

## HANFORD SITE PAST PRACTICE INVESTIGATION STRATEGY LESSONS LEARNED

K. Michael Thompson  
Department of Energy, Field Office, Richland

### ABSTRACT

The U. S. Department of Energy (DOE), U. S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology) have negotiated a strategy for performing Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) Past Practice investigations in a more streamlined manner with a bias-for-action.

This strategy provides new concepts for 1) accelerating decision-making by maximizing the use of existing data consistent with data quality objectives and 2) undertaking expedited response actions and/or interim remedial measures as appropriate to either remove threats to human health and welfare and the environment or to reduce risk by reducing toxicity, mobility or volume of contaminants. Since the goal of the program is cleanup, much more emphasis will be placed on initiating and completing waste site cleanups through interim measures. While investigations and studies are important in meeting long-range goals, there is now agreement by the parties that an appropriate and significant portion of the near-term funding resources can and should be dedicated to remedial work, where there is sufficient information from which to plan and implement interim remedial measures.

The initial stages of Hanford clean-up will optimize the use of interim cleanup actions when justified and practicable. Existing data will be evaluated as the initial basis for decision-making. If the data are found to be insufficient, additional essential data will be collected to support the IRM in a limited field investigation (LFI). Only data needed to formulate a conceptual model (source to pathway to receptor) and qualitative risk assessment would be obtained. The data quality objectives of the LFI will be established based on the use of the data in deciding on IRMs. The data might not need to be of the same quality needed to support final RODs, since the IRM itself would yield valuable information for supporting the final ROD. As IRMs are completed, the later stages of the program would involve more thorough assessment of cumulative risks and environmental effects. In short, the objective would be to achieve real cleanup, where it is obviously necessary to bring health and environmental risk into acceptable levels in the shortest possible time, in a cost effective manner. This would require that the initial focus of the IRMs is on the most obvious problems and on the most achievable and cost effective solutions.

As the cleanup program proceeds through IRMs in the initial stages of cleanup, the strategy envisions that opportunities for effective IRMs may diminish and the need for more comprehensive investigations leading to final remedy selection will then command an increasing shift of resources to complete characterization for cumulative risk assessments and final remedy selection.

The first ten operable unit work plans have been redrafted in accordance with the strategy. Preliminary results of the rescoping effort indicate that interim records of decision can be reached for priority waste sites in as little as eighteen months. Characterization requirements required to reach interim records of decision for all of the priority waste sites in these operable units are significantly reduced as compared to the previous drafts. Approximately one-third of the groundwater wells and one-fourth of the boreholes are required to reach decisions to initiate remedial action under the new work plans. Sample needs are reduced at a commensurate rate.

### INTRODUCTION

In May 1989, the U. S. Environmental Protection Agency (EPA), the Washington State Department of Ecology (Ecology) and the U. S. Department of Energy (DOE) entered into an Interagency Agreement to provide a legal and procedural framework for cleanup and regulatory compliance at numerous hazardous waste sites at the Hanford Site.

Four subareas of the Hanford Site (the 100, 200, 300, and 1100 Areas) have been included on the EPA's National Priorities List (NPL). Under the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement), the more than 1000 inactive waste disposal and unplanned release sites have been grouped into 78 operable units (74 source operable units and 4 groundwater operable units which underlie the source units). The contamination is in the form of solely hazardous waste, radioactive mixed waste, and other Comprehensive Environmental Response, Compensation

and Liability Act (CERCLA) hazardous substances. Included within the Tri-Party Agreement are 55 Resource Conservation and Recovery Act (RCRA) treatment, storage, or disposal (TSD) facilities which will be closed or permitted to operate in accordance with WAC 173-303 (RCRA) regulations. Some of these TSD facilities are included in the operable units. The Tri-Party Agreement requires that the cleanup programs at Hanford integrate the requirements of the CERCLA program, the federal RCRA/Hazardous and Solid Waste Amendments (HSWA) program and the state's dangerous waste program. As such, the scope of the agreement includes all actions through CERCLA remedial actions and RCRA/HSWA corrective measures. At the same time it integrates activities related to RCRA interim status compliance, RCRA permitting and RCRA closure activities which apply to the TSD units.

While the EPA maintains authority for CERCLA, Ecology has received authorization from EPA to implement the

state's dangerous waste program in lieu of the federal RCRA program. In addition, the state has received authorization to implement the EPA's radioactive mixed waste program. The state does not yet have HSWA authority and that authority remains under EPA. Thus, as a result of the rather complex regulatory involvement coupled with the sheer size of the cleanup program, a major challenge of the Tri-Party Agreement is to coordinate, in a cost effective and timely manner, the different requirements of CERCLA, RCRA corrective action and RCRA TSD activities. In many cases these activities occur at the same physical location.

The experience gained to date on developing the work plans and permit applications has shown the need for rethinking the strategy of RCRA/CERCLA integration beyond that specified in the Tri-Party Agreement to provide for greater uniformity in the applicability of requirements to the Hanford Site. Due to complexity of the Hanford Site operable units, particularly with regard to characterizing existing mixed waste and hazardous waste contamination, and the need to obtain sufficient quantities of data necessary to provide a high degree of certainty in decision making, the schedules for investigations have become very long, ranging from three-and-one-half years to seven years. For the same reasons, the costs of the RI/FSs showed growth well beyond initial expectations. Further, because there were no plans to provide for any cleanup actions to commence until the Record of Decision (ROD) was issued following the RI/FS, DOE and the regulatory agencies became concerned that too much time and too large a fraction of a limited budget would be spent before evidence of actual cleanup could be demonstrated.

The lessons learned from work plan development also showed that there was a need to more closely integrate source and groundwater operable units such that the information gained from each of the investigations was in sync and available for input into the source and groundwater risk assessments conducted in parallel. Also, since a groundwater operable unit covers an area which encompasses several source operable units, many of which are scheduled for investigation much later in the program, there was a need for early identification of the specific sites within source operable units which are significant contributors to groundwater contamination. It was agreed that these significant contributor sites should be brought forward into the overall investigation and risk assessment for the groundwater aggregate area.

Through the lessons learned in work plan development, all parties to the Tri-Party Agreement recognized that all past practice investigations must be managed and implemented under one characterization and remediation strategy regardless of the regulatory agency lead (as defined in the Tri-Party Agreement) and the applicable regulations (CERCLA or RCRA corrective action). In addition, there was a need to coordinate past practice investigations with RCRA closure activities since some operable units contain RCRA TSD facilities.

The high costs and long schedules associated with traditional past practice investigations have given the parties a new perspective on the need to streamline the RI/FS and RFI/CMS processes (Fig. 1). In addition, and perhaps most importantly, the parties have recognized that, since the goal of the program is cleanup, much more emphasis needs to be placed on initiating and completing waste site cleanups through interim measures. While investigations and studies

are important in meeting long-range goals, there is now agreement by the parties that an appropriate and significant portion of the near-term funding resources can and should be dedicated to remedial work, where there is sufficient information from which to plan and implement interim remedial measures.

The parties have undertaken an ongoing dialogue over the past year to develop a new strategy for streamlining the past practice corrective action process. This strategy provides new concepts for 1) accelerating decision-making by maximizing the use of existing data consistent with data quality objectives and 2) undertaking expedited response actions and/or interim remedial measures as appropriate to either remove threats to human health and welfare and the environment or to reduce risk by reducing toxicity, mobility or volume of contaminants.

## OBJECTIVES

A primary objective of this strategy is to develop a uniform streamlined process to meet statutory requirements and integrate CERCLA RI/FS and RCRA Past Practice RFI/CMS guidance and ensure the protection of human health and welfare and the environment at the Hanford Site through effective cleanup actions (effective both in terms of protection and cost). DOE's responsibilities and authorities under the Atomic Energy Act of 1954 (as amended) are not included in the considerations of this strategy. The strategy must satisfy the Tri-Party Agreement and in turn RCRA and CERCLA requirements. This process will be used in both EPA-lead and Ecology-lead past practice units.

The strategy describes concepts and framework for the RI/FS process, in a manner that has a bias-for-action through optimizing the use of interim remedial actions, culminating with decisions on final remedies on the operable unit and aggregate area scale. The overall process leading to final RODs is described in general terms; however, more details are given regarding the initial stages of Hanford cleanup which focus on reaching early decisions to initiate and complete cleanup projects. These early decisions will maximize the use of existing data coupled with focused short time-frame investigations where necessary. As more becomes known about the contamination problems and associated risks through interim actions and through the early, priority-based investigations and studies, the details of the longer term investigations and studies will be better defined. The parties recognize that the details of most longer-term programs cannot be effectively specified when operable unit work plans are initially written. To define such specifics requires more information, which is expected to be forthcoming as results of the near-term work become available. The parties intend that such definition be provided by mutual consultation and incorporated as future work plan addendums, specific agreed to statements of work, etc., which will be reflected in Appendix D of the Tri-Party Agreement Action Plan.

The strategy recognizes that the RI/FS process is a continuum of activities whereby the effort is defined based upon knowledge gained as work progresses. Thus work plans are intended to, (1) Describe in detail what is known about the operable unit; (2) Describe in detail the agreed-upon focused and priority-based investigations, agreed to when the work plan is submitted for approval; and (3) Describe in general terms the framework and process to be followed for the overall RI/FS (RFI/CMS) process.

The process is defined as a combination of interim cleanup actions (involving concurrent characterization), field investigations for final remedy selection where interim actions are not clearly justified, and feasibility/treatability studies.

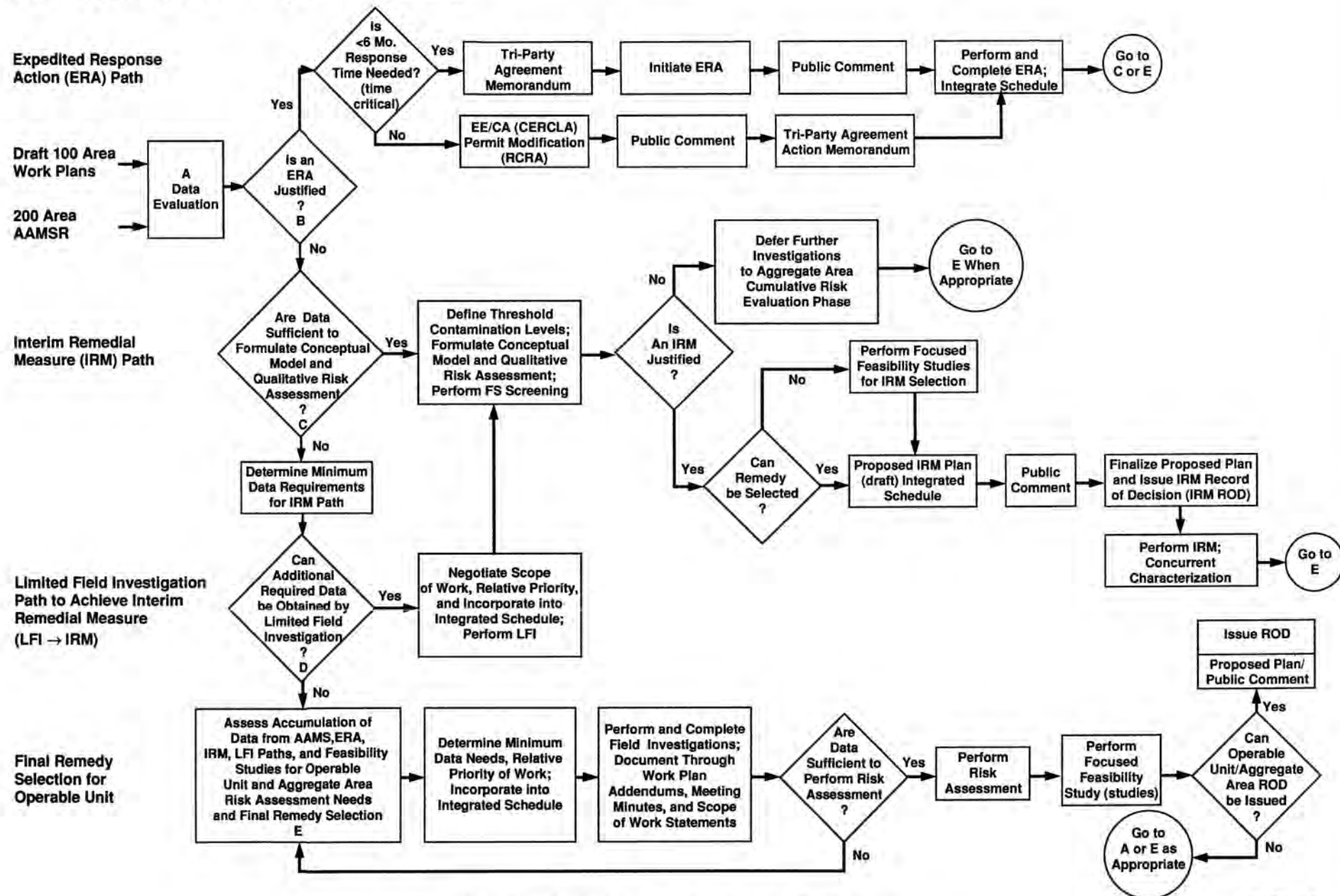


Fig. 1. Hanford past practice RI/FS (RFI/CMS) process.

79108086.1

The parties intend that this strategy be consistent with the requirements of the NCP and RCRA. The strategy defines the Hanford RI/FS (RFI/CMS) process. While the strategy is intended to streamline investigations and documentation and to promote the use of interim actions to accelerate cleanup, the elements of the investigations and interim actions are in aggregate intended to meet all of the objectives of the RI/FS and RFI/CMS processes.

The initial stages of Hanford clean-up will optimize the use of interim cleanup actions when justified and practicable. Existing data will be evaluated as the initial basis for decision-making. If the data are found to be insufficient, additional essential data will be collected to support the IRM in a limited field investigation (LFI). Only data needed to formulate a conceptual model (source to pathway to receptor) and qualitative risk assessment would be obtained. The data quality objectives of the LFI will be established based on the use of the data in deciding on IRMs. The data might not need to be of the same quality needed to support final RODs, since the IRM itself would yield valuable information for supporting the final ROD. As IRMs are completed, the later stages of the program would involve more thorough assessment of cumulative risks and environmental effects. In short, the objective would be to achieve real cleanup, where it is obviously necessary to bring health and environmental risk into acceptable levels in the shortest possible time, in a cost effective manner. This would require that the initial focus of the IRMs is on the most obvious problems and on the most achievable and cost effective solutions.

As the cleanup program proceeds through IRMs in the initial stages of cleanup, the strategy envisions that opportunities for effective IRMs may diminish and the need for more comprehensive investigations leading to final remedy selection will then command an increasing shift of resources to complete characterization for cumulative risk assessments and final remedy selection.

The strategy provides for Expedited Response Actions (ERAs) and IRMs that are consistent with both regulatory requirements and the Tri-Party Agreement Action Plan (Sections 7.2.3 and 7.2.4). ERAs would meet the requirements of removal actions and IRMs would meet the requirements of interim remedial actions, as provided in the EPA's National Contingency Plan (NCP) (40 CFR 300). Interim measures as provided in the proposed amendments to 40 CFR parts 264-271(55 FR 30798) could be performed either as ERAs or IRMs as deemed appropriate by the parties. This strategy will be revised to incorporate appropriate RCRA corrective action provisions upon adoption and regulatory review of the final rule.

Investigations for RCRA TSD closures conducted within past practice operable units will be fully integrated into past practice aggregate area management studies, work plans and the investigation and abatement process. These RCRA TSD closure investigations would comply with the substantive applicable requirements of RCRA. Section 6 of the Tri-Party Agreement Action Plan further describes implementation of RCRA at the Hanford Site. At the initiation of the first of either the RCRA TSD closure plan, or the Past Practice aggregate area management study or work plan, the involved parties (which would include DOE and either one or both of the regulatory agencies due to Tri-Party Agreement lead assignments) would meet to coordinate the schedules of the

investigations or abatement activities and adjust milestones accordingly. The goal is to gain optimal efficiencies in site investigations by coordinating the field activities, while maintaining a schedule of investigations and abatement measures that assures protection of human health and welfare and the environment, documented in a compliance schedule of the Tri-Party Agreement.

The strategy makes effective use of a process similar to the standard "scoping study" to gather and analyze existing data to allow a more limited and focused remedial investigation process. In this manner, the existing data base would become the basis for decisions, where sufficient data and data quality exist.

In cases where existing data are sufficient, it is appropriate to make the Feasibility Study (FS) process much more efficient by initiating formal evaluations of remedial technologies during "scoping" and, by mutual consent of the three parties, reducing the number of alternatives evaluated. Further efficiencies can be realized in these cases if treatability studies are initiated early in the program. The number of alternative treatment technologies that would be evaluated in both the early case, as provided in this strategy, and in the detailed analysis of alternatives portion of the FS in the normal past practice process, could be limited because: the existence of few known effective and technically feasible remedial technologies available to address the particular site problems; recent abatement experience at similar sites; or applicability of particular applicable or relevant and appropriate requirements (ARARs) which might constrain the number of alternatives capable of meeting ARARs as required by the NCP. Also, for certain types of sites (e.g. large non-hazardous waste landfills), the number of treatment or containment alternatives evaluated might be reduced or eliminated if consistent with the EPA's expectation for remediating that particular type of site (NCP preamble 55 FR 8702-8703; NCP regulatory language, 40 CFR 300.430(a)(1)(iii)).

Finally, the strategy identifies critical programmatic decisions and the timing of those decisions. Such decisions are important to the implementation of the strategy. All of these objectives are in keeping with the ultimate goal of performing cleanup at the earliest possible date in the most effective manner that is technically sound. This is compatible with the stated goals of the EPA streamlining efforts as shown in the NCP and other documents.

An important objective of the strategy will be for the parties to work together in identifying the best mix of ERAs, IRMs and investigations to optimize the use of available resources. The goal of such optimization is to focus on real cleanup while still maintaining a technically sound and cost effective program of investigations which meets the intent of the Tri-Party Agreement.

## STRATEGY

The attached figure graphically depicts the Hanford Past Practice Investigation Strategy. A complete, detailed description of the process is found in DOE/RL-9104, Hanford Past Practice Investigation Strategy.

## PRELIMINARY STRATEGY IMPACTS

Operable unit work plans were drafted for ten CERCLA and RCRA past practice operable units in the Hanford 100 Area when the strategy was developed. Through negotiations

with the EPA and State of Washington, Department of Ecology the Tri-Party Agreement Action Plan was modified to allow these operable units to be investigated under the new strategy. Work plans were redrafted and are presently under regulatory review.

Preliminary results of the rescoping effort indicate that interim records of decision can be reached for priority waste sites in as little as eighteen months. Characterization requirements required to reach interim records of decision for all of the priority waste sites in these operable units are significantly reduced as compared to the previous drafts. Approximately one-third of the groundwater wells and one-fourth of the boreholes are required to reach decisions to initiate remedial action under the new work plans. Sample needs are reduced at a commensurate rate. Groundwater monitoring wells were reduced from 143 to 53; groundwater samples were reduced from 1698 to 424; characterization boreholes were reduced from 214 to 53, characterization samples were reduced from 2,171 to 668. The overall cost avoidance is estimated to be

\$123,913,000. These estimates do not include activities and costs to characterize the low priority sites. The characterization efforts under the new strategy are based on the assumption that the minimum characterization efforts will justify removal actions or similar remedial actions where the observational approach can be used to fully characterize the site during remediation.

#### LESSONS LEARNED

The negotiations were successful due to several factors. DOE and the regulators had a common goal of obtaining records of decision in a cost-effective and timely manner, thus assuring that remedial actions are initiated in a timely manner. It is imperative that resource constraints are identified and agreed upon early in the negotiation process. An integrated, resource-loaded, schedule that identifies critical path items is necessary to negotiate realistic compliance schedules and enforceable milestones. Finally, it is imperative that the parties are aware of current regulatory policy and practice.