Transitioning Fund-Financed Site Remedies from EPA to the States: A Guide for Project Managers

ASTSWMO CERCLA Post Construction Focus Group
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In Memoriam

This paper is dedicated to the memory of our focus group member, colleague and friend, Joe Coyne. Joe was a passionate and dedicated public servant who was universally loved and respected by all who had the privilege to work with him. With his quick wit, kind spirit and contagious laugh, Joe was truly the heart and soul of our focus group.

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I. EXECUTIVE SUMMARY

The Comprehensive Environmental Response, Compensation and Liability Act, as amended (CERCLA or Superfund), addresses the remediation of uncontrolled or abandoned hazardous substance sites. Often, remediation activities are conducted by potentially responsible parties (PRPs) with federal and State oversight. Where no viable PRP(s) exists, U.S. Environmental Protection Agency (EPA) generally serves as the lead agency, implementing the requirements of the National Contingency Plan (NCP). These sites are understood to be Fund-financed sites, and the EPA and the State wherein the site is located share remedy implementation costs. Under CERCLA, the State is required to assume operation and maintenance (O&M) responsibilities at Fund-financed sites. Oftentimes, the costs associated with O&M are not fully understood until later in the process, leading to uncertainty by the State on its long term financial obligations. This is especially true for sites that involve surface water and/or groundwater restoration. Additionally, decisions made during the remedy design and construction phases can have a profound economic impact on a State’s long-term O&M costs. To facilitate successful remedy transfer, it is important to engage in effective and early communication and planning between the EPA and the State.

Upon remedy transfer, it becomes the State’s responsibility to ensure that the remedy is maintained so that it remains protective of human health and the environment. Because transition from the remedial action (RA) phase of a remedy to O&M is often complicated, inadequate preparation and communication between the agencies may result in inefficiency and confusion. The CERCLA Post Construction Focus Group (CPCFG) contacted various States for examples of challenges that arose during transition from the RA phase to the O&M phase. Based on State feedback, it became apparent that identification of potential issues early in the CERCLA process for NPL sites could help facilitate a more successful transition into O&M. This paper will: 1) provide examples of challenges experienced by various states during the transition of sites from the EPA to a state and 2) present NPL site examples that illustrate opportunities for possible solutions to aid in facilitating more successful transitions.

There are opportunities throughout the CERCLA process for EPA and the State to engage in planning for the eventual transfer of O&M responsibilities. The site-specific Superfund State Contracts (SSCs) and Cooperative Agreements (CAs) between EPA and individual States are the primary mechanisms used to define expectations and delineate roles and responsibilities, while providing opportunities for dispute resolution. These agreements should also be used to identify

1 While the focus of this paper is on Fund-financed sites, much of the information is applicable to all National Priorities List (NPL) sites or NPL-caliber sites, regardless of funding source.
the mutually agreed-upon roles and responsibilities during the transition process and should include methods to assess (and reassess, as necessary) any issues that may arise. Clear dispute-resolution processes should also be established early to help facilitate resolution of disagreements over the functional operation of a remedy prior to its transfer to a State.

Because it will ultimately become the State’s responsibility to implement O&M, States may consider taking a more proactive role during development and implementation of the remedial design (RD) and remedial action (RA). It is important for States to have meaningful involvement at the beginning of the CERCLA process (e.g. RI/FS) for NPL sites, so that they have a solid understanding of O&M issues and costs and opportunities to minimize potential inefficiencies.

Tools that can be used to leverage effective and efficient transition into O&M include:

- SSCs & CAs
- Feasibility study
- Optimization reviews and implementation
- Five-year reviews
- Site-specific administrative documents
- Comprehensive O&M plans and manuals
- Accurate Cost estimates
- Equipment Ownership Agreements
- Clear project documentation (e.g. administrative record, site file, etc.)

Successful project transitions necessitate early identification of O&M costs. In certain situations, it may be appropriate to utilize third party remedy optimization reviews as part of any Long-Term Response Action (LTRA) to help streamline transitions. States should ensure that decision-making and communication processes are thoroughly negotiated and identified in SSCs and Cooperative Agreements.

II. INTRODUCTION

Under CERCLA (or Superfund), as amended, EPA is given the authority to seek out those parties responsible for a release and assure their cooperation in the cleanup. Through various enforcement tools, EPA obtains private party cleanup through orders, consent decrees, and other small party settlements. Once a response action has been completed, EPA also recovers costs from financially viable individuals and companies. However, when no PRPs can be identified or when the PRPs have demonstrated an inability to pay, the cleanup is funded by EPA and State
dollars. These sites are considered “Fund-financed” sites, wherein EPA and States share remedy implementation costs.

At a Fund-financed remedial action, remedy construction costs are split, with typically 90% of the cost coming from federal sources and the remaining 10% from the State. After completion of the RA, CERCLA requires that the State assume responsibility for and fully fund O&M of the selected remedy to ensure it remains protective of human health and the environment. Figure 1 illustrates the historic trends of estimated annual O&M costs of Fund-Lead pump-and-treat systems. States should be prepared to take steps to effectively minimize such rising costs as they assume O&M activities.²

![Figure 1- Trends in Pump & Treat O&M Costs](image)

Figure 1- Trends in Pump & Treat O&M Costs (Source: ITRC Remediation Process Optimization: Identifying Opportunities for Enhanced and More Efficient Site Remediation, September 2004)³


³ This figure is intended to illustrate trends associated with increasing O&M costs. While the data set is dated, and future costs have been extrapolated, the reader is given a sense of why early engagement is needed to influence the minimization of future O&M costs.

Notes:
- Data reflect estimates provided by site Remedial Project Managers between February and May 2001. These estimates may vary from actual values.
- Data, including the number and status of systems, may change over time.
- Fund-lead pump-and-treat systems are those systems where groundwater extraction and treatment is specified in the Record of Decision and oversight is provided by EPA or by the state with financial support from Superfund.
- Annual O&M costs are estimates and include such components as labor, utilities, materials, analytical costs, etc.
- This chart shows only the trends between 2001 and 2015. Existing systems and new systems are expected to operate beyond 2015.
This document is intended to identify issues that have previously arisen during the transition of Fund-financed NPL sites from the EPA to the State for O&M and to provide recommendations for processes that can be implemented to prevent complications from arising during future transitions. Case Studies depicting challenges that have arisen during or following transition of O&M responsibilities to the State are included as text boxes in Section VII to depict the advantages of early State engagement.

I. BACKGROUND

CERCLA Section 104 requires that EPA consult with the affected State or States before determining the appropriate RA and prior to implementing an RA, EPA and the State must first enter into a contract or cooperative agreement. These contracts or agreements help to provide mutual assurances that EPA or the State will fulfill their respective obligations. As stated in Section 104 of CERCLA, the State’s responsibilities include:

- Providing a 10 percent cost share on the remedial response (could be 50% or more for State-operated facilities);
- Conducting and paying for all O&M activities; and
- Accepting transfer of all real property acquired by EPA to conduct the RA.

Because the State is responsible for fully funding O&M activities, the State should proactively participate in the selection and development of a remedy involving O&M obligations. This is especially true for sites that involve surface and/or groundwater which, in many cases, must be operated into perpetuity.

Decisions made during remedy design and construction phases can have a profound economic impact on the State’s long-term O&M costs. Therefore, State involvement should begin early in the CERCLA process. State involvement during various phases in the CERCLA process can be defined in one or more of three common mechanisms: Superfund Memorandum of Agreements (SMOAs), SSCs or CAs.

A SMOA is a nonbinding, written document executed by an EPA Regional Administrator and the head of a State agency that establishes the nature and extent of EPA and State interaction during the removal, pre-remedial, remedial, and/or enforcement response process. The SMOA is not a site-specific document although attachments may address specific sites. The SMOA generally defines the roles and responsibilities of both the lead and the support agencies.
The lead agency is the agency that provides the on-scene coordinator or remedial project manager (RPM) who is responsible for planning and implementing response actions under the NCP. The EPA, Department of Defense (DOD), Department of Energy (DOE), another federal agency, or a State (or political subdivision of a State) operating pursuant to a contract or cooperative agreement executed pursuant to section 104(d)(1) of CERCLA may be the lead agency for a response action. The lead agency will consult with the support agency, if one exists, throughout the response process. Depending on whether EPA or the State is the lead agency, a site-specific SSC or CA is required.

A site-specific SSC is a joint, legally-binding agreement between EPA and the State that provides a mechanism for assuring the transfer of State cost-sharing funds to EPA when EPA is leading a response action. A CA transfers funds from EPA to the State when the State is taking the lead for a site-specific response. CERCLA allows a State to be authorized to lead cleanup efforts at a site in situations where the State possesses the technical and management capabilities to carry out the response action.

When EPA is the lead agency implementing a Fund-financed response, State involvement is particularly important. Transition from the RA to O&M can be complicated and can result in various issues arising between the agencies involved. If these issues are identified early and a process for issue resolution has been previously identified, transition into O&M can be more successful.

To help ensure a smooth transition from EPA to the State, it is critical that State Project Officers (SPOs) coordinate closely with the EPA RPM and actively participate in the development and completion of the Remedial Investigation and Feasibility Study (RI/FS), Record of Decision (ROD), RD, RA (including LTRA), the Operational and Functional (O&F) determination. Early participation and good communication between the EPA and State should help prevent unanticipated O&M costs, delays and/or unnecessary expenses associated with treatment or containment systems that may require coordination to address needed repairs or upgrades. Further, consistent and effective communication will allow the parties to collaboratively develop a course for correcting ineffective or inefficient remedies. To minimize the possibility of such issues arising, the EPA and State should reassess the future transition and long-term O&M costs during each phase of the Superfund process, as appropriate. Suggestions for State involvement during each of these phases are discussed in the next section.

State involvement and obligations in CERCLA response actions vary depending on the site-specific funding source and who is serving the role of lead agency. A general schematic detailing EPA and State involvement in the Superfund process is shown in Figures 2 through 4.
EPA/State Superfund Involvement From Site Discovery Through Record of Decision
(Figure 2)

REQUIRED ACTIVITIES

State and EPA collaborate to:
1. Track priority sites;
2. Identify sites needing additional consideration;
3. Discuss potential sites for NPL listing;
4. Confirm sites that do not require EPA attention.

SUGGESTED ACTIVITIES

Considerations State makes before providing information to the Governor:
State should consider viability of PRP.
State should consider RA and O&M costs based on known information.

Pre-screening/Discovery  PA/SI  NPL Listing  Settlement Negotiations  RI/FS  PRAP  ROD

State notifies the state and requests written concurrence at least 30 days prior to proposing a site to the NPL.

State provides review, comments, and ARARs.

State has opportunity to review and submit comments to EPA that are to be included in the ROD for public review and EPA response.

State provides final ARARs and provides Concurrence.

Notes: 1. The Superfund Remedial Process is the same for both Fund Lead Sites and PRP funding sites except for Settlement Negotiation with PRP funding sites, and SSC in Fund Lead Sites. (PRP funding sites can become Fund Lead Sites at anytime in the process)
22. Activities depicted above may differ upon State specific language in Superfund MOA.
EPA/State Superfund Involvement From Post Record of Decision Through De-listing (Figure 3)

**REQUIRED ACTIVITIES**

- **Settlement/SSC Negotiated**
  - State should participate and enter into third party agreements.
- **RD**
  - State should require EPA to submit an O&M Plan concurrently with the SSC in order for State to fully evaluate its potential O&M responsibilities.
- **RA**
  - State should consider and evaluate the SSC Model Provisions? Subpart O
- **O&F**
  - State should consider encouraging all LTRA to undergo optimization and include this requirement in all SSCs that contain LTRA.
- **O&M**
  - State should evaluate O&M and optimization continuously.
- **De-listing**
  - State should actively seek re-use of the site for O&M responsibility to transfer

**SUGGESTED ACTIVITIES**

- **Settlement/SSC Negotiated**
  - EPA drafts SSC usually during remedial design process. The SSC must be signed by State in order for EPA to spend superfund funds on the RA.
- **RD**
  - Formal O&F determination is a critical milestone because it governs when EPA turns the remedy over to the State for O&M. A joint inspection marks the beginning of the O&F period.
- **RA**
  - EPA conducts 5 year reviews

**Notes:**
1. The Superfund Remedial Process is the same for both Fund Lead Sites and PRP funding sites except for Settlement Negotiation with PRP funding sites and SSC in Fund Lead Sites.
2. PRP funding sites can become Fund Lead Sites at anytime in the process.
3. Activities depicted above may differ upon State specific language in Superfund MOA.
State Involvement Activities During Long Term Response Action (LTRA) (Figure 4)

**EPA**

- RD/RA
- **LTRA / Operational & Functional**
- **O&M**
- Deletion

**State**

- Remedy Construction
- **LTRA/ Operational & Functional**
- **O&M**
- Deletion

- The model provisions for the SSC include a recommendation to develop O&F factors.
- EPA sends written response documenting inspection.
- O&F Determination RA Report.
- Joint State/EPA inspection.
- 3rd party optimization review year 0-6 during LTRA.
- Update all O&M costs.
- Remedy Transfers to State.

**Detailed O&M plan with all applicable elements including performance standards used to determine Operational & Functional.**
- State responds to any concerns from inspection.
- Validate RD assumptions including conceptual site model.
- Future contractor evaluation, selection, and training.
- Conduct O&M and regular reviews to assess cleanup progress and identify changed conditions.
IV. RECOMMENDATIONS FOR IMPROVING TRANSITIONS THROUGHOUT THE SUPERFUND PROCESS

A. Superfund Agreements

The SMOA is the first agreement that may be executed between the EPA and the State and is not site-specific. As a result, the SMOA is an ideal vehicle for memorializing ground rules that apply to agency interactions. To ensure effective communication and coordination, the SMOA should contain specificity regarding the expectations, roles and responsibilities of the lead and support agencies. In addition, the SMOA should identify which draft documents, proposed timelines and other decisions will be provided in advance to the support agency for its review and concurrence, prior to finalization. Section 300.505 of the NCP identifies what should be in a SMOA.

The SMOA is considered a “living” document and as such, can be modified if necessary. Additional details can also be included in site specific SSCs or CAs. These agreements should also be used to identify the mutually agreed-upon steps in the transition process, and should include ways to identify issues and processes to resolve any conflict on the functional operation of a remedy prior to its transfer to a State (e.g. clear dispute resolutions processes included within the SMOA or SSC). They should also provide general procedures for dispute resolution. Project managers are encouraged to review recently published ASTSWMO guidance on SSCs, found at: Superfund State Contracts Reference Guide (ASTSWMO April 2016)

The NCP (Sections 300.515(g) and (h)) requires:4

- The nature and extent of State involvement during the RD and RA be specified in site specific SCCs or CAs;
- A joint inspection be conducted at the conclusion of RA construction; and
- The lead agency allows the support agency the opportunity to review and provide input on documents.

EPA and the State should begin negotiating the SSC early in the RD phase as 40 CFR, Part 35, Subpart O requires it be finalized prior to EPA expending money on the RA. The SSC should address remedy transfer, operator training, site access, O&M Plan and Manual as-built drawings, etc. The SSC should be finalized as soon as the final RA cost estimates (including the cost of construction management services) are available. The SSC needs to address the State’s obligation to conduct the CERCLA O&M requirements. The O&M plan is an important document for the State to review prior to executing an SSC as it provides information to the State to determine how the state can provide 100% of O&M costs. An O&M plan differs from an O&M manual in

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4 See also: Guidance for Management of Superfund Remedies in Post Construction, OLEM 9200.3-105, February 2017.
that an O&M plan should define the administrative, financial, and technical requirements for inspecting, operating, and maintaining the RA, including institutional controls (ICs), whereas the O&M manual is normally prepared by the construction contractor and should provide a detailed description of the O&M components. The O&M Plan and cost estimates are developed during the remedial design and updated during RA and even O&M. Since these documents contain the information necessary for a State to understand the scope of the O&M activities it will be responsible for, these documents should be reviewed by the State prior to finalizing an SSC.⁵

As EPA initiates the remedial design on Fund-Lead sites, the State should initiate good faith negotiation of SSC components since the remedial action will not be funded until an SSC or CA is finalized. To avoid unnecessary delays, States should ensure that:

- A complete RA cost estimate with appropriate contingency amount for potential cost escalation (State input and ultimate concurrence is needed to finalize the SSC).
- A determination of whether and to what extent the State will be involved in RA construction management (so that the State may provide input on technical and cost related issues).
- A determination of when and how the remedy will be declared O&F, including a clear list of the performance metrics or other functional requirements that will be used to make the O&F determination.
- An adequately detailed description of the O&M requirements and anticipated costs.
- Should an RA become ineffective at meeting the cleanup standard, the State may ask EPA to consider reopening the ROD for further consideration of a different remedy.

Alternatively, it may be appropriate for the State to take the lead role in implementing RD and RA. By having the State serve as the lead, the SPO will become intimately familiar with the operation and maintenance of the remedy and will know what resources and funding are necessary to fulfill the O&M obligation.

B. Remedial Investigation/Feasibility Study

The RI/FS Phase is one of the earliest parts of the CERCLA process. During the RI, the nature and extent of contamination is determined and risk assessments are performed. The State should review the draft RI to ensure adequate characterization of the site has occurred and to minimize the potential that unexpected sources are identified after the selection of the remedy.⁶

The FS develops remedial action objectives (RAOs), including preliminary remediation goals (PRGs), and develops, presents and evaluates remedial alternatives that will meet the RAOs. CERCLA Section 121(f) defines how states are involved with the development of cleanup levels. During the FS, Applicable or Relevant and Appropriate Regulations (ARARs) are identified and Remedial Action Objectives (RAOs) are developed based on the risks posed by the contamination and to ensure protection of human health and the environment. Remedial alternatives are generated and then screened to determine whether the options can attain RAOs and comply with ARARs. Remedies that meet the threshold criteria of overall protection of human health and the environment and compliance with ARARs are further weighed against the remaining evaluation criteria of:

- Long-Term Effectiveness and Permanence,
- Reduction of Toxicity, Mobility or Volume Through Treatment,
- Short-Term Effectiveness,
- Ability to Implement,
- Cost,
- State Acceptance, and
- Community Acceptance.

CERCLA Section 121(b) requires that the evaluation of alternative remedies involving treatment technologies need to consider several factors including long-term maintenance costs and the potential for future RA costs if the alternative RA in question were to fail.

The State should review the remedial alternatives in the FS and weigh potential O&M activities and costs associated with each of the alternatives. Because the State is responsible for the O&M, the State should be aware that often remedies with a lower RA costs often result in higher O&M costs.\(^7\) Since O&M activities generally begin several years after the development of the FS, the assumptions used to develop the O&M cost estimates should be clearly defined and the appropriate discount rate applied.\(^8\) The State should also verify that the O&M timeframes identified are realistic. If the State is going to be responsible for implementing the O&M, it is important that they are involved in the cost estimate development for the FS and that any uncertainties are specifically identified as such so that they may be revisited and addressed when more information becomes available. It is important to recognize that, due to the length of time it takes to move from remedy selection to O&M, the initial cost estimate developed during the FS may no longer be accurate (normally expected to be anywhere from +50% to -30%). For that

\(^7\) See: The Role of Cost in the Superfund Remedy Selection Process, OSWER 9200.3-23, September 1996.
\(^8\) See: Guide to Developing and Documenting Cost Estimates During the Feasibility Study, EPA 540-R-00-002, OSWER 8355.0-75, July 2000.)
reason, O&M costs should be regularly updated as new information becomes available and to account for inflation.

During the FS phase, the State should consider the practicability of ensuring the ICs are implementable. For example, in certain instances where the IC includes the requirement for a deed restriction, EPA and the State should identify the property owner early in the process to ascertain the property owner's willingness to restrict the property (if there is no unilaterally-enforceable mechanism available in the State) in the way intended by the future RD. Because ICs are only effective if they are enforceable, an evaluation of the practicability of the IC may need to be revisited at various points of the process, particularly if remedy components are modified or property ownership changes. An IC is more likely to be enforceable (and therefore effective) in those states that have adopted statutes or regulations that require compliance with ICs (e.g., states that have adopted a Uniform Environmental Covenants Act program).

C. Record of Decision
The ROD selects the remedy, establishes the objectives and cleanup levels that will be achieved by the remedy. Concurrent with finalizing the ROD, the State and EPA project managers should discuss, at the earliest practicable opportunity, whether the remedy requires an LTRA action. The ROD should include clear RAoRs, performance goals and measures. While the criteria to determine when a remedial action is complete and ready for O&M is not defined in the ROD, it should nevertheless be defined and documented by EPA. Similarly, long-term monitoring obligations and O&M requirements should be sufficiently detailed so that the EPA and the State are clear on their respective roles and responsibilities in the future.

If applicable, the ROD should recognize potential contingencies to allow an opportunity to modify the remedy through, for example, a future Explanation of Significant Differences (ESD). An ESD may be issued to document that a specific trigger identified in the ROD has been met and that the remedy will switch to the contingency. If appropriate, the State and US EPA may agree to include a contingency remedy and defined triggers to switching to such a contingency. For example, the ROD could incorporate interim remediation goals (RGs) that would allow the State to shut down active treatment systems and implement Monitored Natural Attenuation

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(MNA) or passive treatment. Another example of contingencies in the ROD could be for a site that includes in-situ treatment as the selected remedy, followed by monitoring. If successful, specifying such a contingency may significantly reduce long-term O&M costs for the State.

D. Remedial Design

Implementation of the remedy occurs during the RD/RA phase. Coordination between the EPA and State regarding the development of the remedy design and the O&M Plan and Manual is critical during the RD phase. It is important that the agencies consider the entire cost of the remedy, including LTRA and O&M, to most appropriately balance the distribution of costs among the different phases of the project. If ICs are included as part of the remedy, it is important that they are identified in sufficient detail to ensure they can be appropriately implemented and enforced.\textsuperscript{12}

O&M requirements should be considered during design development, particularly for remedies with extensive O&M obligations, such as those remedies involving groundwater or surface water restoration. Examples of O&M design elements may include incorporation of:

- native species used for revegetation, including drought-tolerant and other adaptable plants and grasses
- Leadership in Energy and Environmental Design (LEED) principals and certification
- durable construction materials and energy-efficient equipment designed for the anticipated remedy duration (beyond 30 years, as applicable)
- spare equipment, installed or on the shelf
- adequate clearances around equipment
- housekeeping pads under certain components and adequate drainage
- access to all appurtenances (e.g. lighting fixtures, overhead ventilation equipment)
- equipment that uses like spares or maintenance parts
- sufficient storage space for spare components
- adequate clearance for ingress/egress of oversized equipment
- adequate storage space for maintenance supplies (e.g. oil, grease, cleaning chemicals, tools)
- ancillary equipment required for O&M (e.g. drum dollies, pallet jacks, bridge cranes, hoists, pressure sprayers, drum vacuums)
- local electrical disconnects to allow for minimal disruption during servicing and repairs
- adequate weather protections to prevent freezing of plumbing

\textsuperscript{12} See: Policy on Management of Post-Removal Site Controls, OSWER 9360.2-02, December 1990.
Repeated design reviews can provide an excellent opportunity for the State to provide input on the design details (to the extent that releasing draft documents is permitted). Under ideal circumstances, US EPA and the State should agree to conduct a review as part of an iterative process performed at key design phases (i.e. preliminary, intermediate, and pre-final). By using this approach, the focus of the review can change as the design develops and adjustments could be suggested early in the process without causing major redesign cost.

Generally, the engineer developing the design documents provides a draft O&M Plan as part of the preliminary design, intermediate design and final design deliverables. At this stage, the O&M Plan may contain the following descriptions:\(^\text{13}\)

- Designation of the government agency or unit responsible for O&M
- Identification of the available State funding mechanisms for O&M activities
- Milestone dates for State assumption of O&M responsibilities
- Criteria for determination of O&F
- Description and duration of O&M activities
- Summary of O&M staffing needs (including training and certification requirements)
- Summary of O&M performance standards
- Contingency plan for handling abnormal occurrences (e.g. severe weather events, loss of power/backup power, etc.)
- Safety requirements for O&M activities
- Equipment and material requirements
- Estimates of annual O&M costs
- Reporting requirements
- Conditions for O&M termination, if appropriate

During the RD, a cost estimate is developed for both the capital and O&M costs. The final RA cost estimate is expected to be accurate within +15%/-5%; the O&M cost estimate information is included in the draft O&M Plan.\(^\text{14}\) The State should revisit the RD and O&M cost estimates (including contingencies) for completeness and accuracy during the RA.

\(^{13}\) For US EPA’s guidance on suggested O&M Plan elements, please see: Section 5.0 (Operation and Maintenance) of the Guidance for Management of Superfund Remedies in Post Construction, OLEM 9200.3-105, February 2017

E. Remedial Action

States should review the RA Statement of Work to ensure that it contains all the necessary components/details (e.g. ICs, O&M Plan, O&M Manual) to ensure that the remedy will be implemented as intended. The Remedial Action Plan should clearly describe the performance measures that will be used to determine that the remedy is operational and functional. The Remedial Action Plan should also include a schedule for transition from RA through the O&F phase to O&M to facilitate a smooth transition. During the RA phase, the O&M Plan is updated by the design contractor and should describe the administrative and technical details of inspecting, operating and maintaining the treatment system, any long-term monitoring, and any ICs. FYRs may also be completed during the remedial action phase, prior to transition to O&M.\textsuperscript{15}

If changes to the remedy are needed, the project managers may need to consider a reevaluation of the O&M Plan, O&M Manual, ICs,\textsuperscript{16} remedy completion strategy, conceptual site model (CSM), etc. so that any necessary updates or modifications can be incorporated.

During RA, the construction contractor implements the design, as detailed by the RD. Any changes to the design anticipated at this point will likely result in additional costs and time delays, and therefore should be minimized. According to the PCC guidance “The responsibilities for completing the O&M manual typically are shared between the designer and the RA contractor. During each phase of the RD, the RD contractor normally submits a draft O&M manual. The RA contractor generally completes the O&M manual during the RA. The RA contractor normally submits the O&M manual upon completion of the RA.” The O&M Manual is a technical document that should contain all the data and specifications, manufacturers, process parameters, operation procedures, maintenance requirements and schedules, and staffing and training needs. For less complex remedies, the O&M Plan and the O&M Manual could be combined, upon agreement by EPA and the State. To minimize future misunderstandings, the O&M manual should, at a minimum, consider the following\textsuperscript{17}:

- How the designer intends the facility to operate
- Potential operating problems, including common or anticipated remedies and a useful life analysis of significant components that includes replacement costs
- Quality Assurance Plan

\textsuperscript{15} See: Recommended Annual O&M/Remedy Evaluation Checklist, OSWER 9355.0-87, April 2008; and Recommended Annual O&M/Remedy Evaluation Checklist for Contaminated Sediment Remedies, OSWER 9355.0-118, September 2008.

\textsuperscript{16} See: Recommended Evaluation of Institutional Controls: Supplement to the Comprehensive Five-Year Review Guidance, OSWER 9355.7-18, September 2011.

\textsuperscript{17} For more detailed guidance on O&M Manual elements, please see: Section 5.4 of the Guidance for Management of Superfund Remedies in Post Construction, OLEM 9200.3-105, February 2017
- Safety considerations that minimize threats to workers who will be implementing the O&M

At the end of the RA construction, the agencies need to ensure that the as-built drawings are accurate and complete and the O&M Manual and Plan are updated and reflect the most current O&M cost estimates. At this point, the state should review and provide comments on the RA report, as necessary.

F. **Operational and Functional**
The NCP 40 CFR§300.435(f)(2), states, “A remedy becomes ‘operational and functional’ either one year after construction is complete, or when the remedy is determined concurrently by EPA and the State to be functioning properly and is performing as designed, whichever is earlier. The O&F period begins when EPA and the State conduct a joint inspection at the completion of construction to determine that the remedy has been constructed as specified in the RD (remedial action completion).\(^{18}\) The joint inspection marks the beginning of the O&F period, which can last for up to one year. The EPA RPM should send the State a letter formally documenting the date of the joint inspection, the determination that RA construction is complete, and that the O&F period has started.\(^{19}\) The O&F period allows for continued adjustments or corrections to occur to ensure that the remedy is fully functional prior to the start of O&M. During this time, the State should review cost and operational data to identify any aspects of the remedy that may need to be changed or updated to evaluate remedy effectiveness or efficiency, as needed. EPA may grant extensions to the one-year period, as appropriate.” This period is often referred to as “shakedown,” when the contractor makes minor repairs or adjustments as necessary to ensure the remedy is operating as designed. If the State and EPA cannot come to an agreement on the determination that the remedy is O&F, the dispute resolution procedures identified in the SMOA can be initiated.

O&M begins as soon as O&F is determined for Fund-financed remedies that do not include groundwater or surface water restoration. The date of O&F determination is documented in a letter from EPA to the state.

G. **Long Term Response Action (LTRA)**
The NCP states: “For Fund-financed remedial actions involving treatment or other measures to restore ground- or surface-water quality to a level that assures protection of human health and the environment, the operation of such treatment or other measures for a period of up to ten

\(^{18}\) Remedial Action Completion is not the same as the Construction Completion Milestone as defined in the NCP.
\(^{19}\) See: Operational and Functional Determination and the Transfer of Fund-Lead Vapor Intrusion Mitigation Systems to the State, OSWER 9200.2-72, April 2009.
years after the remedy becomes operational and functional will be considered part of the remedial action.” (40 CFR §300.435(f)(3).) The ten-year period between the O&F determination and the start of O&M is referred to as a LTRA and federal funding (generally 90% federal contribution, 10% state contribution) is provided throughout this period. LTRA is defined by the RAOs. Groundwater pump and treat and MNA are examples of LTRA remedies commonly used to attain aquifer restoration. Remedies that do not include a groundwater or surface water restoration objective (e.g. groundwater containment remedies and groundwater monitoring only remedies) do not have an LTRA phase and instead move directly from an O&F determination to O&M. A general schematic of EPA and State involvement activities at remedies that are eligible for LTRA is shown in Figure 4.

Independent third-party remedy optimization reviews at a limited group of sites each year have become a useful tool to evaluate Superfund sites. An optimization is defined in EPA’s National Strategy to Expand Superfund Optimization Practices from Site Assessment to Site Completion (OSWER 900.3-75, September 2012) as “Systematic site review by a team of independent technical experts, at any phase of a cleanup process, to identify opportunities to improve remedy protectiveness, effectiveness and cost efficiency; and to facilitate progress toward site completion.”

An objective of the strategy is to incorporate optimization principles and practices in early pipeline stages to reduce the need for optimization at the later stages. However, optimization reviews can be conducted at any time on operating systems. They may be of greater effectiveness early in the LTRA period. Optimization reviews should be scheduled to allow time to complete the review and design and implement any recommended revisions prior to the start of O&M. While the State pays 10% of LTRA costs, optimization reviews are typically conducted by EPA Headquarters and are often fully funded by EPA. However, the limited size of this program constrains the number of reviews available. If construction modifications are required, then cost sharing between the states and USEPA will be evaluated.

It is important to note that EPA does not allow for changes or restarts of the ten-year LTRA period following the initial O&F determination. However, there have been a few exceptions for situations involving discovery of new contaminants and responding to condition changes resulting from a natural disaster (see EPA 2017). EPA considers adjustments to groundwater restoration remedies to be routine and ensure effective and efficient operations. For this reason, implementation of such adjustments should be made, is possible, prior to transition into O&M.21

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H. Summary

In addition to the phase-specific considerations mentioned above, transition planning needs to occur throughout the Superfund process. Based on experiences from some States, it is more advantageous to be actively more engaged throughout the various phases of remedy implementation. This can be accomplished by:

- Conducting remedy optimization reviews that may result in increased effectiveness or efficiency, as appropriate\(^{22}\)
- Properly documenting remedy changes in a ROD amendment, ESD, or memo to the file as appropriate (see EPA 1999)
- Planning/programming for O&M funding and contracting support
- Ensuring appropriate rights of entry, lease agreements, covenants, etc. have been executed, which will allow the State and its contractors long-term access
- Ensuring required ICSs have been implemented, are effective, and have clear enforcement authority and associated responsibilities as described in an ICIAP or O&M Plan (ICSs do not need to be in place prior to transfer).
- Inspecting all remedial system equipment and identify any repair or replacement needs
- Ensuring that EPA conducts any necessary training for the State and its contractors to ensure familiarization with the treatment system components
- Ensuring that EPA provides detailed cost information to allow the State to budget adequately for O&M responsibilities
- Ensuring property and equipment ownership is clear and transferred appropriately; have EPA retain ownership of or properly dispose of any inoperable or unnecessary equipment
- Updating all manuals, as-builts, monitoring plans,\(^{23}\) and sampling and analysis plans as needed.
- Exchanging monitoring and sampling data collected during the O&M for incorporation into 5-Year Reviews

Keeping these items in mind while moving through the RA/LTRA process will ultimately lead to a smoother transition into the O&M phase.

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V. O&M

Once a remedy has been transferred from the EPA to the State, continued communication between the two parties is still critical because EPA retains the responsibility for O&M oversight, for determining when O&M is complete and conducting FYRs to evaluate remedy effectiveness.24

During the O&M period, the State is generally required to submit routine reports summarizing O&M activities to the EPA RPM, who is responsible for oversight to ensure the State is performing the O&M properly. These reports should include data collection information, summary of sampling results, results from routine inspections, listing of major repairs and equipment change outs, regular updates of the O&M manual and as-built drawings, and a breakdown of actual costs for the reporting period.25 The State RPM should conduct periodic site inspections, ongoing monitoring and review of O&M reports. In addition, opportunities for states to conduct further optimization studies of the selected remedies should be considered throughout the O&M period. According to the “National Strategy to Expand Superfund Optimization Practices from Site Assessment to Site Completion” (EPA 2012a), one of the overarching goals of the Strategy is to “apply optimization practices earlier and throughout the remedial pipeline.” The State should communicate frequently with the EPA RPM during their O&M oversight about optimization study opportunities.

In addition, opportunities for remedy optimization may be identified during a FYR.26 Remedy optimization opportunities typically identify modifications to the operating remedy which may improve remedy performance or reduce remedy costs. The types of sites that are particularly good candidates for optimization include those where annual O&M costs exceed the cost of the study by an order of magnitude or those sites where a remedy has not performed as designed and therefore, the State has identified that additional measures may be required. Any optimization program should have a follow-up component to track the progress the site is making with respect to implementing the recommendations from an optimization evaluation.27 All stakeholders should be included at the outset of optimization reviews, during implementation and during follow-up tracking.28

As stated in Section 1.2 of the “Comprehensive Five-Year Review Guidance” (EPA 2001b), FYRs are typically required when hazardous substances remain on-site above levels which permit unrestricted use and unlimited exposure. Although FYRs may occur while the remedy is being

26 See: Five-Year Reviews, Frequently Asked Questions (FAQs) and Answers, OSWER 9355.7-21, September 2009.
28 See: National Strategy to Expand Superfund Optimization Practices from Site Assessment to Site Completion, OSWER 9200.3-75, September 2012.
implemented or during LTRA and therefore, under EPA’s oversight and control, the FYRs will continue once the State assumes O&M obligations. When FYRs occur during the O&M period, the costs of maintaining ICs and engineering controls to eliminate and mitigate the exposure to hazardous substances remaining on the site must be borne by the State.

At the time of the FYR, the State and EPA should be familiar with the RAOs as specified in the ROD, the RA design and construction, the current O&M status, the implementation of ICs, as well as data supporting the effectiveness of the remedy. The EPA, when serving as the lead Agency for the 5YR, is expected to give the State adequate opportunity to participate in the FYR process, as referenced in Section 2.1.2 of the “Comprehensive Five-Year Review Guidance” (EPA 2001b). In addition, the specific amount of time that the support agency will have to review the FYR report should be documented in the agreement document (e.g., MOA, SSC, or CA). The goal should be to resolve any concerns of support agencies before drafting the final report. Communication among team members, agencies, and organizations is critical to ensure that all parties remain informed throughout the entire FYR process. If it appears that the RA will not achieve the cleanup levels selected in the ROD, decisions related to other cleanup approaches and optimization studies should involve all stakeholders. Any changes that significantly or fundamentally alter the selected remedy require an ESD or ROD Amendment.

Re-engagement of EPA may become necessary for a variety of reasons including paying for remedy repairs or modifications due to latent defects, identification of a new contaminant of concern, or identification of a change in ARARs that necessitates a more stringent cleanup level. Any of these situations may require a new ROD, or a modification of the existing ROD. If the Governor of the State declares a state of emergency and formally requests from the President that the Federal Emergency Management Agency (FEMA) respond to the disaster, and if the disaster impacts the remedy, FEMA may provide funds for repair/replacement of the remedial system.

Ideally, optimization of the remedial system occurs before transfer, but as noted above, may also be beneficial post-transfer. It may also be necessary to modify the RAOs or even the remedy. If, for example, after a FYR, it becomes apparent that the remedial system will not achieve the cleanup levels in a timely manner, modifications to the RAOs or remedy should be considered and appropriately addressed in a decision document (i.e. ROD amendment, ESD).

31 See also: Section 5.5 of Guidance for Management of Superfund Remedies in Post Construction, OLEM 9200.3-105, February 2017
Although O&M may continue for decades, once the RAOs are achieved, a Final Close Out Report (FCOR) is prepared by EPA unless delegated to the State. As noted in OSWER 9320.2-22 “Close Out Procedures for NPL Sites” (EPA, 2011), the FCOR documents compliance with statutory requirements and provides a consolidated record of all removal and remedial activities for the entire site. The FCOR describes how the cleanup was accomplished and provides the overall technical justification for site completion. This information is readily available from the previous documents such as the RI/FS, RODs, RDs, RA reports, O&M reports, and FYRs. The state has an opportunity to review and comment on the report prior to final signature. In addition, the region sends the FCOR draft to EPA Headquarters (HQ) for review and comment. Once all comments are appropriately addressed, the document is signed by the Regional Administrator or other appropriate official.

VI. GUIDANCE/REGULATIONS REGARDING TRANSFERS

See APPENDIX A

VII. TRANSITION TOOLS AND ASSOCIATED CASE STUDIES

Case studies were solicited to evaluate how previous O&M transitions from EPA to the State have taken place and the experiences gained and lessons learned during the transitions. Both positive and negative experiences were represented in the case studies. States may become particularly invested in remedies which involve ground or surface water restoration through the long-term operation and maintenance of systems designed for treatment or containment. Common examples of long-term treatment systems are ground water pump-and-treat processes and chemical precipitation of mining-impacted water. Active systems may need to operate for extended periods of time beyond periods of time originally contemplated by the remedy and as such, may be very costly to operate and maintain. While other types of remedial actions (e.g. engineered cover or “cap” systems) may also require O&M in perpetuity, the associated costs are generally orders of magnitude lower. Several of the case studies indicated concern by the State over the condition of the remedy at the time of transfer. In some cases, States reported that the equipment and facilities may be aging, energy inefficient, and/or difficult to maintain as they approach the end of their design life. In other cases, clean soil covers or “cap” systems may be eroded or have vegetation die-off. To ensure long-term remedy protectiveness, it is therefore important to consistently evaluate the effectiveness of the engineered controls.

The review of the solicited case studies found that there may be tools that can be useful to facilitate a successful O&M transition. Below is a discussion of the relevant tools with reference to the associated case study.
Case Study Example (General)- Need for Identifying RPs Early and Ability to Use an Environmental Covenant

A challenge at one site included waste being managed on site with the State requiring some type of monitoring and institutional control for the foreseeable future. The former owners are deceased and as such an environmental covenant is nearly impossible to place on the site.

A. Remedy Effectiveness and Longevity

Case Study Example (Remedy Effectiveness & Longevity)- Need to Identify State Expectations Early

At a dig and haul remedial site, the State clearly verbalized what would need to occur before accepting responsibility for the site for long term O&M. In this instance no restoration plan was developed for the site. The State refused to take on O&M responsibility until erosion issues were corrected. EPA extended the O&F period and corrected the erosion problems. Had the project included a restoration plan including the management of erosion, this delay could have been prevented.

Past State experience with effectiveness of the remedy at the time of transfer indicate that improvements can be made. In many cases, the selected remedy is not operating optimally or is no longer effective in attaining the Remedial Action Objectives. States should verify with EPA that the remedy in place is not only performing as designed, but performing in the most effective manner possible.\(^\text{32}\) For LTRA sites moving to O&M, the remedial systems have been in place for nearly 10 years. By the time the site is moving into O&M, it is expected that the baseline conditions developed at the time of the ROD will have changed (e.g. reduced concentrations of groundwater contaminants; some remedial systems, such as SVE, may have been removed; etc.) and that the remedial system components have gone through some wear and tear.

It is necessary for the State to continue to remain involved throughout the LTRA period to ensure the remedial system is performing adequately and optimally. A Remedy Completion Strategy which provides a roadmap to facilitate effective transition to O&M and ultimately, to shutdown of the system upon remedy completion, if applicable, should be completed prior to the transition of the site. Pre-transfer optimization reviews should be performed, as appropriate, and implementation of recommendations should be agreed to and completed prior to transfer. It is highly recommended that an additional opportunity for optimization should be undertaken.

during year 8 of LTRA to confirm the effectiveness of the remedy. The state and EPA should, to the greatest extent possible, take steps prior to transfer to ensure that the remedy is effective and optimal.

Prior to the time of transfer, a detailed review of the site and system conditions should be performed by state personnel and their contractor. This is necessary to familiarize themselves with the current conditions such that they have significant input into any optimization reviews and subsequent implementation of recommendations by EPA.

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**Case Study Example (Remedy Effectiveness & Longevity)- Lack of an Effective Remedy Leads to Additional State Costs**

At a fund lead NPL site, the effectiveness of ground water extraction/treatment/re-injection system was poor at transfer. State had to verify via soil sampling areas that had been required by the ROD to be remediated and to determine whether there were source areas left.

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**B. Optimization Reviews and Implementation**

**Case Study Example (Optimization Reviews & Implementation)- Successful RSE Leads to Cost Savings**

Prior to transition from LTRA to O&M, a RSE was performed on an active treatment system. The State suggested some improvements, which the RSE team agreed with. Funding was made available to implement improvements, although they occurred after the transition to O&M. Estimated 25% reduction in O&M costs realized.

A technical capability review of the remedy, known as a Remediation System Evaluation/Remedial System Optimization (RSE/RSO) should be done prior to the transfer if there are active remedial systems in place. This evaluation will help identify whether the system is performing as designed, currently and for the future, or if any upgrades could improve efficiency and/or effectiveness. For example, a pump and treat system would be reviewed to determine appropriateness of extraction well location, pump placement and extraction rates. This information will inform whether the treatment system is functioning in an energy-efficient manner and whether any components need replacing or alternatively, whether certain components can be eliminated based on current groundwater conditions which could result in a reduction in other costly components (e.g. more automation and less man-power required). Part of this review would be an update of the conceptual site model and an update of a remedy completion strategy and timeframes anticipated in other remedial documents. Any recommendations that are determined by the agencies to be appropriate should be implemented by EPA prior to the transfer.

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An RSE/RSO may need to be funded by the State.
While EPA will only consider funding one RSE/RSO during the LTRA, states should consider conducting and additional State-Funded RSE/RSO during the LTRA period. As RSE/RSOs can take 1-2 years from initiation to full implementation, it is recommended that the State initiate the process prior to year 6, and a follow up optimization in year 8 of the LTRA. The information to be obtained and evaluated is identified in the RSO guidance provided in Appendix A. Some issues that may need to be evaluated by EPA or the States may include the following: condition of remedial equipment, need for removal of unused equipment, energy use and potential related upgrades of building, pumps etc., and operational issues that have resulted in significant system downtime. An agreement between EPA and the state should be established to address any significant items of concern. A checklist of remedial effectiveness issues that may be pertinent to the site can be found in Appendix B.

C. Five-Year Reviews

Case Study (Five Year Reviews)- Series of 5 Year Reviews Leads to Identifying Remedy Erosion with Agreement to Use O&M PRP Fund to Address

One of the earliest NPL Sites included a remedy for burial and capping of waste. The site is situated along a river which was eventually causing erosion into the unit and release of point waste. During a five year review the issue was identified. While an established PRP O&M fund was not contemplated to address the issues, the fund was able to offset the remedial action needed to stop the release.

While this case study was for a PRP-lead site, it illustrates how new releases discovered during a five-year review may necessitate consideration of new funding mechanisms for any necessary remedial actions. For this reason, it is important for States to participate and provide input on issues that will impact the O&M; recommendations should be followed up on and implemented in a timely manner (before transfer to O&M whenever feasible). If a State is in a lead agency role, it may take on the responsibility of conducting five-year reviews. This enables the State to obtain direct knowledge of a remedy’s specific weaknesses and to provide the ability for long term planning to restore or keep a remedy functioning properly.

D. Site-Specific Administrative Needs

Permits, licenses etc.: Some sites require that site-specific permits or licenses be issued for operating the remedial system. For example, a point source discharge or a proprietary programmable logic control system may be in place. These items will need to have the associated permit or license updated and/or transferred to allow the state to utilize the permits or license. Other documents that need to be updated to include the state as an agent may include access
agreements, if not done during pre-transfer, and maintenance contracts. See Appendix (X) for a full list of documents that may need to be transferred or obtained.

**Contracts**: At least three months prior to the transfer date, the State should have finalized a contract with its consultant/contractor to perform the O&M. Because State contracting processes can be lengthy, States should begin communicating with internal contracting staff at least one year prior to the transfer date. Earlier contacts with contracting staff would allow States sufficient time to finalize contracting arrangements. This is necessary to streamline and communicate historical actions and current conditions as well as to allow a smooth flow of information to the contractor regarding current and future operational needs. This information may include: an overview of the remedial system, well integrity, locations and accessibility, unusual or updated sampling issues, and general site information. Contract mechanisms, which provide the ability to retain the contractor used by USEPA may be helpful, but are not required. In some instances, it may be beneficial to change the on-site contractor to get a fresh view of the project. The State should consider the remedy at the site and determine which O&M contractor would be the most effective.

**Closing Documents**: If the transition involves the transfer of real property, title insurance may be required prior to the deed transfer. A property survey and/or appraisal may also be required. If vehicles are included in the transaction, motor vehicle titles will also need to be transferred. Other assets, such as water rights, may also be involved. Following the real estate closing, the transferred deeds will need to be recorded with the appropriate recording entity (e.g. county clerk, recorder or register). The State must maintain appropriate insurance to cover the property, structures and certain equipment.\(^{34}\)

**E. Cost Considerations**

It is important that an updated O&M plan and O&M Manual be updated prior to transfer to give the states ample opportunity to understand the scope of required O&M activities and to obtain accurate cost estimates. Additionally, costs expended by EPA for LTRA need to be available to states to further identify future financial obligations. Knowing the potential costs is essential for a State to appropriately allocate funding for a site. Federal costs are not confidential and the previous 5 years (for LTRA) of costs should be provided to the State to allow the State an opportunity to determine the trend in expenditures and allow the State to budget for adequate resources. Also, the SSC requires a 10% cost share and therefore costs are shared with the State in order for EPA to be reimbursed. If not available otherwise, payment related to the SSC can be referenced to determine recent Federal expenditures.

\(^{34}\) For additional guidance on suggested transitional documentation, see: Section 4, Guidance for Management of Superfund Remedies in Post Construction, OLEM 9200.3-105, February 2017.
More detailed O&M funding requirements should be provided by EPA to the State 1-2 years prior to transfer date to allow funding to be set aside for contractual services. During the last year of LTRA or RA, EPA should update the expected expenditures, especially if changes have been made to the site systems. Note that prior to initiating a remedial action at a Fund-Lead site, the NCP requires States to assume responsibility for O&M activities. The SSC indicates that funding is available from the State to provide for O&M. Therefore, being aware of and adjusting the expected state O&M expenditures based on the current EPA LTRA expenditures will assist the States in fulfilling this requirement.

**F. Equipment**

**Case Study Example (Equipment) - Installed Equipment Could Not Function As Designed**

EPA installed and was operating a ground water pump and treat system that also included equipment to serve as a backup water supply to local citizens. The equipment could not perform this function. Control logic was extremely complex and had to be overhauled. After 2 years of effort to keep the system running, the State will be performing a full RSO including review of the conceptual site model and appropriate extraction points, extraction rates and treatment equipment. The site runs through a large valley with contamination from many source areas.

Determine who owns the equipment to be left on site. If equipment/material left on site is not useable, have EPA remove any excess or unusable equipment before the state takes over the site. Determine how compatible are the current systems that are being used with what the state taking over normally uses.

**G. Documentation**

**Case Study (Documentation)- Reviewing and Understanding Transfer Expectations Means Careful Review of Site Documentation**

Two Fund-Lead sites transferred to States without a full understanding of the documentation related to equipment/software license ownership. Both sites included advanced pump and treat systems and documentation was not fully understood by the State prior to the transfer. In one case, the EPA contractor uninstalled software stating it was their proprietary information. The State had to expend resources to re-establish key logic control software. In another case, needed copies of databases of information utilized for future use (i.e., compliance monitoring, statistical trend analyses, etc.) were not compatible when a new contractor took over the site. Also, drawings, O&M Plans and spreadsheets were not in an easily editable format for future use once the site transferred to the State.
It is important that the State be sure to request and receive documentation before the time of transfer. The State should also ensure that all documentation needed, including the RA report, O&M reports, and as-builts have been provided in both paper and electronic format. All environmental covenants or IC documents should be finalized and properly executed and copies of the final IC documents should be provided to the State when completed. If necessary, it is important that States properly update access agreements (or create new ones) to facilitate access for state personnel and their contractors.

VIII. SUMMARY

Early and continued involvement by the States throughout the Superfund RI/FS and RD/RA/LTRA phases can ensure that common problems encountered during O&M transition are minimized. Additionally, early and more extensive State involvement in the RD/RA phase will allow States to adequately prepare for an effective O&M transition. Careful consideration of O&M needs throughout a project will help ensure successful transition so that States are not left with ineffective and costly O&M.

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35 For a list of suggested documentation see: Section 4.5 of the Guidance for Management of Superfund Remedies in Post Construction, OLEM 9200.3-105, February 2017.
APPENDIX A
Guidance/Regulations Regarding Transfers
<table>
<thead>
<tr>
<th>Title of CERCLA Guidance Document</th>
<th>Date</th>
<th>Document Number</th>
<th>WebLink to Guidance Document</th>
<th>Description of Guidance</th>
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<tbody>
<tr>
<td>2015 Model Superfund State Contract Provisions</td>
<td>November-15</td>
<td>EPA, 2015a</td>
<td><a href="https://ofmsc.epa.gov/wsn/document/21/1173397">https://ofmsc.epa.gov/wsn/document/21/1173397</a></td>
<td>This is an older Superfund guidance but is still the most current USEPA document containing model clauses that can be used as the basis for the generation of a draft Superfund State Contract.</td>
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<tr>
<td>A Cost Comparison Framework for Use in Optimizing Ground Water Pump and Treat Systems</td>
<td>May-07</td>
<td>EPA, 2002b</td>
<td><a href="https://www.epa.gov/sites/production/files/2015-05/documents/cost_comparison_framework_542d7305.pdf">https://www.epa.gov/sites/production/files/2015-05/documents/cost_comparison_framework_542d7305.pdf</a></td>
<td>This guidance provides a framework for comparing costs of remedial alternatives or modifications in conjunction with the optimization of long-term groundwater remediation systems. States should be encouraged to employ and provide input on any remedial alternatives or modifications being considered for long-term groundwater remediation and this guidance may help with understanding how USEPA recommends that these cost estimates be compared.</td>
</tr>
<tr>
<td>A Guide to Developing and Documenting Cost Estimates during the Feasibility Study</td>
<td>July-00</td>
<td>EPA, 2000a</td>
<td><a href="https://www.epa.gov/sites/production/files/2000-08/nov99/pdf/f500010.pdf">https://www.epa.gov/sites/production/files/2000-08/nov99/pdf/f500010.pdf</a></td>
<td>The purpose of this guidance is to provide a reference for developing and documenting cost estimates of remedial action alternatives during the Feasibility Study (FS). States should review the O&amp;M cost estimates for all remedial alternatives from the FS and this guidance may help with understanding how those cost estimates are prepared.</td>
</tr>
<tr>
<td>Close Out Procedures for NPL Sites</td>
<td>May-11</td>
<td>EPA, 2011</td>
<td><a href="https://ofmsc.epa.gov/wsn/document/21/1176206">https://ofmsc.epa.gov/wsn/document/21/1176206</a></td>
<td>This document describes a recommended process for accomplishing and documenting remedial action completion, construction completion, site closure, and site deletion. The guidance is intended for those sites that are or were on the National Priorities List (NPL). (NPL)</td>
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<tr>
<td>Comprehensive Five Year Review Guidance</td>
<td>June-01</td>
<td>OSWER 9355.7-038-P</td>
<td><a href="https://ofmsc.epa.gov/wsn/document/21/1176627">https://ofmsc.epa.gov/wsn/document/21/1176627</a></td>
<td>This guidance is intended to assist EPA Headquarters (HQ), Regional staff, and support agencies responsible for conducting five-year reviews under CERCLA. This guidance generally is intended to promote a consistent implementation of the five-year review process.</td>
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<tr>
<td>Directive on Paying for Remedy Repairs or Modifications during the State-Funded Period of Operation and Maintenance (O&amp;M)</td>
<td>February-17</td>
<td>OSWER 9202.0-105</td>
<td><a href="https://ofmsc.epa.gov/wsn/document/21/1176397">https://ofmsc.epa.gov/wsn/document/21/1176397</a></td>
<td>This document includes guidance on when it may be appropriate for the Agency to pay for remedy repair or modifications once a State has assumed responsibility for O&amp;M at a Funded site.</td>
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<tr>
<td>National Contingency Plan (NCP) Guidelines on Long Term Response Actions (LTRA)/OCRPR 300-03209(9)[3]</td>
<td>July-15</td>
<td>EPA, 2015a</td>
<td></td>
<td>This document leads you to the appropriate citations in the National Contingency Plan or NCP which provides guidelines regarding Long Term Response Actions.</td>
</tr>
<tr>
<td>National Contingency Plan (NCP) Guidelines on Operation and Maintenance (O&amp;M). 40CFR 300-44510.</td>
<td>July-15</td>
<td>EPA, 2015c</td>
<td></td>
<td>This document leads you to the appropriate citations in the National Contingency Plan or NCP which provides guidelines regarding Operation and Maintenance.</td>
</tr>
<tr>
<td>O&amp;M Report Template for Ground Water Remedies</td>
<td>April-05</td>
<td>EPA, 2005a</td>
<td>EPA 542-8-06-010 OSWER 9200-1-22FS</td>
<td>This document provides a recommended report template that can be used to present information on the operations and maintenance (O&amp;M) of a ground water remedy, particularly for those remedies including pump and treat (P&amp;T).</td>
</tr>
<tr>
<td>Guidance for Management of Superfund Remedies in Post Construction</td>
<td>February-17</td>
<td>EPA, 2017</td>
<td>OLEM 9203-3-105</td>
<td>Fact sheet which provides guidance to States, RACs, and others who have O&amp;M responsibilities. It provides practical information on the timing of O&amp;M planning, the transition of a remedy from construction to the O&amp;M stage, the performance of O&amp;M functions and oversight responsibilities such as recordkeeping, troubleshooting and O&amp;M termination. Summary table on page 5 of this fact sheet goes thru CERCLA process from RACs to States and highlights when and how States should be involved so they are prepared when they take over O&amp;M for the site.</td>
</tr>
<tr>
<td>Operational and Functional Determination and the Transfer of Fund-Used Vapor Intrusion Mitigation Systems to the State</td>
<td>April-09</td>
<td>EPA, 2009a</td>
<td>OSWER 9200-2-72</td>
<td>This document presents guidance for making the operational and functional (OF) determination for vapor intrusion mitigation systems which identifies the point of time where these systems transfer to the State of O&amp;M.</td>
</tr>
<tr>
<td>Optimization Strategies for Long-Term Groundwater Remedies</td>
<td>May-07</td>
<td>EPA, 2007c</td>
<td>EPA 542-8-07-007</td>
<td>This document discusses the principles and techniques for optimizing long-term ground water remedies, with particular emphasis on optimizing pump and treat (P&amp;T) systems. The ideas contained in this document are based on professional experience in designing and operating long term ground water remedies and on lessons learned from conducting optimization evaluations called Remediation System Evaluations (RSEs) at sites with P&amp;T systems.</td>
</tr>
<tr>
<td>Policy on Management of Post-Remediation Site Controls</td>
<td>December-86</td>
<td>EPA, 1990b</td>
<td>OSWER 9359-2-03</td>
<td>This memorandum transmits the OSWER policy on management of postremedial site control for fund-financed remedial activities and provides a uniform framework that all States should consider when deciding what to do at the site.</td>
</tr>
<tr>
<td>Guidance for Management of Superfund Remedies in Post Construction</td>
<td>February-17</td>
<td>EPA, 2017</td>
<td>OLEM 9200-3-105</td>
<td>This policy provides factors that Regions should consider when evaluating site-specific circumstances and establishes a consultation process with USEPA Headquarters when making the determination to recalculate the Fund-Used LTRA 10-year time period.</td>
</tr>
<tr>
<td>Guidance for Management of Superfund Remedies in Post Construction Guidance</td>
<td>February-17</td>
<td>EPA, 2017</td>
<td>OLEM 9200-3-125</td>
<td>Although this document does not contain specific model clauses that can be used in a SCC, it does provide recommended activities, such as O&amp;M, ILTAs and ILAs that the State and USEPA should consider (and include provisions for) when drafting a Superfund State Contract (SCC). Careful consideration of these activities during the SCC drafting can help make the transfer of Superfund site remedies from USEPA to the State go smoother.</td>
</tr>
<tr>
<td>Recommended Annual O&amp;M/Remedy Evaluation Checklist</td>
<td>Apr-08</td>
<td>EPA, 2008a</td>
<td>OSWER 9355-0-87</td>
<td>Design to help the Remedial Project Manager capture data routinely collected during O&amp;M in a way that can better evaluate the efficiency and effectiveness of the remedial action.</td>
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<tr>
<td>Title</td>
<td>Date</td>
<td>Author</td>
<td>OSWER</td>
<td>URL</td>
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<td>USEPA National Strategic to Expand Superfund Optimization Practices from Site Assessment to Site Completion</td>
<td>September-12</td>
<td>EPA, 2012a</td>
<td>OSWER 9200-3-75</td>
<td><a href="https://semisep.epa.gov/sem/semisep/611/172096">https://semisep.epa.gov/sem/semisep/611/172096</a></td>
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</tbody>
</table>

- Designed to help the remedial Project Manager capture data routinely collected during O&M in a way that can better evaluate the efficiency and effectiveness of the remedial action. This checklist will also be helpful when evaluating a sediment remedy prior to transferring the site to the state for O&M.

- This guidance supplements OSWER's 2001 Comprehensive Five-Year Review Guidance and provides recommendations for conducting PFA's for the IC component of remedies. It is in a manner similar to the review of engineering or other remedy components.

- This Handbook focuses on how an RPM can use project management principles to implement effectively a selected remedy in accordance with the Record of Decision (ROD). It is not a conventional engineering manual, but rather a general reference document for issues that arise during the RD/PA process. For purposes of this guidance document, Chapter 1 is the most important part to focus on as it contains information on O&M issues that can be helpful to the state in preparing for eventual transfer of the system oversight/maintenance.

- This fact sheet describes the role of cost in the selection of remedial actions as established by the Superfund statute (CERCLA) and the Superfund regulations (the National Oil and Hazardous Substances Contingency Plan (NCP)), and is expanded upon in EPA guidance.

- This fact sheet provides guidance to RPMs and others who have responsibilities for transferring TPA projects from EPA to States. It gives practical information on planning for the transfer of a remedy from the TRA to the CERB stage, including rules, responsibilities, documentation, and recordkeeping.

- This document presents USPNC's National Strategy to expand and formalize optimization practices from site assessment to site completion as an operating business model for the Superfund Remedial Program.

- This roadmap focuses on optimizing established long term monitoring programs for groundwater. Tools and techniques discussed concentrate on methods for optimizing the monitoring frequency and spatial distribution of wells.
APPENDIX B

Checklist
Checklist for Transitioning Remedies to the States

Site Name ___________________________ Date ____________
State Project Manager ____________________________

Memorandum of Agreement/Memorandum of Understanding

- Does the State have a Superfund MOA with EPA?

- If not, has the State requested that EPA enter into Superfund MOA discussions?

- Have the roles and responsibilities, contained in the MOA of the State and EPA for removal, pre-remedial, remedial, and enforcement responses been defined?

- Does the MOA identify requirements, including timelines, for EPA and State review of each other's key documents?
### Remedial Investigation/Feasibility Study

- Review NCP nine evaluation criteria carefully. Do long-term effectiveness and permanence criteria adequately address O&M requirement?
- Is nature and extent adequately characterized in order to develop and evaluate potential remedial alternatives?
- Do cost estimates adequately address O&M requirements, including contingencies?
- Is there cleanup work that can be done on the front end in order to reduce the cost for O&M?
- Has consideration been given to the practicability of instituting the institutional controls being considered in the Feasibility Study?
- Has the project manager considered potential future site use during this stage, so that the site will be “ready for anticipated use” once it is remediated

### Record of Decision

- Do the RAOs address the unacceptable risk identified in the RI?
- Does the ROD contain clear cleanup levels?
- Are there interim performance measures to be achieved? If so, incorporate these goals when appropriate.
- Does the ROD contain a clearly written remedy transition and ultimately as appropriate a remedy completion strategy?
Remedial Design/Remedial Action

- Has the state project manager been actively involved with EPA in the development of the remedy and the development of the O&M Plan and Manual?

- Has the design contractor created an O&M Plan that clearly describes the administrative and technical details of inspecting, operating and maintaining the treatment system(s) and all ICs in a readily sharable and searchable electronic format?

- Does the O&M Plan clearly describe the performance measures that will be used to determine that the remedy is operational and functional (O&F) in a readily sharable and searchable electronic format? If not defined in the O&M plan, it should be included in the SSC.

- Does the O&M Plan include a schedule for transition from RA through O&F to O&M?

- Has the construction contractor created an O&M Manual that contains all the technical information, data and specifications, manufacturer information, process parameters, operation procedures, maintenance schedules and requirements, staffing and training needs in a readily sharable and searchable electronic format?

- Is the final RA cost estimate (including contingencies) within +15% to -5% of actual final costs?

- Has the project manager considered any possibilities for earning state credit or in-kind contributions to offset state cost share?

- Did you plan ahead for any necessary real property transfer, including access agreements?
### Operational & Functional Phase

- Has the state and EPA conducted a joint inspection at the conclusion of the construction phase to determine that the remedy has been constructed properly?
- Does either party have any concerns with the construction and has that been shared?
- Did the EPA RPM send the state a letter formally documenting the date of the joint EPA/state inspection?
- Has the state identified punch list items that may need changing or updating after the joint inspection and communicated those to EPA?
- Have the assumptions made during the RD, including the conceptual site model, been verified?

### Long-Term Response Action Phase

- Has an independent third-party remedy optimization review been conducted to evaluate the operating systems early in the LTRA period?
- Has the PM determined if state wants to keep EPA’s contractor(s) or select a new contractor(s)?
- Has the PM begun early planning/programming for O&M funding and contracting support, in addition to training for state and its contractors? As such, contractual discussions between the state and their potential contractors should take place at least six months prior to transfer.
- Are all necessary and appropriate rights of entry, lease agreements and other agreements in effect and do they include state personnel and their contractors?
  
  If not, will they be in effect prior to transfer?
- Are there any permits (e.g., for discharge) that need updating?
- Has all remedial system equipment been inspected?
- Does any of the equipment need repairs prior to transfer?
• Have required ICs been implemented, and are they effective? (note: ICs do not have to be implemented prior to remedy transfer)
• Does the state have copies of all IC and environmental covenant documentation?
• Is equipment ownership clear and transferable to the state?
• Is there any inoperable or unnecessary equipment that should be disposed?
• Will any necessary upgrades be done prior to transfer and be designed to last the length of the O&M period?
  • Are manuals, monitoring plans, and sampling and analysis plans updated?
• Have all LTRA cost estimates been updated?
• Will state employees/contractors be allowed at least a month transition period (last month of federal lead), if they are not already running the system?

Operation & Maintenance Phase

• Did you use OSWER 9355.0-87 “Recommended Annual O&M/Remedy Evaluation Checklist
• Have any of the following situations occurred that would lead to the US EPA coming back into the lead role? (Please note that EPA will consider paying for repairs or modifications during O&M if a) there is a latent design or construction defect or b) if a new contaminant or ARAR is identified that requires a fundamental change to the remedy.)
  • Remedy failure  • Identification of a new pathway (e.g., vapor intrusion)  • Identification of a new contaminant or a change in ARARs
• If there is a declared State of Emergency that impacts the remedy, funds may be requested from FEMA for repair/replacement of the remedial system
# APPENDIX C: Acronyms/Glossary

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ARAR</td>
<td>Applicable or Relevant and Appropriate Requirements</td>
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<tr>
<td>CA</td>
<td>Cooperative Agreement</td>
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<tr>
<td>CCL</td>
<td>Construction Completion List</td>
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<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
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<tr>
<td>CERCLIS</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Information System</td>
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<td>CERCLA Post Construction Focus Group (PCFG)</td>
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<td>CSM</td>
<td>Conceptual Site Model</td>
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<td>DOD</td>
<td>Department of Defense</td>
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<td>DOE</td>
<td>Department of Energy</td>
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<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
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<tr>
<td>ESD</td>
<td>Explanation of Significant Differences</td>
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<td>FCA</td>
<td>Facility Condition Assessment</td>
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<td>FCOR</td>
<td>Final Close Out Report</td>
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<td>FEMA</td>
<td>Federal Emergency Management Agency</td>
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<td>FYR</td>
<td>Five Year Review</td>
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<td>IC</td>
<td>Institutional Control</td>
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<tr>
<td>LTRA</td>
<td>Long-Term Response Action</td>
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<td>MNA</td>
<td>Monitored Natural Attenuation</td>
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<td>MOA</td>
<td>Memorandum of Agreement</td>
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<td>Memorandum of Understanding</td>
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<td>National Contingency Plan</td>
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<td>NPL</td>
<td>National Priorities List</td>
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<td>O&amp;F</td>
<td>Operational and Functional</td>
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<td>G&amp;M</td>
<td>Operations and Maintenance</td>
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<td>PCC</td>
<td>Post-Construction Completion</td>
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<td>PP</td>
<td>Proposed Plan</td>
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<td>PRP</td>
<td>Potentially Responsible Party</td>
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<td>QAPP</td>
<td>Quality Assurance Project Plan</td>
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<tr>
<td>RA</td>
<td>Remedial Action</td>
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<td>RAO</td>
<td>Remedial Action Objective</td>
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<td>RD</td>
<td>Remedial Design</td>
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<td>RD/RA</td>
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<td>RG</td>
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<td>RI/FS</td>
<td>Remedial Investigation/Feasibility Study</td>
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<td>ROD</td>
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<td>Remedial Project Manager</td>
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<td>Remedial System Optimization</td>
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<td>Sampling and Analysis Plan</td>
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