New Environmental Protection Agency (EPA) Programs to Expedite Resource Conservation Recovery Act (RCRA) Corrective Action

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Abstract: Completing Resource Conservation Recovery Act (RCRA) Corrective Action is typically a long and costly process. Three ways are presented to speed up or reduce costs in RCRA Corrective Action. A new program from the United States Environmental Protection Agency (USEPA) is called *RCRA FIRST*. This program greatly streamlines and optimizes the steps within RCRA Corrective Action. In addition, the USEPA has now included a new environmental indicator (EI) called *CA550 OF*. *CA550 OF* outlines a way to defer remedy construction at an operating facility if the remedy is within critical process units or manufacturing equipment. A third way to increase efficiency of the RCRA process is to perform a site-specific Strategy Review that evaluates new strategies resulting in the lowest life-cycle costs while achieving regulatory closure or an exit of the liability.

RCRA FIRST is a new program from the EPA to expedite RCRA Corrective Action. The USEPA realizes that meeting their goals to have a remedy constructed at 95% of their RCRA baseline sites by the year 2020 will be challenging. *RCRA FIRST* initiates optimized communication between the regulators and the industry by setting up a Corrective Action Framework (CAF) meeting at the beginning of the RCRA phase. Hard issues are discussed and decided before any fieldwork or report writing is done. Having the critical discussions at the beginning allows for early mutual understanding and agreement of goals and expectations.

The USEPA now has a new EI that can allow construction-remedy deferral at operating facilities for RCRA Corrective Action. The "Environmental Indicators Initiative" was started in 1997 to improve the agency's ability to report on the progress of achieving RCRA Corrective Action goals. As a result, the USEPA created EIs to track a select list of facilities called the Government Performance and Reports Act (GPRA) Baseline. The USEPA then established specific goals for those facilities to measure performance and progress in RCRA Corrective Action. The USEPA's goal is to have a final remedy constructed by September 30, 2020 at 95% of the RCRA Corrective Action facilities on their GPRA baseline list. Due to the proximity of critical process or manufacturing equipment, along with safety concerns, constructing a remedy is difficult or impossible at portions of many operating or manufacturing facilities. As a result of years of negotiations and meetings, the USEPA now has a new final remedy-construction metric at operating facilities is called *CA550-OF*. A facility and the USEPA can achieve their 2020 goals for Remedy Construction by deferring remedy construction at critical locations within an operating site if certain conditions are met.

Another way to expedite RCRA Corrective Action and CERCLA remediation at high-priority sites is to hold a Strategy Review. A Strategy Review is not simply a peer review of the current strategy or a review of various remedial options. The Strategy Review objective is to develop and evaluate a site-specific strategy, which, when implemented, will result in the lowest life-cycle costs while achieving

regulatory closure or an exit of the liability. Attendees at the Review should consist of multiple disciplines so as to offer a wide view of perspectives and site-closure options. With this wide view of perspectives, alternative site-closure options and options to exit the liability at the site, including but not limited to remedial options, are brainstormed and scrutinized.

Resource Conservation and Recovery Act (RCRA) FIRST

What is RCRA FIRST?

RCRA FIRST is a new streamlined process being promoted by the USEPA for investigation and remediation at RCRA sites. The purpose is to expedite the RCRA Corrective Action process at RCRA facilities. Currently, the process of moving through the RCRA Facility Investigation (RFI) and Remedy Selection (RS) can take years, even decades, to complete and be approved. At this pace, the USEPA realizes that meeting their GPRA goals for having a final Remedy Construction (RC) at 95% of their RCRA baseline sites will be challenging, if not impossible. The RCRA FIRST tool initiates optimized communication between the regulators and the facility. It also sets project objectives for whatever RCRA phase a facility is currently in or wishes to start (e.g., RFI or RS). A CAF meeting at the beginning of the phase, between the regulator and the facility, outlines the project-objectives agreement. A CAF meeting can also be initiated for projects that are stalled and need a fresh restart. The CAF is attended by the USEPA and/or state project managers, their section chiefs, the industrial facility (facility) representatives, and facility consultants. They meet to discuss and agree on the project objectives at the beginning of the RFI or RS phase. This prevents delaying hard issues to the end of the phase. Hard-issue examples that need agreement include:

- Cleanup levels for groundwater and/or soil.
- Determination of need for a Corrective Measures Study (CMS).
- Decisions on what data needs to be collected.
- Future land use decisions.
- Determination on which future exposure pathways should be analyzed.

Under the old process, these objectives are often postponed to the end leading to stagnation and endless "do-loops" of data collection and report writing that is sent back and forth between the regulators and the facility.

Why does RCRA Corrective Action Take So Long?

A study by USEPA Regions 3 and 7 shows that the average time to complete an RFI is about 10 years, with some taking as many as 19 years to complete. The same study shows the average time to complete a Remedy Decision is an additional 6 years (RCRA FIRST Toolbox, 2016). Therefore, the total average time is approximately 16 years to start an RFI through completion of a Remedy Decision.

In 2014, the USEPA formed a study group composed of USEPA, state and industry members. The purpose was to determine and understand the current RCRA Corrective Action processes utilizing the *Lean* decision-making process review. The fundamentals of *Lean* decision making is using only the amount of information and process that is required to obtain a successful decision. The results determined the following root causes for why RCRA Corrective Action takes so long:

- No common, upfront understanding on investigation or remedy-selection objectives between the USEPA, state, and the facility.
- Overall strategies were not discussed early in the process.
- The data-quality objectives were often poorly defined.
- The Conceptual Site Model was misunderstood by either party.
- Competing objectives existed among the parties.

Other major root causes were:

- There was no simple way to elevate conflicting issues to achieve resolution between the parties.
- Projects required too many approval steps.
- Project manager changes required decisions to be remade or discussed again with a new incoming project manager.
- No one person was responsible for project quality.
- The tolerance for uncertainty was not discussed or agreed upon.

The study group's recommendation on how to speed up the RCRA Remedy Selection process was:

- Come to an agreement the conceptual site model and the corrective action objectives for the facility at the beginning of the process in a CAF meeting.
- Don't let decisions linger and elevate issues immediately if agreement can't be reached.
- Reduce the number of reviews and approvals.
- Reduce the number of loop-backs, redoing information and resubmitting data and reports.
- Reduce the number of documents generated.
- Reduce the number of decision points necessary to arrive at regulatory approval.

Why Consider RCRA FIRST?

The new RCRA FIRST process is designed to take years off completing RCRA Corrective Action, thus reducing remediation costs for the facility. Primary reasons for the timeframe reduction is better upfront communication and agreeing on major issues in the beginning of the process. Another primary reason is both the USEPA and/or state section chief(s) attend the CAF meeting. With the section chief(s) in attendance, decisions are designed to be quickly made at the CAF meeting for such items as submittal dates, cleanup levels, and USEPA/state review-turnaround times. This allows the hard decisions to be made and objectives agreed upon before starting fieldwork or report writing. If agreement on issues can't be reached, the process requires that the issues be elevated to higher levels of management for resolution at both the regulatory agency and the facility.

USEPA's Key Principles for RCRA FIRST

Since July 2015, the USEPA has held several training events across the country where they promote and openly discuss the key *RCRA FIRST* principles. These principles include:

- Shifting critical discussions to the front of the corrective-action process for early mutual understanding of goals and expectations during a CAF meeting.

- Confirming RCRA Corrective Action objectives before the remedy is selected at a Remedy Selection process meeting
- Maintaining open communication with the facility and engaging decision-makers and stakeholders at key points.
- Quickly elevating issues to management to resolve disputes.
- Using three paths for the RS process to only complete a full CMS when necessary. In many cases, no CMS is needed or only a limited CMS is needed (e.g., a pilot study of a technology to see if it works in the field).

***RCRA FIRST* Toolbox**

The USEPA has developed a toolbox for parties to implement the RCRA FIRST advantages. The purpose of the toolbox is to guide the facility and the regulators through the streamlined process. It was determined that RCRA FIRST is a better way to manage the RCRA Corrective-Action projects, even though it does not change the RCRA legal and technical requirements.

The following RCRA FIRST benefits were determined.

- Reduces the time and costs needed to complete the RFI and RS.
- Accelerates positive environmental results for affected communities.
- Provides a roadmap with process metrics to drive continuous improvements.
- Enhances communication throughout the process.
- Ensures all stakeholders have a clear understanding of the steps to select a remedy and complete construction.

Corrective Action Framework (CAF) Meeting

One of the first steps in implementing RCRA FIRST is also arguably the most important. It is called the CAF meeting. Project managers from the USEPA, the States (if involved), and the facility attend, as well as their supervisors, technical experts, and even their attorneys. The purpose of the meeting is to understand the goals and expectations of the current RCRA Corrective Action phase the facility is in. This could be an RFI or RS. The goal is to produce a CAF document. The CAF document will describe the agreements made during the CAF meeting, outline the objectives for the phase, and describe the agreed upon Conceptual Site Model (CSM). CAF meeting benefits include:

- Shifting critical decisions to the front of the corrective-action process to reach early mutual understanding of goals and expectations.
- Engaging stake holders early in the process.
- Reaching a common understanding of the physical setting, constraints, current conditions, and CSM (including data gaps).
- Developing, with coordination by the regulatory agency and the facility, a Corrective Action Framework.

Quickly managing and solving difficult issues is a key aspect of RCRA FIRST. If agreements cannot be reached during the CAF meeting, the issue(s) are elevated to management to resolve. Therefore, difficult issues that often stagnated progress are now addressed before any fieldwork begins.

Conceptual Site Model

Getting agreement among the USEPA, states, and industry on the CSM is often a difficult and time-consuming task. The RCRA FIRST toolbox encourages a simple CAF template, which outlines the key points to undertake during the CAF meeting for CSM agreement. The following table is completed for each media (e.g., soil, groundwater, indoor air, surface water).

Contaminant source / contaminated media	Transport/ migration pathway (e.g., leaching to GW, 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)
soil								
groundwater								

(RCRA FIRST Toolbox 2016)

Remedy-Selection (RS) Process

RCRA FIRST can also be used in the RS process. In the CAF meeting, the USEPA, the State, and the facility agree upon the proposed remedy that will facilitate the correct action objectives (cleanup levels). Also at this phase, the need for a CMS is agreed upon. In many cases, no CMS is needed, or a limited CMS is needed. In some cases, a full CMS is needed if it is not clear what remedies could work at a facility.

In the CAF meeting, the parties agree upon the corrective action objectives and discuss the remedy strategy. The remedy strategy consists of four parts:

- Threshold criteria
- Balancing criteria
- Alternative identification
- Data-gap identification

The threshold criteria for a remedy alternative are: the remedy must protect human health and the environment, based on reasonably anticipated land use; the remedy must attain the media cleanup objectives; and the remedy must control release sources.

The balancing criteria for deciding which remedy to select are: long-term effectiveness; reduction in waste volume, mobility, and toxicity; short-term effectiveness; the ability to successfully implement the remedy; cost; community and state acceptance. Also in the Remedy Selection CAF meeting, alternatives and data gaps are identified and agreed upon.

Corrective Action Objectives are developed in the CAF meeting. The objectives for the RS phase are derived from the following:

- Threshold criteria as described above
- USEPA law, policy, and guidance
- CSM
- Current facility uses and exposures
- Reasonably expected future facility uses and exposures
- Resource values (e.g., ecological, groundwater, etc.)

To evaluate the benefits of RCRA FIRST the process was pilot tested at a major oil company site. The site had been in RCRA Corrective Action for over 20 years. The site was divided into parcels of property and RCRA Corrective Action was done on a parcel-by-parcel basis to expedite reuse of certain parcels on the property. A RCRA FIRST pilot test was done for the RS phase on one of the parcels. The pilot test showed the anticipated time to complete the RS phase was reduced to a fraction of the time that other site parcels experienced to complete their RS.

Below is a USEPA example on the anticipated RCRA FIRST improvements.

Remedy Selection Process		
	Current Process	TO BE Process
# of Hand-offs*	23	17
# of Reviews / Approvals	26	5
# of Loopbacks / Re-dos / Re-submissions	30	0
# of Documents Generated	75	8
# of Decision Points	9	4
Total avg. work time per step		
Total avg. wait time within steps and between steps	2,464 days	352 - 717 days**
Total avg. cycle time in process	6.75 years	1 -2 years
% Improvement in time**	75 - 85% **	
% of Value Add activity in end to end process	20%	97%
* "Types" of Hand-offs have been added together (internal to agency, external to agency and internal to industry		
** Range has been calculated and provided for the "3" potential paths within the process		

Chart from EPA Regions 3 & 7, RCRA Facilities Investigation/Remedy Selection Tool Box Training, July 22, 2015.

Environmental Indicator (EI) CA550-OF for Deferring Remedy Construction at an Operating Site

Recently, the USEPA added a new EI to allow remedy construction deferral near critical process areas within an operating facility. The USEPAs "Environmental Indicators Initiative" was started in 1997 to improve the agency's ability to report on the status of and trends in environmental conditions and their impacts on human health and the nation's natural resources. The GPRA of 1993 mandated that federal agencies develop and use a means to measure results. Because of the GPRA, the USEPA created EIs to track a select list of facilities called the GPRA Baseline. The USEPA then established specific goals for

those facilities to measure performance and progress in RCRA Corrective Action. The USEPA's metric is to have a Remedy Constructed by September 30, 2020 at 95% of the RCRA Corrective Action facilities on their GPRA baseline list. This is often called their "2020 Goals" and the USEPA tracks and reports on their performance annually in achieving this goal. In the USEPA's database called *RCRAInfo,* the Final Remedy Constructed goal is labeled "CA550."

Operating Facilities and Manufacturing Facilities

Constructing a remedy and achieving a CA550 may be difficult or impossible at many operating or manufacturing facilities. This is because installing remediation systems, digging subsurface piping systems, or removing contaminated soils or groundwater is not safe at many operating or manufacturing facilities. In many cases, constructing a remedy at certain critical locations at an operating facility would require the facility to shut down or remove critical operating units or major portions of the facility to construct a remedy. While it may be possible to negotiate a final remedy that is built around these critical operating areas, many times cleanup of these areas will need to be addressed in the future when the land becomes available for investigation and remediation.

Through efforts of industry representatives within two major oil companies, the USEPA was convinced that to attain their 2020 goals, they needed to add a new category that would fit these operating facilities. As a result of years of negotiations and meetings, the USEPA now has a new category for Final Remedy Construction at operating facilities called CA550-OF. A facility and the USEPA can achieve their 2020 goals for Final Remedy Construction by deferring remedy construction at critical locations within an operating site if certain conditions are met.

United States Environmental Protection Agency (USEPA) Conditions for a Remedy Deferral

To achieve a CA550-OF requires that the facility "must have a substantive technical basis and should only be used in very limited circumstances such as where implementation of the final remedy would cause undue interruption of a critical process or destruction of an integral portion of the subject operating area(s)" (EPA RCRAInfo, 2016). The facility must demonstrate that there are safety and/or physical limitations that cannot be overcome by engineering and/or scheduling considerations and these preclude reasonable efforts to construct/implement remedies during a specified time period or operation (EPA RCRAInfo, 2016).

Other USEPA conditions for allowing a remedy deferral are as follows:

- There are no ongoing releases contributing to contamination; there is no contamination "source" that is being allowed to migrate outside of the operating area footprint without being treated or contained; and there is no off-site contamination from releases.
- Contaminant extent has been delineated, the anticipated final remedy has been identified, and financial assurance for the final remedy is in place for all areas at the facility.
- Any necessary institutional controls are in place to prevent unacceptable exposures to contamination and ensure protection of human health and the environment.
- The deferral is only for a specified time period and shall not extend beyond the active life of the critical process or integral component that is the basis for the deferral.

Although the USEPA has placed limitations on allowing the deferral of the remedy construction at an operating site, many facilities should closely examine whether this would be a prudent option for deferring the remedy for their site or part of their site.

Strategy Reviews at High-Priority Sites

Another way to expedite RCRA Corrective Action and CERCLA remediation at high-priority sites is to hold an internal Strategy Review (Review). Often these larger and/or more complex sites have high spending and a long duration before a regulatory closure can be obtained. Even though a variety of remedial options may have already been considered at the site, there can be a tendency to become complacent with respect to such sites and allow the high spending to continue year after year. For such sites, conducting a Review can be a way to realistically evaluate the current course of action and determine whether there are better options for achieving the site goals.

A Review is not simply a peer review of the current strategy or a review of various remedial options. Rather, the objective of a Review is to develop and evaluate a site-specific strategy which, when implemented, will result in the lowest life-cycle costs while achieving regulatory closure or an exit of the liability. Attendees at the Review should consist of multiple disciplines so as to offer a wide view of perspectives and closure options for the site. With this wide view of perspectives, alternative site-closure options and options to exit the liability at the site, including but not limited to remedial options, are brainstormed and scrutinized. Effective Reviews invariably provide a wider perspective regarding the ultimate objectives for the site. There is always more than one answer for achieving a site regulatory closure or an exit of the liability.

Strategy-Review Attendees

Multiple disciplines are encouraged to attend the Review because they will offer a wide perspective of options for the site. Examples of attendees are: environmental attorneys, real estate experts, public-relations experts, insurance experts, and other technical experts. The goal of the Review is to brainstorm multiple alternative site-exit options, including but not limited to remedial options. Having cross-sectional experts and multiple disciplines attend the Review will provide wider perspectives on the ultimate objectives for the site that will be broader than limiting attendees to only technical experts.

Brainstorming Other Site Options

With multiple disciplines at a Review, other options for exiting or transferring the liability or a site regulatory closure are brainstormed and considered. Examples of other options that can be considered are:

- Transferring the remediation work to another party.
- Divesting the site to a developer.
- Offering a fixed-price contract to another party.
- Placing the site in a Qualified Settlement Trust.
- Seeking high-level advocacy for such strategies as securing a risk-based closure, approving an alternative cleanup standard, or changing a current law.

Other remedial options could also include:

- Optimizing the current remedy.
- Identifying additional experts needed to pursue a new remedial strategy.
- Advancing the remediation pace before a regulation or cleanup standard becomes more onerous.

Benefits Versus Disadvantages

Review benefits include the following:

- Exploring new ideas from attendees with multiple viewpoints.
- Testing current strategies and considering new strategies.
- Replicating the standardized-review process at other sites.
- Assuring senior management or site owners that numerous options have been explored for managing the high-cost sites.
- Accomplishing the Review in a 1- or 2-day meeting.

The disadvantages of a Review are the costs for holding a 1- or 2-day meeting with multiple disciplines in attendance. In some cases, the current project team may not initially see value in such a Review because they may feel the best strategy is already being implemented.

Review Process Steps

There are six key steps for this Review type. These steps are designed to articulate new ideas from the attendees and evaluate each idea thoroughly and consistently. The Review is best guided by an experienced facilitator.

1. The current project team presents the existing site conditions and their operating strategy to the attendees at the Review. The project team not only explains their operating strategy, but other key issues that influence the site. Examples are: community relations, existing litigation, life-cycle costs, expected duration of the current strategy, property value (if the site is a closed facility), other partners that have joint liability, and the regulatory climate.
2. The attendees break into small groups to identify key issues, risks, boundaries and decision criteria. Examples of "key issues" are the big milestones and drivers that are occurring at the site. Examples of "risks" are the threats for the site (e.g., an angry community or threatened litigation). "Boundaries and decision criteria" are the mandated items for any new strategy that must be adhered to (e.g., site ownership must be retained, existing business operations must continue, or the community must agree with the selected strategy).
3. The attendees break into small groups to brainstorm alternative ideas for the site. The key is to ensure the attendees that no brainstorming idea they offer is a bad idea. The small group narrows down the ideas discussed and shares their best ideas with the larger group at the Review. After the ideas are heard by the larger group, the best three or four ideas are selected to evaluate further.
4. The attendees break into small groups to further evaluate the selected three or four ideas. For each idea, the small group discuss the risks and mitigations. The small group also discusses the key activities for each of the three or four ideas. All of the ideas, risks, mitigations, and boundaries and decision criteria are captured by a note taker. The note taker documents the group

results and these are then given to the project team to evaluate after the Review. The Review is then adjourned.

5. After the Review, the project team meets separately and evaluates each idea. The project team also evaluates the identified risks, mitigations, and key activities that came from the attendees. The project team evaluates and ranks each idea for:
   - Site-goal achievement.
   - Review of whether or not acceptable risks and mitigations could be implemented for those risks.
   - Effectiveness of meeting mandatory site criteria and key issues.
   - Life-cycle costs.
6. The final step is when the project team writes an Action Plan for review and approval by proper management. The Action Plan will compare each of the three or four best ideas from the Review for meeting the achievement of site goals, effectiveness of meeting mandatory site criteria and life-cycle costs. Based upon their comparison, the project team will arrive at a preferred strategy for the site. The Action Plan will provide the rationale for the recommended path forward.

Following the Review steps in a 1-or 2-day meeting gives the project team and the site owner new ideas to evaluate and compare with the existing site strategy. The best strategy can be selected that will achieve a regulatory closure or an exit of the liability at the lowest life-cycle costs.

A successful Review example was a conducted at a large, closed manufacturing site. Due to its prime location, the property had a high land value. The current remediation strategy of impacted soil excavation and a cap cover was going to cost several million dollars. A Review was held using the process outlined. The attendees consisted of a cross section of expertise, most of whom had never worked on or visited the site. The first portion of the Review consisted of attendees learning about the current site strategy and site conditions. The next portion consisted of brainstorming new ideas and on the second day, the new ideas were narrowed to three scenarios. These three scenarios were carried forward for further analyses by the project team. These scenarios, their scoring for achieving the site goals, and estimated costs are presented below.

Scenarios	Achievement of goals of: Key Issues, Risk, Boundaries & Decision Criteria (low score is most effective)	Life-cycle costs, millions, NPV (dollars for each scenario are comparative in scale, but not exact figures)
#1 - Transfer property to a developer	12	$20
#2 - Transfer property and remediation to at 468B Trust*	5	$11
#3 - Maintain current strategy of excavation and cap	13	$12

The evaluation showed the best low-cost scenario that included an exit of the liability was to put the property and remediation responsibility into a 468b Trust. In this scenario, another entity would take possession of the property and take over cleanup responsibility. The project team preferred this scenario because:

- it best met the goals determined in the Review,
- transferred the liability and property to another party,
- would allow a tax deduction for the owner at the time the property was transferred, and
- was anticipated to be the lowest life-cycle cost.

*Scenario #2: A Qualified Settlement Fund is a trust established by 26 CFR §1.46B-1 of the Treasury Regulations pursuant of Section 468B of the Internal Revenue Code.

Conclusion

RCRA FIRST, EI CA550 OF and a High Priority Strategy Review could be beneficial to speed up RCRA Corrective Action and reduce costs. Those performing RCRA Corrective Action should review this information and determine if these three programs would benefit their sites.

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