groundwater environmental indicator could not be approved, although:

RCRA FIRST Toolbox Benefits at Honeywell Chesterfield

- Jumpstarted a project after 10 years of RFI investigation and no approved groundwater environmental indicator.
- Condensed a multiphase investigation and interim measure pilot into a little more than 1 year.
- Final remedy selection expected in 2015 after 2.3 years.

Figure C.3 Honeywell Chesterfield Facility

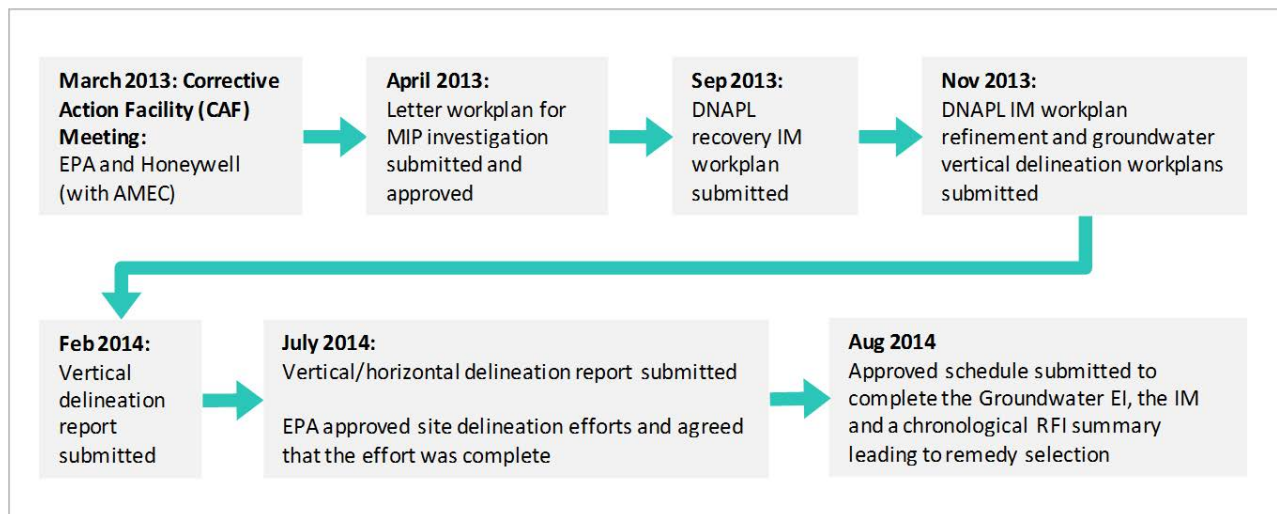


- The facility completed five phases of investigation between 2000 and 2009.
- The facility proposed a CSM in 2009 that concluded groundwater contamination was delineated.

EPA used the RCRA FIRST Toolbox in two ways: (1) to quickly achieve a more accurate delineation of VOC-contaminated groundwater that exceeded drinking water standards; and, (2) mitigate the DNAPL source area generating the dissolved phase plume. During the RCRA FIRST meeting in March 2013, EPA and Honeywell agreed to an expedited site investigation using a membrane interface probe and to implement interim measures upon completion of the DNAPL study.

Honeywell conducted the site investigation through 2013 and early 2014 in stages as the investigation became more complex. The interim measure was conducted as a pilot study in the middle of the groundwater plume. Ultimately both studies were concluded. The groundwater monitoring networks for a groundwater environmental indicator and interim measure performance plan were installed and completed by late 2014. The facility submitted a schedule to complete the groundwater environmental indicator and wrap the results into a proposal by early 2015.

Figure C.4 Honeywell Chesterfield RCRA FIRST Process Timeline



Lessons Learned

1. An initial meeting where both parties agree on the goals of the process saves countless time down the road. The goal of the Honeywell investigation was met more quickly because the parties agreed to what was unknown and agreed to proceed in a step-wise common sense investigation until the goal was realized.
2. Frequent meetings that were collaborative brain-storming sessions showed that when both parties had the same objective there were no conflicts in planning.
3. The inclusion of management beyond the project management level in meetings led to a streamlined proposal/approval process.
4. Workplans for the various stages of investigation were streamlined to the necessary elements and approvals were expedited by EPA.

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Region 7 Case Study: RCRA FIRST Remedy Selection Process

This case study describes one facility's experience with a new approach to Resource Conservation and Recovery Act (RCRA) Corrective Action, called RCRA Facilities Investigation Remedy Selection Track (FIRST). For more information about RCRA FIRST, see:

http://www.epa.gov/epawaste/hazard/correctiveaction/lean_effort.htm

Background

This Remedy Selection Process (RSP) Case Study presents the lessons learned from the first RSP meeting conducted in Region 7. The facility is a steel fabricator that produces building systems, farm and ranch equipment, and grain systems. Operations began at this central Nebraska facility in the 1950's, and manufacturing processes include metal shearing, deforming, welding, grinding, electroplating, hot dip galvanizing, conversion coating and finishing sheet metal. The facility occupies 99 acres and adjacent land use includes light industrial and farming operations. Hazardous wastes generated at the facility include spent pickle waste (K062), mineral spirits (D001), waste solvents such as toluene, xylene, acetone, methyl ethyl ketone, 1,1,1-trichloroethane and methylene chloride (F001, F002, F003, F005). The facility's two former surface impoundments are currently under post-closure requirements.

Region 7 completed the human health environmental indicator in 2004, and the contaminated groundwater migration controlled environmental indicator in 2014.

Corrective Action Approach

The facility entered into a 3008(H) Administrative Order on Consent with Region 7 on March 30, 2005. The facility initiated soil and groundwater investigation activities under NDEQ oversight prior to the issuance of the EPA AOC. The AOC requires that the facility implement interim measures, prepare an RFI/Current Conditions Report, perform a Corrective Measures Study (CMS), and implement the remedy selected by EPA.

RCRA FIRST RSP Approach Benefits for Region 7

- Documented that a CMS was not necessary
- Focused resources on a pilot test that all parties agreed was the appropriate path
- Expected to issue the Statement of Basis within the RCRA FIRST timeframes—which will reduce lead time by 75% from the Region 7 average

Figure C.5 Region 7 RSP Facility

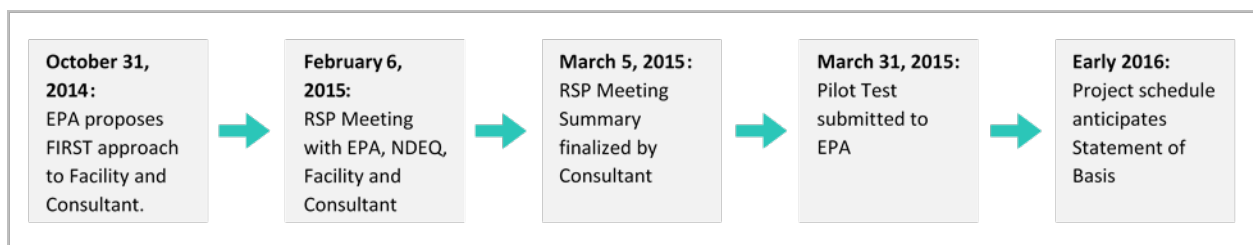


NDEQ approved the surface impoundments closure and post-closure plans in June 1987. The two impoundments covered 1.5 acres and contained 4,500 cubic yards of sludge. Releases to the groundwater were confirmed during closure. The facility conducted additional soil and groundwater investigation activities through the 1990s and into the early 2000s. When off-site groundwater contamination was detected, the facility initially provided bottled water to those impacted, then paid for the extension of the city’s water lines. In 2004, the facility commenced operation of a soil vapor extraction system.

The RFI Report required by the 3008(H) AOC was completed in 2014. The next step in the AOC was the submittal of a CMS. Several interim measures have been performed during the last two decades by the facility—excavation of contaminated soil, providing alternate water to those impacted off-site, and operation of an air sparging and soil vapor extraction system. Region 7 believed this would be an excellent project in which to utilize the RCRA FIRST RSP tools. A meeting was held at the Region 7 office on October 31, 2014 with facility representatives and their consultant to present the tools and discuss developing an RSP rather than conducting a CMS. With the facility and consultant receptive to the approach, the parties involved determined Region 7 would proceed down the RCRA FIRST path. The EPA project manager and the consultant utilized the RSP Agenda to develop the facility-specific agenda, coordinated a meeting date that would work for all participants, and began preparing the necessary materials for a successful meeting.

The RSP meeting was held on February 6, 2015. Participants included the EPA project team, facility representatives, the consultant’s project team, and NDEQ’s project managers and management. Several of the NDEQ participants and an EPA Region 8 project manager participated as observers. The meeting followed the RSP Agenda and the parties agreed the consultant would prepare the RSP Meeting Summary. Working through the RSP Agenda, the project team agreed to focus the project on a pilot test to evaluate potential improvements to the interim measures. The team developed a schedule for the remainder of the year, which included the deliverables for implementing the pilot test. A Statement of Basis will be developed and placed on public notice during early 2016.

Figure C.6 Region 7 Facility RSP Timeline



Lessons Learned

The Region 7 RSP Case Study is an excellent example of the benefits of bringing the parties involved in the corrective action project together and developing clear objectives for the path forward rather than focusing on the process. This facility has a typical Region 7 3008(H) order requiring a CMS, which was the next step in the “process.” All parties agreed a CMS was not necessary, and they utilized the FIRST Tools to streamline the approach to remedy selection.

1. Preparing for a successful RSP meeting takes time; requires close coordination, planning, and communication amongst the project team; and must ensure that all of the necessary participants are involved.
2. Even though the RSP meeting did not result in the preparation of a RSP document at the time of writing, it did establish a clear path forward that all parties understand.
3. Resources are now focused on the activity that is really necessary to implement a remedy rather than the CMS.
4. A Region 8 project manager participated in the RSP meeting as an observer. Observer participation, where possible, is an excellent way for other states and EPA Regions to see first-hand the FIRST tools in use, and expand the knowledge and understanding of FIRST.

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May 2016