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OLEM Directive 9200.3-105

MEMORANDUM

SUBJECT: Transmittal of *Guidance for Management of Superfund Remedies in Post Construction*

FROM: James E. Woolford, Director
Office of Superfund Remediation and Technology Innovation

TO: National Superfund Program Managers, Regions 1-10

PURPOSE

This memorandum transmits the *Guidance for Management of Superfund Remedies in Post Construction.*

The document provides comprehensive guidance for managing Superfund remedial actions (RAs) where construction activities are complete (known as post construction completion or PCC). The guidance emphasizes the importance of early planning and consistent communication to set the stage for successful PCC activities and to ensure that remedies continue to be protective of human health and the environment.

This guidance provides recommendations for Superfund remedies regardless of how the RA is funded. Section 1, Introduction; Section 2, Planning for Post Construction Completion Activities Throughout the Remedial Process; and Section 5, Operation and Maintenance (O&M), apply whether the RA is Fund-financed, potentially responsible party (PRP)-lead, or at a federal facility. Section 3, Operational and Functional (O&F) determination; Section 4, Long Term Response Action (LTRA); and Section 6, Equipment and Real Property Considerations, generally are most relevant to Fund-financed remedies.

The primary audience for this guidance is the EPA remedial project manager.

BACKGROUND

When the May 2011 guidance, *Close Out Procedures for National Priorities List Sites*, was updated and issued, it no longer included as much information about PCC activities, such as O&F determinations, LTRA, and O&M. Existing O&F, LTRA, and O&M guidance was

dispersed among seven separate documents. Those seven documents have been superseded (see Section 1.2), and the topics are now contained in one guidance for easy reference. Regional and Headquarters staff formed a work group to develop the guidance. The regions, Office of General Counsel, Federal Facilities Restoration and Reuse Office, Office of Site Remediation Enforcement and Federal Facilities Enforcement Office at EPA have reviewed drafts of the guidance.

IMPLEMENTATION

The guidance will be available on the Superfund PCC website at: https://www.epa.gov/superfund/superfund-post-construction-completion.

If you have any questions, please contact me or have your staff contact Tracy Hopkins of my staff at Hopkins.Tracy@epa.gov or (703) 603-8788.

Attachment

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Guidance for Management of Superfund Remedies in Post Construction

Office of Superfund Remediation and Technology Innovation
U.S. Environmental Protection Agency

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1.0 INTRODUCTION

1.1 Purpose and Scope

This document provides consolidated guidance on the management of Superfund remedial actions (RAs) after construction activities have been completed. Superfund RAs are conducted under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and implemented in a manner consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).[1]

Post construction completion (PCC) is the name commonly given to activities undertaken at Superfund RAs following remedy construction. PCC activities may be underway at portions of a site before the entire site is declared "construction complete." The activities may include:

- Operational and functional (O&F) determinations;
- Long-term response actions (LTRAs);
- Operation and maintenance (O&M);
- Equipment and real property management;
- Institutional control (IC) implementation;
- Five-year reviews (FYRs);
- Optimization of remedies;
- Monitoring; and
- National Priorities List (NPL) deletions and partial deletions.

PCC activities often can be a critical component following RA to help ensure that remedies are properly maintained and perform as intended to protect human health and the environment.

More than two-thirds of current Superfund NPL sites have one or more remedies in the PCC phase, and many more remedies are expected to enter the PCC phase in coming years. The U.S. Environmental Protection Agency (EPA), states, other federal agencies, tribes, local governments, and potentially responsible parties (PRPs) all may have important roles to play in PCC activities.

This document is primarily intended for EPA Superfund remedial project managers (RPMs). States, tribes, PRPs, other federal agencies, local governments, and community members may also find this document useful.

[1] This guidance is designed to help promote a consistent national approach for implementation of CERCLA remedial actions. It does not, however, substitute for CERCLA or EPA's regulations, nor is it a regulation itself. Thus it does not impose legally binding requirements on EPA, states, tribes or the regulated community, and may not apply to a particular situation based upon the circumstances. Where appropriate, EPA, state, tribal and local decision-makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any, and any decisions regarding a particular facility will be made based on the applicable statutes and regulations.

1.2 Contents and Relationship to Other Post Construction Completion Guidance Documents

This guidance supplements the 2011 *Close Out Procedures for National Priorities List Sites* (EPA, 2011a) and describes recommended roles and responsibilities related to planning and implementation of certain PCC activities, including:

- O&F determinations;
- LTRAs;
- O&M; and
- Equipment and real property considerations.

This guidance does not address all PCC components. For more detailed guidance on topics not covered here, please refer to the documents listed below:

- ICs: EPA, 2012c and EPA, 2012d.
- FYRs: EPA, 2016d; EPA, 2012b; EPA, 2012e; EPA, 2011d; EPA, 2009b; and EPA, 2001.
- Remedy optimization: EPA, 2012a; EPA, 2011c; EPA, 2007a; and EPA, 2007b.
- NPL deletions: EPA, 2011a.
- Superfund Redevelopment Initiative: EPA, 2016b; EPA, 2010; and EPA, 1995a.

This document supersedes the following overview documents:

- OSWER Directive 9355.0-79FS. *Superfund Post Construction Completion: An Overview.* June 2001.
- OSWER Directive 9355.0-80FS. *Superfund Post Construction Completion Activities.* June 2001.

In addition, this document supersedes the following policy memos:

- OSWER Directive 9200.1-37FS. *Operation and Maintenance in the Superfund Program.* May 2001.
- OSWER Directive 9355.0-81FS-A. *Transfer of Long-Term Response Action (LTRA) Projects to States.* July 2003.
- OSWER Directive 9355.0-109. *Policy on Recalculating the Long-term Response Action (LTRA) Ten-Year Time Period.* June 9, 2006.
- OSWER Directive 9375.2-12. *Directive on Paying for Remedy Repairs or Modifications during the State-Funded Period of Operation and Maintenance (O&M).* April 26, 2007.
- OSWER-9242.2-19. *Post Construction Completion Considerations in Superfund State Contracts.* August 22, 2008.

The material in the previous seven documents and memos has been consolidated and updated in this document or EPA, 2015. In addition, Sections 2.4, 3.7, 4.2.3, and 4.6 discuss interim actions.

1.3 Applicability

This guidance provides recommendations for remedies at CERCLA sites regardless of who is funding the RA. Some sections, including Section 2 and Section 5, apply whether the RA is provided by EPA as

a Superfund (Fund)-financed cleanup (e.g., using annual appropriations or special account funds), PRP-lead, or at a federal facility. However, O&F determinations (40 CFR §300.435(f)(2)) and LTRA (CERCLA §104(c)(1)(6) and 40 CFR §300.435(f)(3)) are described in CERCLA and the NCP as pertaining to Fund-financed remedies. Consequently, Section 3 and Section 4 generally are most relevant to Fund-financed remedies. In addition, real property transfers from EPA to states (Section 6) also are relevant only at Fund-financed remedies.

1.4 Roles during Post Construction Completion Activities

CERCLA and the NCP specifically address some roles and responsibilities for RA post construction completion activities. EPA, states, tribes, PRPs, and other federal agencies all might have important roles to play in Superfund PCC and should fulfill their respective responsibilities to help ensure that RAs remain protective.

1.4.1 Remedial Project Manager

EPA's role in PCC may be extensive and may include operating Fund-financed surface and groundwater restoration remedies for up to ten years (LTRAs); ensuring that O&M and environmental monitoring are performed; monitoring to ensure that ICs are implemented and remain effective; conducting or reviewing FYRs; and conducting a rulemaking to delete sites from the NPL once all response actions are completed and the NCP criteria for deletion are met. EPA may also have responsibility for evaluating federal agency demonstrations that an RA at an NPL site is "operating properly and successfully" as a precondition to the transfer of federally owned property.

Normally, the EPA RPM has responsibility for guiding NPL remedial sites through the Superfund process and, in so doing, ensuring successful implementation of CERCLA remedies that are consistent with the statute, NCP and guidance. Generally, the RPM is responsible for communication and coordination with the project team, program managers, enforcement and legal staff, state representatives, tribal representatives (if applicable), other federal agencies (if applicable) and community stakeholders.[2] EPA intends for this guidance, in conjunction with the 2011 *Close Out Procedures for National Priorities List Sites* (EPA, 2011a), to assist the RPM when conducting many PCC activities.

1.4.2 State

States also often have significant responsibilities during PCC activities. At sites with Fund-financed RAs, the state's role can be particularly important because the state is statutorily responsible for assuring the RA's O&M. Throughout most sites' remedial processes, the state typically serves as the support agency and, consistent with the NCP and CERCLA §104(d), plays a review and concurrence role in the process. The state should have opportunities to provide meaningful input throughout the remedial process, particularly at important milestones, to review documents, and, as provided for in the NCP, to concur on certain remedy decisions.

[2] For detailed information on effective engagement with community stakeholders, see EPA, 2016c.

State responsibilities during PCC of Fund-financed remedies may include O&M of waste containment structures; O&M of groundwater restoration or containment systems; environmental monitoring; and implementation, and maintenance and enforcement of ICs required to ensure remedy protectiveness. Initiating communication between the EPA RPM and state project manager at the beginning of the remedial process can help lay the foundation for successful collaboration between EPA and the state during the PCC phase. This document further describes some key state roles and responsibilities for specific PCC activities.

1.4.3 Tribe

CERCLA §126 requires that federally recognized Indian tribes be treated substantially the same as states with respect to certain provisions of the statute. In addition, the NCP at 40 CFR §300.5 includes a definition of "Indian tribe" and includes Indian tribes within the definition of the term "State" for all purposes of the NCP except where specifically noted. Further, the NCP at 40 CFR §300.515(b) states that:

> To be afforded substantially the same treatment as states under section 104 of CERCLA, the governing body of the Indian tribe must: (1) Be federally recognized; and (2) Have a tribal governing body that is currently performing governmental functions to promote the health, safety, and welfare of the affected population or to protect the environment within a defined geographic area; and (3) Have jurisdiction over a site at which Fund-financed response, including pre-remedial activities, is contemplated.

Consistent with CERCLA §104(d), at sites where EPA's actions or decisions may affect tribal interests, the tribe (or tribes) may also serve as the support agency in the RA process. However, unlike states, tribes are not expected to provide assurances[3] for the performance of O&M or sharing the cost of RA for Fund-financed remedies.

As with states, federally recognized tribes also should have opportunities to provide meaningful input throughout the remedy selection process, including the opportunity to review and comment on site documents and, in some cases, to concur on certain remedy decisions. Furthermore, in accordance with EPA's 2011 *Policy on Consultation and Coordination with Indian Tribes* (EPA, 2011b), the Agency's "policy is to consult on a government-to-government basis with federally recognized tribal governments when EPA actions and decisions may affect tribal interests." Communication and coordination between the EPA RPM and tribal project manager should begin early in the Superfund RA process and continue during the PCC phase.

Because CERCLA does not require tribes to provide assurances for O&M, based on experiences at specific sites, tribes tend to be involved in post construction activities primarily as a support agency. Given that the roles and responsibilities for federally recognized tribes may differ from those of states, it

[3] CERCLA §104(c)(3)

is recommended that the RPM consult with his/her Regional Superfund Tribal Coordinator if a tribe is going to be involved in PCC activities at a Superfund site.

1.4.4 Other Stakeholders

Depending on the particular circumstances of a site, other stakeholders (including PRPs, other federal agencies, and local governments) also may be involved in the site cleanup. Often, at PRP-lead sites, viable and responsible PRPs bear the primary responsibility for PCC activities. Similarly, other federal agencies are generally responsible for PCC activities at federal facilities. Depending on a particular site's circumstances, local governments may play a role as well. At all sites, communication among the various entities early in the RA process can help lay the foundation for success during the PCC phase.

2.0 PLANNING FOR POST CONSTRUCTION COMPLETION ACTIVITIES THROUGHOUT THE REMEDIAL PROCESS

As discussed in Section 1.3, this section provides recommendations for Fund-financed, PRP-lead, and federal facility-lead remedies.

Planning for PCC activities generally occurs throughout the remedial process. Early planning for post construction completion activities (particularly during remedy selection and implementation) and consistent communication and coordination among EPA, the state, and other stakeholders can help set the stage for a successful PCC phase.

2.1 Evaluation of Remedial Alternatives

One of the first steps in the Superfund remedial process typically is the remedial investigation and feasibility study, or RI/FS. The RI generally is designed to assess the nature and extent of contamination, and the FS generally is designed to evaluate cleanup alternatives. In evaluating RA alternatives, regions should consider existing guidance (e.g., EPA, 1999) when describing PCC activities, including O&M requirements and ICs for each alternative, evaluating them as part of the nine-criteria analysis in the FS, and formulating and developing the remedy selection decision document. In addition, as discussed in existing guidance, the FS normally should include a summary of the major cost elements for each alternative, including the selected remedy (EPA, 1999). The estimate should include capital and O&M costs and the present value of each alternative as well as the discount rate used in calculating the present value and the number of years over which the O&M costs are projected.[4] The estimate normally is expected to be accurate within a range of +50 to -30% (EPA, 2000).

2.2 Decision Document Development

The Record of Decision (ROD), as supported by the Administrative Record, serves as the legal decision document for remedy selection (EPA, 1999). The ROD typically identifies and discusses a number of topics, including the selected remedy, associated remedial action objectives (RAOs), and applicable or relevant and appropriate requirements (ARARs). PCC activities may be discussed in several locations throughout the decision document. Documentation of post-ROD changes to selected remedies in a ROD amendment or an explanation of significant differences (ESD) also may consider PCC activities not previously addressed in the ROD.

Within the decision document, RAOs specify "contaminants and media of concern, potential exposure pathways, and remediation goals" (40 CFR §300.430(e)(2)(i)). The ROD should include clear RAOs that "provide a general description of what the cleanup will accomplish (*e.g.*, restoration of groundwater to drinking water levels)" (EPA, 1999). RAOs should be "clear and precise" (EPA, 1999) as well as "specific" (EPA, 1988).

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[4] The NCP notes that "(t)he types of costs that shall be assessed include the following: (1) Capital costs, including both direct and in-direct costs; (2) Annual operation and maintenance costs; and (3) Net present value of capital and O&M costs" (40 CFR §300.430(e)(9)(iii)(G)).

For purposes of this guidance, and consistent with EPA, 2011a, constructed remedies are grouped into three categories and their associated media:

- Groundwater and surface water restoration actions,
- Source and groundwater containment actions.
- Source remediation actions.

The RAOs associated with an RA help inform which of the categories above into which an RA falls. Identification of a groundwater or surface water remedy as having a restoration RAO will help determine if the remedy may be considered a Fund-financed LTRA, a designation that may affect the timeline and long-term funding and operation of the remedy (see Section 4).

The NCP at 40 CFR §300.435(f)(1) states that "Operation and maintenance (O&M) measures are initiated after the remedy has achieved the remedial action objectives and remediation goals in the ROD, and is determined to be operational and functional, except for ground- or surface-water restoration actions covered under 300.435(f)(4)." Therefore, achievement of the RAOs normally marks the point at which source and groundwater containment remedies transition to O&M (see Sections 3 and 5).

For source remediation actions, achievement of the RAOs often means that the remedial system, if in use, can be turned off, and typically no O&M or other PCC activities are required (EPA, 2011a).

2.3 Remedies with Both Restoration and Non-Restoration Components

Some Superfund remedies may have both groundwater or surface water restoration components and separate non-restoration source remediation or source or groundwater containment components. In those cases, even if the components are selected in the same ROD, the restoration and non-restoration components generally should be considered as separate RAs and may have their own timelines for transition to PCC.

Examples of remedies where remedy components normally should be considered as separate RAs for purposes of timeline and transition to PCC, include, but are not limited to:

- A landfill cap typically is considered as a separate RA from the groundwater extraction wells and treatment plant components of a restoration remedy.
- In situ treatment of source material typically is considered as a separate RA from the treatment components intended to restore groundwater.
- A subsurface barrier can be built as one component of a RA designed to contain groundwater contamination underneath a waste management unit. This component typically is considered as a separate RA from a pump and treat or MNA component of the remedy intended to restore groundwater outside or downgradient of the barrier.

In rare instances, the restoration and non-restoration remedy components may not be easily separated. If such a situation arises, the RPM should consult with EPA headquarters, Office of Superfund Remediation and Technology Innovation (OSRTI), to determine how to proceed.

2.4 Interim Actions

An interim action or remedy[5] generally should not be distinguished from a final action or remedy for purposes of PCC. As noted in the ROD guidance, "[a]n interim action is limited in scope and only addresses areas/media that also will be addressed by a final site/operable unit ROD…" and "…an interim action must be followed by a final ROD" (EPA, 1999). Interim actions generally "institute temporary measures to stabilize the site or operable unit and/or prevent further migration of contaminants or further environmental degradation" while a final RA is developed (EPA, 1999). Interim actions in the context of O&F and LTRA are discussed further in Sections 3.7, 4.2.3, and 4.6.

2.5 Superfund State Contract or Cooperative Agreement

This section applies only to Fund-financed remedies.

Before EPA can undertake a Fund-financed RA at a site within a state, CERCLA requires EPA to enter into a Superfund State Contract (SSC) or Cooperative Agreement (CA) (CERCLA §104(c)(3)). An SSC is "a joint, legally binding agreement between EPA and another party(ies) to obtain the necessary assurances before an EPA-lead RA or any political subdivision-lead activities can begin at a site, and to ensure State or Indian Tribe involvement as required under CERCLA section 121(f)" (40 CFR §35.6015). A CA can be used by EPA to transfer funds to a state, political subdivision or Indian tribe when that entity assumes responsibility as the lead for a Superfund RA. CERCLA allows a CA to be used in lieu of, or in addition to, an SSC.

40 CFR §300.510, State Assurances, and 40 CFR part 35, Subpart O, provide additional requirements for state, political subdivision and federally recognized Indian tribe involvement in a CERCLA response.[6] This document does not cover SSCs and CAs comprehensively; however, some regulations that relate to PCC include the following:

> "Prior to a Fund-financed remedial action, the state must also provide its assurance in accordance with CERCLA section 104(c)(3)(A) to assume responsibility for operation and maintenance of implemented remedial actions for the expected life of such actions. In addition, when appropriate, as part of the O&M assurance, the state must assure that any institutional controls implemented as part of the remedial action at a site are in place, reliable, and will remain in place after the initiation of O&M." (40 CFR §300.510(c)(1))

[5] For purposes of this document, the terms "interim remedy" and "interim action" are used interchangeably to describe an interim response action conducted using CERCLA authority to address a release or threatened release of a hazardous substance, pollutant or contaminant. Previous CERCLA guidance documents refer to "interim actions" (EPA, 1999) or "interim remedies" (EPA, 2011a). See also the definition of "Remedy or remedial action (RA)" at 40 CFR §300.5.

[6] CERCLA §104(c)(3) states that tribes do not need to provide assurances for the performance of O&M or for sharing the cost of remedial action at Fund-financed sites.

> "The SSC must include a statement that following completion of the remedial action, the State and EPA shall jointly inspect the project to determine that the remedy is functioning properly and is performing as designed." (40 CFR §35.6805(q))
>
> "The State's responsibility for operation and maintenance begins when EPA determines that the remedy is operational and functional or one year after construction completion, whichever is sooner." (40 CFR §35.6805(i)(1))

EPA has developed model SSC provisions that should be used as the basis for new SSCs and amendments to existing SSCs (EPA, 2015).

2.6 Remedial Design/Remedial Action

During remedial design (RD), the "engineering reports, documents, specifications, and drawings that detail the steps to be taken during the remedial action (RA) to meet the goals established in the Record of Decision" are developed (EPA, 1995b). PCC documents that are typically developed as part of the RD include the draft O&M plan; an Institutional Control Implementation and Assurance Plan (ICIAP; see EPA, 2012d), if institutional controls were selected as part of the ROD; a draft O&M manual and updated construction and O&M cost estimates. These draft documents typically continue to be refined over the course of the RD and RA. For Fund-financed remedies, EPA and the state should develop a draft SSC (EPA, 2015) or CA during the RD phase.

Upon completion of the RA, the O&M plan and O&M manual usually are updated based on actual operational experience obtained during the O&F period. The completed O&M plan and O&M manual normally are submitted as part of RA completion when the remedy transitions to O&M or LTRA (if applicable). Both documents should continue to be updated during the O&M period as conditions change. Section 5 contains further information regarding some of the key components of an O&M plan and O&M manual.

2.7 Remedy Completion Strategy

Superfund remedies and, in particular, groundwater restoration remedies, can take an extended period of time to achieve RAOs. A site-specific remedy completion strategy can help the site team focus resources on the information and decisions that can effectively move a remedy through the PCC phase (EPA, 2014). As used in this document, a "completion strategy" means a site-specific course of action established to achieve RAOs and associated cleanup levels selected in the remedy decision documents. A completion strategy normally describes a recommended step-wise plan and decision-making process for evaluating a number of RA components, including remedy operation and progress toward and attainment of RAOs, use of an updated conceptual site model, performance metrics and data derived from site-specific remedy evaluations. A completion strategy is not necessarily appropriate for all remedies, but preparation of such a strategy should be considered, particularly for groundwater or surface water restoration remedies.

2.8 Five-Year Reviews

FYRs are discussed in existing guidance (EPA, 2001; EPA, 2009b; EPA, 2011d; EPA, 2012b; EPA, 2012e; EPA, 2016d). FYRs are mentioned here because they often evaluate PCC activities.

FYRs generally are conducted "to evaluate the implementation and performance of a remedy in order to determine if the remedy is or will be protective of human health and the environment" (EPA, 2001). As a part of the FYR, remedy operations and performance may be assessed in various ways, including through site inspections, evaluations of monitoring data, and document review. During an FYR of a remedy in the PCC phase, it may be appropriate to evaluate a number of elements, including but not limited to:

- RA performance;
- Effectiveness and costs of O&M;
- IC implementation and monitoring;
- Opportunities for remedy optimization; and
- Remedy completion strategy.

2.9 Post Construction Completion Considerations During the Remedial Process

Exhibit 1 shows a list of recommended PCC considerations throughout the remedial process. Many of these considerations have been adapted from the superseded *Operation and Maintenance in the Superfund Program*, May 2001. Other considerations have been adapted from previous guidance documents, as indicated in the parentheses, and from text in this guidance document.

Exhibit 1 – Recommended Post Construction Completion Considerations During the Remedial Process	
Project Phase	**PCC Considerations: Depending on site-specific circumstances, it may be appropriate for regions to evaluate a number of considerations, including the ones described below.** ◆ *indicates considerations that may be appropriate for all remedies* ❖ *indicates considerations that may be appropriate primarily for Fund-financed remedies*
RI/FS and ROD	◆ Identify O&M activities and estimate costs for each screened alternative (EPA, 1999, p. 3-15). ◆ Provide state the opportunity to comment on the remedial alternatives and the opportunity to concur on the ROD (EPA, 1999, p 2-3). ◆ Document IC decisions in proposed plan and decision document (EPA, 2012c, p. 8). ❖ Discuss and share model SSC provisions with the state in case the remedy will be Fund-financed. ❖ Review O&M and IC components of the selected remedy with the state.
RD	◆ Meet with state counterparts before the RD starts to discuss both parties' roles and responsibilities. This meeting serves as a kick-off to ongoing exchanges that will continue to take place between EPA and the state (EPA, 1995b, p. 27). ◆ Ensure that the RD statement of work includes development of an O&M plan, O&M manual, ICIAP and remedy completion strategy, as appropriate. ◆ Review RA, O&M, and IC cost estimates for completeness and accuracy (EPA, 1995b, p. 60). ◆ Ensure SSC or CA, for Fund-financed remedies, or consent decree, for PRP-lead remedies, includes language on O&M and IC responsibilities. ❖ Complete and obtain state signature for the SSC (EPA, 1995b, p. 63). ❖ Regularly communicate project progress to state counterparts and identify any state concerns related to its CERCLA obligations as well as any constraints that may affect the RA implementation (EPA, 1995b, p. 27). ❖ Consult with the state to develop a draft O&M plan for the selected remedy (40 CFR §300.510(c)(1)).
RA	❖ Ensure that the RA statement of work includes training of O&M staff before the remedy is transferred to the state. ◆ Update O&M plan, ICIAP, and remedy completion strategy, as appropriate. ◆ Coordinate review and finalization of the O&M manual by the RA contractor. ❖ Meet regularly with state during RA to discuss site progress and any issues that may affect the SSC. Encourage the state to attend site progress meetings and visit the site during construction (EPA, 1995b, p. 69).

Exhibit 1 (continued) – Recommended Post Construction Completion Considerations During the Remedial Process	
Project Phase	**PCC Considerations: Depending on site-specific circumstances, it may be appropriate for regions to evaluate a number of considerations, including the ones described below.** ◆ *indicates considerations that may be appropriate for all remedies* ❖ *indicates considerations that may be appropriate primarily for Fund-financed remedies*
O&F determination (part of RA)	❖ Conduct joint EPA/state inspection at completion of remedy construction (40 CFR §300.515(g)), and document in a letter to the state. The inspection marks the start of O&F. ❖ Notify state of upcoming O&F determination. Conduct joint EPA/state inspection if O&F duration is less than one year (40 CFR §35.6805(q)). ❖ Make an O&F determination and document in a letter to the state. ◆ Ensure RA Report is prepared and includes a section on required O&M activities (EPA, 2011a). ◆ Prepare preliminary close out report for site, if appropriate (EPA, 2011a).
O&M Period	*Note: For Fund-financed groundwater and surface water restoration LTRA, please see Exhibit 4. The considerations here apply to the O&M period (if applicable) of all other remedy types.* ◆ Ensure remedy is inspected periodically and monitored as needed. ◆ Implement ICs, if applicable (timing will vary and could be earlier). ◆ Review O&M reports. ◆ Conduct an optimization study, if appropriate. ◆ Develop or update the remedy completion strategy (EPA, 2014). ◆ Conduct FYRs, consistent with the schedule for the site. Provide the state the opportunity to participate in the FYR process and review and comment on the draft report (EPA, 2001, p. 2-2). ◆ Determine when cleanup levels have been achieved for groundwater or surface water restoration (EPA, 2011a). ◆ Prepare final close out report, which documents compliance with statutory requirements and provides a consolidated record of all removal and remedial activities for the entire site (EPA, 2011a).

3.0 OPERATIONAL AND FUNCTIONAL DETERMINATION

As discussed in Section 1.3, this section provides recommendations pertaining primarily to Fund-financed remedies that involve LTRA and/or O&M. Some information also may be useful at sites with PRP-lead and federal facility-lead remedies, as discussed in Section 3.3.

3.1 Definition

The NCP at 40 CFR §300.435(f)(2) defines the O&F period as follows:

> "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. EPA may grant extensions to the one-year period, as appropriate."

The O&F period normally is considered to be the time when minor adjustments are made, as necessary, to ensure that a remedy is functioning properly and performing as designed. Activities during the O&F period generally are considered to be part of the RA for purposes of the cost-share requirements of CERCLA §104(c)(3). The O&F period normally leads up to the O&F determination, which typically is made for constructed remedies that result in O&M and/or LTRA.

3.2 Joint Inspections

For Fund-financed remedies involving LTRA and/or O&M, EPA and the state conduct a joint inspection at the end of all remedy construction activities in order to start the O&F period (40 CFR §300.515(g)):

> "For Fund-financed remedial actions, the lead and support agencies shall conduct a joint inspection at the conclusion of construction of the remedial action to determine that the remedy has been constructed in accordance with the ROD and with the remedial design."

The results of the inspection should be summarized in an "O&F start" letter from EPA to the state documenting the start of the O&F period (see Section 3.6 and Appendix D).

If less than one year has passed since the start of the O&F period, EPA and the state determine that the remedy is O&F during a second joint inspection (40 CFR §35.6805(q)):

> "Final inspection of the remedy. The SSC must include a statement that following completion of the remedial action, the State and EPA shall jointly inspect the project to determine that the remedy is functioning properly and is performing as designed."

Consistent with 40 CFR §300.435(f)(2) above, if one year has passed without an O&F determination, the remedy is determined to be O&F at the one-year mark. EPA may grant extensions to the one-year period, as appropriate.

The O&F determination should be documented in a letter from EPA to the state (see Section 3.6 and Appendix D).

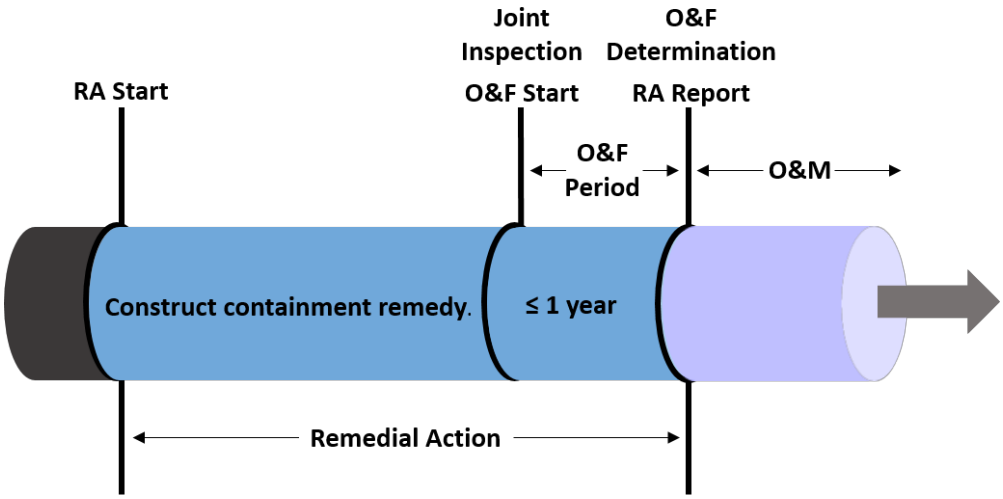
EPA generally conducts RA contract pre-final and final inspections with the RA contractor prior to closing out an RA construction contract. The RA contract inspections generally are conducted to determine whether the construction has been completed in accordance with the contract plans and specifications. If convenient, the EPA and state joint inspection can be conducted at the same time as one of the RA construction contract inspections; however, the joint inspection generally is a separate inspection for O&F determination purposes (EPA, 2011a).

3.3 Relationship to Other Site Actions

A Superfund site may consist of one or more operable units (OUs), each of which is normally addressed by one ROD but may involve one or more RAs. Because the O&F determination's primary purpose is to establish that the remedy is functioning properly and performing as designed, this determination normally should be made for each individual RA at a site. There may be multiple O&F determinations at a single site (*i.e.*, it is not typically a site-wide determination), and the O&F determination for each RA should be separate from the site-wide construction completion determination (EPA, 2011a).

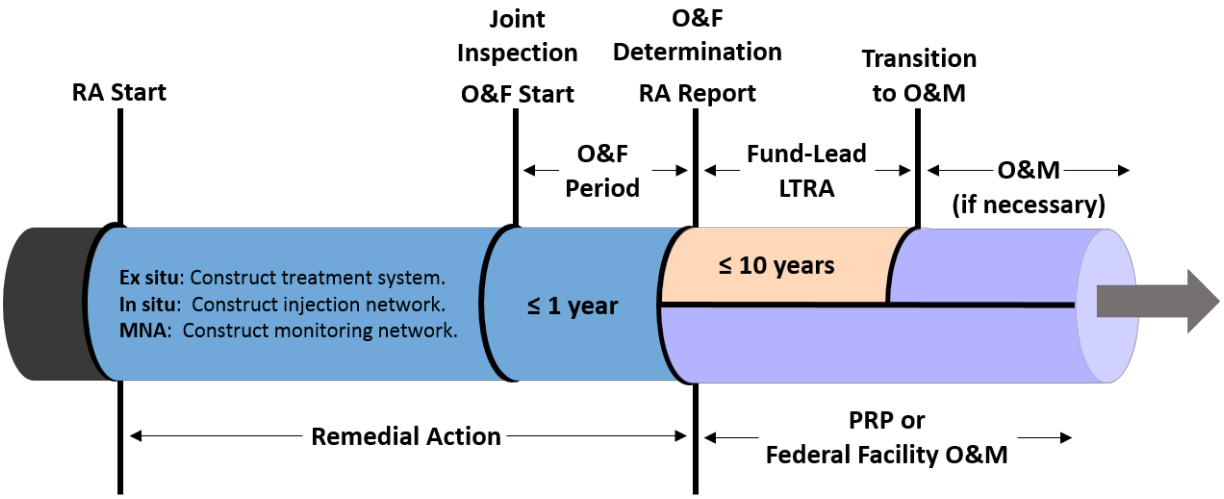
The O&F determination for a Fund-financed containment or restoration remedy generally is a significant project milestone because it informs the schedule for transfer of a remedy from EPA to the state for O&M (see 40 CFR §300.435(f)). For Fund-financed containment remedies that do not involve restoration of groundwater or surface water to its beneficial use, this transfer to O&M typically occurs when the O&F determination is made. Exhibit 2 depicts the typical timeline for source and groundwater containment remedies.

Exhibit 2 – Example of Source or Groundwater Containment Remedy Timeline
(Adapted from EPA, 2011a)



For Fund-financed groundwater or surface water restoration remedies that include an LTRA component, the O&F determination marks the start of the LTRA period of up to 10 years. If the RAOs have not been achieved within 10 years, the state normally will then assume responsibility for the remedy's O&M. Exhibit 3 depicts the typical timeline for groundwater and surface water restoration remedies. Section 4 also provides more details about LTRAs.

Exhibit 3 – Example of Groundwater or Surface Water Restoration Remedy Timeline
(Adapted from EPA, 2011a)



For PRP-lead remedies, the PRP normally continues to be responsible for the remedy after it transitions into O&M. Nonetheless, EPA recommends, but does not require, a PRP-lead remedy O&F determination to affirm that the remedy is functioning properly and performing as designed, and that O&M has begun. For federal facility-lead remedies, a similar determination, "Operating Properly and Successfully," is sometimes made during the process of property transfer.[7]

Note that some source remediation actions (see also section 2.2) typically have no O&F determination, O&M, or other PCC activities (EPA, 2011a). Consequently, the source remediation timeline is not shown in this guidance. Source remediation actions normally remain in the RA phase until their RAOs are achieved.[8] In cases where an operating treatment system such as soil vapor extraction is employed, there may be an extended period of continued remedial action operation after the remedy has been constructed to achieve the RAOs.

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[7] For additional information on "Operating Properly and Successfully," see CERCLA §120(h)(3).

[8] As explained in 2.2.1 of EPA, 2011a: "For purposes of this guidance, source material is defined as material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, to surface water, to air, or acts as a source for direct exposure. Source remediation generally refers to actions taken to reduce or eliminate the toxicity, mobility, or volume of contaminated source material, either through on-site treatment to appropriate cleanup levels or by physically removing it from the site. Examples include soil vapor extraction, in situ thermal treatment, and dredging of contaminated sediments."

3.4 Institutional Controls

Consistent with existing EPA CERCLA policy, ICs are defined for purposes of this guidance as "non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for exposure to contamination and/or protect the integrity of a response action. ICs typically are designed to work by limiting land and/or resource use or by providing information that helps modify or guide human behavior at a site" (EPA, 2012c). ICs generally are administrative in nature (rather than engineered or constructed), and the RA contractor does not implement them; therefore, ICs typically are not part of an RA's O&F determination.

3.5 Remedy-Specific Factors

To assist EPA and the state in making an O&F determination, remedy-specific O&F factors related to the functioning and performance of the remedy may be specified, agreed upon, and documented by EPA and the state in the SSC or CA. These site-specific factors normally should also include delivery of a current O&M plan, O&M manual, and as-built drawings for the constructed remedy.

For purposes of this guidance, vapor intrusion (VI) is the general term given to the migration of hazardous vapors from any subsurface vapor source, such as contaminated soil or groundwater, through the soil and into an overlying building or structure. *Operational and Functional Determination and the Transfer of Fund-lead Vapor Intrusion Mitigation Systems to the State*, (EPA, 2009a) provides more information for Fund-lead VI remedies.

3.6 Operational and Functional Documentation

For Fund-financed remedies, clear and transparent documentation of both the O&F start and the O&F finish (determination) should help ensure a timely transfer of the remedy to the state for O&M. These dates should be entered in the EPA's Superfund Enterprise Management System (SEMS).

> O&F Start: The constructed remedy's joint inspection conducted by EPA and the state (or PRP, if appropriate) normally should mark the start of the O&F period. The O&F start should be documented in a letter from EPA to the state (or PRP, if appropriate). This letter should reference the results of the EPA-State joint inspection and the NCP provisions describing the O&F period.
>
> O&F Finish: Once EPA and the state have conducted another joint inspection to determine that the remedy is O&F, or one year has passed since the O&F start, EPA should send another letter to the state citing the O&F start and O&F determination (finish) dates.

Appendix D provides sample Fund-financed O&F start and O&F determination letters to the state.

3.7 Interim Actions

An interim action or remedy generally should be treated in the same manner as a final RA for purposes of the O&F determination.

As with final RAs, Fund-financed interim containment actions normally should transfer to the state for O&M following the O&F determination. For Fund-financed groundwater and surface water restoration interim actions, the O&F determination generally should mark the beginning of the LTRA period. Sections 4.2.3. and 4.6 provide additional information regarding interim actions in the context.

4.0 LONG-TERM RESPONSE ACTION

This section provides recommendations for Fund-financed remedies involving restoration of groundwater and/or surface water as Section 1.3 discusses.

As shown in Exhibit 3 of Section 3.3, for Fund-financed groundwater or surface water restoration remedies, the O&F determination generally marks the start of the LTRA period. This section describes the Fund-financed LTRA period and a recommended planning process for the transfer of the remedy to the state.

This section supersedes the following policy memos:

- OSWER Directive 9355.0-81FS-A. *Transfer of Long-term Response Action (LTRA) Projects to States.* July 2003.
- OSWER Directive 9335.0-109. *Policy on Recalculating the Long-term Response Action (LTRA) Ten -Year Time Period.* June 9, 2006.

This section consolidates and updates the superseded information and clarifies the role of LTRA for interim actions.

4.1 Description

LTRA refers to the Fund-financed operation of groundwater or surface water restoration remedies for up to 10 years after the remedy becomes O&F:

> "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 years after the remedy becomes operational and functional will be considered part of the remedial action." (40 CFR §300.435(f)(3))

Activities during LTRA may include operation, maintenance and monitoring of the remedy, introduction of substrates into the subsurface, monitoring of affected groundwater or surface water, remedy optimization, and planning for transfer of the remedy to the state for the O&M phase. Consistent with the NCP, if cleanup levels are not achieved within 10 years, then the LTRA period normally should end and state-funded O&M begins. The state generally continues to operate, maintain and monitor the remedy until cleanup levels are achieved.

During LTRA, the state cost share typically should continue to be the same, since LTRA is considered to be part of the RA. The state cost share is 10 percent, except when states are required to "share 50%, or greater, in the cost of all Fund-financed response actions if the facility was publicly operated at the time of the disposal of hazardous substances" (see CERCLA §104(c)(3) and 40 CFR §300.510(b)(1)). Following the LTRA period, the state normally becomes responsible for 100 percent of the remedy's O&M costs.

4.2 Considerations

Consistent with the NCP, LTRA may apply to Fund-financed remedies involving groundwater and surface water where restoration is an RAO (40 CFR §300.435(f)(3)). As noted in Section 2.2, the ROD should clearly state if the selected RA includes RAOs for groundwater and surface water restoration and should identify which remedy components are supposed to achieve restoration.

4.2.1 Ineligible Remedies

The NCP at 40 CFR §300.435(f)(4) specifically identifies two types of remedies to which LTRA does not apply:

(i) "Source control maintenance measures; and
(ii) Groundwater or surface water measures initiated for the primary purpose of providing drinking water supply, not for the purpose of restoring groundwater."

The following types of remedies normally do not have groundwater or surface water restoration as an RAO, and, hence, typically would not be eligible for LTRA:

- Source treatment activities;
- Containment of acid mine drainage;
- VI mitigation systems; or
- ICs, such as restrictive covenants, zoning, and fish advisories.

In addition, decisions about other remedies being eligible for LTRA, including the use of any particular technology, should be made on a site-specific basis. While a specific technology might be used in a restoration remedy that is considered an LTRA in some situations, the same technology might be used in a containment remedy or source treatment remedy in another situation. Therefore, site-specific decision documents and RAOs describing the objective of the RA generally should guide whether the remedy may be eligible for LTRA.

4.2.2 Remedies with Both Restoration and Non-Restoration Components

As discussed in Section 2.3, some remedies may have both restoration and non-restoration remedy components. The restoration and non-restoration components should be handled separately and may follow different timelines for transfer to the state. For example, components of the remedy that are used for containment normally would immediately transfer to the state for O&M following the O&F determination, while components of the remedy used for restoration typically would go through LTRA following the O&F determination.

In rare instances, restoration and non-restoration remedy components are not easily separated for RA contracting and transfer purposes. If that situation arises, the RPM should consult with OSRTI at EPA Headquarters.

4.2.3 Interim Actions with Restoration Components

As discussed in Section 2.4, as a policy matter, interim actions are normally treated the same as final remedies for purposes of PCC. When an interim action ROD includes an RAO of restoring groundwater or surface water, the LTRA period normally should begin after the O&F determination for the interim

action and usually would continue for up to 10 years. If the final remedy ROD also has an RAO of restoring the same groundwater or surface water resource, there generally should be no additional LTRA period (*i.e.*, no extension to the LTRA period for the portion of the remedy that already has been funded as an LTRA). See Sections 2.4 and 4.6 for more information on interim actions.

4.3 Optimization Considerations during Long-Term Response Action[9]

EPA generally intends to transfer groundwater and surface water restoration systems to states when those systems are operating effectively and efficiently (EPA, 2012a). As such, optimization reviews by an independent party often are an important tool used to evaluate operating systems. The major questions that are typically considered during an optimization review include:

- Are the extraction, treatment, or other components of the remedy performing efficiently?
- Can adjustments be made to the extraction or treatment systems to reduce costs while maintaining performance?
- Is the system making progress toward achieving restoration cleanup goals?
- Is the plume captured and contaminant migration under control?
- Are recovery wells properly located to maximize capture?
- Does the site-specific remedy completion strategy that will be used to guide decisions on when to shut down the groundwater restoration system need to be updated?
- Were any performance issues identified during the previous FYR and have they been addressed?
- Do adjustments need to be made to the monitoring effort?
- Can system components or treatment train elements be removed or modified in response to changes in site conditions, to improve the efficiency/effectiveness of the system, or to reduce long-term costs?

In general, optimization reviews to verify remedy effectiveness and identify opportunities for cost savings normally should be conducted early enough in the LTRA period (generally by year six or seven) to allow sufficient time for 1) implementation of the recommendations that are deemed appropriate and necessary; and 2) operation and monitoring of an optimized system prior to transfer. If an optimization review is not conducted by that point, RPMs are still encouraged to conduct the review and implement any recommendations that EPA deems appropriate prior to transferring the remedy to the state.

4.4 Considerations for Long-Term Response Action

Exhibit 4 provides a list of commonly occurring recommended LTRA considerations that may be useful for EPA and the state to evaluate to help ensure a smooth transition process. Consistent communication and collaboration between EPA and the state throughout all of the steps in the RA process generally should contribute to the ease of transfer. Exhibit 4 presumes that EPA is the lead agency. Many of these considerations have been adapted from the superseded *Transfer of Long-Term Response Action Projects*

[9] This section focuses on optimization during LTRA; however, optimization can be appropriate for any phase of the remedial process to identify and implement specific actions that improve the effectiveness and cost-efficiency of the phase.

to States, April 2003. Other considerations have been adapted from previous guidance documents, as indicated in the parentheses, or from text in this guidance document.

Exhibit 4 – Recommended Long-Term Response Action Considerations for Fund-Financed Groundwater Restoration Remedies	
Project Phase	**LTRA Considerations: Depending on site-specific circumstances, it may be appropriate for regions and states to evaluate a number of considerations, including the ones described below.**
RD	◆ Meet with state counterparts before the RD starts to discuss the roles and responsibilities of both parties. This meeting serves as a kick-off to and ongoing exchanges that will continue to take place between EPA and the state (EPA, 1995b, p. 27). ◆ Ensure that the RD Statement of Work includes development of an O&M plan, O&M manual, ICIAP, and remedy completion strategy, as appropriate. ◆ Perform a review of the RA's biddability, constructability, and operability (with assistance, if needed, from USACE or contractors) (EPA, 1995b, p. 61). ◆ Review RA, LTRA, O&M and IC cost estimates for completeness and accuracy (EPA, 1995b, p. 60). ◆ Complete and obtain state signature for the SSC (EPA, 1995b, p. 63). ◆ Regularly communicate project progress to state counterparts and identify any state concerns related to its CERCLA obligations as well as any constraints that may affect the RA implementation (EPA, 1995b, p. 27). ◆ Consult with the state to develop a draft O&M plan for the selected remedy (40 CFR §300.510(c)(1)).
RA	◆ Ensure that the RA Statement of Work requires training of O&M staff before the remedy is transferred to the state. ◆ Update O&M plan, ICIAP, and remedy completion strategy, as appropriate. ◆ Coordinate review and finalization of the O&M manual by the RA contractor. ◆ Meet regularly with state during RA to discuss site progress and any issues that may affect the SSC. Encourage the state to attend site progress meetings and visit the site during construction (EPA, 1995b, p. 69).

Exhibit 4 (continued) – Recommended Long-Term Response Action Considerations for Fund-Financed Groundwater Restoration Remedies	
Project Phase	**LTRA Considerations: Depending on site-specific circumstances, it may be appropriate for regions and states to evaluate a number of considerations, including the ones described below.**
O&F determination (part of RA)	◆ Conduct joint EPA/state inspection at completion of remedy construction (40 CFR §300.515(g)), and document in a letter to the state. The inspection typically marks the start of O&F. ◆ Conduct joint EPA/state inspection if O&F duration is less than one year (40 CFR §35.6805(q)). ◆ Make an O&F determination and document in a letter to the state. ◆ Ensure RA Report is prepared and includes a section on required LTRA and O&M activities (EPA, 2011a). ◆ Prepare preliminary close out report for site, if appropriate (EPA, 2011a).
Years 0-6 of LTRA	◆ Operate system and make adjustments, repairs and replacements as appropriate. ◆ Regularly share cost, performance and monitoring data, results of performance reviews, and other technical site data with state counterparts. ◆ Conduct FYRs, consistent with the schedule for the site. Provide the state the opportunity to participate in the FYR process and review and comment on the draft report. ◆ Consider an optimization review to ensure effective and efficient operation. ◆ Develop or update the remedy completion strategy (EPA, 2014).
Year 7 of LTRA	◆ Notify State by letter of the planned LTRA transfer date. ◆ Recommend that the state initiate funding requests for continued O&M after LTRA is complete.
Year 8 of LTRA **Planning and Performance Reviews**	◆ Revise O&M plan as appropriate. ◆ Continue to share cost, performance and monitoring data, results of performance reviews, and other technical site data with state counterparts. ◆ Consider an optimization review, if not previously performed. ◆ Review property transfer and site access requirements. ◆ Recommend that the state begin planning to assume O&M (*e.g.*, hiring initiatives, procurement strategy and a timeline for contract support). ◆ Identify any necessary equipment repair/replacement.

Exhibit 4 (continued) – Recommended Long-Term Response Action Considerations for Fund-Financed Groundwater Restoration Remedies	
Project Phase	**LTRA Considerations: Depending on site-specific circumstances, it may be appropriate for regions and states to evaluate a number of considerations, including the ones described below.**
Year 9 of LTRA **Implement System Changes**	◆ Notify the state again, by letter, of date of anticipated transfer from LTRA to O&M so state has ample time to budget O&M costs and plan for the upcoming schedule and milestones. ◆ Design/construct revisions to system, as required. ◆ Revise O&M manual, O&M plan, sampling plan, monitoring plan and remedy completion strategy, as needed. ◆ Conduct second FYR, consistent with the remedy's schedule. ◆ Prepare to transfer permits, warranties, certificates of occupancy, deeds and other agreements.
Year 10 of LTRA **Complete Transfer**	◆ State completes arrangements for conducting O&M. ◆ State or contractor personnel observe operations and receive training on the treatment system. ◆ Complete all transfer documents/arrangements. ◆ EPA sends a final letter confirming transfer date and schedule for any remaining actions (see sample letter in Appendix D).
O&M Period	◆ State assumes responsibility for conducting O&M. ◆ Implement ICs, if applicable (timing will vary and could be earlier). ◆ State provides progress reports to EPA as agreed in O&M plan. ◆ EPA (or state, per agreement with EPA) conducts subsequent FYRs. ◆ State and EPA determine when cleanup levels have been achieved. ◆ EPA (or state, per agreement with EPA) prepares final closeout report, which documents compliance with statutory requirements and provides a consolidated record of all removal and remedial activities for the entire site (EPA, 2011a).

4.5 Transition from Long-Term Response Action to State-Funded Operation and Maintenance

Consistent with the NCP, a groundwater or surface water restoration remedy normally transitions from Fund-financed LTRA into state-funded O&M at the end of the 10-year LTRA period. Some restoration remedies, however, may achieve ROD cleanup levels within the 10-year LTRA period, which may mean that no O&M is required.

If the cleanup levels have not been achieved by the end of the 10-year LTRA period, the state typically becomes responsible for operation, maintenance and monitoring of the remedy until cleanup levels are achieved. This transition from LTRA to O&M distinguishes the period of federal RA funding from state O&M funding, but transition is not necessarily related to any operational change in the cleanup approach (*e.g.*, the operating pump and treat system).

To support smooth operation during the LTRA period and subsequent transfer to the state for O&M, the EPA and state representatives should be in close communication throughout the LTRA period. At the end of the LTRA period, EPA should send a letter to the state documenting the transfer. Appendix D includes a sample LTRA transfer letter.

Documents associated with remedy implementation, including O&M, should be available in the site file to support this transition from LTRA to O&M. Suggested documents may include:

- RD documents;
- As-built drawings;
- O&F determination letter;
- RA Report(s);
- Optimization report, if conducted;
- FYR report(s);
- Current O&M plan and O&M manual;
- Long-term monitoring plan and reports;
- Site inspection reports; and
- IC plans (*e.g.*, ICIAP) and associated documentation.[10]

For additional information on O&M plans, see Section 5.3. For additional information on O&M manuals, see Section 5.4. For information on reporting, see Section 5.6. The transition from LTRA to state-funded O&M may also involve the transfer of property interests from EPA to the state. For additional information on equipment and real property, see Section 6.

[10] Effective implementation and maintenance of ICs, however, is not normally a condition for an O&F determination or the transfer of a remedy from LTRA into state-lead O&M.

If all RAOs have been achieved within the 10-year LTRA period and no O&M is required, no transfer to the state for O&M of this aspect of the RA should be necessary. However, a report should be prepared containing valid monitoring data and any other evidence that collectively demonstrate achievement of the RAOs.

4.6 Recalculating the Long-Term Response Action Time Period

Consistent with CERCLA and the NCP, the LTRA timeframe of up to 10 years normally should not be affected by a remedy change that would be considered a continuation of the original remedy but would achieve the RAOs in a more efficient or less costly manner (*e.g.*, as a result of remedy optimization).

Generally, the LTRA time period also should not be affected by a new or changed ARAR where the new or changed ARAR does not require a fundamental remedy change. In addition, adjustments made to groundwater restoration remedies following an optimization review typically would not affect the LTRA time period since these changes generally are considered routine and are designed to ensure effective and efficient operations of the ROD-selected remedy.

As discussed in Section 4.2.3, the LTRA period normally should not change in situations where an interim action involving a restoration remedy is followed by a final remedy to achieve restoration of the same groundwater resource in the same manner (*i.e.*, no extension to the LTRA time period because the interim action has the same RAO as the final restoration remedy).

In certain rare site-specific circumstances, EPA may determine that it is appropriate to recalculate the LTRA 10-year time period. For example, the region may consider an LTRA time period recalculation when:

- A new, previously not identified contaminant of concern is discovered late in the LTRA period, which necessitates a fundamental change to the operating treatment system chosen in the ROD.
- A natural disaster (*e.g.*, flood, hurricane, tornado, etc.) occurs during LTRA that causes extensive damage to the remedy, requiring EPA (with the state providing cost share) to reconstruct or rebuild all or part of the remedy.

If the region, after consulting with the state, believes that a site's circumstances might warrant a recalculation of the LTRA 10-year time period, the region should first consult with the Office of Superfund Remediation and Technology Innovation (OSRTI) at EPA headquarters. After that consultation, a formal request for recalculation of the 10-year LTRA period can be submitted in a memorandum to OSRTI summarizing the following:

- Brief site background and description;
- Description of the overall remedy and the remedy component that is being considered for the recalculated LTRA time period;
- Rationale for requesting the change and the proposed recalculated time period; and
- If applicable, draft of the proposed decision document in support of the request.

If OSRTI provides written approval to recalculate the 10-year LTRA period, the region should document the recalculation by writing a memorandum to the file and updating EPA's project tracking system.

Because recalculation of the LTRA period affects the schedule for transfer of a remedy to state-performed O&M, the region should coordinate with the state throughout the process of requesting an LTRA recalculation.

5.0 OPERATION AND MAINTENANCE

As discussed in Section 1.3, this section provides recommendations for Fund-financed, PRP-lead, and federal facility-lead remedies.

This section discusses O&M measures, which generally are designed to ensure that the remedy continues to operate as designed and remains protective of human health and the environment. O&M activities may include remedy operation, maintenance and monitoring, as well as monitoring of impacted media and implemented ICs. In general, experience has shown that adequately planning for and addressing O&M issues throughout the life of a remedy is often critical to a successful PCC phase.

This section supersedes the following policy memos:

- OSWER Directive 9200.1-37FS. *Operation and Maintenance in the Superfund Program.* May 2001.
- OSWER Directive 9375.2-12. *Directive on Paying for Remedy Repairs or Modifications during the State-Funded Period of Operation and Maintenance (O&M).* April 26, 2007.

These policy memos have been consolidated and updated in this section.

5.1 Superfund Programmatic Definition

The NCP, 40 CFR §300.435(f)(1), describes O&M as the measures:

> "…initiated after the remedy has achieved the remedial action objectives and remediation goals in the ROD (Record of Decision), and is determined to be operational and functional, except for ground- or surface-water restoration actions covered under 40 CFR §300.435(f)(4)."

Although Fund-financed remedies to restore groundwater to its beneficial use generally do not transition to O&M until 10 years after the O&F determination, many LTRA activities are similar to O&M activities. Consequently, the topics discussed in this section may also be appropriate for consideration regarding remedies still in the LTRA period, including preparing O&M plans (Section 5.3) and manuals (Section 5.4) and various reports (Section 5.6).

5.2 Responsibility

For Fund-financed remedies, CERCLA §104(c) requires states to assure all future O&M.

The NCP, 40 CFR §300.510(c)(1), indicates that, "the state must also provide its assurance in accordance with CERCLA section 104(c)(3)(A) to assume responsibility for operation and maintenance of the implemented remedial actions for the expected life of such actions." A state's O&M responsibilities generally should ensure that the remedy remains protective of human health and the environment and responsibilities may include the repair, replacement, and decommission of all damaged, worn, and obsolete equipment and structures.

For PRP-lead remedies, the PRP typically remains responsible for O&M. For federal facility-lead remedies, the federal agency is ultimately responsible for O&M, but may be able to contract out activities associated with O&M. At NPL sites where there is a section 120 Federal Facility Agreement

in place, EPA may require the federal agency to perform O&M to ensure the activities are properly carried out.

Although others are responsible for conducting the O&M, EPA retains responsibility for oversight to ensure that the O&M is being performed adequately. This may involve ensuring that O&M reports are sufficient, performing periodic inspections, and conducting FYRs.

5.3 Operation and Maintenance Plan

As discussed in Section 2.6, the draft O&M plan normally is developed as part of the RD and typically is finalized at the end of the RA. The O&M plan should continue to be updated as conditions change during O&M.

5.3.1 Fund-Financed

The NCP, 40 CFR §300.510(c)(1), states, "The state and EPA shall consult on a plan for operation and maintenance prior to the initiation of a remedial action."

For Fund-financed remedies, the opening section of the O&M plan normally describes the transfer of O&M responsibilities, including the organizational unit of the state government responsible for O&M, state funding mechanisms for O&M activities, and milestone dates for state assumption of O&M. The remaining sections of the O&M plan normally should be more technical in nature.

5.3.2 Potentially Responsible Party-Lead and Federal Facility-Lead

For PRP-lead remedies, the PRPs normally are responsible for constructing, operating and maintaining the remedy. In rare circumstances, the PRP may arrange to transfer O&M-related activities to another organization and provide sufficient funds to conduct them. In either case, an O&M plan is normally required as part of the enforceable instrument.

For federal facility-lead remedies at NPL sites, the federal agency generally will develop an O&M plan in accordance with the CERCLA §120(e)(2) interagency agreement for the site.

5.3.3 Plan Elements

The O&M plan normally should define the administrative, financial and technical details and requirements for inspecting, operating and maintaining the RA. The plan typically discusses roles and responsibilities, monitoring and reporting. If a separate ICIAP or other similarly detailed plan has not been prepared, the O&M plan should also provide information on the implementation, maintenance, and enforcement of ICs, if applicable to the remedy.

Exhibit 5 shows the recommended O&M plan elements.

Exhibit 5 – Recommended O&M Plan Elements

- Transfer of O&M responsibilities (for Fund-financed RAs when the state assumes O&M)
  - Designation of the organizational unit of the state government responsible for O&M
  - Identification of the availability of state funding mechanisms for O&M activities (if appropriate and feasible)
  - Milestone dates for state assumption of O&M responsibilities
- Description of O&M engineering components
  - Equipment and material requirements
  - Description, duration and frequency of O&M activities
  - Summary of O&M staffing needs (including training and certification requirements)
- Safety requirements
  - Emergency contacts and procedures
  - Updated Health and Safety Plan
- Estimate of O&M annual and periodic costs
- Description of routine environmental monitoring and laboratory testing
  - Description and frequency of monitoring tasks
  - Description of required laboratory tests and a guide to interpreting possible results
  - Updated Quality Assurance Project Plan, if needed
  - Description of performance standards from the ROD
  - Access agreements and parcel information (if applicable)
- Description of corrective action in case of systems failure, including:
  - Contingency plan for handling abnormal occurrences
  - Alternative procedures to prevent the release or threatened release of hazardous substances which may endanger public health and the environment or exceed performance standards from the ROD
  - Analysis of vulnerability and additional resource requirements should a failure occur
  - Notification and reporting requirements should O&M systems fail or be in danger of imminent failure
  - Community notification requirements
- Description of records and reporting requirements
  - Operating logs
  - Laboratory reports
  - Mechanism for reporting emergencies
  - Definition of type and frequency of reports to EPA and others
- O&M Completion (if applicable)
  - Conditions for engineered system O&M termination
  - Requirements for monitoring termination
  - Demobilization activities
  - Description of site use and disposition of facilities following O&M completion
- Roles and responsibilities for ICs, if a separate ICIAP has not been prepared
- Appendices, including copy of the O&M manual

5.4 Operation and Maintenance Manual

The O&M manual normally should contain detailed technical information used to operate and maintain the engineered remedy, while the O&M plan is designed to be more of a management document describing how the O&M will be conducted.

Components of the O&M manual normally include technical information and data, manufacturer information, protocols, process parameters, operational procedures, staffing and training requirements, and maintenance schedules.

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. As with the O&M plan, the O&M manual should continue to be updated during the O&M phase as conditions change.

Exhibit 6 shows the recommended elements of an O&M manual. Note that the O&M manual usually becomes an appendix of the O&M plan, described in Section 5.3, so that both documents can serve together as references for conducting O&M.

Exhibit 6 – Recommended O&M Manual Elements

- System description, including facility operation and control
  - Description of how the designer intends the system to operate
  - Description of normal operation, including startup procedures
  - Description of routine maintenance activities
  - Description of routine remedy inspection requirements
  - Description of potential operating problems with suggested solutions
  - Description of corrective action to be taken in the event of a release
- Description of installed equipment
  - Equipment inventory and identification numbers
  - Vendor data and warranties
  - Maintenance requirements and schedule
  - Spare parts list
  - Replacement schedule
  - Suggested monitoring requirements
- Records and reporting
  - Format and delivery requirements
  - Operating and inspection logs
  - Laboratory records
  - Monthly and annual reports
  - Maintenance records
  - Operating costs
- Emergency operating and response program
  - Emergency equipment inventory
  - System vulnerabilities
  - Emergency contacts
  - Emergency procedures (including emergency shutdown)
  - Special reports (for floods, fires, and other emergencies)
- Utilities
  - Electrical, telephone, natural gas, water and fuel oil information
  - Schematic diagrams
  - Alternate power source
- Appendices
  - Schematics and plans of remedy
  - As-built drawings
  - Health and safety plan
  - Inspection checklists
  - Other remedy-specific items

5.5 Fund-Financed Remedy Repairs or Modifications During State-Funded Operation and Maintenance

In certain site-specific circumstances, EPA may determine that it is appropriate to pay or partially pay for repairs to or modifications of Fund-financed operating remedies even though a state has already assumed responsibility for O&M. Since the state is responsible for O&M of the remedy, coordination and discussions with the state about the need for and financing of modifications or repair of a remedy generally are crucial.

5.5.1 Evaluation Considerations

When evaluating whether it is appropriate for EPA to pay some or all of the costs to repair or modify a remedy after a state has assumed responsibility for O&M, regions should consider a number of factors. For example, regions should consider whether:

- A latent defect in a remedy that affects protectiveness is discovered after the construction has been completed and O&M has begun;
- A new, previously not identified, contaminant of concern is discovered, which necessitates a fundamental change to the operating treatment system selected in the ROD; or
- An ARAR change necessitates a more stringent cleanup level than the one established in the ROD and a fundamental change to the remedy selected in the ROD.

With regard to repairs, regions should consider whether they are necessary due to inadequate performance of O&M by the state, in which case the state normally should be responsible for the appropriate corrective action. Similarly, if equipment life expectancy has been exceeded, then the state should make the necessary changes as part of its O&M obligation. Furthermore, if some form of natural disaster damages the remedy during O&M, then the state typically makes the necessary repairs.

5.5.2 Headquarters Consultation

If a region, after consulting with the state, believes that it may be appropriate for EPA to pay for remedy repairs or modifications after a state has assumed responsibility for O&M, the region should first consult with OSRTI at EPA Headquarters. After that consultation, a formal request for EPA funding of repairs or modifications can be submitted in a memorandum to OSRTI that:

- Provides a brief background and description of the site;
- Identifies the remedy to be repaired or modified, the reason the repair or modification is necessary, and the estimated cost and timeframe to repair or modify the remedy;
- Identifies the total amount of funding needed for the remedy repair or modification; and
- If applicable, provides a draft of the proposed decision document to be used to document the repair or modification.

After OSRTI has reviewed the provided information, the findings will be provided to the region. For circumstances involving remedy modification, the region should document the action taken in a ROD Amendment, ESD, or letter to the file, as appropriate (EPA, 1999).

5.6 Reports

Several types of O&M reports usually are prepared. The following O&M reports may be prepared for a given remedy.

5.6.1 Routine Reports

Routine O&M reports summarizing O&M activities performed typically are prepared by the state, PRP, or federal facility on a regular basis (such as monthly, quarterly, or annually) and submitted to the RPM. Routine reports might include the following information:

- Operational data;
- Sampling results;
- Discharge and emission calculations;
- Routine inspections;
- Repairs;
- Equipment change-outs, updates of the O&M manual and as-built drawings;
- Community concerns and responses; and
- Verification of the integrity of ICs.

5.6.2 Annual Reports

The RPM may request comprehensive annual O&M reports to assist in analyzing O&M activities and costs. For example, the magnitude of the O&M activities performed may increase unexpectedly over time or may be significantly lower than had been estimated at the time of the remedy selection. The RPM may use the annual reports to perform an analysis to determine why the changes are occurring.

5.6.3 Special Reports

O&M safety, emergency and contingency plans normally include provisions for responding to and reporting on safety concerns, emergencies, and other unusual events such as fires, floods or weather damage.

5.6.4 Annual Operation & Maintenance/Remedy Evaluation Checklist

EPA has developed two Recommended Annual O&M/Remedy Evaluation Checklists to help capture data routinely collected during O&M in a way that is designed to better evaluate the efficiency and effectiveness of the remedy. One of the available checklists is designed for contaminated sediment remedies (EPA, 2008b), and the second is for all other remedies (EPA, 2008a). The recommended checklist generally is intended to be completed annually.

5.6.5 Five-Year Review Reports

As the FYR is being developed, the state, PRP, or federal facility will typically provide information to document O&M activities and the continued effectiveness of the remedy at the site. The information may include interviews of O&M personnel, and records of equipment repairs, system modifications, sampling results, discharge and emission compliance, routine inspections and safety and emergency incidents. The information should assist the RPM in assessing the adequacy of O&M, as related to assessing continued remedy protectiveness. Five-Year Reviews are covered in more detail in EPA, 2016d; EPA, 2012b; EPA, 2012e; EPA, 2011d; EPA, 2009b; and EPA, 2001.

6.0 EQUIPMENT AND REAL PROPERTY CONSIDERATIONS

This section discusses real property transfer as it pertains to Fund-financed remedies. For federal facility property transfer, there may be further complexities and other federal agency policies generally should be consulted.[11]

6.1 Background

A wide range of equipment, supplies and other materials often are needed to conduct Superfund RAs. These may include machinery (*e.g.*, backhoes, air monitoring instruments or components of the treatment train), mobile units (*e.g.*, construction trailers) and consumable items (*e.g.*, disposable gloves), etc. As defined in the *EPA Personal Property Policy and Procedures Manual* (EPA, 2006a):

- "Real property is land, together with the improvements, structures, and fixtures located thereon."
- "Personal property is any property, except real property."

As discussed below, most equipment used at a Superfund site is not considered EPA personal property, and accordingly is not entered into the EPA property inventory maintained by the Facilities Management and Services Division, nor is it subject to the procedures set forth in the *EPA Personal Property Policy and Procedures Manual* (EPA, 2006a). Equipment that is installed as part of a constructed remedy (*e.g.*, wells installed as part of a groundwater pump and treat system, treatment system equipment or components, etc.) is considered part of the real property at a site.

6.2 Recommended Approach for Handling Personal and Real Property

When developing the RD specifications and planning for the RA contract, the RPM should anticipate RA completion and disposition of any personal property (*i.e.*, equipment) used in the RA that is not considered real property. Whenever possible, the RA contract should instruct the contractor to provide all equipment, supplies and materials needed to conduct the RA. The RA contract vehicle typically includes applicable property procedures if property is acquired.[12]

Sections 3 and 4 discuss how EPA turns over responsibility for operation and maintenance of a Fund-financed remedy to a state. Disposition of personal property and real property associated with the remedy generally is addressed during transfer of the remedy to the state.[13] As part of preparing for remedy transfer to the state, any real property acquired by EPA and associated with the RA should be

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[11] For example, see CERCLA §102(h) as well as *EPA Guidance on the Transfer of Federal Property by Deed before All Necessary Remedial Action Has Been Taken Pursuant to CERCLA Section 120(h)(3) (Early Transfer Authority Guidance).* 1998.

[12] For example, 40 CFR §35.6400 and §35.6405 discuss the acquisition, transfer and use of real property acquired by EPA under a cooperative agreement.

[13] CERCLA §104(j) provides authority for EPA to acquire real property interests needed to conduct a remedial action (see also 40 CFR §300.510(f)). However, the statute requires the state to provide assurance that it will "accept transfer of the interest following completion of the remedial action."

identified in a Real Property Disposition inventory list. Upon transfer to the state, full title to all items identified on the Real Property Disposition List is granted to the state or other appropriate parties. The state generally is responsible for future repairs, replacement, abandonment and disposal. EPA normally should have no further responsibility for such property.

In the event that the remedy has personal property at the time of transfer, the EPA RPM should refer to the references listed below.

6.3 Additional Information Sources

Each EPA region has a property management specialist who should be contacted to provide site-specific advice. During the RA contracting phase, the EPA RPM should confer with the property management specialist and the contracting officer to ensure that the contract vehicle provisions minimize EPA's personal property responsibility and liability.

In the event that the RA results in EPA acquiring personal property, there are government-wide policies and procedures for personal property management issues. The internal to EPA documents can be found at the following EPA intranet websites:

> *EPA Personal Property Policies and Procedures Manual*: http://intranet.epa.gov/ohr/rmpolicy/ads/manuals/pp-policy-procedures-manual.pdf (EPA, 2006a, undergoing revision and reissuance).
>
> *Custodial Officer's Guide*: http://intranet.epa.gov/oas/fmsd/property/pdfs/co-guidebook.pdf (EPA, 2006b).
>
> *Environmental Protection Agency Acquisition Guide* (see Chapter 45 for property considerations): http://oamintra.epa.gov/node/521 (EPA, 2016a).

7.0 CONCLUSION

PCC activities are important because they are designed to ensure that a remedy remains effective in protecting human health and the environment. A Superfund remedy that is operated and maintained properly generally remains effective for as long as is necessary to ensure protectiveness of human health and the environment.

Early planning and consistent communication can help foster successful PCC activities. PCC activities should be carried out consistent with CERCLA, the NCP, as well as the various documents, agreements and orders that cover site work conducted by EPA, states, Indian tribes, PRPs and federal facilities.

Information regarding PCC is available and regularly updated at the following EPA website: https://www.epa.gov/superfund/superfund-post-construction-completion

Appendix A: References

EPA, 2016b. *Superfund Redevelopment Initiative*. http://www.epa.gov/superfund-redevelopment-initiative

EPA, 2016c. *Superfund Community Involvement Handbook.* January 2016. http://semspub.epa.gov/src/document/11/100000070

EPA, 2016d. *Five-Year Review Recommended Template*. OLEM Directive 9200.0-89. January 20, 2016. http://semspub.epa.gov/src/document/HQ/100000001

EPA, 2015. *Issuance of 2015 Model Superfund State Contract Provisions.* OSWER Directive 9242.3-18. November 16, 2015. https://semspub.epa.gov/src/document/HQ/177107

EPA, 2014. *Groundwater Remedy Completion Strategy: Moving Forward with the End in Mind.* OSWER Directive 9200.2-144. May 2014. http://semspub.epa.gov/src/document/HQ/100000021

EPA, 2012a. *National Strategy to Expand Superfund Optimization Practices from Site Assessment to Site Completion.* OSWER Directive 9200.3-75. September 2012. http://semspub.epa.gov/src/document/HQ/174096

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EPA, 2011a. *Close Out Procedures for National Priorities List Sites*. OSWER Directive 9320.2-22. May 2011. http://semspub.epa.gov/src/document/HQ/176076

EPA, 2011b. *EPA Policy on Consultation and Coordination with Indian Tribes*. May 4, 2011. http://www.epa.gov/sites/production/files/2013-08/documents/cons-and-coord-with-indian-tribes-policy.pdf

EPA, 2011c. *Groundwater Road Map: Recommended Process for Restoring Contaminated Groundwater at Superfund Sites*. OSWER Directive 9283.1-34. July 2011. http://semspub.epa.gov/src/document/HQ/174480

EPA, 2011d. *Recommended Evaluation of Institutional Controls: Supplement to the "Comprehensive Five-Year Review Guidance."* OSWER Directive 9355.7-18. September 13, 2011. http://semspub.epa.gov/src/document/HQ/175441

EPA, 2010. *Considering Reasonably Anticipated Future Land Use and Reducing Barriers to Reuse at EPA-lead Superfund Remedial Sites.* OSWER Directive 9355.7-19. March 17, 2010. http://semspub.epa.gov/src/document/HQ/175563

EPA, 2009a. *Operational and Functional Determination and the Transfer of Fund-lead Vapor Intrusion Mitigation Systems to the State*. OSWER Directive 9200-2.72. April 9, 2009. http://semspub.epa.gov/src/document/HQ/176118

EPA, 2009b. *Assessing Protectiveness for Asbestos Sites: Supplemental Guidance to Comprehensive Five-Year Review Guidance.* OSWER Directive 9355.7-038-P. December 3, 2009. http://semspub.epa.gov/src/document/HQ/174475

EPA, 2008a. *Recommended Annual O&M/Remedy Evaluation Checklist*. OSWER Directive 9355.0-87. April 2008. http://www.epa.gov/sites/production/files/2015-09/recommended_annual_om_checklist.doc

EPA, 2008b. *Recommended Annual O&M/Remedy Evaluation Checklist For Contaminated Sediment Remedies.* OSWER Directive 9355.0-118. September 2008**.** http://www.epa.gov/sites/production/files/2015-09/sediment_checklist.doc

EPA, 2007a. *A Cost Comparison Framework for Use in Optimizing Ground Water Pump and Treat Systems*. EPA 542-R-07-005. May 2007. http://semspub.epa.gov/src/document/HQ/174828

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EPA, 1995a. *Land Use in the CERCLA Remedy Selection Process*. OSWER Directive No. 9355.7-04. May 25, 1995. http://semspub.epa.gov/src/document/HQ/174935

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Appendix B: Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CA	Cooperative Agreement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986
ESD	Explanation of Significant Differences
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
IC	Institutional Control
ICIAP	Institutional Control Implementation and Assurance Plan
LTRA	Long-Term Response Action
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&F	Operational and Functional
O&M	Operation and Maintenance
OLEM	Office of Land and Emergency Management (formerly OSWER)
OSRTI	Office of Superfund Remediation and Technology Innovation
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PCC	Post Construction Completion
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act
SEMS	Superfund Enterprise Management System
SSC	Superfund State Contract
VI	Vapor Intrusion

Appendix C: Glossary

For purposes of this guidance, the terms are defined as follows:

Applicable or Relevant and Appropriate Requirement (ARAR): In general, an ARAR is a requirement under other environmental law which is either applicable or relevant and appropriate for purposes of selecting a remedial action under CERCLA. "Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable" (40 CFR §300.5). "Relevant and appropriate requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not 'applicable' to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate" (40 CFR §300.5).

CERCLA: "Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986" (42 USC §9601 et seq.).

Cleanup Levels: "Final cleanup levels establish acceptable contaminant-specific exposure levels that are protective of human health and the environment. They are not formally determined until the site remedy is ready to be selected and are established in the ROD. In the ROD, it is preferable to use the term "remediation level" or "cleanup level" rather than "remediation goal" in order to make clear that the Selected Remedy establishes binding requirements" (EPA, 1999).

Cooperative Agreement (CA): A CA is "[a**]** legal instrument EPA uses to transfer money, property, services, or anything of value to a recipient to accomplish a public purpose in which substantial EPA involvement is anticipated during the performance of the project" (40 CFR §35.6015).

Explanation of Significant Differences (ESD): The ESD documents "significant post-ROD changes" to a remedy (EPA, 1999).

Feasibility Study (FS): FS "means a study undertaken by the lead agency to develop and evaluate options for remedial action. The FS emphasizes data analysis and is generally performed concurrently and in an interactive fashion with the remedial investigation (RI), using data gathered during the RI. The RI data are used to define the objectives of the response action, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives. The term also refers to a report that describes the results of the study." (40 CFR §300.5; see also EPA, 1988).

Five-Year Review (FYR): A Five-Year Review is conducted "if a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unrestricted use and unlimited exposure" (40 CFR §300.430(f)(4)(ii)). "The purpose of a five-year review is to evaluate the implementation and performance of a remedy in order to determine if the remedy is or will be protective of human health and the environment" (EPA, 2001).

Indian Tribe: "Indian tribe" or "tribe" means "any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village but not including any Alaska Native regional or

village corporation, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians" (CERCLA §101(36)).

Institutional Controls (ICs): ICs are "non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for human exposure to contamination and/or protect the integrity of a response action" (EPA, 2012c).

Institutional Control Implementation and Assurance Plan (ICIAP): As discussed in existing EPA guidance, an ICIAP typically is a site-specific document developed to "help ensure that ICs are properly implemented; that ICs operate effectively during their entire lifespan; and is intended to serve as a single source of concise site-specific IC information." "An ICIAP is a document designed to systematically (a) establish and document the activities necessary to implement and ensure the long-term stewardship of ICs; and (b) specify the persons and/or organizations that will be responsible for conducting these activities….The ICIAP should identify the existing or anticipated enforcement documents and approaches that may be used to enforce the ICs, where applicable. It also should describe how the IC approach for the site relates to the reasonably anticipated future land use assumption used in the response selection process, especially for special siting circumstances (*e.g.*, schools)." (EPA, 2012c).

Long-Term Response Action (LTRA): LTRA is the component of "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…for a period of up to 10 years after the remedy becomes operational and functional" (40 CFR §300.435(f)(3)).

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The NCP "provide[s] the organization structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants" (40 CFR §300.1).

National Priorities List (NPL): The NPL "means the list, compiled by EPA pursuant to CERCLA §105, of uncontrolled hazardous substance releases in the United States that are priorities for long-term remedial evaluation and response" (40 CFR §300.5).

Operable Unit (OU): "Operable unit means a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site." (40 CFR §300.5).

Operational and Functional (O&F): A remedy becomes O&F "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" (40 CFR §300.435(f)(2)).

Operation and Maintenance (O&M): O&M "means [the] measures required to maintain the effectiveness of response actions" (40 CFR §300.5). "The activities required to maintain the effectiveness and integrity of a remedy; in the case of Fund-financed measures to restore groundwater or surface water, O&M refers to the continued operation of such measures beyond the LTRA (long-term remedial action) period until cleanup levels are achieved" (EPA, 2011a).

O&M Manual: The O&M manual serves as a guide to the purpose and function of the equipment and systems that make up the remedy. The responsibilities for completing the O&M manual are shared between the designer and the RA contractor of the remedy (EPA, 1995b).

O&M Plan: The O&M Plan describes the administrative, financial, and technical details for inspecting, operating, and maintaining the remedy. It helps ensure the proper transition of responsibilities from EPA to the state for O&M. The O&M Plan may also include institutional control implementation and assurance components if there is not a separate ICIAP (40 CFR §300.510(c)(1) and EPA, 2012d).

Optimization: Optimization refers to the "efforts at any phase of the removal or remedial response to identify and implement specific actions that improve the effectiveness and cost-efficiency of that phase" (EPA, 2012a).

Personal Property: "Personal property is any property, except real property" (EPA, 2006b).

Post Construction Completion (PCC): Activities generally undertaken at remedies following construction of remedial actions.

RA Contractor: The company that is awarded the contract for the RA and performs the RA construction.

Real Property: "Real property is land, together with the improvements, structures, and fixtures located thereon" (EPA, 2006b).

Record of Decision (ROD): "The ROD documents the remedial action plan for a site or operable unit and serves the following three basic functions:

- It certifies that the remedy selection process was carried out in accordance with CERCLA and, to the extent practicable, with the NCP.
- It describes the technical parameters of the remedy, specifying the methods selected to protect human health and the environment including treatment, engineering, and institutional controls components, as well as cleanup levels.
- It provides the public with a consolidated summary of information about the site and the chosen remedy, including the rationale behind the selection" (EPA, 1999).

Record of Decision Amendment (ROD Amendment): A ROD Amendment "documents fundamental post-ROD changes" to the remedy selected (EPA, 1999).

Remedial Action (RA): RA "means those actions consistent with permanent remedy taken instead of, or in addition to, removal action in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment" (40 CFR §300.5).

Remedial Action Objectives (RAOs): RAOs specify "contaminants and media of concern, potential exposure pathways, and remediation goals" (40 CFR §300.430(e)(2)(i)). Consistent with the NCP, "RAOs provide a general description of what the cleanup will accomplish (*e.g.*, restoration of groundwater to drinking water levels)" (EPA, 1999).

Remedial Design (RD): RD "means the technical analysis and procedures which follow the selection of remedy for a site and result in a detailed set of plans and specifications for implementation of the remedial action" (40 CFR §300.5).

Remedial Investigation (RI): The RI “is a process undertaken by the lead agency to determine the nature and extent of the problem presented by the release. The RI emphasizes data collection and site characterization, and is generally performed concurrently and in an interactive fashion with the feasibility study. The RI includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for remedial action and to support the evaluation of remedial alternatives” (40 CFR §300.5; see also EPA, 1988).

Remedy Completion Strategy: A recommended site-specific planned course of action and decision making process to achieve groundwater RAOs and associated cleanup levels using an updated conceptual site model, performance metrics and data derived from site-specific remedy evaluations (EPA, 2014).

Superfund State Contract (SSC): The SSC is a “joint, legally binding agreement between EPA and another party(ies) to obtain the necessary assurances before an EPA-lead remedial action or any political subdivision-lead activities can begin at a site, and to ensure State or Indian Tribe involvement as required under CERCLA section 121(f)” (40 CFR §35.6015).

Tribe: See "Indian Tribe."

Appendix D: Sample Fund-Financed Letters

Sample O&F Start Letter from EPA to State for Containment Remedy

EPA regional letterhead

[Date]

[Name of State Agency Official]
[State Agency]
[Address]
[City, State Zip Code]

Re: Operational and Functional Start for [remedy or remedies or OU], [Site Name], [Site Location]

Dear [Name of State Agency Official]:

This letter serves to advise you that the remedy for OU [#] at [site name] started the operational and functional (O&F) period on [date]. EPA Region [#] has completed construction activities including [insert constructed elements of remedy] at OU [#]. An inspection was conducted jointly with your office on [date] and included [insert participants]. During the inspection, we determined that construction of the remedy was complete, the remedy was constructed in accordance with the remedial design plans and specifications, and [no] [only minor] construction items remain.

[Include any additional findings from the inspection]

The National Contingency Plan, 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." Until the remedy is declared O&F, EPA will continue to operate the remedy as a remedial action.

Consistent with the NCP, once the remedy is declared O&F, [state agency] is responsible for operation & maintenance (O&M) of the [insert remedy] at [site name]. EPA will initiate discussions with [state agency] in the near future regarding the smooth transfer of the remedy to [state agency] when the remedy is declared O&F. During these discussions, EPA will share performance information, monitoring data, and results of reviews.

If you have any questions, please feel free to contact [RPM name], [title], at [phone #] or [email].

Sincerely,

[Name of EPA First Level Manager or higher]

Sample O&F Start Letter from EPA to State for
LTRA Remedy (Groundwater or Surface Water Restoration)

EPA regional letterhead

[Date]

[Name of State Agency Official]
[State Agency]
[Address]
[City, State Zip Code]

Re: Operational and Functional Start for [remedy or remedies or OU], [Site Name], [Site Location]

Dear [Name of State Agency Official]:

This letter serves to advise you that the remedy for OU [#] at [site name] started the operational and functional (O&F) period on [date]. EPA Region [#] has completed construction activities including [insert constructed elements of remedy] at OU [#]. An inspection was conducted jointly with your office on [date] and included [insert participants]. During the inspection, we determined that construction of the remedy was complete, the remedy was constructed in accordance with the remedial design plans and specifications, and [no] [only minor] construction items remain.

[Include any additional findings from the inspection]

The National Contingency Plan (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." Until the remedy is declared O&F, EPA will continue to operate the remedy as a remedial action.

As discussed in the NCP, after a CERCLA groundwater restoration remedy is declared O&F, the remedy enters the long-term response action (LTRA) period. The NCP, 40 CFR §300.435(f)(3), states, "for fund-financed remedial actions involving treatment or other measures to restore groundwater 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 years after the remedy becomes operational and functional will be considered part of the remedial action. Activities required to maintain the effectiveness of such treatment or measures following the ten-year period, or after the remedial action is complete, whichever is earlier, shall be considered O&M."

EPA will continue to operate the [groundwater or surface water] restoration system for up to 10 years or until cleanup levels are achieved, whichever is earlier. The LTRA period is considered part of the remedial action.

If you have any questions, please feel free to contact [RPM name], [title], at [phone #] or [email].

Sincerely,

[Name of EPA First Level Manager or higher]

Sample O&F Determination Letter from EPA to State for Containment Remedy

EPA Letterhead

[Date]

[Name of State Agency Official]
[State Agency]
[Address]
[City, State Zip Code]

Re: Operational and Functional Determination for [remedy and/or OU], [Site Name], [Site Location]

Dear [Name of State Agency Official]:

This letter serves to advise you that the remedy for OU [#] at [site name] was declared operational and functional (O&F) on [date]. Therefore, consistent with CERCLA §104(c)(3), the National Contingency Plan (NCP), and [insert the section of the SSC, CA or other written contract that includes the state assurance for §104(c)(3)], [State agency] is now responsible for operation & maintenance (O&M) of the remedy.

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."

An inspection was conducted jointly with your office on [date], and the participants determined that construction of the remedy was complete, which began the O&F period. EPA's contractor has continued to operate and make minor adjustments to the remedy. [On [date], EPA and the state conducted a second joint inspection of the remedy and concurrently determined that the remedy is O&F.] [One year has passed, and the remedy is now O&F].

Pursuant to CERCLA §104(j)(2) and [insert SSC or CA provision that includes §104(j)(2) assurance], [State or political subdivision on behalf of state] must accept transfer of any property interest that was originally acquired by EPA to conduct the remedial action. Subsequent disposal of such property by [state or political subdivision] must be made in accordance with 40 CFR §35.6815(b)(5). If [state] acquired property using federal money in order to conduct the remedial action, disposition of the property must be made in accordance with applicable regulations in 40 CFR §35 Subpart O and the NCP.

Now that the remedy has been declared O&F, EPA no longer has an interest in CERCLA-funded equipment that is considered an integral part of services to individuals, as per 40 CFR §§35.6325 and 35.6815. For instructions on the disposal of other CERCLA-funded equipment and supplies and federally owned property, please refer to 40 CFR §35 Subpart O and the NCP.

EPA will be [conducting] [continuing] the Five-Year Reviews for [site name], with the [indicate #] due in [month, year]. [Add text as needed to summarize any previous FYR recommendations.]

If you have any questions, please feel free to contact [RPM name], [title], at [phone #] or [email].

Sincerely,

[Name EPA First Level Manager or higher]

Sample O&F Determination Letter from EPA to State for
LTRA Remedy (Groundwater or Surface Water Restoration)

EPA Letterhead

[Date]

[Name of State Agency Official]
[State Agency]
[Address]
[City, State Zip Code]

Re: Operational and Functional Determination for [remedy and/or OU], [Site Name], [Site Location]

Dear [Name of State Agency Official]:

This letter serves to advise you that the remedy for OU [#] at [site name] was declared operational and functional (O&F) on [date].

The National Contingency Plan (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."

An inspection was conducted jointly with your office on [date], and the participants determined that construction of the remedy was complete, which began the O&F period. EPA's contractor has continued to operate and make minor adjustments to the remedy. EPA has shared performance and monitoring data and results of reviews with [state agency]. [On [date], EPA and the state conducted a second joint inspection of the remedy and concurrently determined that the remedy is O&F.] [One year has passed, and the remedy is now O&F].

The groundwater restoration remedy is now entering the long-term response action (LTRA) period of up to 10 years. The NCP, 40 CFR §300.435(f)(3), states, "for fund-financed remedial actions involving treatment or other measures to restore groundwater 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 years after the remedy becomes operational and functional will be considered part of the remedial action. Activities required to maintain the effectiveness of such treatment or measures following the ten-year period, or after the remedial action is complete, whichever is earlier, shall be considered O&M."

Consistent with the NCP, the state continues to be responsible for [10% or 50%] of the cost of the remedial action. The LTRA period will last for up to 10 years or until cleanup levels are achieved, whichever is earlier. During this time, EPA will continue to operate the [groundwater or surface water] restoration system and share performance information, monitoring data, and results of reviews with you. Prior to the end of the LTRA period, if cleanup levels have not been achieved, EPA will work with you to ensure smooth transfer of system operation to [state agency] by [O&F date plus 10 years].

EPA will be conducting the Five-Year Reviews for [site name], with the first one due in [month, year]. [Add text as needed to summarize any previous FYR recommendations.]

If you have any questions, please feel free to contact [RPM name], [title], at [phone #] or [email].

Sincerely,

[Name EPA First Level Manager or higher]

Sample LTRA Transfer Letter from EPA to State
(Groundwater or Surface Water Restoration)

EPA Letterhead

[Date]

[Name of State Agency Official]
[State Agency]
[Address]
[City, State Zip Code]

Re: Transfer of Operation and Maintenance (O&M) responsibilities for [remedy or OU], [site name], [site location] to [state agency]

Dear [Name of State Agency Official]:

This letter serves to document the transfer of responsibility for the CERCLA [groundwater or surface water] restoration remedy at OU [#] at [site name] site in [site location] from the U.S. Environmental Protection Agency (EPA) to [state agency]. The long-term response action (LTRA) period is now complete; therefore, as required by CERCLA §104(c)(3) and [insert the section of the SSC, CA, or other written contract that includes the CERCLA §104(c)(3) state assurance], the state must assume O&M activities at this site. [State agency] is now responsible for implementing the O&M until the cleanup levels have been achieved.

The National Contingency Plan, 40 CFR §300.435(f)(3), states, "for fund-financed remedial actions involving treatment or other measures to restore groundwater 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 years after the remedy becomes operational and functional will be considered part of the remedial action. Activities required to maintain the effectiveness of such treatment or measures following the ten-year period, or after the remedial action is complete, whichever is earlier, shall be considered O&M."

Ten years have passed since [O&F date], when the remedy was declared operational and functional. During the past ten years, EPA's contractor has continued to operate the remedy, and EPA has shared performance information, monitoring data, and results of reviews with [state agency]. [More detailed information about remedial action, LTRA activities, and the current site status may be included as needed.]

Pursuant to CERCLA §104(j)(2) and [insert SSC or CA provision that includes §104(j)(2) assurance], [State or political subdivision on behalf of state] must accept transfer of any property interest that was originally acquired by EPA to conduct the remedial action. Subsequent disposal of such property by [state or political subdivision] must be made in accordance with 40 CFR §35.6815(b)(5). If [state] acquired property using federal money in order to conduct the remedial action, disposition of the property must be made in accordance with applicable regulations in 40 CFR §35 Subpart O and the NCP.

Now that the LTRA period for the remedy is complete, EPA no longer has an interest in CERCLA-funded equipment that is considered an integral part of services to individuals, as per 40 CFR §§35.6325

and 35.6815. For instructions on the disposal of other CERCLA-funded equipment and supplies and federally owned property, please refer to 40 CFR §35 Subpart O and the NCP.

EPA completed its first Five-Year Review of [site name] in [month, year], and the next one is due in [month, year]. [Add text as needed to summarize any FYR recommendations.] Once the cleanup levels established in the Record of Decision have been achieved, EPA, in consultation with the state, will begin the process of evaluating whether to delete [the site] from the National Priorities List.

If you have any questions, please contact [RPM name], [title], at [phone #] or [email].

Sincerely,

[Name EPA First Level Manager or higher]

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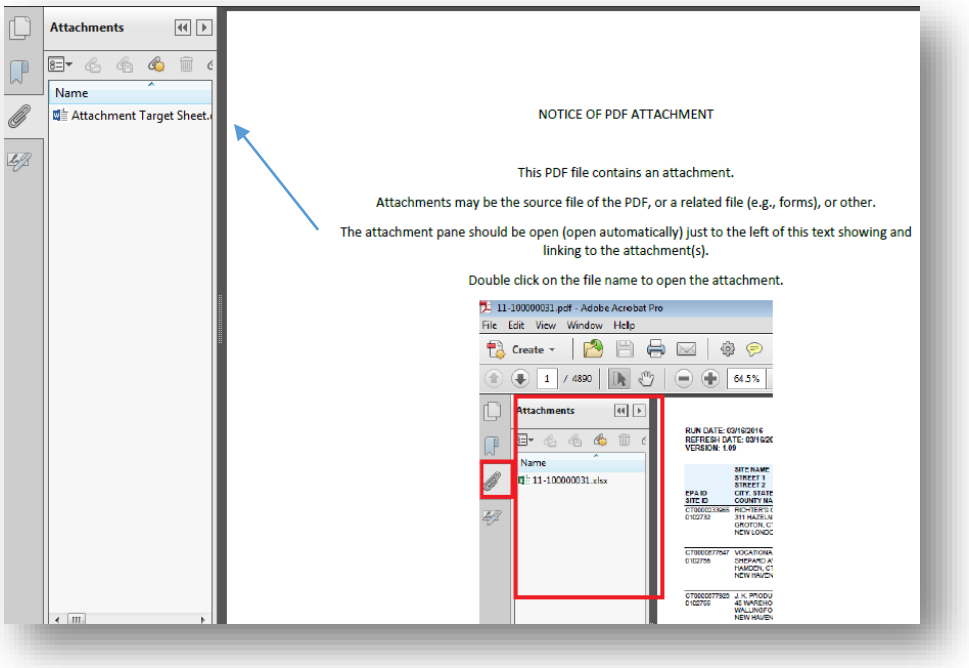

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