



# Environmental and Disposal Liabilities Identification, Documentation And Reporting Handbook v1.1



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## **LIST OF ACRONYMS**

AAPC	Accounting and Auditing Policy Committee
AST	Above Ground Storage Tank
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CHF	Central Hazardous Materials Fund
CMS	Corrective Measures Study
CWA	Clean Water Act
Department	Department of the Interior
ECL	Environmental Cleanup Liability
EDL	Environmental and Disposal Liability
EDLS	Environmental and Disposal Liability Site
EE/CA	Engineering Evaluation and Cost Analysis
FRTR	Federal Remediation Technologies Roundtable
GAAP	Generally-accepted Accounting Principles
GMRA	Government Management Reform Act
HCAS	Historical Cost Analysis System
IGCE	Independent Government Cost Estimate
LL	Lower Limit
LOC	Location of Concern
LTM	Long-term Monitoring
No.	Number
OEPC	Office of Environmental Policy and Compliance
O&M	Operation and Maintenance
OMB	Office of Management and Budget
P	Probable
PA/SI	Preliminary Assessment / Site Inspection
PFM	Office of Financial Management
PMB	Office of Policy, Management, and Budget
PRP	Potentially Responsible Party
R	Remote
RACER	Remedial Action Cost Engineering and Requirements
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation and Feasibility Study
RP	Reasonably Possible
ROD	Record of Decision
SFFAS	Statement of Federal Financial Accounting Standards
TSCA	Toxic Substances Control Act
UL	Upper Limit
URL	Universal resource locator
UST	Underground Storage Tank

## 1.0 INTRODUCTION

Current directive from the Office of Management and Budget (OMB) requires the Department of the Interior (Department) and other federal agencies to prepare annual audited financial statements in accordance with the Chief Financial Officers Act of 1990 (Public Law 101-576) and the Government Management Reform Act of 1994 (GMRA) (Public Law 101-576). OMB also requires quarterly unaudited financial statements in accordance with OMB Circular A-136, *Financial Reporting Requirements*. Per Statement of Federal Financial Accounting Standard (SFFAS) Number (No.) 5, *Accounting for Liabilities of the Federal Government*, Federal agencies are required to report information on contingent environmental liabilities in their financial reports. Agencies are required to recognize a contingent liability when a future outflow or other sacrifice of resources as a result of past transactions or events is *probable* and *measurable*. Contingent liabilities that do not meet the criteria of *probable*, but are *reasonably possible* are disclosed in notes in financial statements. As such, the Department bureaus are required to report contingent environmental liabilities to the Office of Financial Management (PFM) on a quarterly basis.

This guidance is intended to provide a consistent approach for estimating and reporting contingent environmental liabilities across all bureaus.

### 1.1 Applicable Standards and Guidance

The reporting of contingent environmental liabilities must conform to specific governmental-accounting practices including:

- Statement of Federal Financial Accounting Standards (SFFAS) Number (No.) 5, *Accounting for Liabilities of the Federal Government*, as amended, issued by the Federal Financial Accounting Standards and Advisory Board
- Statement of Federal Financial Accounting Standards No. 6, *Accounting for Property, Plant, and Equipment*, as amended, issued by the Federal Financial Accounting Standards Advisory Board
- *Chief Financial Officers Act of 1990*, Public Law 101-576, 101<sup>st</sup> Congress- Second Session
- *Financial Reporting Requirements*, OMB Circular A-136, issued by the Office of Management and Budget, August 23, 2005
- *Government Management Reform Act of 1994*, Public Law 103-356, 103<sup>rd</sup> Congress- Second Session, October 13, 1994

Additional guidance developed to facilitate contingent environmental liabilities identification, cost estimating and reporting requirements include:

- *Department of the Interior, Prioritization System for Hazardous Materials Site Cleanup* (ECM-93-2), January 4, 1993
- *Determining Probable and Reasonably Estimable For Environmental Liabilities in the Federal Government*, Federal Financial Accounting and Auditing, Technical Release



Number 2 (Technical Release No. 2), issued by the Accounting and Auditing Policy Committee

- *Environmental Cleanup Liabilities and Materials Used in Facility Construction*, Director, Office of Financial Management and Director, Office of Environmental Policy and Compliance (OEPC), dated October 1, 2003
- *Updating Schedule of Sites with Potential Environmental Liability*, Assistant Secretary – Policy, Management and Budget (PMB), issued annually

## 1.2 Definitions

Various terms have been used to refer to environmental liabilities including environmental contingent liabilities, environmental contaminant liabilities, and environmental cleanup liabilities; all using the acronym ECL. As of fiscal year 2006, the Department uses the terminology environmental and disposal liability (EDL) to be consistent with the terminology used in the Department’s annual performance and accountability report. EDLs have the same requirements for identifying and reporting as previously applicable to ECLs. The change affects the terminology only. The following is a list of commonly used terms found within applicable environmental liability estimating and reporting standards and guidance.

- **Contingency** - An existing condition, situation, or set of circumstances *involving uncertainty* as to a possible gain or loss that will ultimately occur or fail to occur.
- **Disclosure** - Information presented in notes that is considered an integral part of the basic financial statements. A disclosure should include the nature of the contingency and an estimate of the total range of possible liability.
- **Due Care**– The process followed by a bureau or office to use reasonable effort to examine a location of concern to identify the presence or likely presence of contamination at concentrations significant enough to require further study or cleanup.
- **Environmental and Disposal Liability (EDL)** - An anticipated future outflow or other sacrifice of resources (e.g., costs) where, based on the results of due care, further study or cleanup is warranted due to past or current operations that have environmental closure requirements or a release of hazardous substances on Department lands or facilities.
- **Environmental Professional** - Someone who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of hazardous substances releases on, at, or to Department land.

An environmental professional must have one or more of the following:

- a. A current professional Engineer’s or Geologist’s license and three years of relevant full time work experience;

- b. A state- or tribal-issued registration, certification or license and three years of relevant full-time work experience;
  - c. A Baccalaureate degree or higher in science or engineering and five years of relevant full-time work experience; or
  - d. Ten years of relevant full-time work experience.
- **Government-acknowledged Financial Responsibility** - When the bureau did not cause or contribute to the contamination and it is not otherwise liable for cleanup costs, but the bureau chooses to accept financial responsibility to protect public health, welfare, or the environment, the cleanup costs are considered government-acknowledged.
  - **Liability** - For federal financial accounting purposes, a future outflow or other sacrifice of resources (e.g., costs) as a result of past events or transactions for which the Department is responsible. This definition is derived from generally-accepted accounting principles and does not imply or infer legal liability.
  - **Liability Status** - The likelihood (*probable, reasonably possible, or remote*) that the bureau or office will be required to incur a future outflow or other sacrifice of resources for some or all of the study or cleanup at an EDL site.
  - **Location of Concern** - An area within the jurisdiction, custody, or control of a Department of the Interior bureau or office that is suspected to be contaminated based on known past activities or observed and reported physical indicators, but where no due care has yet been conducted.

For purposes of this definition, land that the United States owns in trust for an Indian tribe or individual Indian is not under the jurisdiction, custody, or control of a Department of the Interior bureau or office solely because of its trust status.

- **Probable** - A future outflow or other sacrifice of resources (e.g., costs) is likely to occur.
- **Reasonably Possible** – A future outflow or other sacrifice of resources (e.g., costs) is less than *probable*, but greater than *remote*.
- **Recognition** - Reporting a dollar amount on the face of the basic financial statements.
- **Remote** – A future outflow or other sacrifice of resources (e.g., costs) is slight (less than *reasonably possible*).
- **Report** - Estimated costs recognized on the federal financial statements or disclosed in notes.

### **1.3 Responsibilities**

Responsibilities for the development and for the recordation of EDLs are shared by environmental program management and the equivalent-level accounting personnel. The bureau-level environmental program management is accountable for identifying EDLs and generating cleanup cost estimates and the associated documentation on a site-by-site basis. The bureaus' accounting personnel are responsible for coordinating with the environmental staff, reviewing the cost estimates so they are reasonable and that appropriate cost estimate documentation is in place, and for ensuring the liability is correctly categorized as recognized or disclosed according to generally-accepted accounting principles (GAAP).

At the Departmental level, the OEPC is responsible for maintaining and enhancing the database used to record EDLs, and to provide guidance to the bureaus' environmental management personnel. The PFM is responsible for coordinating with the OEPC and the bureaus' accounting personnel, consolidating the individual liabilities, and for ensuring that the total liability is recognized or disclosed according to GAAP.

The OEPC and PFM will conduct periodic management reviews of selected EDL sites to check the adequacy of the cleanup cost estimates and the documentation. Bureaus that prepare EDL cleanup cost estimates must retain adequate documentation of the management reviews, as well as, documentation that identify the data sources, estimating method, and assumptions used for preparing the cleanup cost estimates.

## **2.0 EDL IDENTIFICATION**

Contamination can occur from past or current operations (such as solid waste landfills; treatment, storage, or disposal facilities; ware yards; firing ranges; mine sites) or unsanctioned activities (such as illegal dumping) that result in releases of hazardous substances. Department bureaus and offices are required to routinely attempt to identify contamination on bureau lands and report that information to the responsible bureau officials and the Department. However, in many circumstances environmental assessment (due care) activities are necessary to confirm the presence of contamination at suspect areas to determine whether further action is warranted. For example, the illegal dumping of solid waste does not in and of itself mean the area is contaminated. An area containing solid waste with no release of hazardous substances to the environment would not be EDL.

Currently, each bureau or office implements a process for identifying an EDL. Because each bureau has a different mission and a different organizational structure, the Department recognizes that processes and resources will vary. However, in order to ensure that all Department bureaus and offices identify and report EDLs consistently, bureau-specific EDL identification processes will meet, at a minimum, the following criteria:

- A site that is suspected to be contaminated based on known past activities or observed physical indicators, but where due care has not been conducted, will be identified as a location of concern (LOC) (see Section 2.1).
- A site **WILL NOT** be identified as an EDL until environmental due care has been conducted. If the due care results indicate that further action (study or cleanup) is warranted, the site will be identified as an EDL (see Section 2.3).

In general, environmental compliance and operation and maintenance activities are not considered EDLs. Examples of activities that are NOT EDLs include:

- Permit requirements such as monitoring and reporting under the Resource Conservation and Recovery Act (RCRA), National Pollutant Discharge Elimination System (NPDES), or other permits;
- Indoor air quality corrective measures (with the exception of actions required as part of a cleanup such as volatile contamination in buildings associated with leaking underground storage tanks (USTs) or groundwater plumes);
- Radon mitigation (radon is a naturally-occurring gas);
- Environmental audits;
- Water and sewage systems maintenance and monitoring;
- Routine disposal of hazardous materials and chemicals or Federal personal property as defined by the General Services Administration (e.g., computers); and
- UST / above ground storage tank (AST) operation costs (installation of leak detectors, upgrading fill pipes, tank replacements, etc.).

## 2.1 Environmental Location of Concern

The process for identifying a LOC will vary between bureaus because they have different missions, organizational structures, operations, geographic areas, and resources. However, each bureau will examine site inventories, conduct land reconnaissance, and work with state and local communities to identify LOCs on Department land. In addition, a formal petition process for concerned citizens to report environmental concerns is currently under development by the OEPC.

Each bureau maintains a property/facility inventory. Property/facility inventories will be routinely evaluated to identify areas where releases of hazardous substances may have occurred. These areas should be inspected routinely. If physical conditions indicate a potential release of hazardous materials may have occurred, appropriate bureau officials will be notified.

Additionally, bureau personnel routinely conduct reconnaissance of the land within their jurisdiction, custody, or control. During reconnaissance, physical indicators of potential hazardous-substance releases are observed and noted. These physical indicators may include, but are not limited to, stained soil, solvent or petroleum odor, scorched earth, discolored vegetation, illegal dumps, dead animals, discolored water in a stream, surface water sheen, etc. Prior to conducting any additional environmental activities, the bureau should verify that the abnormal site conditions are on land within the bureau's jurisdiction, custody, or control<sup>1</sup>.

Local bureau officials will determine if the abnormal physical condition falls under one of the following scenarios:

- It can be furthered evaluated or cleaned up under routine activities and existing operation and maintenance or infrastructure funds,
- Sufficient evidence exists that the site is an EDL; or
- Additional support including technical services or site-specific funding is needed for due care to be conducted to determine if a release has occurred that warrants further study or cleanup.

If additional support is required for due care to be conducted, the area will be identified as an environmental location of concern (LOC).

Currently, each bureau works closely with state and local agencies to identify LOCs, as well as to discuss the progress of cleanups on Department land. State and local agencies will continue to be a main source of LOC identification. However, in order to involve the public more directly, the Department is developing an Environmental Location of Concern Public Due Care Petition Form and a process for implementing the petition form. The intent of the form will be for concerned citizens to notify the Department and its bureaus of an environmental LOC, where the presence of hazardous substances is known or suspected. The form will request the petitioner to provide a description of the location, the physical conditions present that lead the petitioner to

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<sup>1</sup> For this activity, land that the United States owns in trust for an Indian tribe or individual Indian is not under the *jurisdiction, custody, or control* of a DOI bureau or office solely because of its trust status.

know or suspect hazardous substances are present, and a list of state and local authorities that the petitioner has contacted. Once the public petition form and process is in place, the Department will issue guidance under a separate cover.

The presence or suspected presence of contamination at a LOC will be confirmed through due care by or under the oversight of an environmental professional with the appropriate credentials to properly make this determination. Activities conducted during the due care-process include, but are not limited to:

- Review of recorded chain-of-title documents (including restrictions, covenants and any possible liens) and good faith inquiry and investigation into prior uses of the property;
- Investigation of aerial or satellite photographs that may reflect prior uses, areas of distressed vegetation, or changing population centers;
- Inquiry into records that are available from federal, state, tribal, and/or local jurisdictions that show whether there has been a release or suspected release of hazardous substances on the property (and adjacent property that could impact the bureau's property);
- Investigation of complaints regarding abnormal health conditions or concerns raised by the public;
- Visual site inspection of any portions of the property where environmental contamination is known or suspected;
- Collection and analysis of selected samples; and
- Documentation of findings.

If the results of due care indicate that it is likely that contamination is present at a concentration that requires further study or future cleanup, the LOC will become an EDL site. If, however, contamination is not present, the level of contamination is NOT significant enough to warrant study or cleanup, or cleanup is warranted but the volume is NOT significant and can be accomplished under current routine operation and maintenance or infrastructure costs then the LOC is NOT an EDL.

The date and results of the due care conducted and any action performed will be documented and retained in bureau files.

## **2.2 Deconstruction and Renovation Activities**

Many bureau and office facilities have regulated materials (e.g., asbestos, paint containing heavy metals) used in the construction or past renovation of the facility. These regulated materials, while in an undisturbed or encapsulated state (e.g. non-friable asbestos, not flaking), are not subject to cleanup under applicable law. The generally-recognized best management practice for such materials is to monitor them, but leave them undisturbed. Only if they become friable and are released to the environment would they be considered contaminants requiring cleanup.

Under routine operation and maintenance activities, the presence or suspected presence of these regulated materials will be identified by bureau personnel. If due care is necessary to determine if hazardous materials were released to the environment, the site will be identified as a LOC, and due care activities will be scheduled and conducted. If the physical conditions or due care results

indicate a release to the environment has occurred, and current maintenance and infrastructure funding is insufficient to rectify the condition, the site will be identified as an EDL.

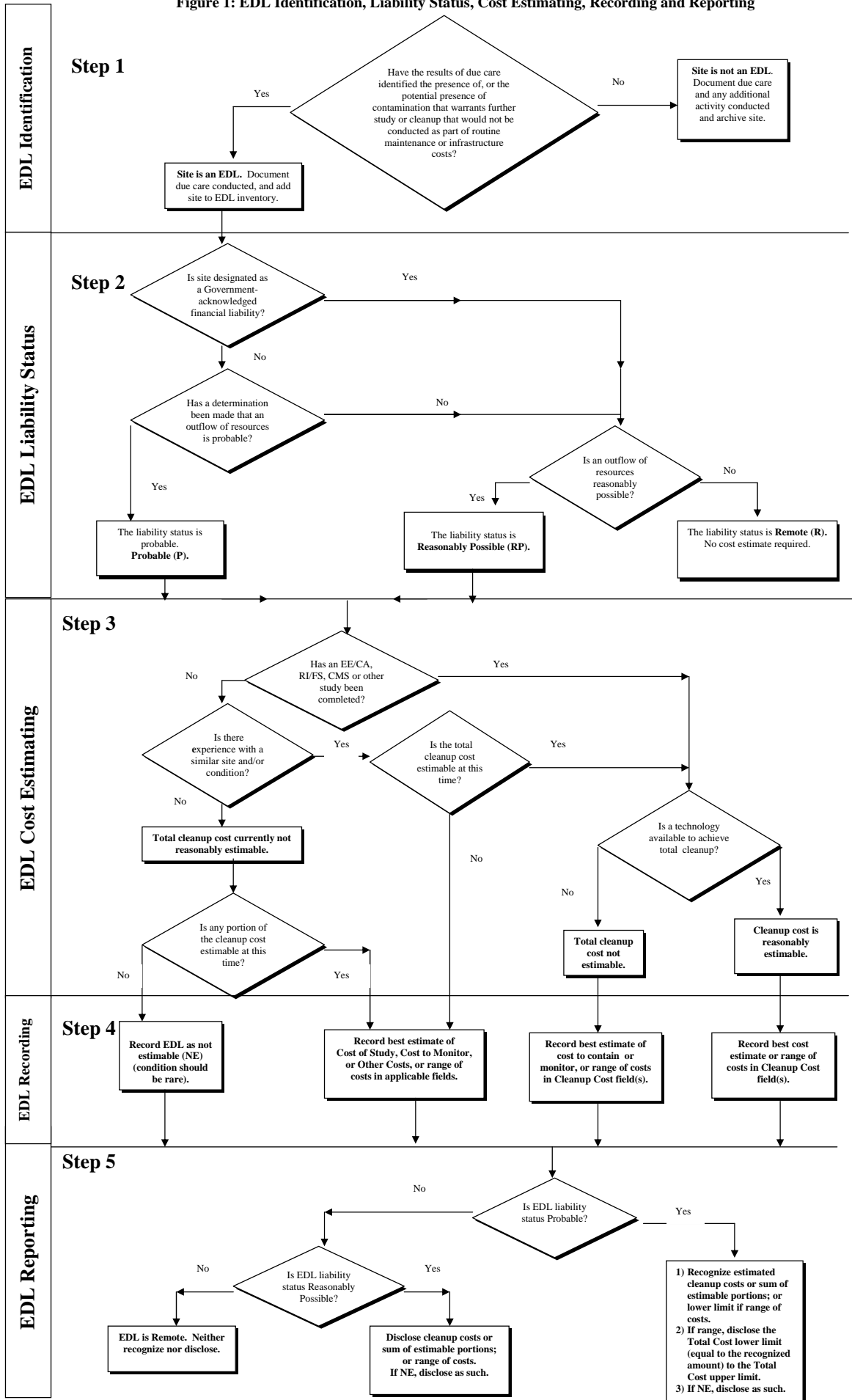
If a facility (or other structure) containing regulated materials (including utilities or equipment) is not an EDL, and the facility or structure is scheduled for deconstruction, demolition, or renovation, the costs to appropriately abate and dispose of the hazardous materials under all applicable regulations is considered part of the deconstruction / demolition / renovation costs, and is not an EDL. The costs associated with the abatement and disposal would be an account payable at the time of deconstruction, demolition, or remodeling. If the abatement is improperly conducted and a release to the environment occurs, the cleanup costs would be an EDL.

### **2.3 Environmental and Disposal Liabilities**

The process that will be used by the Department and its bureaus to identify and report an EDL is illustrated in Figure 1. A LOC will be identified as an EDL if the results of the due care indicate that a known or suspected release of hazardous substances to the environment has occurred that warrants further study or cleanup, and the cleanup is not part of routine operation and maintenance or infrastructure actions.

The date and results of the due care conducted and any action performed will be documented and retained in bureau files. If it is determined that the LOC meets the criteria of an EDL, it will be tracked in the Department's environmental database as an EDL. If however, the LOC does not meet the criteria of an EDL, no further action is required.

Figure 1: EDL Identification, Liability Status, Cost Estimating, Recording and Reporting





### 3.0 LIABILITY STATUS

Once an EDL has been identified, its liability status will be determined. An EDL's liability status is the likelihood that the bureau will incur a future outflow or other sacrifice of resources (costs) for some or all of the study or cleanup at an EDL site. The likelihood classifications are *probable* (P), *reasonably possible* (RP), or *remote* (R).

Often, the Department and its bureaus expend resources to study or cleanup contamination at an EDL site in order to protect public health and the environment even though a determination regarding the Department's or bureaus' legal liability has not been decided. The Department has the right to pursue cost recovery for costs expended from responsible parties. However, for planned cleanup actions, the EDL liability status, as used here for federal financial accounting purposes, is determined without consideration of potential future cost recovery. Only an existing agreement, order or other legally-binding document is considered when determining the liability status of planned actions. Bureau environmental managers and accountants should consult with the Office of the Solicitor to reach conclusions on the likelihood of a legal liability, or the status of a legally-binding agreement, order, or other document. If the site is being addressed under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the bureau should contact the Federal Facilities Compliance Branch in the Solicitor's Office in Washington, D.C. For all other sites, the bureau should contact the appropriate Regional Solicitor's Office.

#### 3.1 Probable

An EDL has a liability status of *probable* (a future outflow or other sacrifice of resources is likely to occur) only when a determination has been made (in consultation with the Solicitor's Office, if necessary) that:

- a. The bureau or office caused or contributed to the contamination,
- b. The outflow of resources is expected pursuant to a duty or responsibility pertaining to statute or regulation,
- c. The bureau or office has agreed to assume responsibility for cleanup costs in an interagency agreement, settlement agreement, or similar legally-binding document, or
- d. The bureau or office is required to incur cleanup costs under a court decision or administrative order.

In general, if a determination has not been made regarding whether any of the criteria for *probable* apply (a through d), and a cleanup action is planned, the expected outflow of resources (costs) is *probable*. If a legally-binding agreement, order, or other document is issued subsequent to the initiation of the cleanup action, the expectant future outflow of resources (estimated costs) will be adjusted based on the requirements of the legally-binding document.

Government-acknowledged financial responsibilities do not meet the criteria necessary to be recognized as a future liability (i.e., a *probable* EDL). A government-acknowledged financial responsibility occurs when the Department (it bureaus or offices) **did not** cause or contribute to the contamination and it **is not otherwise liable** for the cleanup costs, but the bureau chooses to

accept financial responsibility to protect public health, welfare, or the environment. When an appropriation has been issued and the bureau has incurred cleanup costs, any unpaid amounts for work performed are included as accounts payable on the financial statements.

The government-acknowledged designation for cleanup actions should be rare. Examples of government-acknowledged EDLs include cleanup actions on lands held in trust or cleanups associated with natural disasters.

### **3.2 Reasonably Possible**

An EDL has a liability status of *reasonably possible* if a determination has not been made regarding whether any of the criteria for *probable* apply (a through d), but the likelihood that a future outflow or other sacrifice of resources will be required is less than *probable* but greater than *remote*.

The EDL process involves uncertainty; therefore, there are circumstances where the likelihood of a future outflow of resources is not obvious. For example, contamination may be present on a bureau's land, but the bureau has not determined whether they caused or contributed to the contamination (e.g., a potential upgradient source that may have migrated on to bureau land). If no cleanup action is currently planned, the bureau may classify this site as a *reasonably possible* (or *remote*) likelihood of incurring future cost.

Additionally, if a responsible party(s) is or will be actively cleaning up the contamination and incurring all the costs, but the viability of the responsible party(s) is questionable, the bureau may classify the site as a *reasonably possible* likelihood of incurring future costs.

### **3.3 Remote**

An EDL has a liability status of *remote* if a determination has not been made regarding whether any of the criteria for *probable* apply (a through d), but the likelihood that a future outflow or other sacrifice of resources will be required is slight (less than *reasonably possible*).

Examples of *remote* EDLs include:

- Where a viable responsible party(s) is or will be actively cleaning up the contamination and incurring all the costs, and
- Inaccessible locations where contamination is unlikely to affect human health or pose a risk to the environment.

## 4.0 EDL COST ESTIMATING

If an EDL has a liability status of *probable* or *reasonably possible*, every effort should be made to develop a total cleanup cost estimate, if it is reasonable to do so. The EDL amount will be recognized or disclosed in financial statements based on the liability status (Section 3.0). If the total cleanup cost is not reasonably estimable at the time the financial report is due, a portion of the cleanup cost that is reasonably estimable (such as the cost to study) should be reported. If no portion of the cleanup cost is estimable at the time the financial report is due, the bureau should document that a cost estimate cannot be made at this time and the reason why. However, this condition is only applicable if the EDL has recently been identified and there is insufficient time between identification and reporting to develop a cost estimate. The Department requires a cost estimate (at least a portion of the total cost estimate, e.g., cost to study) for *probable* and *reasonably possible* EDL's within one fiscal year of identification. The Department does not require cost estimates to be developed for EDLs that have a liability status of *remote*.

### 4.1 Reasonably Estimable

Various key factors (tests) should be considered in determining whether future cleanup costs can be reasonably estimated. The factors are:

1. Completion of an Engineering Evaluation/Cost Analysis (EE/CA), Remedial Investigation/Feasibility Study (RI/FS), Corrective Measures Study (CMS), or Other Study,
2. Experience with a Similar Site and/or Conditions, and
3. Availability of the Cleanup Technology.

Step 3 of Figure 1 illustrates the application of these tests. Cost estimates should be based on the application of professional environmental engineering knowledge using all relevant information and meaningful site comparisons. Estimates should be reproducible and documentation supporting the estimates should be maintained.

The following discusses the three key factors:

1. **Completion of EE/CA, RI/FS, CMS, or Other Study:** The first test in determining whether future costs are reasonably estimable is to ascertain whether there is a completed study upon which to base an estimate. For example, if an EE/CA, RI/FS, CMS, or other investigation study has been completed for a particular site, these studies would form the basis upon which to begin estimating the cleanup costs.

The fact that a site does not have a comprehensive study completed does not exempt the bureau from making a best effort to estimate the cleanup costs for financial statements purposes, or for reporting a cost estimate for that portion of its obligation (or potential obligation) that can be estimated (see No. 2 below). The Department recognizes that if a comprehensive study has not been completed, the quality of the cleanup cost estimate will be less reliable than if a comprehensive study has been completed. Cleanup cost estimates for sites that have not completed a comprehensive study would necessarily be

based on a set of assumptions that will be subject to change. Therefore, the level of required documentation for cleanup cost estimates where a comprehensive study has not been completed will be much less than cleanup cost estimates for EDLs where a comprehensive study has been completed (see Section 4.2).

If the results of the study indicate that no contamination exists or no further action is warranted, then an EDL does not exist and the EDL will be removed from the Department's EDL inventory. The justification for removing the EDL from the inventory must be documented.

2. **Experience With Similar Site and/or Conditions:** If no study has been completed, the next test is to determine whether a site appears to be similar to any other site or condition where experience has been gained through either a completed study or actual cleanup. Similar sites or conditions used for developing a cost estimate can be associated with other federal agencies or non-federal entities (public or private).

If there is a similar site or condition with experience gained (through actual cleanup and/or a completed study), the EDL cost estimate for a site could be based on the similar experience or conditions. The quality of a cost estimate based on a similar site may be very different from the actual cleanup costs if the actual site conditions are different than those of the similar site. Future studies will result in improved estimates as site-specific conditions become known.

If no actual remediation or study costs of a similar site and/or condition exist, but cost estimates have been developed for similar sites, these similar site-cost estimates can be used. A cost estimate developed for a similar site type (such as a firing range, landfill) with comparable assumptions (e.g., comparable climates, comparable size, comparable contaminants) can be used as a single cost estimate, or a range of costs estimates developed for similar site types could be recorded. A range of similar site type cleanup cost estimates would capture the variability of the unknown site conditions until site-specific information is obtained. The Bureau of Reclamation (Reclamation) has prepared generic cost estimate ranges for the cleanup of landfills, mines, industrial facilities, or agricultural sites (Appendix A). A similar approach can be used by the bureaus to develop bureau-specific generic cost estimate ranges for common site types.

3. **Availability of a Cleanup Technology:** If a study has been completed, or a bureau or other agency has experience with a similar site and/or condition as noted above, the next test is whether there is a technology available to achieve total cleanup. If no technology exists to achieve total cleanup, then total cleanup costs would not be reasonably estimable. However, the bureau would be required to report the costs to contain the contamination and any other relevant costs, such as costs of future studies, treatment, or monitoring that will be implemented to minimize and control the contamination. For example, the total cleanup of certain volatiles in groundwater is often difficult to achieve. However, partial cleanup actions are implemented such as removal of the primary source of contamination, groundwater extraction and treatment, and long-term groundwater monitoring to ensure capture or natural attenuation is occurring. The costs of these

actions are estimable and would be recorded. The bureau would calculate an amount to be recorded based on the type and length of containment required. If a record of decision (ROD) or other pertinent decision document has not been written, and therefore, a length of time has not been determined, a reasonable length of time based on similar conditions should be assumed in the cost estimate.

If a cleanup technology is available, then cleanup costs are reasonably estimable, and the bureau would record the best estimate at current cost. If no amount within a range of estimates is a better estimate than any other amount, the bureau should record a range of amounts. If the estimate is based on similar site criteria, the agency would also include the anticipated cost of an EE/CA, RI/FS, CMS or other study, if required.

If management has not determined what cleanup action should be taken for an active contaminated site (current facility or operations), the cost of containment at the end of the facility's useful life, plus the cost of a study, if not yet done, should be considered as the low end of the range of future estimated cleanup costs.

## 4.2 Elements of the Cost Estimate

EDL cost estimates should include any cleanup activity or portion of an activity that has not yet been completed, such as:

- Studies, plans, designs, removal activities, cleanup activities, and cleanup operations (to include operation and maintenance [O&M] costs of cleanup systems) necessary to comply with applicable legal and regulatory requirements, and the costs of contractors, engineers, and consultants. **Do not include O&M costs associated with routine operations.** Only the O&M costs associated with actions to close the operation in accordance with environmental regulatory permits should be included. For example, if a bureau was operating an active landfill, the O&M costs associated with the landfill's routine operations or infrastructure would not be considered an EDL. Even environmental sampling, analysis and reporting required under a RCRA permit during operation would not be an EDL. However, O&M costs associated with an environmental cleanup action or the closure of an inactive site (e.g., a closed landfill), such as the O&M associated with a groundwater treatment system, would be an EDL.
- Machinery and equipment dedicated to a response action (removal or remedial) that do not have alternative uses, and their associated operating and maintenance costs would be an EDL cost element.
- Compensation and benefits of government personnel that devote significant time to an environmental cleanup effort would be an EDL cost element.
- Long-term monitoring (LTM) associated with a response action would be an EDL cost element.

### **4.3 Development of Cleanup Actions Cost Estimates**

The Department requires bureaus or offices to develop a total cleanup cost estimate for *probable* and *reasonably possible* EDLs within one fiscal year of identification. If a total cleanup cost estimate cannot be developed (possibly because a study has not been completed and insufficient information is available regarding the type or extent of contamination), the bureaus are required to develop a cost estimate for the portion of the cleanup (interim cleanup activities) that are known and estimable (such as the cost to study).

#### **4.3.1 Total Cleanup Cost Estimates**

Estimates should be calculated for the total site cleanup cost, or for a range of the total cleanup costs. A range of the total cleanup costs would be reported if site conditions have not yet been fully determined, such as the extent and/or nature of contamination or if several cleanup alternatives are possible and a preferred alternative has not been selected. Reporting a range of costs allows the estimator to capture the uncertainty inherent when predicting future cleanup costs early in the cleanup process. The assumptions used to develop the low and high end of the cost estimate range must be documented such that the estimate is reproducible and easy to revise as new site information becomes available.

For sites regulated under CERCLA that have one or more potentially responsible parties (PRPs), the estimator may develop a cost range that reflects the bureau's likely cleanup responsibilities (such as oversight of the cleanup or long-term monitoring) on the low end of the range, and the total cleanup costs on the high end of the range. The assumptions used for creating such a range must be documented.

If the preferred cleanup alternative has been selected, the total cleanup cost estimate will be developed based on the preferred alternative as documented in the proposed plan, ROD, or other decision document. If the preferred alternative has not been selected, but a total cleanup cost estimate can be developed based on professional engineering judgment and similarities with other site conditions, the bureau should develop a total cleanup cost estimate though uncertainty exists. If several alternatives are possible, the cost estimate can be based on an assumed cleanup action, or cost estimates may be developed for different possible cleanup actions. Bureaus are encouraged to develop total cleanup cost estimates even if the preferred alternative has not been selected. These cost estimates will be used for reporting contingent liabilities on financial statements, and facilitate project and program management activities. They should not be misconstrued as a pre-decisional selection of the preferred alternative.

If the estimate is developed using a single assumed cleanup action, a range of costs could be developed to capture any uncertainty regarding actual site conditions. If a single preferred cleanup action is assumed, the reasons for selecting the action must be documented. However, the estimator may elect to develop cost estimates for several possible cleanup actions and record a range that captures the different actions. The different cleanup actions used for developing the cost estimate range and the assumptions used must be documented.

### **4.3.2 Interim Cleanup Action Cost Estimates**

If the total cleanup cost is not currently estimable (possibly because no studies have been completed) cost estimates should be developed for those portions of the total cleanup cost (interim cleanup activities) that are known and estimable. Interim cleanup activities for which a cost is estimable, though the total cleanup cost is not, include site studies such as an EE/CA, RI/FS, CMS, etc.; or monitoring activities if a cleanup technology is not available. Cost estimates for interim cleanup activities should be recorded as either: 1) cost to study, 2) cost to monitor, 3) other costs or 4) a combination of activities 1, 2, and 3.

### **4.3.3 Quantification of the Cost Estimate**

Cost estimates must be based on site-specific information, and can be calculated using engineering estimates or cost models. Cost estimates are subject to audit, and therefore, adequate documentation identifying data sources, estimating method, rationale used, and assumptions must be retained and readily accessible. Detailed backup materials that support the cost estimate reported must be maintained in the project files (see Section 4.4, Cost Estimate Documentation).

If a cost model is used for estimating EDL costs, the model must be accredited for estimating environmental cleanup costs.

Cost data can be obtained from a variety of sources:

- Cost estimating guides/references (see Appendix B)
- Cleanup action vendors or contractor quotes
- Professional judgment based on experience with similar projects
- Cost estimating software/databases (e.g., Remedial Action Cost Engineering and Requirements [RACER])

Cost estimating guides or references (e.g., unit price books) can provide costs for a wide variety of construction activities, including those related to remedial actions. Some guides are specifically tailored to estimate costs for environmental remediation projects. Cost data in these references are sometimes broken down into labor, equipment, and material categories, and may or may not include contractor markups. Generally, each cost is associated with a specific labor and equipment crew and production rate. Costs are typically provided on a national average basis for the year of publication of the reference.

Quotes from cleanup action vendors or construction contractors can provide costs that are more site-specific in nature than costs taken from standard guides and references. These quotes usually include contractor markups and are usually provided as a total cost rather than categorized as labor, equipment, or materials. If possible, more than one vendor quote should be obtained.

Quotes from multiple sources can be averaged, or the highest quote can be used in the cost estimate if the collected quotes seem to be at the low end of the industry range. Vendors or contractors can also be an important source of design-related information, including operating capacity, production rates, operating life, and maintenance schedules that may have implications for O&M costs.

The Bureau of Indian Affairs (BIA) obtained a contractor-provided template to facilitate the development of cleanup cost estimates (Appendix C). This cost-estimating template was developed in Microsoft Excel format, and provides typical General Services Administration (GSA) labor rates, field equipment unit rates, and laboratory analysis unit rates applicable for fiscal years 2005 and 2006. (The template provided in Appendix C was adjusted to contain rates for fiscal year 2006 only since fiscal year 2005 has ended). The user is required to create a detailed scope of work by task in order to effectively use the cost-estimating template. If the template was to be used for future fiscal years, the unit rates would require adjusting, as appropriate. The cost-estimating template is provided in Appendix C as a tool that bureaus could use.

Estimates and actual costs of similar projects can also be used as a source of cost data. Professional-engineering judgment should be exercised where cost data taken from another project need to be adjusted to take into account site- or technology-specific parameters. Sources of actual cost data from government remediation projects are maintained by various Federal agencies. These sources include the Historical Cost Analysis System (HCAS) (<http://www.frtr.gov/cost/ec2/index.html>) and Federal Remediation Technologies Roundtable (FRTR) cost and performance reports (<http://www.frtr.gov/cost/>). HCAS and the FRTR reports are two initiatives that are currently being used to collect and record treatment technology costs in a standardized format. If estimates and actual costs of similar projects are used to develop a cost estimate, the estimator should document the name of the similar site used, the similarities that justify use of this site's estimate or actual costs, and any adjustments applied (including an inflation factor if the estimate or actual cost used is not current). This information would be maintained in the project file as detailed backup material that supports the cost estimate.

Cost estimating software and databases can also be used as sources of cost data. The majority of available software tools are designed to estimate the cost for all or selected cost elements of an alternative. One such Government-sponsored software tool is the RACER cost estimating system, which is sponsored by the U.S. Air Force, U.S. Army Corps of Engineers, and DOI. More information on RACER can be found at the following internet sites:

- <http://talpart.earthtech.com/racer.htm>
- <http://www.ccb.org/RACER%20Program%20Description.pdf>
- [http://www.afcesa.af.mil/ces/cesc/cost\\_engr/cesc\\_costengr.asp](http://www.afcesa.af.mil/ces/cesc/cost_engr/cesc_costengr.asp)

The Department's Central Hazardous Materials Fund (CHF) Program uses RACER as a uniform method for estimating CERCLA-related cleanup costs. RACER has been reviewed and approved by Price Waterhouse Coopers and is accredited to provide automated, consistent, repeatable, and documented estimates for environmental cleanup of contaminated sites. RACER provides a reasonable cost estimate for program funding purposes using site information



available at the time the estimate is prepared (Memorandum from P. Lynn Scarlett dated February 27, 2004). Reclamation has been contracted by OEPC to prepare cost estimates for environmental cleanup at CHF projects using RACER. Reclamation has compiled costs for studies, remediation, long-term maintenance, and LTM at most CHF sites. These data can be used in preparing cost estimates at non-CHF sites. A similar approach can be used by the bureaus to develop bureau-specific generic cost estimate ranges for common site types.

#### **4.3.4 Periodic Review and Update**

Changes / updates to cleanup cost estimates are required so that periodic financial statements are fairly presented. Future costs cannot be known with certainty; therefore, estimating requires the exercise of judgment. Therefore, cost estimates change as new events occur, as more experience is acquired, or as additional information is obtained. At least annually or when there is a material change in the status of the site, the cost estimate will be reviewed and adjusted as needed. Any changes to the estimate must be documented in the detailed backup materials that support the cost estimate (Section 4.4).

The receipt of new facts or clarifying information that would affect a cost estimate may include:

- The type and extent of contaminants at the site
- The identification, number and financial position of PRPs
- The allocation of costs among PRPs based on judgments, assessments, or consent decrees
- Data regarding the remediation experiences at other sites
- Results of an EE/CA, RI/FS, CMS or other study
- Approval of a ROD or other decision document
- Refinements of the remediation plan
- The type of technology available to remediate
- Unanticipated problems identified during remediation
- The type and duration of post-closure monitoring required
- Unanticipated problems encountered during the post-closure monitoring period
- New regulations regarding the appropriate method of disposing hazardous wastes
- New laws regarding the acceptable levels of contamination

As an example, the preferred alternative presented in the proposed plan can undergo changes as a result of public comment or new information such as additional site characterization data. Any changes to the selected cleanup alternative should be reflected in an updated EDL cost estimate (Section 4.4). In addition, if the cleanup selection process has spanned more than one (1) year, the estimated costs should be escalated to a new base year. The escalation (or inflation factor) applied should be documented in the detailed backup materials that support the cost estimate.

Additionally, as cleanup activities progress, the EDL estimate would be reduced by the cost of the work completed. The EDL estimate would be reduced by the amount expended since the last reporting period. In certain cases, the amount expended may be insignificant compared to the total cleanup cost estimate (i.e., less than  $\pm 10$  percent [%]). In these cases, the bureau's financial personnel may decide not to change the EDL cost estimate.

If no new site information has been obtained that would alter the cost estimate, the previous cost estimate generated would be appropriate for current use; however, the estimator may adjust the previous estimate for work completed and inflation (for each year beyond the date the estimate was generated). Applying an inflation factor would be particularly important if the rate of inflation has exceeded 10%. The activities completed with the associated costs, and the inflation factor applied should be documented in the detailed backup materials that support the cost estimate. Annual inflation factors are calculated every year by and can be found at various internet web sites using an internet search engine. One such site is [http://www.oregonstate.edu/dept/pol\\_sci/fac/sahr/sahr.htm](http://www.oregonstate.edu/dept/pol_sci/fac/sahr/sahr.htm).

#### **4.4 Cost Estimate Documentation**

All cost estimates will be documented such that costs and underlying assumptions are clearly presented and understood. Documentation should include:

- Detailed backup materials that support the cost estimate for interim cleanup activities and total site cleanup (including assumptions used)
- Cost summary of individual cleanup alternatives
- Comparative cost summary of cleanup alternatives (if costs for multiple alternatives are estimated)

The cost estimate of each cleanup action will be documented. The Department has developed a form for the appropriate documentation of cost estimates. The EDL Cost Estimate Documentation Sheet (Appendix D) can be used by bureaus or offices, or bureau-developed forms can be used. If the total cleanup cost is estimable, the estimator should fill out the portion of the Department's documentation sheet applicable to the total cleanup cost. However, if only a portion of the total cleanup cost is estimable, the applicable interim cleanup action sections of the documentation sheet should be filled out. The cost estimate should be presented by activity-based work elements and include all capital costs, all labor costs, annual O&M costs, and any periodic costs (LTM). The detailed backup materials that demonstrate how the work element costs were derived need to be maintained with the cost estimation documentation sheet in the project files. The EDL Cost Estimate Documentation Sheet is also available directly from the Cost Estimate module of DOI's environmental database.

In the future, all EDL cost estimates will be reviewed and approved via the DOI environmental database. Currently, a signed, copy of the EDL cost estimate documentation form and the detailed backup materials that support the cost estimate will be maintained in the project files.

#### **4.5 Records Management**

All records and documentation associated with the development of a cost estimate or with the development of a revised cost estimate needed to support a site's listing on DOI's Environmental database must be retained by the preparing field office. All applicable documentation should be readily accessible for review even after the EDL is removed from the inventory. . Therefore, EDL records and documents will be maintained for no less than two years after the site cleanup

action is complete. This retention applies to any required long-term site maintenance and LTM, but does not supersede any regulatory requirements. The cost estimates will be further documented in the DOI environmental database (Section 5.0).

## **5.0 EDL RECORDING AND REPORTING**

Each bureau must provide the OFM and the OEPC with information on their estimated EDLs to be used in preparing quarterly and annual financial statements no later than one week before the end of each quarter. To facilitate the recording, tracking and reporting of EDLs, the Department has developed an environmental database. Bureaus will be required to utilize the DOI environmental database for the recording, tracking and reporting of EDLs starting in the third quarter, fiscal year 2006.

### **5.1 EDL Recording**

The term “record” as used here refers to the information documented in the DOI environmental database. The database is located on the DOI intranet at the universal resource locator (URL) <http://ecl.doi.gov>. The database can be accessed by approved Department and bureau personnel. Access to bureau data and specific privileges (such as edit, read only) will be determined by a designated EDL bureau administrator and approved by the Department.

New EDL sites can be recorded into the database as they are identified and site-specific information and cleanup cost estimates can be revised as new information is obtained. Each quarter the data will be “frozen” (archived) prior to reporting EDL information on the financial statement. Once frozen, the quarterly data cannot be changed; however, new EDL sites and revisions to existing EDL sites that will be reported on the next financial statement (for the current, active quarter) can be made at any time by approved users. Bureau administrators will be responsible for approving all data that is reported on the financial statements and archived. Reviews and approval by designated bureau personnel will be recorded in the DOI environmental database.

In order for Department personnel and bureau users to track the progress of cleanup at EDL sites, compare cost estimates developed at similar sites, or generate EDL site statistics for assessing purposes, the database requires bureaus to provide site-specific general information including:

- Facility name and site name
- Location (region, city [if applicable], state, zip [if applicable], latitude and longitude)
- Site type (e.g., landfill / dump, firing range, underground storage tank, etc.)
- Contaminants of Concern
- Affected Media
- Stage (i.e., the stage of the cleanup process such as study, cleanup / remediation / removal, LTM, etc.)
- CHF Site (identifies the EDL site as receiving cleanup funds under the Central Hazardous Materials [CHF] Program)
- Law / Regulation (CERCLA, RCRA, UST, CWA [Clean Water Act], CAA [Clean Air Act], TSCA [Toxic Substance Control Act], or Other)
- EPA’s Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) ID and name, or Federal Docket name (if applicable)

The bureaus will also be required to record in the database the likelihood of incurring future costs as *probable, reasonably possible, or remote*, based on the criteria specified in Section 3.0, Liability Status.

Cost estimates, the date the cost estimate was generated, and the planned and actual completion dates (in fiscal year) will also be recorded in the database. The relevancy of the cost estimate will be captured in the database by the user selecting the cost estimating method used (independent government cost estimate [IGCE], contractor supplied, professional judgment based on known comparable site costs, or model).

Database users with edit privileges can add notes and attach pertinent electronic documents (e.g., PDF, Microsoft files, etc.) associated with EDL sites within the database. Notes can include (but are not limited to) reasons for general information, liability status, or cost estimate revisions. Attached documents can include (but are not limited to) executive summaries of detailed studies, maps, RODs, letters stating no-further-action required received from the state, etc.

## **5.2 EDL Reporting**

As used in this guidance, the term “reporting” means to recognize an amount on the face of financial statements or to disclose an amount, a range of amounts, or a comment regarding the uncertainty of the EDL cost estimate in notes in the financial statements. EDL cost estimate reporting is illustrated in Figure 1, Step 5. The estimated recognized or disclosed amounts will be obtained from reports generated from the DOI environmental database. Reports have been designed that will calculate individual and aggregate recognized and disclosed amounts.

### **5.2.1 Recognized EDL Amounts**

The Department and its bureaus are required to recognize an EDL when the future outflow or other sacrifice of resources is *probable* and *reasonably estimable*. If both these conditions exist, the EDL cost estimate, or the portion of the total cleanup cost that is estimable at this time, will be included in the amount recognized on the face of financial statements.

If the cost estimate is a single amount, this amount will be recognized. However, if the EDL cost estimate is a range of amounts, the minimum amount (lower limit [LL]) would be recognized. Although it is understood that the minimum amount of the range is not necessarily the amount that will ultimately be expended, it is not likely that the ultimate amount will be less than the minimum amount.

The environmental database is designed to calculate the amount to recognize on financial statements. The recognized amount can be calculated for each site, each bureau, and for all bureaus (the Department). For EDLs having a liability status of *probable* (P), the sum of Cost to Study LL, Cost to Monitor LL, Other Costs LL, and Cleanup Cost LL, equal to the Total Cost LL, would be included in the amount recognized.

### **5.2.2 Disclosed EDL Amounts**

There are three conditions under which the EDL cost estimate is disclosed in notes in financial statements. The three conditions are described below, and illustrated in Figure 1, Step 5.

1. If the EDL has a liability status of *probable*, the entire range of the estimated total cleanup costs for *probable* sites is disclosed in notes associated with the financial statements. For example, if the estimated cost range was \$100,000 to \$1,000,000, \$100,000 would be recognized and a range of \$100,000 to \$1,000,000 would be disclosed.
2. If the aggregate of either the *probable* or *reasonably possible* EDL sites is not estimable, a comment that the EDL costs are not estimable at this time and an explanation would be included in the disclosure notes associated with the financial statements. However, it is unlikely that a bureau or office could not estimate the cleanup costs at any of their *probable* or *reasonably possible* EDL sites. Therefore, this occurrence should be rare.
3. If the EDL has a liability status of *reasonably possible*, the estimated total cleanup costs, or the range of estimated costs, would be disclosed in notes associated with the financial statements.

Separate disclosure notes are included for *probable* and *reasonably possible* EDL sites.

The environmental database has been designed to calculate the amount to disclose in notes in financial statements. The disclosed amount range can be calculated for each site, each bureau, and for all bureaus (the Department). In the database, the lower limit of the disclosed range is calculated as the sum of Cost to Study LL, Cost to Monitor LL, Other Costs LL, and Cleanup Cost LL, equal to the Total Cost LL for all sites with a liability status of *probable and reasonably possible*. The upper limit of the disclosed range is calculated as the sum of Cost to Study upper limit [UL], Cost to Monitor UL, Other Costs UL, and Cleanup Cost UL, equal to the Total Cost UL for all sites with a liability status of *probable and reasonably possible*.

### **5.2.3 Amounts Not Reported**

If an EDL has a liability status of *remote*, no reporting (i.e., recognizing or disclosing) is necessary in financial statements.



**Environmental and Disposal Liabilities Identification, Documentation and Reporting  
Handbook v1.1  
Appendixes**



**Appendix A**  
**DOI Generic Cost Estimates Tables and Ranges**

## SUMMARY - DOI GENERIC COST ESTIMATES TABLES AND RANGES

Costs shown in 2005 dollars\*

### Mine Remediation - Capping

Remedial Process	Generic RACER Model Cost Range	CHF Project-specific RACER Model Cost Range	Suggested Cost Range per Acre of Cap <sup>6</sup>
Studies/Design/Remedial Action	\$2.7 M (5 acres) to \$38.7 M (100 acres)	\$0.5 M (5 acres) to \$14.9 M (31 acres)	
O&M (30 years)	\$1.3 M (5 acres) to \$7.9 M (100 acres)	\$2.3 M (5 acres) to \$3.4 M (31 acres)	
<b>Total with O&amp;M</b>	<b>\$4.0 M (5 acres) to \$46.6 M (100 acres)</b>	<b>\$2.8 M (5 acres) to \$18.3 M (31 acres)</b>	<b>\$420,000 to \$840,000 per acre of cap</b>

### Landfill/Dump Remediation - Capping

Remedial Process	Generic RACER Model Cost Range	CHF Project-specific RACER Model Cost Range	Suggested Cost Range per Acre of Cap <sup>6</sup>
Studies/Design/Remedial Action	\$2.2 M (5 acres) to \$29.5 M (100 acres)	\$1.8 M (2 acres) to \$2.1 M (29 acres)	
O&M (30 years)	\$1.0 M (5 acres) to \$4.7 M (100 acres)	\$0.3 M (2 acres) to \$6.2 M (29 acres)	
<b>Total with O&amp;M</b>	<b>\$3.2 M (5 acres) to \$34.3 M (100 acres)</b>	<b>\$2.1 M (2 acres) to \$8.3 M (29 acres)</b>	<b>\$320,000 to \$1,050,000 per acre of cap</b>

### Industrial Remediation – Excavate/Demolish and Haul/Dispose

Remedial Process	Generic RACER Model Cost Range	CHF Project-specific RACER Model Cost Range	Suggested Cost Range per Acre <sup>6</sup>
Studies/Design/Remedial Action	Not computed due to unique nature of each site	\$0.18 M (0.5 acres to 0.6 acres)	
O&M (30 years)	Not computed due to unique nature of each site	\$0.41 M (0.5 acres to 0.6 acres)	
<b>Total with O&amp;M</b>	<b>Not computed due to unique nature of each site</b>	<b>\$0.59 M (0.5 acres to 0.6 acres)</b>	<b>\$950,000 to \$1,160,000 per acre</b>

### Agricultural Remediation – Excavate and Bioremediate

Remedial Process	Generic RACER Model Cost Range	CHF Project-specific RACER Model Cost Range	Suggested Cost Range per Acre <sup>6</sup>
Studies/Design/Remedial Action	Not computed due to unique nature of each site	\$0.4 M (0.6 acres) to \$2.1 M (3 acres)	
O&M (2 years)	Not computed due to unique nature of each site	\$0.1 M (0.6 acres) to \$0.2 M (3 acres)	
<b>Total with O&amp;M</b>	<b>Not computed due to unique nature of each site</b>	<b>\$0.5 M (0.6 acres) to \$2.3 M (3 acres)</b>	<b>\$736,000 to \$840,000 per acre</b>

#### Assumptions:

\*Costs shown are in 2005 dollars. (2005 dollars obtained by using model-generated 2003 dollar estimates plus a 5.1% inflation increase from January 2003 to January 2005; source of inflation increase is [http://www.oregonstate.edu/dept/pol\\_sci/fac/sahr/sahr.htm](http://www.oregonstate.edu/dept/pol_sci/fac/sahr/sahr.htm). (Note: The Suggested Cost Range values were rounded to the nearest \$10,000).

1. The data on the Cost Summary tables:
  - a. Were obtained from generic (non site-specific) RACER model cost estimates, DOI CHF project-specific RACER estimates, and estimating expertise.
  - b. Are general in nature and are intended to represent typical response action scenarios.
  - c. Should be adjusted to reflect actual site conditions (if known).
  - d. Represents lowest level estimate (order of magnitude).
  - e. Reflects typical costs on DOI CHF sites.
2. Landfills and Dumps are combined due to similarities.
3. O&M represents 30 years of monitoring for mines and landfill/dump sites. On other sites, it is estimated that less monitoring may be allowed.
4. DOI CHF project-specific RACER cost estimates, used in compiling the Cost Summary tables, may not be indicative of other similar CHF sites.
5. Due to the unique nature of each site, RACER assumptions, cost estimates and data tables (with plotted charts) were not generated for industrial or agricultural type sites.
6. Suggested Cost Ranges per Acre were estimated from the plotted charts (attached).

## SUMMARY - DOI CHF GENERIC COST ESTIMATES TABLES AND RANGES

(Costs shown are in 2003 dollars)

### Mine Remediation - Capping

Remedial Process	RACER Cost Range	DOI CHF Historical Budget Cost Range	Suggested Cost Range per Acre of Cap
Studies/Design/Remedial Action	\$2.6 M (5 acres) to \$36.8 M (100 acres)	\$0.5 M (5 acres) to \$14.2 M (31 acres)	
O&M (30 years)	\$1.2 M (5 acres) to \$7.5 M (100 acres)	\$2.2 M (5 acres) to \$3.2 M (31 acres)	
<b>Total with O&amp;M</b>	<b>\$3.8 M (5 acres) to \$44.3 M (100 acres)</b>	<b>\$2.7 M (5 acres) to \$17.4 M (31 acres)</b>	<b>\$400,000 to \$800,000 per acre of cap</b>

### Landfill/Dump Remediation - Capping

Remedial Process	RACER Cost Range	DOI CHF Historical Budget Cost Range	Suggested Cost Range per Acre of Cap
Studies/Design/Remedial Action	\$2.1 M (5 acres) to \$28.1 M (100 acres)	\$1.7 M (2 acres) to \$2.0 M (29 acres)	
O&M (30 years)	\$0.9 M (5 acres) to \$4.5 M (100 acres)	\$0.3 M (2 acres) to \$5.9 M (29 acres)	
<b>Total with O&amp;M</b>	<b>\$3.0 M (5 acres) to \$32.6 M (100 acres)</b>	<b>\$2.0 M (2 acres) to \$7.9 M (29 acres)</b>	<b>\$300,000 to \$1,000,000 per acre of cap</b>

### Industrial Remediation – Excavate/Demolish and Haul/Dispose

Remedial Process	RACER Cost Range	DOI CHF Historical Budget Cost Range	Suggested Cost Range per Acre
Studies/Design/Remedial Action	Not computed due to unique nature of each site	\$0.17 M (0.5 acres to 0.6 acres)	
O&M (30 years)	Not computed due to unique nature of each site	\$0.39 M (0.5 acres to 0.6 acres)	
<b>Total with O&amp;M</b>	<b>Not computed due to unique nature of each site</b>	<b>\$0.56 M (0.5 acres to 0.6 acres)</b>	<b>\$900,000 to \$1,100,000 per acre</b>

### Agricultural Remediation – Excavate and Bioremediate

Remedial Process	RACER Cost Range	DOI CHF Historical Budget Cost Range	Suggested Cost Range per Acre
Studies/Design/Remedial Action	Not computed due to unique nature of each site	\$0.4 M (0.6 acres) to \$2.0 M (3 acres)	
O&M (2 years)	Not computed due to unique nature of each site	\$0.1 M (0.6 acres) to \$0.2 M (3 acres)	
<b>Total with O&amp;M</b>	<b>Not computed due to unique nature of each site</b>	<b>\$0.5 M (0.6 acres) to \$2.2 M (3 acres)</b>	<b>\$700,000 to \$800,000 per acre</b>

#### Assumptions:

1. Escalation is not factored into these costs. All costs shown are in 2003 dollars (Note: The Suggested Cost Range values were rounded to the nearest \$100,000).
2. The data on the Cost Summary tables:
  - a. Will be continually updated as actual costs/data are compiled.
  - b. Was obtained from DOI CHF budget estimates, RACER estimates and estimating expertise.
  - c. Is general in nature and is intended to represent typical scenarios.
  - d. Should be adjusted to reflect actual site conditions (if known).
  - e. Represents lowest level estimate (order of magnitude).
  - f. Reflects typical costs on DOI CHF sites, which are believed to be less than superfund sites.
3. Landfills and Dumps are combined due to similarities.
4. O&M represents 30 years of monitoring for mines and landfill/dump sites. On other sites, it is estimated that lesser monitoring over 30-year period may be required.
5. DOI CHF budget estimates, used in compiling the Cost Summary tables, may not be indicative of other similar CHF sites.
6. Due to the unique nature of each site, RACER assumptions, cost estimates and data tables (with plotted charts) were not generated for industrial or agricultural type sites.

**Mines**  
(Cost shown in 2003 dollars)

**DOI CHF Project-specific RACER Cost Estimates**

Description	Area (Acres of cap)	Studies (eg, RI/FS)	Remediation (RD + RA)	Total for Studies and Remediation	O&M/year	O&M for 30 Years*
BLM Mill Site (1)	5	\$240,000	\$290,000	\$530,000	\$74,000	\$2,220,000
BLM Millsites (2)	10	\$60,000	\$2,400,000	\$2,460,000	\$42,000	\$1,260,000
NPS Mine (1)	31	\$170,000	\$14,000,000	\$14,170,000	\$105,000	\$3,150,000

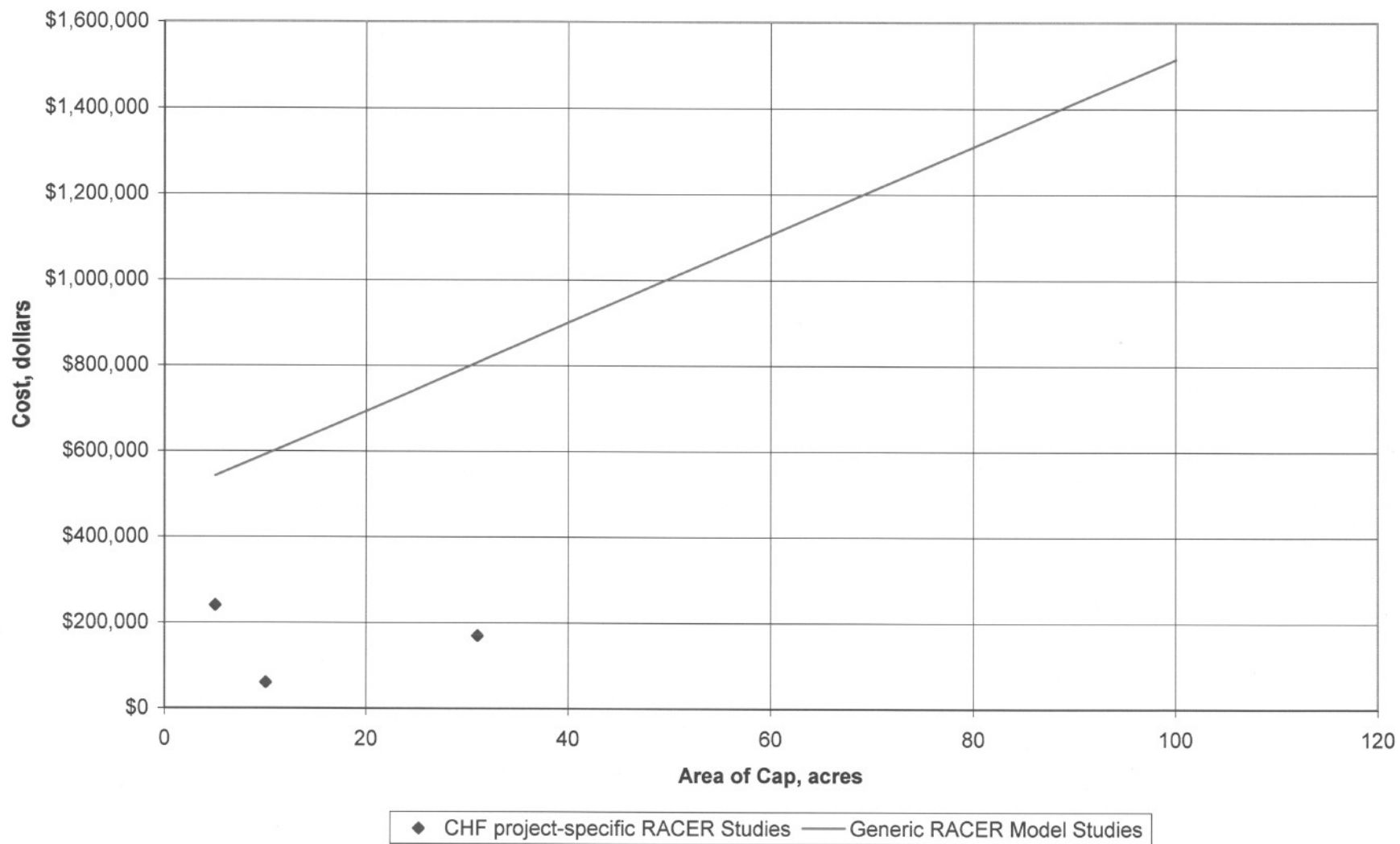
\* Note: For BLM Mill Site (1), O&M is for only 5 years total.

**Generic RACER Model Cost Estimates**

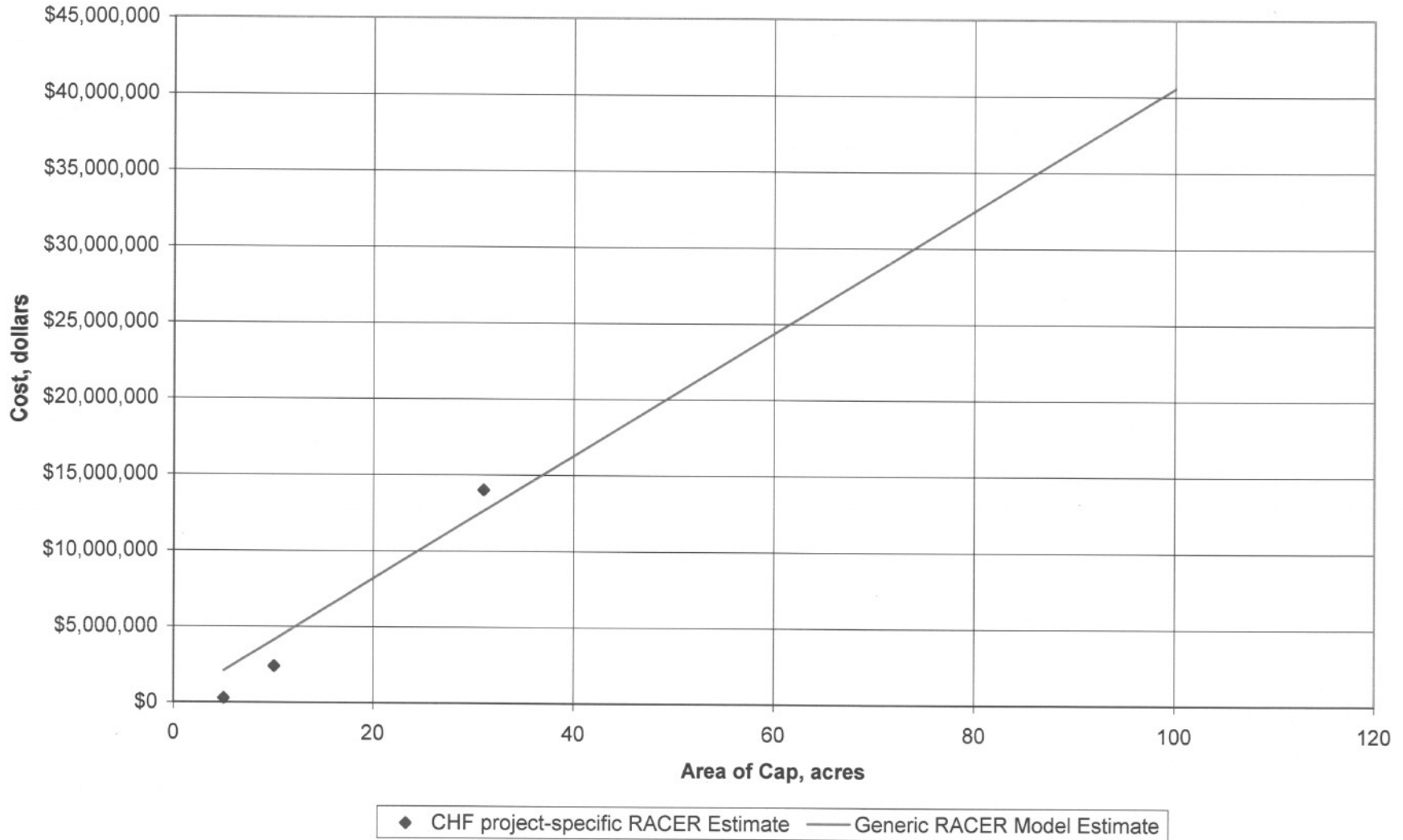
Area (Acres of cap)	Studies (eg, RI/FS)	Remediation (RD + RA)	Total for Studies and Remediation	Size Reduction Factor	Factored Total	O&M/year	O&M for 30 Years
5	\$500,000	\$2,100,000	\$2,600,000	0.00%	\$2,600,000	\$40,000	\$1,200,000
20	\$700,000	\$8,200,000	\$8,900,000	2.50%	\$8,700,000	\$70,000	\$2,100,000
40	\$900,000	\$16,300,000	\$17,200,000	5.00%	\$16,300,000	\$120,000	\$3,600,000
60	\$1,100,000	\$24,400,000	\$25,500,000	7.50%	\$23,600,000	\$160,000	\$4,800,000
80	\$1,300,000	\$32,500,000	\$33,800,000	10.00%	\$30,400,000	\$210,000	\$6,300,000
100	\$1,500,000	\$40,600,000	\$42,100,000	12.50%	\$36,800,000	\$250,000	\$7,500,000

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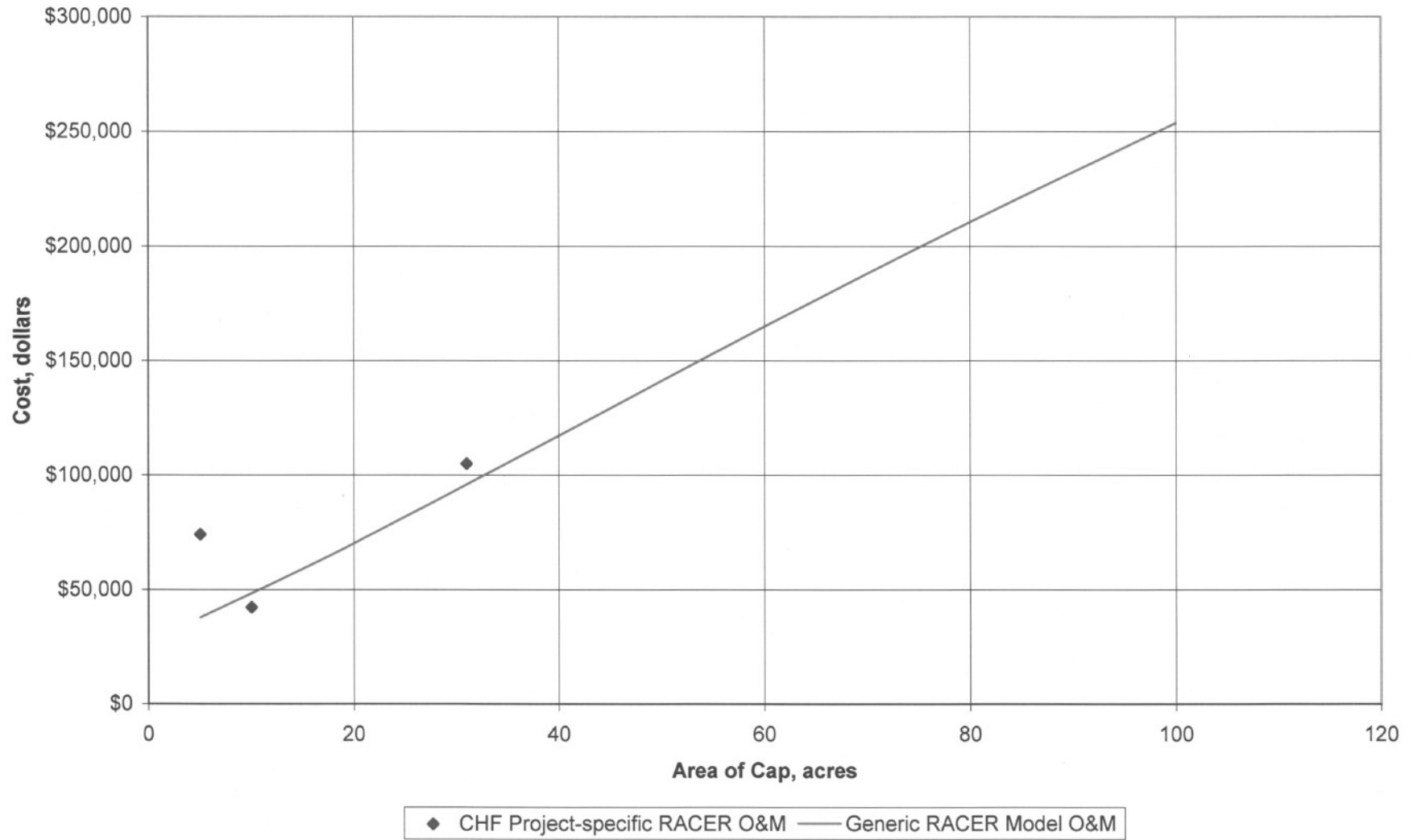
### RACER Cost Estimates for Mine Studies vs Area of Cap (Cost shown in 2003 dollars)



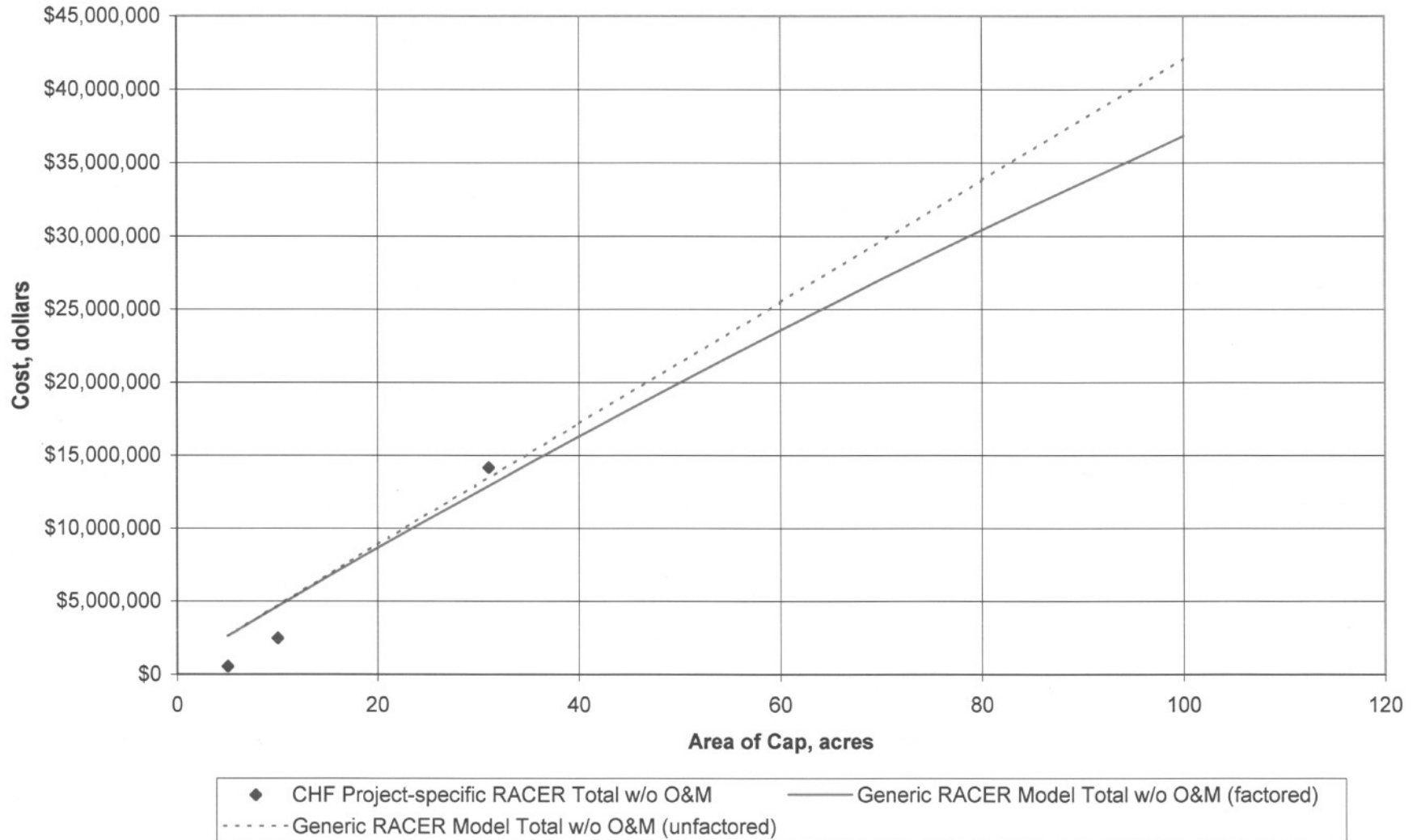
**RACER Cost Estimates for Mine Remediations (Design and Action) vs Area of Cap**  
(Cost shown in 2003 dollars)



### RACER Cost Estimates for Mine O&M per Year vs Area of Cap (Cost shown in 2003 dollars)



**RACER Cost Estimates for Mines (Total w/o O&M) vs Area of Cap**  
(Cost shown in 2003 dollars)





## RACER STUDY ASSUMPTIONS FOR MINES

Assume all mine sites need the following studies:

1. Installing Ground Monitoring Wells
2. Preliminary Assessment
3. Site Inspection
4. Remedial Investigation
5. Feasibility Study

### Installing Ground Monitoring Wells:

1. Safety level on average is D
2. One aquifer on average
  - a. Depth to groundwater on average is 100 feet
  - b. Install two wells per 5 acres:
    - i. Average well depth is 150 feet
    - ii. Average well diameter is 4 inches
    - iii. Assumed drilling method is air rotary
    - iv. Assumed formation type is consolidated

### Preliminary Assessment:

1. Site complexity on average is Moderate
2. Site distance one way on average is 50 miles
3. Tasks include:
  - a. Identify information needs:
    - i. Records search
    - ii. Photo interpretation
    - iii. Interviews
  - b. Conduct Site Reconnaissance
    - i. Identify on-site/off-site sources of contamination
    - ii. Identify on-site/off-site receptors
    - iii. Determine contaminants of concern
    - iv. Conduct site visit/inspection
  - c. Documentation
    - i. Complete revised HRS scoring package
    - ii. Compose preliminary assessment report
    - iii. Complete EPA preliminary assessment form
  - d. Community Relations
    - i. Update administrative record
    - ii. Contact state and local officials

### Site Inspection:

1. Site complexity on average is Moderate
2. Site distance one way on average is 50 miles
3. Tasks include:
  - a. Planning:
    - i. Data review

- ii. SI work plan
  - iii. SI supplemental plans (health and safety, sampling and analysis, investigation derived waste)
- b. Site investigation:
  - i. Provide fieldwork support
  - ii. Data validation
  - iii. Compose SI report
  - iv. Complete revised HRS scoring package
  - v. Implement community relations
- c. Sampling and analysis (S&A):
  - i. Groundwater:
    - 1. One aquifer at an average sample depth of 100 feet:
      - a. One sample location per five acres:
        - i. One sample per location
    - 2. On average, test for:
      - a. Total dissolved solids (EPA 160.1)
      - b. Total suspended solids (EPA 160.2)
      - c. TAL metals (EPA 6010/7000s)
  - ii. Surface water:
    - 1. One sample location per five acres:
      - a. One sample per location
    - 2. On average, test for:
      - a. Total dissolved solids (EPA 160.1)
      - b. Total suspended solids (EPA 160.2)
      - c. TAL metals (EPA 6010/7000s)
  - iii. Surface soil:
    - 1. One sample location per five acres:
      - a. One sample per location
    - 2. On average, test for:
      - a. Pesticides/PCBs (SW 3550B/SW 8081/8082)
      - b. TAL metals (EPA 6010/7000s)
  - iv. Subsurface soil:
    - 1. Average sample depth of 50 feet:
      - a. One sample location per five acres:
        - i. One sample per location
    - 2. On average, test for:
      - a. Pesticides/PCBs (SW 3550B/SW 8081/8082)
      - b. TAL metals (EPA 6010/7000s)

**Remedial Investigation:**

- 1. Site complexity on average is Moderate
- 2. Site distance one way on average is 50 miles
- 3. Tasks include:
  - a. Scoping:
    - i. RI work plan
    - ii. Data quality objectives

- iii. Preliminary Alternatives
- iv. Community relations activities
- v. RI supplemental plans (HASP, FSP, QAPP)
- b. Site characterization:
  - i. Fieldwork support
  - ii. Evaluate site geology/hydrogeology
  - iii. Evaluate site soils/surface hydrology
  - iv. Evaluate site meteorology
  - v. Evaluate populations and land usage
  - vi. Evaluate site ecology
  - vii. Evaluate nature and extent of contamination
  - viii. Evaluate contaminant fate and transport
  - ix. Conduct baseline risk assessment
- c. Sampling and Analysis (S&A):
  - i. Groundwater:
    - 1. One aquifer at an average sample depth of 100 feet:
      - a. Two sample locations per five acres:
        - i. One sample per location
    - 2. On average, test for:
      - a. Total dissolved solids (EPA 160.1)
      - b. Total suspended solids (EPA 160.2)
      - c. TAL metals (EPA 6010/7000s)
  - ii. Surface water:
    - 1. Two sample locations per five acres:
      - a. One sample per location
    - 2. On average, test for:
      - a. Total dissolved solids (EPA 160.1)
      - b. Total suspended solids (EPA 160.2)
      - c. TAL metals (EPA 6010/7000s)
  - iii. Surface soil:
    - 1. Two sample locations per five acres:
      - a. One sample per location
    - 2. On average, test for:
      - a. Pesticides/PCBs (SW 3550B/SW 8081/8082)
      - b. TAL metals (EPA 6010/7000s)
  - iv. Subsurface soil:
    - 1. Average sample depth of 50 feet:
      - a. Two sample locations per five acres:
        - i. One sample per location
    - 2. On average, test for:
      - a. Pesticides/PCBs (SW 3550B/SW 8081/8082)
      - b. TAL metals (EPA 6010/7000s)

**Feasibility Study:**

- 1. Site complexity on average is Moderate
- 2. Level of study detail on average is Moderate

3. Level of study documentation on average is Moderate
4. Tasks include:
  - a. Scoping:
    - i. RI review
    - ii. FS work plan
    - iii. Data quality objectives
    - iv. Preliminary alternatives
    - v. Community relations activities
  - b. Development/Screening of alternatives:
    - i. Identify/Evaluate treatment technologies
    - ii. Assemble technologies into alternatives
    - iii. Identify action-specific ARARs
    - iv. Screen alternatives
    - v. Evaluate action-specific ARARs
  - c. Analysis of alternatives:
    - i. Evaluate alternatives by nine criteria
    - ii. Compose draft FS report
    - iii. Implement community relations
    - iv. Further develop preferred alternative
    - v. Public meeting(s)/prepare transcript
  - d. Remedy selection:
    - i. Compose final FS report
    - ii. Prepare ROD/decision document/proposed plan
    - iii. Update administrative record

## **RACER REMEDIATION ASSUMPTIONS FOR MINES**

Assume all mine sites' selected remediation is consolidation and capping

### **Design:**

1. On average, the design phase is approximately 4-5% of the remedial cost

### **Consolidation:**

#### **Excavation:**

1. Safety level is D.
2. On average, the volume of tailings to be excavated is the area of cap times an average of 5 feet.
3. There is on average one confirmatory soil analysis per five acres:
  - a. Test for:
    - i. Pesticides/PCBs (SW 3550B/SW 8081/8082)
    - ii. TAL metals (EPA 6010/7000s)

### **Consolidation (continue):**

#### **Load & Haul:**

1. Safety level is D.
2. On average the one-way haul distance is ½ mile.
3. Load and haul a volume equal to the excavated volume.
4. Place and compact volume in 6-inch lifts.

### **Capping:**

1. Safety level on average is D
2. Type of cover on average is a standard cover
  - a. At a 3:1 side slope
  - b. Source of topsoil is off-site
  - c. Depth of soil layer is 30 inches
  - d. Source of soil layer is off-site
  - e. Source of leveling layer is off-site

## RACER O&M ASSUMPTIONS FOR MINES

Assume all mine sites need the following O&M (monitoring) for a minimum of 30 years

### Monitoring:

1. Average safety level D
2. Average site distance is 50 miles
3. Include QA/AC samples
4. Include data management/reporting
5. Average crew size of two field technicians
6. Monitor (1<sup>st</sup> year):
  - a. Groundwater:
    - i. Average sample depth of 100 feet
    - ii. Take two samples per year per five acres
    - iii. On average, test for:
      1. Total dissolved solids (EPA 160.1)
      2. Total suspended solids (EPA 160.2)
      3. TAL metals (EPA 6010/7000s)
  - b. Surface water:
    - i. Take two samples per year per five acres
    - ii. On average, test for:
      1. Total dissolved solids (EPA 160.1)
      2. Total suspended solids (EPA 160.2)
      3. TAL metals (EPA 6010/7000s)
  - c. Surface soil:
    - i. Take two samples per year per five acres
    - ii. On average, test for:
      1. Pesticides/PCBs (SW 3550B/SW 8081/8082)
      2. TAL metals (EPA 6010/7000s)
  - d. Subsurface soil:
    - i. Average sample depth of 50 feet
    - ii. Take two samples per year per five acres
    - iii. On average, test for:
      1. Pesticides/PCBs (SW 3550B/SW 8081/8082)
      2. TAL metals (EPA 6010/7000s)
7. Monitor (remaining 29 years):
  - a. Groundwater:
    - i. Average sample depth of 100 feet
    - ii. Take two samples per year per five acres
    - iii. On average, test for:
      1. Total dissolved solids (EPA 160.1)
      2. Total suspended solids (EPA 160.2)
      3. TAL metals (EPA 6010/7000s)
  - b. Surface water:
    - i. Take two samples per year per five acres
    - ii. On average, test for:

1. Total dissolved solids (EPA 160.1)
  2. Total suspended solids (EPA 160.2)
  3. TAL metals (EPA 6010/7000s)
- c. Surface soil:
- i. Take two samples per year per five acres
  - ii. On average, test for:
    1. Pesticides/PCBs (SW 3550B/SW 8081/8082)
    2. TAL metals (EPA 6010/7000s)
- d. Subsurface soil:
- i. Average sample depth of 50 feet
  - ii. Take two samples per year per five acres
  - iii. On average, test for:
    1. Pesticides/PCBs (SW 3550B/SW 8081/8082)
    2. TAL metals (EPA 6010/7000s)

**Landfills & Dumps**  
(Cost shown in 2003 dollars)

**DOI CHF Project-specific RACER Cost Estimates**

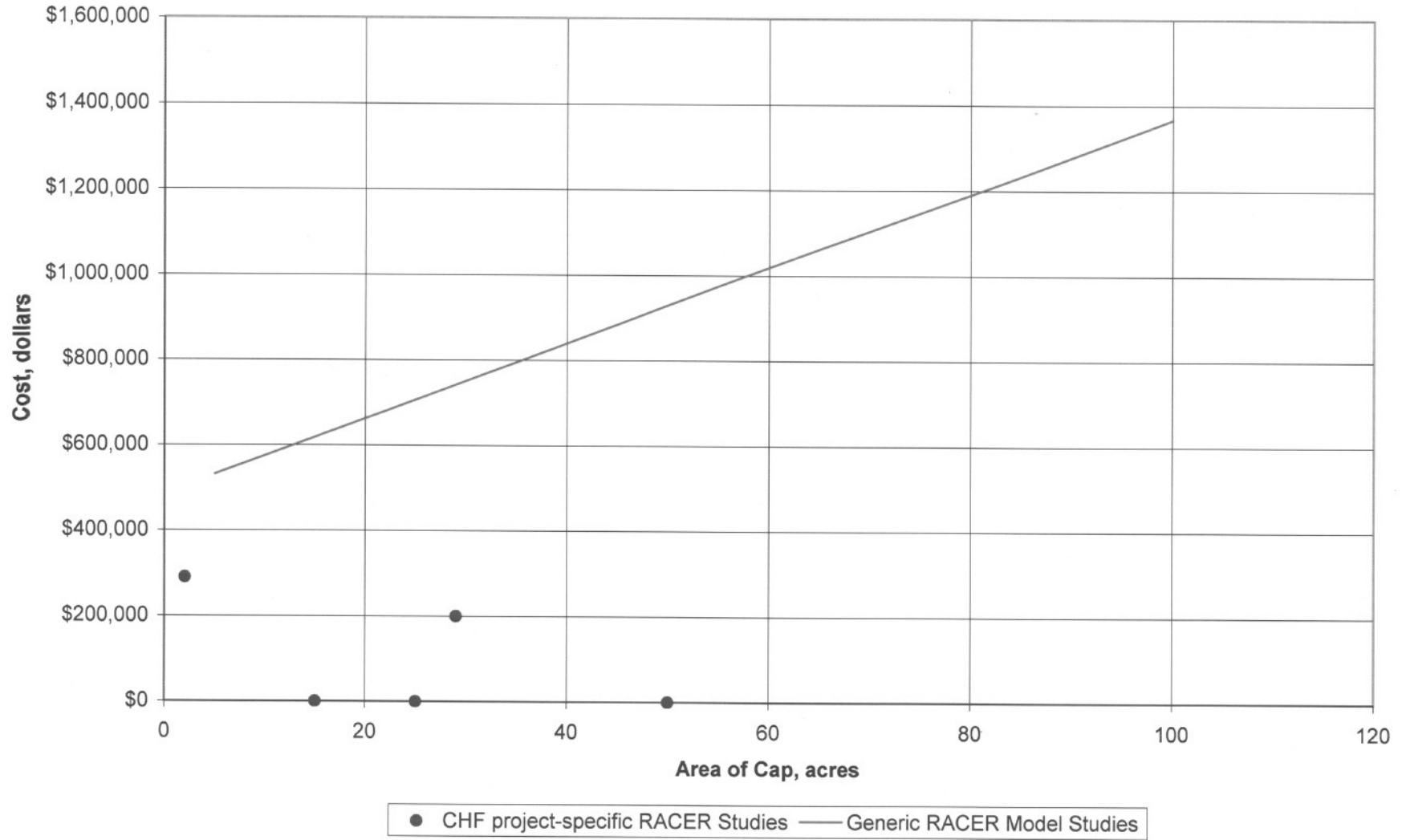
Description	Area (Acres of cap)	Studies (eg, RI/FS)	Remediation (RD + RA)	Total for Studies and Remediation	O&M/year	O&M for 30 Years
BLM Landfill (1)	2	\$290,000	\$1,400,000	\$1,690,000	\$11,500	\$345,000
FWS Landfill (1)	15	Completed	\$4,700,000	\$4,700,000	\$60,000	\$1,800,000
BLM Landfill (1)	25	Completed	\$2,700,000	\$2,700,000	\$66,000	\$1,980,000
NPS landfill (1)	29	\$200,000	\$1,750,000	\$1,950,000	\$195,000	\$5,850,000
NPS Landfill (2)	50	Completed	\$10,500,000	\$10,500,000	\$7,600	\$228,000

**Generic RACER Model Cost Estimates**

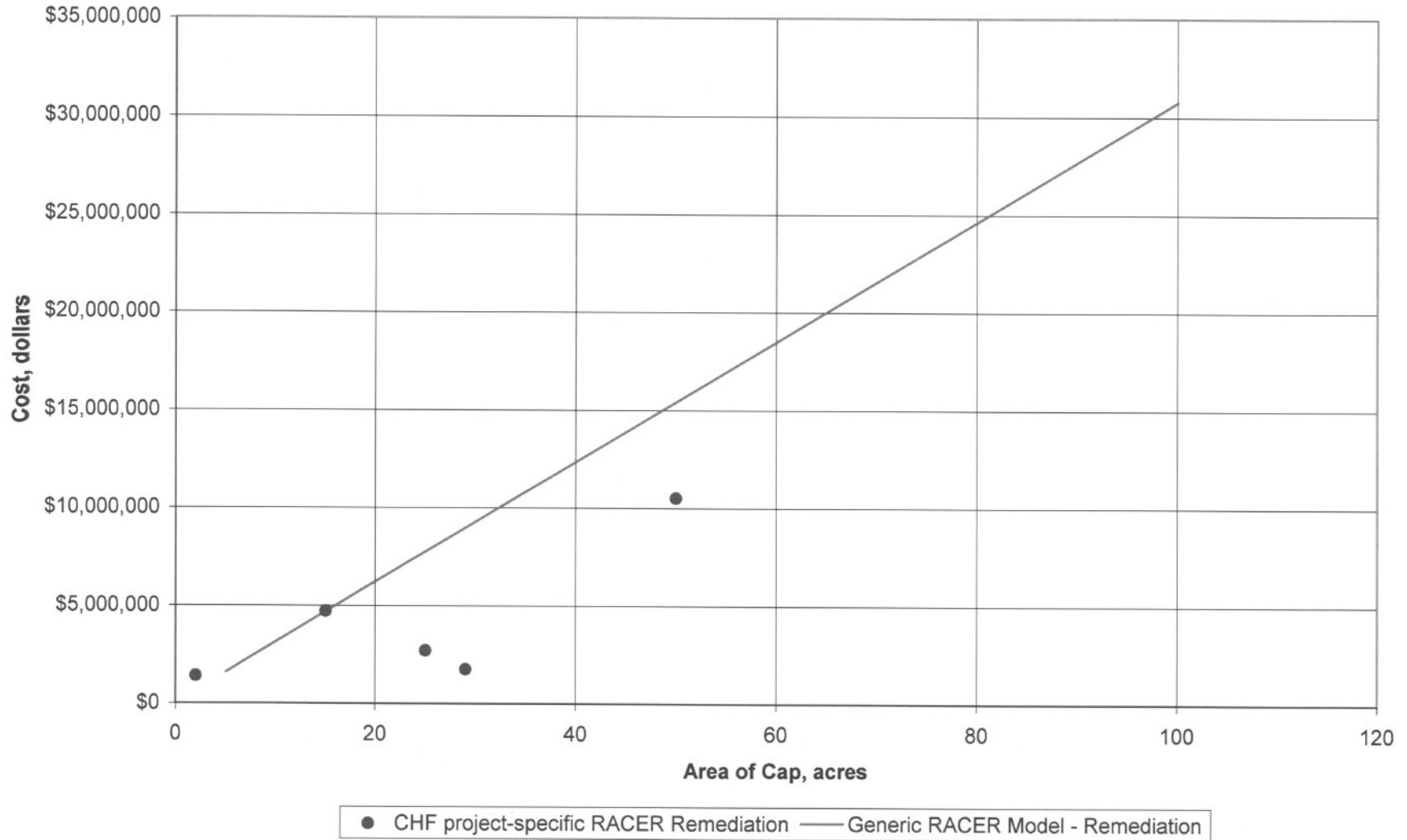
Area (Acres of cap)	Studies (eg, RI/FS)	Remediation (RD + RA)	Total for Studies and Remediation	Size Reduction Factor	Factored Total	O&M/year	O&M for 30 Years
5	\$500,000	\$1,600,000	\$2,100,000	0.00%	\$2,100,000	\$30,000	\$900,000
20	\$700,000	\$6,200,000	\$6,900,000	2.50%	\$6,700,000	\$50,000	\$1,500,000
40	\$800,000	\$12,300,000	\$13,100,000	5.00%	\$12,500,000	\$70,000	\$2,100,000
60	\$1,000,000	\$18,500,000	\$19,500,000	7.50%	\$18,000,000	\$100,000	\$3,000,000
80	\$1,200,000	\$24,600,000	\$25,800,000	10.00%	\$23,200,000	\$120,000	\$3,600,000
100	\$1,400,000	\$30,800,000	\$32,200,000	12.50%	\$28,100,000	\$150,000	\$4,500,000



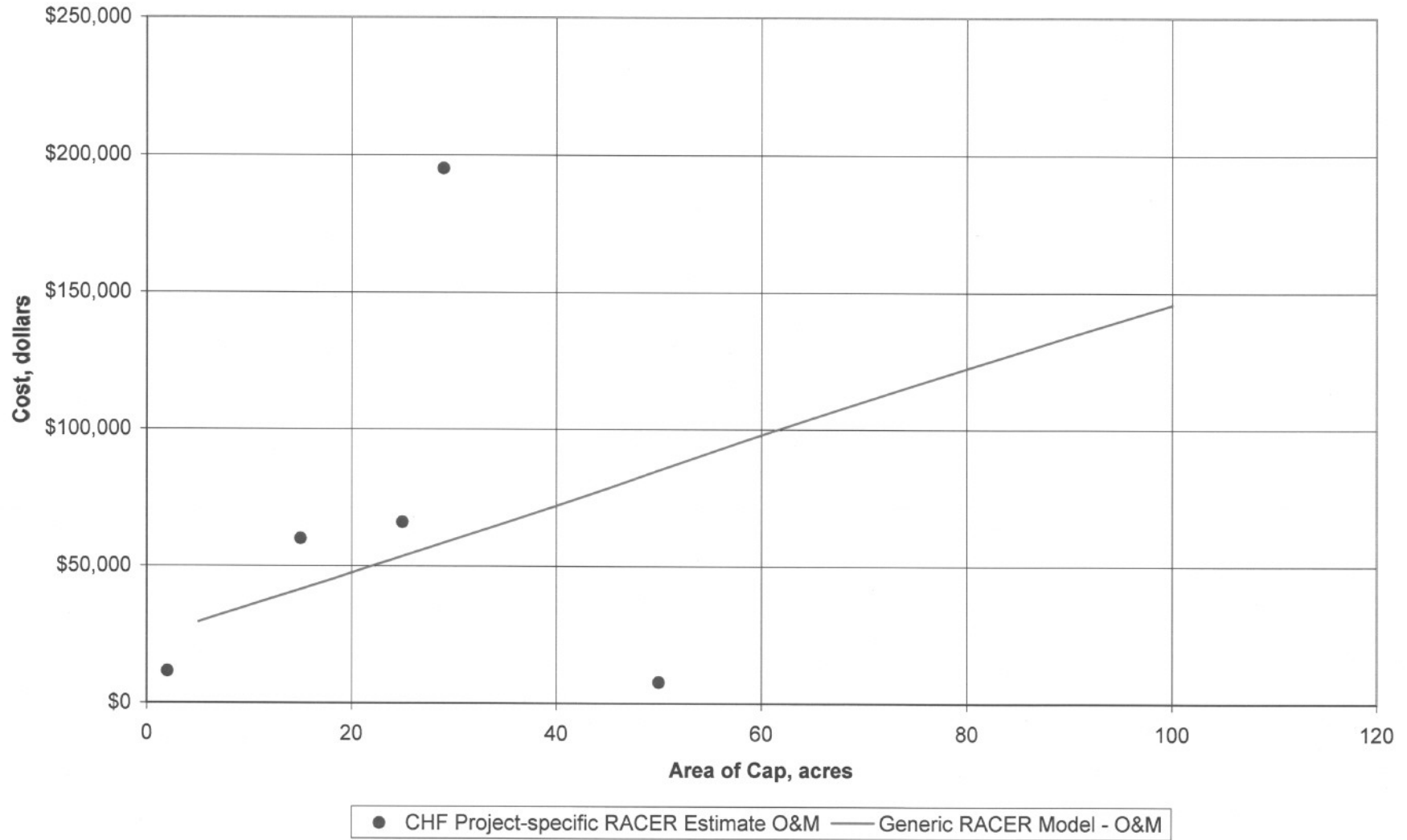
**RACER Cost Estimates for Landfill/Dump Studies vs Area of Cap**  
(Cost shown in 2003 dollars)



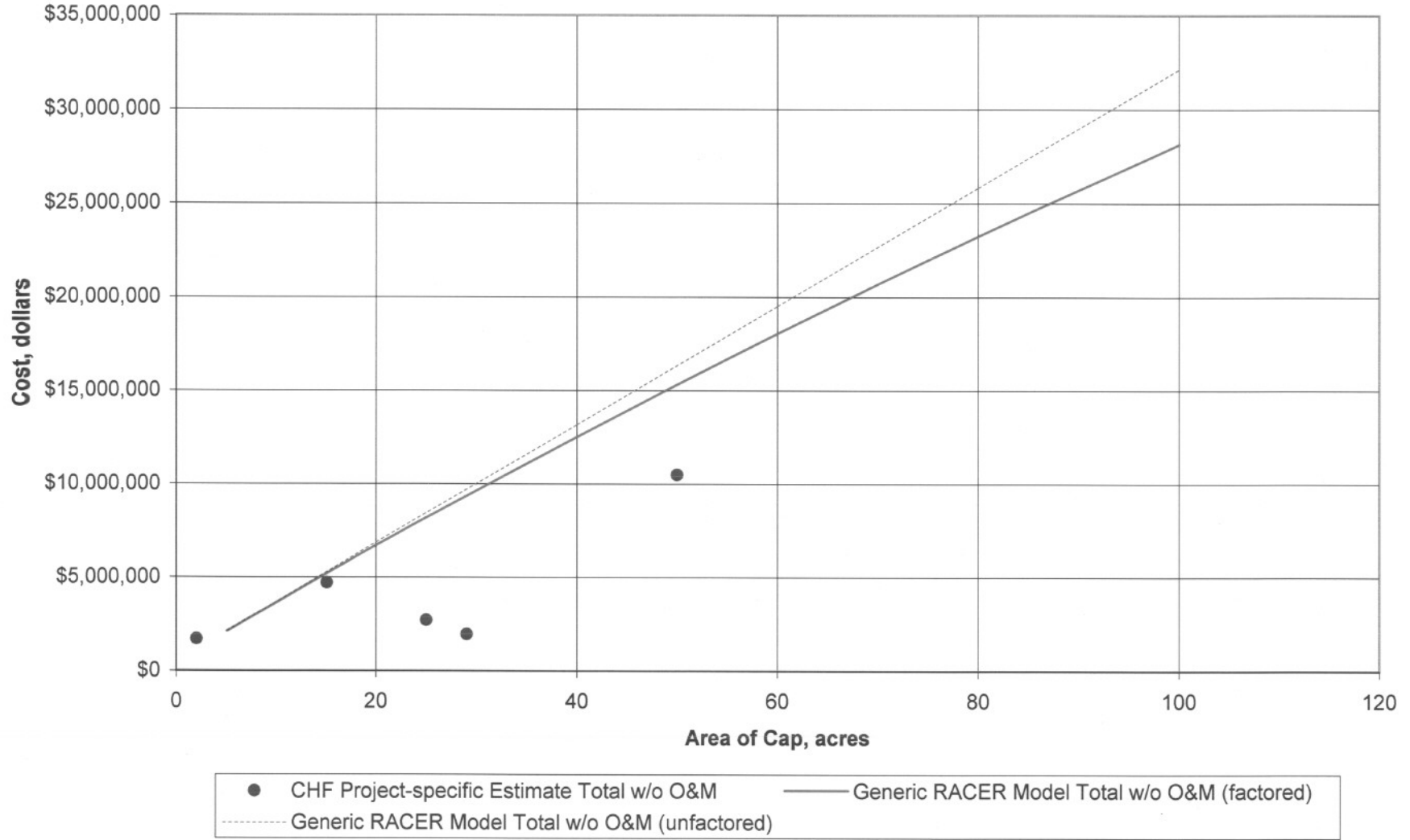
**RACER Cost Estimates for Landfill Remediation (Design and Action) vs Area of Cap**  
(Cost shown in 2003 dollars)



# RACER Cost Estimates for Landfill/Dump O&M per Year vs Area of Cap (Cost shown in 2003 dollars)



**RACER Cost Estimates for Landfills/Dumps (Total w/o O&M) vs Area of Cap**  
(Cost shown in 2003 dollars)



## **RACER STUDY ASSUMPTIONS FOR LANDFILLS/DUMPS**

Assume all landfill/dump sites need the following studies:

1. Installing Ground Monitoring Wells
2. Preliminary Assessment
3. Site Inspection
4. Remedial Investigaiton
5. Feasibility Study

### **Installing Ground Monitoring Wells:**

1. Safety level on average is D
2. One aquifer on average
  - a. Depth to groundwater on average is 50 feet
  - b. Install two wells per 5 acres:
    - i. Average well depth is 150 feet
    - ii. Average well diameter is 4 inches
    - iii. Assumed drilling method is air rotary
    - iv. Assumed formation type is consolidated

### **Preliminary Assessment:**

1. Site complexity on average is Moderate
2. Site distance one way on average is 50 miles
3. Tasks include:
  - a. Identify information needs:
    - i. Records search
    - ii. Photo interpretation
    - iii. Interviews
  - b. Conduct Site Reconnaissance
    - i. Identify on-site/off-site sources of contamination
    - ii. Identify on-site/off-site receptors
    - iii. Determine contaminants of concern
    - iv. Conduct site visit/inspection
  - c. Documentation
    - i. Complete revised HRS scoring package
    - ii. Compose preliminary assessment report
    - iii. Complete EPA preliminary assessment form
  - d. Community Relations
    - i. Update administrative record
    - ii. Contact state and local officials

### **Site Inspection:**

1. Site complexity on average is Moderate
2. Site distance one way on average is 50 miles
3. Tasks include:
  - a. Planning:
    - i. Data review

- ii. SI work plan
- iii. SI supplemental plans (health and safety, sampling and analysis, investigation derived waste)
- b. Site investigation:
  - i. Provide fieldwork support
  - ii. Data validation
  - iii. Compose SI report
  - iv. Complete revised HRS scoring package
  - v. Implement community relations
- c. Sampling and analysis (S&A):
  - i. Groundwater:
    - 1. One aquifer at an average sample depth of 50 feet:
      - a. One sample location per five acres:
        - i. One sample per location
    - 2. On average, test for:
      - a. Lead (SW 3005A/SW 7421)
      - b. Polynuclear Aromatic Hydrocarbons, PAH (EPA 610)
  - ii. Subsurface soil:
    - 1. Average sample depth of 25 feet:
      - a. One sample location per five acres:
        - i. One sample per location
    - 2. On average, test for:
      - a. Gasoline Group (8021B, Lead, EDE)
      - b. Polynuclear Aromatic Hydrocarbons(PAH) (SW 8310)
  - iii. Perform a soil gas investigation:
    - 1. Average sample depth of 25 feet:
      - a. One sample location per five acres:
        - i. One sample per location

**Remedial Investigation:**

- 1. Site complexity on average is Moderate
- 2. Site distance one way on average is 50 miles
- 3. Tasks include:
  - a. Scoping:
    - i. RI work plan
    - ii. Data quality objectives
    - iii. Preliminary Alternatives
    - iv. Community relations activities
    - v. RI supplemental plans (HASP, FSP, QAPP)
  - b. Site characterization:
    - i. Fieldwork support
    - ii. Evaluate site geology/hydrogeology
    - iii. Evaluate site soils/surface hydrology
    - iv. Evaluate site meteorology

- v. Evaluate populations and land usage
- vi. Evaluate site ecology
- vii. Evaluate nature and extent of contamination
- viii. Evaluate contaminant fate and transport
- ix. Conduct baseline risk assessment
- c. Sampling and Analysis (S&A):
  - i. Groundwater:
    - 1. One aquifer at an average sample depth of 50 feet:
      - b. Two sample location per five acres:
        - i. One sample per location
    - 2. On average, test for:
      - a. Lead (SW 3005A/SW 7421)
      - b. Polynuclear Aromatic Hydrocarbons, PAH (EPA 610)
  - ii. Subsurface soil:
    - 1. Average sample depth of 25 feet:
      - a. Two sample location per five acres:
      - b. One sample per location
    - 2. On average, test for:
      - a. Gasoline Group (8021B, Lead, EDE)
      - b. Polynuclear Aromatic Hydrocarbons(PAH) (SW 8310)
  - iii. Perform a soil gas investigation:
    - 1. Average sample depth of 25 feet:
      - a. Two sample location per five acres:
      - b. One sample per location

### **Feasibility Study:**

- 1. Site complexity on average is Moderate
- 2. Level of study detail on average is Moderate
- 3. Level of study documentation on average is Moderate
- 4. Tasks include:
  - a. Scoping:
    - i. RI review
    - ii. FS work plan
    - iii. Data quality objectives
    - iv. Preliminary alternatives
    - v. Community relations activities
  - b. Development/Screening of alternatives:
    - i. Identify/Evaluate treatment technologies
    - ii. Assemble technologies into alternatives
    - iii. Identify action-specific ARARs
    - iv. Screen alternatives
    - v. Evaluate action-specific ARARs
  - c. Analysis of alternatives:
    - i. Evaluate alternatives by nine criteria

- ii. Compose draft FS report
- iii. Implement community relations
- iv. Further develop preferred alternative
- v. Public meeting(s)/prepare transcript
- d. Remedy selection:
  - i. Compose final FS report
  - ii. Prepare ROD/decision document/proposed plan
  - iii. Update administrative record



## **RACER REMEDIATION ASSUMPTIONS FOR LANDFILLS/DUMPS**

Assume all landfill/dump sites' selected remediation is capping

### **Design:**

1. On average, the design phase is approximately 4-5% of the remedial cost

### **Capping:**

1. Safety level on average is D
2. Type of cover on average is a standard cover
  - a. At a 3:1 side slope
  - b. Source of topsoil is off-site
  - c. Depth of soil layer is 30 inches
  - d. Source of soil layer is off-site
  - e. Source of leveling layer is off-site

## RACER O&M ASSUMPTIONS FOR LANDFILLS/DUMPS

Assume all Landfill/Dump sites need the following O&M (monitoring) for a minimum of 30 years

### Monitoring:

1. Average safety level D
2. Average site distance is 50 miles
3. Include QA/AC samples
4. Include data management/reporting
5. Average crew size of two field technicians
6. Monitor (1<sup>st</sup> year):
  - a. Groundwater:
    - i. One aquifer at an average sample depth of 50 feet:
      1. Two sample location per five acres:
        - a. One sample per location
      2. On average, test for:
        - a. Lead (SW 3005A/SW 7421)
        - b. Polynuclear Aromatic Hydrocarbons, PAH (EPA 610)
    - b. Subsurface soil:
      - i. Average sample depth of 25 feet:
        1. Two sample location per five acres:
          - a. One sample per location
        - ii. On average, test for:
          1. Gasoline Group (8021B, Lead, EDE)
          2. Polynuclear Aromatic Hydrocarbons(PAH) (SW 8310)
    - c. Perform a soil gas investigation:
      - i. Average sample depth of 25 feet:
        1. Two sample location per five acres:
          - a. One sample per location
  7. Monitor (remaining 29 years):
    - a. Groundwater:
      - i. One aquifer at an average sample depth of 50 feet:
        1. Two sample location per five acres:
          - a. One sample per location
        2. On average, test for:
          - a. Lead (SW 3005A/SW 7421)
          - b. Polynuclear Aromatic Hydrocarbons, PAH (EPA 610)
      - b. Subsurface soil:
        - i. Average sample depth of 25 feet:
          1. Two sample location per five acres:
            - b. One sample per location
          - ii. On average, test for:
            1. Gasoline Group (8021B, Lead, EDE)

2. Polynuclear Aromatic Hydrocarbons(PAH) (SW 8310)
- c. Perform a soil gas investigation:
  - i. Average sample depth of 25 feet:
    1. Two sample location per five acres:
      - a. One sample per location

**Industrial**  
(Costs shown in 2003 dollars)

**DOI CHF Project-specific RACER Cost Estimates**

Description	Area (Acres)	Studies (eg, RI/FS)	Remediation (RD + RA)	Total for Studies and Remediation	O&M/year	O&M Years	O&M for Total Years
USGS Facility (1)	0.5	Completed	\$160,000	\$160,000	\$14,000	7	\$98,000
FWS Facility (1)	0.6	\$50,000	\$125,000	\$175,000	\$13,000	30	\$390,000
FWS Facility (2)	43,500	\$25,000,000	\$37,000,000	\$62,000,000	\$930,000	30	\$27,900,000

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**Agricultural**  
(Costs shown in 2003 dollars)

**DOI CHF Project-specific RACER Cost Estimates**

Description	Area (Acres)	Studies (eg, RI/FS)	Remediation (RD + RA)	Total for Studies and Remediation	O&M/year	O&M for 2 Years
FWS Agricultural Site (1)	0.6	\$150,000	\$230,000	\$380,000	\$52,000	\$104,000
BIA Agricultural Site (1)	3	\$310,000	\$1,650,000	\$1,960,000	\$70,000	\$140,000

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**Appendix B**  
**Cost Estimating Guides / References**

## Appendix B. Cost Estimating References

The following documents can provide a reasonable basis for the development of an EDL cost estimate. However, this list is not intended to be all inclusive and is subject to periodic updating.

Association for the Advancement of Cost Engineering International. 1990. Standard 10S-90. Standard Cost Engineering Terminology. (AACE 1990)

Code of Federal Regulations (CFR). Title 40, Part 300. National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (<http://www.epa.gov/epacfr40/chapt-I.info/chi-toc.htm>) Subchapter J

United States Environmental Protection Agency. October 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA. Interim Final EPA/540/G-89/004. (USEPA 1988) (<http://www.epa.gov/superfund/resources/remedy/pdf/540g-89004-s.pdf>)

United States Environmental Protection Agency. April 1990. A Guide to Selecting Superfund Remedial Actions. OSWER Publication 9335.0-27FS. (USEPA 1990). ([http://www.epa.gov/superfund/tools/topics/relocation/gui\\_sel.htm](http://www.epa.gov/superfund/tools/topics/relocation/gui_sel.htm)).

United States Environmental Protection Agency. June 25, 1993. Memorandum: Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis. OSWER Directive No. 9355.3-20. (USEPA 1993). (<http://www.epa.gov/superfund/>)

United States Environmental Protection Agency. September 1996. The Role of Cost in the Superfund Remedy Selection Process. Quick Reference Fact Sheet. (USEPA 1996). ([http://www.epa.gov/superfund/resources/cost\\_dir/index.htm](http://www.epa.gov/superfund/resources/cost_dir/index.htm))

United States Environmental Protection Agency. August 1997. Rules of Thumb for Superfund Remedy Selection. (USEPA 1997). (<http://www.epa.gov/superfund/resources/rules/index.htm>)

United States Environmental Protection Agency. February 1999. Scopers Notes – An RI/FS Costing Guide. Bringing in a Quality RI/FS on Time and Within Budget. EPA/540/G-90/002. (USEPA 1999). (<http://www.epa.gov/superfund/action/guidance/remedy/supersede.htm>)

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**Appendix C**  
**BIA Cost-Estimating Template**



Tetra Tech EM Inc.  
2005

for BIA

Summary - All Tasks

Staff	GSA Title	Through	GSA Rate FY06	All Tasks	All Tasks	Total LOE	GSA Cost
					FY 2006		
0	Program Manager		\$128.70	0	0	0	\$0.00
0	Business Manager		\$107.13	0	0	0	\$0.00
0	Analyst/Planner III		\$143.01	0	0	0	\$0.00
0	Scientist V		\$131.19	0	0	0	\$0.00
0	Scientist IV		\$110.31	0	0	0	\$0.00
0	Scientist III		\$88.50	0	0	0	\$0.00
0	Scientist II		\$69.87	0	0	0	\$0.00
0	Scientist I		\$57.27	0	0	0	\$0.00
0		0	\$0.00	0	0	0	\$0.00
0		0	\$0.00	0	0	0	\$0.00
0		0	\$0.00	0	0	0	\$0.00
0		0	\$0.00	0	0	0	\$0.00
0		0	\$0.00	0	0	0	\$0.00
0		0	\$0.00	0	0	0	\$0.00
<b>Total LOE</b>				<b>0</b>	<b>0</b>	<b>0</b>	<b>\$0.00</b>

Other Direct Cost	No. Units - FY06	From Table	GSA Cost
Telephone	0		\$0.00
Computer	0		\$0.00
Reproduction	0		\$0.00
Freight/Delivery	0		\$0.00
Supplies		\$0.00	\$0.00
Rental Equipment		\$0.00	\$0.00
Travel		\$0.00	\$0.00
Subcontractor		\$0.00	\$0.00
<b>Subtotal</b>			\$0.00
G&A on Other Cost 8.9%			\$0.00
0.75% Industrial Fee to GSA			\$0.00
<b>Total Cost</b>			<b>\$0.00</b>







Tetra Tech EM Inc.  
GSA Schedule

for BIA

Task 2 - Define

Staff	GSA Title	GSA Rate FY06	Task 2		Total LOE	GSA Cost
			Input No. units FY 2006			
0	Program Manager	\$128.70	0		0	\$0.00
0	Business Manager	\$107.13	0		0	\$0.00
0	Analyst/Planner III	\$143.01	0		0	\$0.00
0	Scientist V	\$131.19	0		0	\$0.00
0	Scientist IV	\$110.31	0		0	\$0.00
0	Scientist III	\$88.50	0		0	\$0.00
0	Scientist III	\$69.87	0		0	\$0.00
0	Scientist I	\$57.27	0		0	\$0.00
0		\$0.00	0		0	\$0.00
0		\$0.00	0		0	\$0.00
0		\$0.00	0		0	\$0.00
0		\$0.00	0		0	\$0.00
0		\$0.00	0		0	\$0.00
0		\$0.00	0		0	\$0.00
0		\$0.00	0		0	\$0.00
<b>Total LOE</b>			<b>0</b>		<b>0</b>	<b>\$0.00</b>

Other Direct Cost	Input Rate FY06	Input No. Units - FY06	From Table	GSA Cost
Telephone				\$0.00
Computer				\$0.00
Reproduction				\$0.00
Freight/Delivery				\$0.00
Supplies			\$0.00	\$0.00
Rental Equipment			\$0.00	\$0.00
Travel			\$0.00	\$0.00
Subcontractor			\$0.00	\$0.00
<b>Subtotal</b>				<b>0.00</b>
G&A on Other Cost 8.9%				0.00
0.75% Industrial Fee to GSA				0.00
<b>Total Cost</b>				<b>\$0.00</b>

Table B-1 : SUPPLIES AND EQUIPMENT RENTAL BACKUP									
	Description	Supplies				Equipment Rental			
		Unit Price	Type	Qty	Estimated Cost	Unit Price	Type	Qty	Estimated Cost
TASK 1					\$0.00	\$0.00			\$0.00
					\$0.00	\$0.00			\$0.00
<b>Total for Task 1</b>					<b>\$0.00</b>				<b>\$0.00</b>

**TASK 2**

	AMS Standard auger kit					\$105.00	wk		\$0.00
	Solinst Levellogger probe					\$99.00	wk		\$0.00
	Solinst water level meter					\$40.00	wk		\$0.00
	PID					\$125.00	wk		\$0.00
	Submersible pump					\$230.00	wk		\$0.00
	Pump controller					\$150.00	wk		\$0.00
	turbidity meter					\$60.00	wk		\$0.00
	Generator					\$125.00	wk		\$0.00
	Multparameter water analyzer and flow cell					\$500.00	wk		\$0.00
	Slug	\$50.00	each		\$0.00				
	Disposable polyethylene tubing	\$0.25	feet		\$0.00				
	Field vehicle (incl. Gas, parking, tax, etc.)	\$375.00	week		\$0.00				
	HPLC water for blank	\$18.00	gal		\$0.00				
	Field log book	\$9.00	book		\$0.00				
	Gasoline for generator	\$2.00	gallon		\$0.00				
	ice (3 bags/cooler)	\$2.00	bag		\$0.00				
	gloves (box)	\$22.00	box		\$0.00				
	buckets	\$6.00	ea		\$0.00				
	Tyvek (box of 24)	\$120.00	ea		\$0.00				
	IDW Drums	\$50.00	ea		\$0.00				
	Ship samples	\$50.00	box		\$0.00				
	Schoensted Magnetometer	\$10.00	day		\$0.00				
	G858 Magnetometer and Base Station	\$115.00	day		\$0.00				
	Shipping for UXO equipment	\$300.00	boxes		\$0.00				
	Alconox	\$10.00	carton		\$0.00				
	Tape	\$2.00	roll		\$0.00				
	<b>SUPPLIES TOTAL</b>				<b>\$0.00</b>				<b>\$0.00</b>
<b>Total for Task 2</b>					<b>\$0.00</b>				<b>\$0.00</b>

GSA Schedule  
for BIA

TABLE B-2 : TRAVEL COST ESTIMATES

Task No.	Descp.	Origin	Destination	No. People	Trips	Days	Airfare		Lodging + Per diem		Car Rental		Gas	POV Ground		Total
							Unit Cost	Total cost	Unit Cost	Total cost	Unit Cost	Total Cost	Total cost	Miles/Trip	Cost (\$0.485)	
1								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
<b>TOTAL COST FOR TASK 1</b>															<b>\$0.00</b>	
2								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
								\$0.00		\$0.00		\$0.00			\$0.00	\$0.00
<b>TOTAL COST FOR TASK 2</b>															<b>\$0.00</b>	

\* Lodging includes 15% for taxes allowable under the FTR.

\*\* Ground includes, taxi, mileage, gas and tolls.

**TOTAL COST \$0.00**

**GSA Schedule  
for BIA**

**TABLE B-3 : SUBCONTRACTOR COST**

<b>Task</b>	<b>Activity</b>	<b>Subcontractor</b>	<b>Amount</b>
2	Surveying of 5 Wells	Lowest of 3 Bids	\$ -
2	Drilling	Lowest of 3 Bids	\$ -
2	Utility Location - See Table B-4	Lowest of 3 Bids	\$ -
2	Laboratory - See Table B-5	Basic Ordering Agreement	\$0.00
2	Cursory Validation - See Table B-6	Basic Ordering Agreement	\$0.00
2	Full Validation - See Table B-7	Basic Ordering Agreement	\$0.00
2	Investigation Derived Waste Disposal - see Table B-8	Basic Ordering Agreement	\$ -
<b>Task 2 Total Subcontractor Cost</b>			<b>\$ -</b>



**GSA Schedule  
for BIA**

**TABLE B-4 : DRILLING AND UTILITY LOCATION SUBCONTRACTORS COST ESTIMATE**

**Drilling**

*Driller: Precision Sampling*

DESCRIPTION OF SERVICES	Units	Unit Rate	Unit Measure	AMOUNT
Mobilization/Demobilization		\$ 750.00	Lump Sum	\$ -
Hollow-stem Auger Drilling, installation, and construction of 5-4-inch wells (each well 15 feet)		\$ 7,000.00	Lump Sum	\$ -
Well Development (Five 4-inch wells)		\$ 1,500.00	Lump Sum	\$ -
Soil borings at 12 locations (15-foot depth)		\$ 3,000.00	Lump Sum	\$ -
55 Gallon drums for IDW Management		\$ 45.00	Lump Sum	\$ -
IDW Management		\$ 125.00	Per hour	\$ -
Standby time		\$ 250.00	Per hour	\$ -
<b>TOTAL DRILLING SUBCONTRACTOR</b>				<b>\$ -</b>

**Utility Location**

*Utility Location by: Precision Locating Inc.*

DESCRIPTION OF SERVICES	Units	Unit Rate	Unit Measure	AMOUNT
Mobilization/Demobilization		\$ 50.00	Lump Sum	\$ -
Utility Location (4x4 areas)		\$ 17.50	Per Location	\$ -
<b>TOTAL DRILLING SUBCONTRACTOR</b>				<b>\$ -</b>

**Surveying**

*Surveying by: PLS Surveying*

DESCRIPTION OF SERVICES	Units	Unit Rate	Unit Measure	AMOUNT
Mobilization/Demobilization		\$ 970.00	Lump Sum	\$ -
Surveying Monitoring Well Locations		\$ 55.00	Per Location	\$ -
<b>TOTAL DRILLING SUBCONTRACTOR</b>				<b>\$ -</b>

**TABLE B-5 : LABORATORY ANALYTICAL COSTS**

Analysis	Matrix	Analytical Method	Unit Price	# of Samples	Total Cost	Matrix	Analytical Method	Unit Price	# of Samples	Total Cost
CLP VOA	Soil	EPA Organics SOW	\$150.00	0	\$0.00	Water	EPA Organics SOW	\$150.00	0	\$0.00
CLP VOA - 5035	Soil	EPA Organics SOW	\$170.00	0	\$0.00	Water		N/A	0	
CLP VOA - Low Level	Soil	EPA Low Concentration Organics SOW	\$132.60	0	\$0.00	Water	EPA Low Concentration Organics SOW	\$169.95	0	\$0.00
CLP VOA - Low Level - 5035 <sup>4</sup>	Soil	EPA Low Concentration Organics SOW	\$157.08	0	\$0.00	Water		N/A	0	
8260 VOA	Soil	EPA 8260B, 5030B, SW-846	\$125.50	0	\$0.00	Water	EPA 8260, 5030B, SW-846	\$125.00	0	\$0.00
8260 VOA - 5035	Soil	EPA 8260B, 5035, SW-846	\$165.00	0	\$0.00	Water		N/A	0	
8260 MTBE/BTEX	Soil	EPA 8260B, 5030B, SW-846	\$100.00	0	\$0.00	Water	EPA 8260B, 5030B, SW-846	\$100.00	0	\$0.00
8260 MTBE/BTEX - 5035	Soil	EPA 8260B, 5035, SW-846	\$127.50	0	\$0.00	Water		N/A	0	
CLP SVOA	Soil	EPA Organics SOW	\$250.00	0	\$0.00	Water	EPA Organics SOW	\$250.00	0	\$0.00
CLP SVOA - Low Level	Soil	EPA Low Concentration Organics SOW	\$290.70	0	\$0.00	Water	EPA Low Concentration Organics SOW	\$290.70	0	\$0.00
8270 SVOA	Soil	EPA 8270C, SW-846	\$234.60	0	\$0.00	Water	EPA 8270, SW-846	\$220.00	0	\$0.00
CLP Pesticides/PCBs	Soil	EPA Organics SOW	\$163.20	0	\$0.00	Water	EPA Organics SOW	\$153.00	0	\$0.00
CLP Pesticides/PCBs - Low Level <sup>2</sup>	Soil	EPA Low Concentration Organics SOW	\$180.25	0	\$0.00	Water	EPA Low Concentration Organics SOW	\$180.25	0	\$0.00
CLP Metals <sup>4</sup>	Soil	EPA Inorganics SOW	\$153.00	0	\$0.00	Water	EPA Inorganics SOW	\$136.68	0	\$0.00
6010B/7000 for Metals	Soil	EPA 6010B/7000A, SW-846	\$160.00	0	\$0.00	Water	EPA 6010B/7000A, SW-846	\$160.00	0	\$0.00
6020B/7000 for Metals	Soil	EPA 6020/7000A, SW-846	\$200.00	0	\$0.00	Water	EPA 6020/7000A, SW-846	\$200.00	0	\$0.00
CLP Individual Metals <sup>4</sup>	Soil	EPA Inorganics SOW	\$23.00	0	\$0.00	Water	EPA Inorganics SOW	\$18.36	0	\$0.00
Individual Metals by 6010	Soil	EPA 6010B, SW-846	\$21.00	0	\$0.00	Water	EPA 6010B, SW-846	\$18.36	0	\$0.00
Individual Metals by 6020	Soil	EPA 6020, SW-846	\$22.44	0	\$0.00	Water	EPA 6020, SW-846	\$22.44	0	\$0.00
Mercury by CVAA	Soil	EPA Inorganics SOW	\$36.00	0	\$0.00	Water	EPA Inorganics SOW	\$36.00	0	\$0.00
Mercury by 1631	Soil	EPA 1631	\$75.00	0	\$0.00	Water	EPA 1631	\$75.00	0	\$0.00
CLP Cyanide	Soil	EPA Inorganics SOW	\$36.72	0	\$0.00	Water	EPA Inorganics SOW	\$36.72	0	\$0.00
Cyanide by 9010/9012 <sup>3</sup>	Soil	EPA 9010B/9012A, SW-846	\$35.70	0	\$0.00	Water	EPA 9010B/9012A, SW-846	\$35.70	0	\$0.00
CLP Analysis for Dioxins	Soil	EPA Inorganics SOW	\$765.00	0	\$0.00	Water	EPA Inorganics SOW	\$765.00	0	\$0.00
TPH Purgeables (Gasoline)	Soil	LUFT Manual & EPA 5030, 8015B, SW-846	\$61.20	0	\$0.00	Water	LUFT Manual & EPA 5030, 8015B, SW-846	\$61.20	0	\$0.00
TPH Purgeables - 5035	Soil	LUFT Manual & EPA 5035, 8015B, SW-846	\$78.00	0	\$0.00	Water		N/A	0	
TPH Extractables (Diesel/Motor Oil)	Soil	LUFT Manual & EPA 8015, SW-846	\$61.80	0	\$0.00	Water	LUFT Manual & EPA 8015, SW-846	\$71.40	0	\$0.00
Additional Fuels	Soil	LUFT Manual	\$20.60	0	\$0.00	Water	LUFT Manual	\$20.60	0	\$0.00
Fuel Fingerprinting <sup>5</sup>	Soil	LUFT Manual & EPA 8015, SW-846	\$90.00	0	\$0.00	Water	LUFT Manual & EPA 8015, SW-846	\$90.00	0	\$0.00
Halogenated Volatiles	Soil	EPA 8021B & 5030B, SW-846	\$75.00	0	\$0.00	Water	EPA 8021 & 5030B, SW-846	\$75.00	0	\$0.00
Aromatic Volatiles (BTEX)	Soil	EPA 8021B, 5030B, SW-846	\$105.00	0	\$0.00	Water	EPA 8021B, 5030B, SW-846	\$91.80	0	\$0.00
Aromatic Volatiles (BTEX) - 5035	Soil	EPA 8021B, 5035, SW-846	\$122.40	0	\$0.00	Water		N/A	0	
Aromatic Volatiles/Halogenated Volatiles	Soil	EPA 8021B, 5030B, 5035	\$135.00	0	\$0.00	Water	EPA 8021B, 5030B	\$135.00	0	\$0.00
Aromatic Volatiles/TPH-Purgeables <sup>1</sup>	Soil	EPA 8021B & 5035, SW-846	\$92.70	0	\$0.00	Water	EPA 8021B & 5030, SW-846	\$92.70	0	\$0.00
PCB - 8082	Soil	EPA 8082, SW-846	\$95.00	0	\$0.00	Water	EPA 8082, SW-846	\$95.00	0	\$0.00
PCB - Isomer Group	Soil	EPA 680	\$80.00	0	\$0.00	Water	EPA 680	\$80.00	0	\$0.00
PCB Congeners w/ Electron Capture Detection <sup>4</sup>	Soil	EPA 8082, SW-846	\$270.30	0	\$0.00	Water	EPA 8082, SW-846	\$270.30	0	\$0.00
PCB Congeners - 1668	Soil	EPA 1668	\$688.00	0	\$0.00	Water	EPA 1668	\$688.00	0	\$0.00
Pesticides	Soil	EPA 8081A, SW-846	\$132.60	0	\$0.00	Water	EPA 8081A, SW-846	\$130.56	0	\$0.00
Organophosphorus Pesticides <sup>2</sup>	Soil	EPA 8141A, SW-846	\$183.60	0	\$0.00	Water	EPA 8141A, SW-846	\$183.60	0	\$0.00
Chlorinated Herbicides <sup>2</sup>	Soil	EPA 8151A, SW-846	\$229.50	0	\$0.00	Water	EPA 8151A, SW-846	\$209.10	0	\$0.00
Organotins	Soil	NOAA, 1993	\$235.00	0	\$0.00	Water	NOAA, 1993	\$235.00	0	\$0.00
Dioxins and Furans by 8280	Soil	EPA 8280A, SW-846	\$561.00	0	\$0.00	Water	EPA 8280A, SW-846	\$561.00	0	\$0.00
Dioxins and Furans by 8290	Soil	EPA 8290, SW-846	\$765.00	0	\$0.00	Water	EPA 8290, SW-846	\$765.00	0	\$0.00
Explosives	Soil	EPA 8330, SW-846	\$200.00	0	\$0.00	Water	EPA 8330, SW-846	\$200.00	0	\$0.00
PAH - 8310	Soil	EPA 8310, SW-846	\$158.00	0	\$0.00	Water	EPA 8310, SW-846	\$158.00	0	\$0.00
PAH - Selective Ion Monitoring	Soil	EPA 8270C, SW-846	\$200.00	0	\$0.00	Water	EPA 8270C, SW-846	\$200.00	0	\$0.00
PAH - 8270 <sup>4</sup>	Soil	EPA 8270C, SW-846	\$160.00	0	\$0.00	Water	EPA 8270C, SW-846	\$160.00	0	\$0.00
Methane/Ethane/Ethene <sup>2</sup>	Soil	RSK 175	\$100.00	0	\$0.00	Water	RSK 175	\$100.00	0	\$0.00
Methane	Soil	RSK 175	\$90.00	0	\$0.00	Water	RSK 175	\$91.80	0	\$0.00
Total Organic Halides	Soil	EPA 9020B, SW-846	\$76.50	0	\$0.00	Water	EPA 9020B, SW-846	\$76.50	0	\$0.00
Oil and Grease	Soil	EPA 1664	\$60.00	0	\$0.00	Water	EPA 1664	\$60.00	0	\$0.00
TRPH <sup>2</sup>	Soil	EPA 418.1 or 1664	\$60.00	0	\$0.00	Water	EPA 418.1 or 1664	\$60.00	0	\$0.00
Organic Lead	Soil	LUFT Manual	\$66.00	0	\$0.00	Water	LUFT Manual	\$66.00	0	\$0.00
Hexavalent Chromium <sup>1</sup>	Soil	EPA 3060A & 7196A, SW-846	\$80.00	0	\$0.00	Water	EPA 3060A & 7196A, SW-846	\$45.00	0	\$0.00
Nitrate-N/Nitrite-N <sup>3</sup>	Soil	EPA 353.1 or 353.2 or 353.3	\$30.00	0	\$0.00	Water	EPA 353.1 or 353.2 or 353.3	\$30.00	0	\$0.00
Ortho Phosphate-P	Soil	EPA 365.1 or 365.2	\$33.66	0	\$0.00	Water	EPA 365.1 or 365.2	\$25.75	0	\$0.00
Major Anions (Chloride/Nitrate/Nitrite/O-Phosphate/Sulfate)	Soil	EPA 300	\$100.00	0	\$0.00	Water	EPA 300	\$100.00	0	\$0.00
Individual Anions by 300.1	Soil	EPA 300.1	\$25.00	0	\$0.00	Water	EPA 300.1	\$25.00	0	\$0.00
Total Dissolved Solids (TDS)	Soil		\$20.00	0	\$0.00	Water	EPA 160.1	\$20.00	0	\$0.00
Total Suspended Solids (TSS)	Soil		\$20.00	0	\$0.00	Water	EPA 160.2	\$20.00	0	\$0.00
Total Kjeldahl Nitrogen (TKN) <sup>3</sup>	Soil	SM 4500-N or EPA 351.2	\$30.90	0	\$0.00	Water	SM 4500-N or EPA 351.2	\$30.90	0	\$0.00
Methylene Blue Active Substances (MBAS)	Soil	SM 5540C	\$65.00	0	\$0.00	Water	SM 5540C	\$65.00	0	\$0.00
Total Organic Carbon (TOC) <sup>5</sup>	Soil	SM 5310B	\$50.00	0	\$0.00	Water	SM 5310B	\$50.00	0	\$0.00
Reactivity	Soil	SW-846 CHAPTER 7.3	\$103.00	0	\$0.00	Water	SW-846 CHAPTER 7.3	\$103.00	0	\$0.00
Acid Sulfides	Soil	EPA 9030B, SW-846	\$69.36	0	\$0.00	Water	EPA 9030B, SW-846	\$71.40	0	\$0.00
Cation Exchange Capacity	Soil	EPA 9081, SW-846	\$90.00	0	\$0.00	Water		\$90.00	0	\$0.00
Ammonia as Nitrogen	Soil		\$32.64	0	\$0.00	Water	EPA 350.1	\$30.90	0	\$0.00
Total Phosphorus	Soil		\$33.66	0	\$0.00	Water	EPA 365.1	\$26.00	0	\$0.00
Sulfide	Soil	EPA 376.1 or 376.2	\$34.00	0	\$0.00	Water	EPA 376.1 or 376.2	\$35.70	0	\$0.00
1,4 Dioxane	Soil		\$0.00	0	\$0.00	Water		\$180.00	0	\$0.00
Perchlorate <sup>4</sup>	Soil		\$91.80	0	\$0.00	Water	EPA 314.0	\$86.70	0	\$0.00
Flashpoint (Ignitability)	Soil	EPA 1010, SW-846	\$35.00	0	\$0.00	Water	EPA 1010, SW-846	\$35.00	0	\$0.00
pH	Soil	EPA 9045C, SW-846	\$13.00	0	\$0.00	Water	EPA 9040B, SW-846	\$13.00	0	\$0.00
Alkalinity	Soil	SM 2320B	\$25.00	0	\$0.00	Water	SM 2320B	\$25.00	0	\$0.00
Conductivity	Soil	EPA 9050A	\$16.00	0	\$0.00	Water	EPA 9050A	\$16.00	0	\$0.00
Salinity	Soil		\$32.00	0	\$0.00	Water	SM 2520B	\$35.00	0	\$0.00
Turbidity	Soil		\$20.00	0	\$0.00	Water	SM 2130B	\$20.00	0	\$0.00
Biological Oxygen Demand (BOD)	Soil	EPA 405.1, SM 5210B/4500-OG	\$51.00	0	\$0.00	Water	EPA 405.1, SM 5210B/4500-OG	\$50.00	0	\$0.00
Chemical Oxygen Demand (COD)	Soil	EPA 410.1, SM 5220B	\$40.80	0	\$0.00	Water	EPA 410.1, SM 5220B	\$37.00	0	\$0.00
Percent Moisture	Soil	EPA CLP Inorganic SOW	\$12.00	0	\$0.00	Water		\$12.00	0	\$0.00
Hardness	Soil		\$25.00	0	\$0.00	Water	EPA 130.1 or SM 2340B or SM 2340C	\$25.00	0	\$0.00
Acidity	Soil		\$25.00	0	\$0.00	Water	EPA 305.1/305.2, SM 2310B	\$25.00	0	\$0.00
TCLP Volatiles	Soil	EPA 1311, SW-846	\$90.00	0	\$0.00	Water	EPA 1311, SW-846	\$90.00	0	\$0.00
TCLP Non-Volatiles	Soil	EPA 1311, SW-846	\$70.00	0	\$0.00	Water	EPA 1311, SW-846	\$70.00	0	\$0.00
Waste Extraction Test (WET)	Soil	CCR 22 Div4 - 66261.126	\$70.00	0	\$0.00	Water	CCR 22 Div4 - 66261.126	\$70.00	0	\$0.00
Modified WET	Soil	CCR 22 Div4 - 66261.126	\$70.00	0	\$0.00	Water	CCR 22 Div4 - 66261.126	\$70.00	0	\$0.00

Subtotal Cost :		\$0.00
Full Data Package and Electronic Data Deliverable (20%) <sup>6</sup> :		\$0.00
Rush Surcharge <sup>7</sup>	Bus. Days %	\$0.00
	0 0%	
Subtotal Cost :		\$0.00

Subtotal Cost :		\$0.00
Full Data Package and Electronic Data Deliverable (20%) <sup>6</sup> :		\$0.00
Rush Surcharge <sup>7</sup>	Bus. Days %	\$0.00
	0 0%	
Subtotal Cost :		\$0.00

**Total Cost : \$0.00**

1-5 Rates are based on BOAs with pricing data as of January 2005

<sup>1-5</sup>The cost estimate prices are based on the maximum price for each analysis unless the maximum was determined to be an outlier. If a maximum price was determined to be an outlier then the next highest price was used for the cost estimate. The analyses with outliers are followed by a number designating which laboratory price had the outlier (1 = Lauck Laboratories, 2 = Columbia Analytical Services, 3 = Curtis and Tompkins, 4 = EMAX Laboratories, 5 = Applied Physics and Chemistry Laboratory).  
<sup>6</sup>Fee is for Full Data Package and TEMI Electronic Data Deliverable (EDD) format. Add'l EDD formats will require a separate surcharge (i.e., UST EDF requirements). Contact Xavier Fernandez for details.  
<sup>7</sup>Rush surcharges are for faxed data only (from date of samples receipt). Availability of a laboratory to perform rush services must be verified prior to sending samples. Individual laboratory rush surcharges are subject to change. Rush surcharges for 24 hour and 48 hour turn-around-times DO NOT include costs from Sequoia Analytical. Sequoia Analytical's costs were determined to be outliers and were excluded.

**TABLE B-6 : CURSORY VALIDATION**

Analysis	Matrix	Analytical Method	Unit Price	# of Samples	Total Cost	Matrix	Analytical Method	Unit Price	# of Samples	Total Cost
CLP VOA	Soil	EPA Organics SOW	\$30.00	0	\$0.00	Water	EPA Organics SOW	\$30.00	0	\$0.00
CLP VOA - Low Level	Soil	EPA Low Concentration Organics SOW	\$30.00	0	\$0.00	Water	EPA Low Concentration Organics SOW	\$30.00	0	\$0.00
8260 VOA	Soil	EPA 8260, SW-846	\$30.00	0	\$0.00	Water	EPA 8260, SW-846	\$30.00	0	\$0.00
8260 MTBE	Soil	EPA 8260, SW-846	\$17.50	0	\$0.00	Water	EPA 8260, SW-846	\$17.50	0	\$0.00
CLP SVOA	Soil	EPA Organics SOW	\$32.50	0	\$0.00	Water	EPA Organics SOW	\$32.50	0	\$0.00
CLP SVOA - Low Level	Soil	EPA Low Concentration Organics SOW	\$32.50	0	\$0.00	Water	EPA Low Concentration Organics SOW	\$32.50	0	\$0.00
8270 SVOA	Soil	EPA 8270, SW-846	\$32.50	0	\$0.00	Water	EPA 8270, SW-846	\$32.50	0	\$0.00
CLP Pesticides/PCBs - 8080 <sup>1</sup>	Soil	EPA Organics SOW	\$26.25	0	\$0.00	Water	EPA Organics SOW	\$26.25	0	\$0.00
NOAA Pesticides/PCBs	Soil		\$30.10	0	\$0.00	Water		\$30.10	0	\$0.00
CLP Metals (Filtered/Total)	Soil	EPA Inorganics SOW	\$35.50	0	\$0.00	Water	EPA Inorganics SOW	\$35.50	0	\$0.00
CLP Metals - Individual Metals	Soil	EPA Inorganics SOW	\$9.00	0	\$0.00	Water	EPA Inorganics SOW	\$9.00	0	\$0.00
CLP Cyanide	Soil	EPA Inorganics SOW	\$9.00	0	\$0.00	Water	EPA Inorganics SOW	\$9.00	0	\$0.00
TPH Purgeables (Gas)	Soil	LUFT Manual & EPA 5030, SW-846	\$13.00	0	\$0.00	Water	LUFT Manual & EPA 5030, SW-846	\$13.00	0	\$0.00
TPH Extractables (Diesel)	Soil	LUFT Manual & EPA 5030, SW-846	\$13.00	0	\$0.00	Water	LUFT Manual & EPA 5030, SW-846	\$13.00	0	\$0.00
Fuel Fingerprinting	Soil	LUFT Manual & EPA 8015, SW-846	\$16.54	0	\$0.00	Water	LUFT Manual & EPA 8015, SW-846	\$16.54	0	\$0.00
Halogenated Volatiles	Soil	EPA 8021 & 5030, SW-846	\$24.50	0	\$0.00	Water	EPA 8021 & 5030, SW-846	\$24.50	0	\$0.00
Aromatic Volatiles (BTEX)	Soil	EPA 8021 & 5030, SW-846	\$15.05	0	\$0.00	Water	EPA 8021 & 5030, SW-846	\$15.05	0	\$0.00
PCBs - 8082	Soil	EPA 8082, SW-846	\$16.54	0	\$0.00	Water	EPA 8082, SW-846	\$16.54	0	\$0.00
Pesticides - 8081	Soil	EPA 8081, SW-846	\$22.05	0	\$0.00	Water	EPA 8081, SW-846	\$22.05	0	\$0.00
Organophosphorus Pesticides	Soil	EPA 8140, SW-846	\$24.26	0	\$0.00	Water	EPA 8140, SW-846	\$24.26	0	\$0.00
Chlorinated Herbicides	Soil	EPA 8151, SW-846	\$20.00	0	\$0.00	Water	EPA 8151, SW-846	\$20.00	0	\$0.00
TRPH	Soil	EPA 418.1 or 1664	\$9.00	0	\$0.00	Water	EPA 418.1 or 1664	\$9.00	0	\$0.00
Oil and Grease	Soil	EPA 1664, SW-846	\$8.50	0	\$0.00	Water	EPA 1664, SW-846	\$8.50	0	\$0.00
Organic Lead	Soil	LUFT Manual	\$8.27	0	\$0.00	Water	LUFT Manual	\$8.27	0	\$0.00
Hexavalent Chromium (VI)	Soil	EPA 3060 & 7196, SW-846	\$8.50	0	\$0.00	Water	EPA 3060 & 7196, SW-846	\$8.50	0	\$0.00
Anions (300)	Soil		\$16.54	0	\$0.00	Water	EPA 300.0	\$16.54	0	\$0.00
Sulfide	Soil		\$8.75	0	\$0.00	Water	EPA 376.1 or 376.2	\$8.75	0	\$0.00
Nitrate-N/Nitrite-N	Soil	EPA 353.1 or 353.2 or 353.3	\$8.75	0	\$0.00	Water	EPA 353.1 or 353.2 or 353.3	\$8.75	0	\$0.00
Ammonia as Nitrogen	Soil		\$13.23	0	\$0.00	Water	EPA 350.1	\$13.23	0	\$0.00
Total Kjeldahl Nitrogen (TKN)	Soil	EPA 4500 or 351.2	\$13.23	0	\$0.00	Water	EPA 4500 or 351.2	\$13.23	0	\$0.00
Total Phosphorus	Soil		\$8.25	0	\$0.00	Water	EPA 365.1	\$8.25	0	\$0.00
Ortho Phosphate-P	Soil	EPA 365.1 or 365.2	\$8.25	0	\$0.00	Water	EPA 365.1 or 365.2	\$8.25	0	\$0.00
Flashpoint	Soil		\$7.58	0	\$0.00	Water	EPA 1010, SW-846	\$7.58	0	\$0.00
Dioxins and Furans	Soil	EPA 8280 or 8290	\$42.00	0	\$0.00	Water	EPA 8280 or 8290	\$42.00	0	\$0.00
PAHs - 8310	Soil	EPA 8310, SW-846	\$19.00	0	\$0.00	Water	EPA 8310, SW-846	\$19.00	0	\$0.00
PAHs - Selective Ion Monitoring	Soil	EPA 8270	\$22.00	0	\$0.00	Water	EPA 8270	\$22.00	0	\$0.00
Organotin <sup>2</sup>	Soil	NOAA 1993	\$16.54	0	\$0.00	Water	NOAA 1993	\$16.54	0	\$0.00
Explosives <sup>2</sup>	Soil	EPA 8330, SW-846	\$18.00	0	\$0.00	Water	EPA 8330, SW-846	\$18.00	0	\$0.00
Picric Acid	Soil		\$15.05	0	\$0.00	Water		\$15.05	0	\$0.00
Perchlorate	Soil		\$15.05	0	\$0.00	Water		\$15.05	0	\$0.00
Total Organic Carbon (TOC)	Soil	EPA 5310	\$9.92	0	\$0.00	Water	EPA 5310	\$9.92	0	\$0.00
Total Organic Halides (TOH)	Soil		\$9.92	0	\$0.00	Water		\$9.92	0	\$0.00
Asbestos - PLM <sup>2</sup>	Soil		\$9.25	0	\$0.00	Water		\$9.25	0	\$0.00
Asbestos - PEM <sup>2</sup>	Soil		\$9.25	0	\$0.00	Water		\$9.25	0	\$0.00
AVS/SEM	Soil		\$24.50	0	\$0.00	Water		\$24.50	0	\$0.00
Ferrous Iron	Soil		\$13.23	0	\$0.00	Water		\$13.23	0	\$0.00
Carbamates	Soil		\$17.64	0	\$0.00	Water		\$17.64	0	\$0.00
pH	Soil	EPA 9045, SW-846	\$7.58	0	\$0.00	Water	EPA 9040, SW-846	\$7.58	0	\$0.00
Acidity	Soil		\$7.58	0	\$0.00	Water	EPA 305.1 or 305.2 or 2310	\$7.58	0	\$0.00
Redox Potential	Soil		\$7.72	0	\$0.00	Water		\$7.72	0	\$0.00
Reactivity	Soil	SW-846	\$13.23	0	\$0.00	Water		\$13.23	0	\$0.00
Conductivity	Soil		\$13.23	0	\$0.00	Water	EPA 9050, SW-846	\$13.23	0	\$0.00
Cation Exchange Capacity	Soil	EPA 9081, SW-846	\$9.92	0	\$0.00	Water		\$9.92	0	\$0.00
Alkalinity	Soil	EPA 2320 or 310.2	\$13.23	0	\$0.00	Water	EPA 2320 or 310.2	\$13.23	0	\$0.00
Salinity	Soil		\$9.92	0	\$0.00	Water	EPA 2520	\$9.92	0	\$0.00
Hardness	Soil		\$13.23	0	\$0.00	Water	EPA 130.1 or 2340B or 2340C	\$13.23	0	\$0.00
Hydrazine	Soil	ASTM, D1385-88	\$13.23	0	\$0.00	Water	ASTM, D1385-88	\$13.23	0	\$0.00
Sediment Oxygen Demand (SOD)	Soil		\$13.23	0	\$0.00	Water		\$13.23	0	\$0.00
Biological Oxygen Demand (BOD)	Soil	EPA 405.1 & 5210	\$13.23	0	\$0.00	Water	EPA 405.1 & 5210	\$13.23	0	\$0.00
Chemical Oxygen Demand (COD)	Soil	EPA 410.1 & 5220	\$13.23	0	\$0.00	Water	EPA 410.1 & 5220	\$13.23	0	\$0.00
Turbidity	Soil		\$9.92	0	\$0.00	Water	EPA 2130	\$9.92	0	\$0.00
Total Dissolved Solids (TDS)	Soil		\$8.25	0	\$0.00	Water	EPA 160.1	\$8.25	0	\$0.00
Total Suspended Solids (TSS)	Soil		\$8.25	0	\$0.00	Water	EPA 160.2	\$8.25	0	\$0.00
Dimethyl Mercury	Soil		\$13.23	0	\$0.00	Water		\$13.23	0	\$0.00
TO-14	Soil		\$29.75	0	\$0.00	Water		\$29.75	0	\$0.00
Landfill Gas (ASTM) D-3416 (O2/CO2)	Soil		\$14.00	0	\$0.00	Water		\$14.00	0	\$0.00
Carbon Dioxide	Soil		\$13.23	0	\$0.00	Water		\$13.23	0	\$0.00
Dissolved Oxygen	Soil		\$13.23	0	\$0.00	Water		\$13.23	0	\$0.00
Methane	Soil		\$10.00	0	\$0.00	Water		\$10.00	0	\$0.00
RSK-175 (Methane, Ethane, Ethene)	Soil		\$17.64	0	\$0.00	Water		\$17.64	0	\$0.00
Headspace (Hydrogen)	Soil		\$13.00	0	\$0.00	Water		\$13.00	0	\$0.00
Mercaptan Compounds (ASTM) D-5504	Soil		\$16.54	0	\$0.00	Water		\$16.54	0	\$0.00
TCLP Non-Volatiles <sup>4</sup>	Soil	EPA 1311	\$25.36	0	\$0.00	Water	EPA 1311	\$25.36	0	\$0.00
TCLP Volatiles	Soil	EPA 1311	\$23.15	0	\$0.00	Water	EPA 1311	\$23.15	0	\$0.00
CA WET Individual Metals	Soil		\$13.23	0	\$0.00	Water		\$13.23	0	\$0.00
WET Metals (Full List)	Soil		\$35.50	0	\$0.00	Water		\$35.50	0	\$0.00
WET VOA	Soil		\$30.00	0	\$0.00	Water		\$30.00	0	\$0.00
WET SVOA	Soil		\$32.50	0	\$0.00	Water		\$32.50	0	\$0.00
WET Pesticides/PCBs	Soil		\$30.10	0	\$0.00	Water		\$30.10	0	\$0.00
WET TPH Purgeables	Soil		\$15.44	0	\$0.00	Water		\$15.44	0	\$0.00
WET TPH Extractables	Soil		\$16.54	0	\$0.00	Water		\$16.54	0	\$0.00
WET Anions	Soil		\$17.64	0	\$0.00	Water		\$17.64	0	\$0.00
WET Biological Oxygen Demand (BOD) <sup>2</sup>	Soil		\$8.82	0	\$0.00	Water		\$8.82	0	\$0.00
WET Chemical Oxygen Demand (COD) <sup>2</sup>	Soil		\$8.82	0	\$0.00	Water		\$8.82	0	\$0.00
WET Total Organic Carbon (TOC) <sup>2</sup>	Soil		\$8.82	0	\$0.00	Water		\$8.82	0	\$0.00

Rates are based on BOAs with pricing data as of April 2004

**Total Cost : \$0.00**

<sup>1-4</sup>The cost estimate prices are based on the maximum price for each analysis unless the maximum was determined to be an outlier. If a maximum price was determined to be an outlier then the next highest price was used for the cost estimate. The analyses with outliers are followed by a number designating which laboratory price had the outlier (1 = Data Val Inc., 2 = Data Validation Group, 3 = QuantaLex, and 4 = Elthix).

**TABLE B-7 : FULL VALIDATION**

Analysis	Matrix	Analytical Method	Unit Price	# of Samples	Total Cost	Matrix	Analytical Method	Unit Price	# of Samples	Total Cost
CLP VOA	Soil	EPA Organics SOW	\$33.50	0	\$0.00	Water	EPA Organics SOW	\$33.50	0	\$0.00
CLP VOA - Low Level	Soil	EPA Low Concentration Organics SOW	\$33.50	0	\$0.00	Water	EPA Low Concentration Organics SOW	\$33.50	0	\$0.00
8260 VOA	Soil	EPA 8260, SW-846	\$35.61	0	\$0.00	Water	EPA 8260, SW-846	\$35.61	0	\$0.00
8260 MTBE	Soil	EPA 8260, SW-846	\$20.20	0	\$0.00	Water	EPA 8260, SW-846	\$20.20	0	\$0.00
CLP SVOA	Soil	EPA Organics SOW	\$36.00	0	\$0.00	Water	EPA Organics SOW	\$36.00	0	\$0.00
CLP SVOA - Low Level	Soil	EPA Low Concentration Organics SOW	\$36.00	0	\$0.00	Water	EPA Low Concentration Organics SOW	\$36.00	0	\$0.00
8270 SVOA	Soil	EPA 8270, SW-846	\$37.71	0	\$0.00	Water	EPA 8270, SW-846	\$37.71	0	\$0.00
CLP Pesticides/PCBs - 8080	Soil	EPA Organics SOW	\$36.12	0	\$0.00	Water	EPA Organics SOW	\$36.12	0	\$0.00
NOAA Pesticides/PCBs	Soil		\$39.80	0	\$0.00	Water		\$39.80	0	\$0.00
CLP Metals (Filtered/Total)	Soil	EPA Inorganics SOW	\$39.00	0	\$0.00	Water	EPA Inorganics SOW	\$39.00	0	\$0.00
CLP Metals - Individual Metals	Soil	EPA Inorganics SOW	\$12.57	0	\$0.00	Water	EPA Inorganics SOW	\$12.57	0	\$0.00
CLP Cyanide	Soil	EPA Inorganics SOW	\$12.57	0	\$0.00	Water	EPA Inorganics SOW	\$12.57	0	\$0.00
TPH Purgeables (Gas)	Soil	LUFT Manual & EPA 5030, SW-846	\$21.00	0	\$0.00	Water	LUFT Manual & EPA 5030, SW-846	\$21.00	0	\$0.00
TPH Extractables (Diesel)	Soil	LUFT Manual & EPA 5030, SW-846	\$21.00	0	\$0.00	Water	LUFT Manual & EPA 5030, SW-846	\$21.00	0	\$0.00
Fuel Fingerprinting	Soil	LUFT Manual & EPA 8015, SW-846	\$20.95	0	\$0.00	Water	LUFT Manual & EPA 8015, SW-846	\$20.95	0	\$0.00
Halogenated Volatiles	Soil	EPA 8021 & 5030, SW-846	\$26.50	0	\$0.00	Water	EPA 8021 & 5030, SW-846	\$26.50	0	\$0.00
Aromatic Volatiles (BTEX)	Soil	EPA 8021 & 5030, SW-846	\$20.00	0	\$0.00	Water	EPA 8021 & 5030, SW-846	\$20.00	0	\$0.00
PCBs - 8082	Soil	EPA 8082, SW-846	\$27.00	0	\$0.00	Water	EPA 8082, SW-846	\$27.00	0	\$0.00
Pesticides - 8081	Soil	EPA 8081, SW-846	\$27.56	0	\$0.00	Water	EPA 8081, SW-846	\$27.56	0	\$0.00
Organophosphorus Pesticides	Soil	EPA 8140, SW-846	\$27.56	0	\$0.00	Water	EPA 8140, SW-846	\$27.56	0	\$0.00
Chlorinated Herbicides	Soil	EPA 8151, SW-846	\$24.00	0	\$0.00	Water	EPA 8151, SW-846	\$24.00	0	\$0.00
TRPH	Soil	EPA 418.1 or 1664	\$11.00	0	\$0.00	Water	EPA 418.1 or 1664	\$11.00	0	\$0.00
Oil and Grease	Soil	EPA 1664, SW-846	\$11.00	0	\$0.00	Water	EPA 1664, SW-846	\$11.00	0	\$0.00
Organic Lead	Soil	LUFT Manual	\$11.00	0	\$0.00	Water	LUFT Manual	\$11.00	0	\$0.00
Hexavalent Chromium (VI)	Soil	EPA 3060 & 7196, SW-846	\$11.00	0	\$0.00	Water	EPA 3060 & 7196, SW-846	\$11.00	0	\$0.00
Anions (300)	Soil		\$18.74	0	\$0.00	Water	EPA 300.0	\$18.74	0	\$0.00
Sulfide	Soil		\$11.00	0	\$0.00	Water	EPA 376.1 or 376.2	\$11.00	0	\$0.00
Nitrate-N/Nitrite-N	Soil	EPA 353.1 or 353.2 or 353.3	\$11.00	0	\$0.00	Water	EPA 353.1 or 353.2 or 353.3	\$11.00	0	\$0.00
Ammonia as Nitrogen <sup>2</sup>	Soil		\$11.00	0	\$0.00	Water	EPA 350.1	\$11.00	0	\$0.00
Total Kjeldahl Nitrogen (TKN) <sup>2</sup>	Soil	EPA 4500 or 351.2	\$11.00	0	\$0.00	Water	EPA 4500 or 351.2	\$11.00	0	\$0.00
Total Phosphorus	Soil		\$11.58	0	\$0.00	Water	EPA 365.1	\$11.58	0	\$0.00
Ortho Phosphate-P	Soil	EPA 365.1 or 365.2	\$11.00	0	\$0.00	Water	EPA 365.1 or 365.2	\$11.00	0	\$0.00
Flashpoint	Soil		\$11.00	0	\$0.00	Water	EPA 1010, SW-846	\$11.00	0	\$0.00
Dioxins and Furans	Soil	EPA 8280 or 8290	\$47.50	0	\$0.00	Water	EPA 8280 or 8290	\$47.50	0	\$0.00
PAHs - 8310	Soil	EPA 8310, SW-846	\$25.00	0	\$0.00	Water	EPA 8310, SW-846	\$25.00	0	\$0.00
PAHs - Selective Ion Monitoring	Soil	EPA 8270	\$30.00	0	\$0.00	Water	EPA 8270	\$30.00	0	\$0.00
Organotin <sup>2</sup>	Soil	NOAA 1993	\$19.00	0	\$0.00	Water	NOAA 1993	\$18.75	0	\$0.00
Explosives <sup>2</sup>	Soil	EPA 8330, SW-846	\$25.00	0	\$0.00	Water	EPA 8330, SW-846	\$25.00	0	\$0.00
Picric Acid	Soil		\$19.85	0	\$0.00	Water		\$19.85	0	\$0.00
Perchlorate	Soil		\$19.85	0	\$0.00	Water		\$19.85	0	\$0.00
Total Organic Carbon (TOC)	Soil	EPA 5310	\$14.88	0	\$0.00	Water	EPA 5310	\$14.88	0	\$0.00
Total Organic Halides (TOH)	Soil		\$14.88	0	\$0.00	Water		\$14.88	0	\$0.00
Asbestos - PLM <sup>2</sup>	Soil		\$11.00	0	\$0.00	Water		\$10.75	0	\$0.00
Asbestos - PEM <sup>2</sup>	Soil		\$11.00	0	\$0.00	Water		\$10.75	0	\$0.00
AVS/SEM	Soil		\$33.08	0	\$0.00	Water		\$33.08	0	\$0.00
Ferrous Iron	Soil		\$19.85	0	\$0.00	Water		\$19.85	0	\$0.00
Carbamates	Soil		\$22.00	0	\$0.00	Water		\$22.00	0	\$0.00
pH	Soil	EPA 9045, SW-846	\$11.00	0	\$0.00	Water	EPA 9040, SW-846	\$10.00	0	\$0.00
Acidity	Soil		\$11.00	0	\$0.00	Water	EPA 305.1 or 305.2 or 2310	\$10.00	0	\$0.00
Redox Potential	Soil		\$11.58	0	\$0.00	Water		\$11.58	0	\$0.00
Reactivity	Soil	SW-846	\$19.85	0	\$0.00	Water		\$19.85	0	\$0.00
Conductivity	Soil		\$19.85	0	\$0.00	Water	EPA 9050, SW-846	\$19.85	0	\$0.00
Cation Exchange Capacity	Soil	EPA 9081, SW-846	\$14.88	0	\$0.00	Water		\$14.88	0	\$0.00
Alkalinity	Soil	EPA 2320 or 310.2	\$19.85	0	\$0.00	Water	EPA 2320 or 310.2	\$19.85	0	\$0.00
Salinity	Soil		\$14.88	0	\$0.00	Water	EPA 2520	\$14.88	0	\$0.00
Hardness	Soil		\$19.85	0	\$0.00	Water	EPA 130.1 or 2340B or 2340C	\$19.85	0	\$0.00
Hydrazine	Soil	ASTM, D1385-88	\$19.85	0	\$0.00	Water	ASTM, D1385-88	\$19.85	0	\$0.00
Sediment Oxygen Demand (SOD)	Soil		\$19.85	0	\$0.00	Water		\$19.85	0	\$0.00
Biological Oxygen Demand (BOD)	Soil	EPA 405.1 & 5210	\$19.85	0	\$0.00	Water	EPA 405.1 & 5210	\$19.85	0	\$0.00
Chemical Oxygen Demand (COD)	Soil	EPA 410.1 & 5220	\$19.85	0	\$0.00	Water	EPA 410.1 & 5220	\$19.85	0	\$0.00
Turbidity	Soil		\$14.88	0	\$0.00	Water	EPA 2130	\$14.88	0	\$0.00
Total Dissolved Solids (TDS)	Soil		\$11.00	0	\$0.00	Water	EPA 160.1	\$10.00	0	\$0.00
Total Suspended Solids (TSS)	Soil		\$11.00	0	\$0.00	Water	EPA 160.2	\$10.00	0	\$0.00
Dimethyl Mercury	Soil		\$19.85	0	\$0.00	Water		\$19.85	0	\$0.00
TO-14	Soil		\$33.50	0	\$0.00	Water		\$33.50	0	\$0.00
Landfill Gas (ASTM) D-3416 (O2)	Soil		\$16.54	0	\$0.00	Water		\$16.54	0	\$0.00
Carbon Dioxide	Soil		\$19.85	0	\$0.00	Water		\$19.85	0	\$0.00
Dissolved Oxygen	Soil		\$19.85	0	\$0.00	Water		\$19.85	0	\$0.00
Methane	Soil		\$15.00	0	\$0.00	Water		\$15.00	0	\$0.00
RSK-175 (Methane, Ethane, Eth)	Soil		\$22.05	0	\$0.00	Water		\$22.05	0	\$0.00
Headspace (Hydrogen)	Soil		\$19.00	0	\$0.00	Water		\$17.00	0	\$0.00
Mercaptan Compounds (ASTM)	Soil		\$22.00	0	\$0.00	Water		\$22.00	0	\$0.00
TCPL Non-Volatiles <sup>4</sup>	Soil	EPA 1311	\$38.04	0	\$0.00	Water	EPA 1311	\$38.04	0	\$0.00
TCPL Volatiles	Soil	EPA 1311	\$34.73	0	\$0.00	Water	EPA 1311	\$34.73	0	\$0.00
CA WET Individual Metals	Soil		\$19.85	0	\$0.00	Water		\$19.85	0	\$0.00
WET Metals (Full List)	Soil		\$39.00	0	\$0.00	Water		\$39.00	0	\$0.00
WET VOA	Soil		\$33.50	0	\$0.00	Water		\$33.50	0	\$0.00
WET SVOA	Soil		\$36.38	0	\$0.00	Water		\$36.38	0	\$0.00
WET Pesticides/PCBs	Soil		\$36.38	0	\$0.00	Water		\$36.38	0	\$0.00
WET TPH Purgeables	Soil		\$23.15	0	\$0.00	Water		\$23.15	0	\$0.00
WET TPH Extractables	Soil		\$24.81	0	\$0.00	Water		\$24.81	0	\$0.00
WET Anions	Soil		\$22.05	0	\$0.00	Water		\$22.05	0	\$0.00
WET Biological Oxygen Demand	Soil		\$11.00	0	\$0.00	Water		\$10.47	0	\$0.00
WET Chemical Oxygen Demand	Soil		\$11.00	0	\$0.00	Water		\$10.47	0	\$0.00
WET Total Organic Carbon (TOC)	Soil		\$11.00	0	\$0.00	Water		\$10.47	0	\$0.00

Rates are based on BOAs with pricing data as of April 2004

**Total Cost : \$0.00**

<sup>1-4</sup>The cost estimate prices are based on the maximum price for each analysis unless the maximum was determined to be an outlier. If a maximum price was determined to be an outlier then the next highest price was used for the cost estimate. The analyses with outliers are followed by a number designating which laboratory price had the outlier (1 = Data Val Inc., 2 = Data Validation Group, 3 = QuantalEx, and 4 = Ethix).

**GSA Schedule  
for BIA**

**TABLE B-8 : INVESTIGATION DERIVED WASTE DISPOSAL**

ITEM DESCRIPTION	UNIT PRICE	NUMBER OF UNITS	TOTAL UNIT COST
Non RCRA wastewater per drum (CLIN 4020)	\$ 175.00		\$ -
Non RCRA soil per drum (CLIN 1021)	\$ 75.00		\$ -
Truck hauling per load (CLIN 801)	\$ 330.00		\$ -
Truck mileage per mile (CLIN 8030)	\$ 1.70		\$ -
<b>Total</b>			<b>\$ -</b>

CLIN = Contract Line Item Number from Basic Ordering Agreement Contract

**Appendix D**  
**EDL Cost Estimate Documentation Sheet**



## ECL Cost Estimate Documentation Sheet

### Disclaimer

This form is designed to document the cost estimate for the referenced site in DOI's ECL report as required and defined by applicable federal accounting standards. Nothing on this form constitutes or should be construed as an admission of fact or the assertion, adoption, or concession of any legal, regulatory, financial, accounting, environmental, scientific or engineering position, projection or conclusion. Estimating future costs associated with the cleanup of environmental damage is fraught with uncertainty. The uncertainty may be high early in the cleanup process, but should decrease as site conditions are better understood. As such, the cleanup cost estimates presented at this time may not accurately reflect the actual cost required to achieve total cleanup. Moreover, the information on this form is strictly confidential and is protected by all applicable privileges.

Note: Work sheet tab 1 alone will be sufficient to document a site's cleanup cost estimate if the site does not consist of multiple sub-areas (e.g., operable units or other) or include several cleanup action alternatives. If the site consists of multiple sub-areas with different cleanup actions activities, a cost estimate will be developed for each sub-area. Tabs 2 and 3 can be used to document different sub-areas. The total cost estimate will combine the cost estimates of the sub-areas (tabs 1, 2, and 3). Additional tabs can be added for additional sub-areas as needed.

Additionally, cost estimates can be developed for several response alternatives if the preferred alternative has not been determined and the estimator cannot assume the alternative that will be preferred. The individual sub-area sheets (tabs 1, 2, and 3) can be used to document individual response alternatives.

1. **Date Completed** \_\_\_\_\_
2. **Current FY Quarter** \_\_\_\_\_
3. **Site Name** \_\_\_\_\_
4. **Sub-area or Alternative Name (if applicable)** \_\_\_\_\_
5. **Location / State** \_\_\_\_\_
6. a. **Estimator's Name** \_\_\_\_\_
- b. **Estimator's Position** \_\_\_\_\_
- c. **Estimator's Signature** \_\_\_\_\_
7. a. **Reviewer's / Approver's Name** \_\_\_\_\_
- b. **Reviewer's / Approver's Position** \_\_\_\_\_
- c. **Reviewer's / Approver's Signature** \_\_\_\_\_

<b>8. Site /Sub-area Type</b>	<b>Select Applicable</b>	<b>Date</b> _____ <b>Select Affected Media</b>
	Abandoned Mine/Mineral Processing Mill/ Tailings	Air <input type="checkbox"/>
	Abandoned Oil, Gas or Fluid Well(s)	Soil <input type="checkbox"/>
	Active Mine/Mineral Processing Mill/ Tailings	Sediment <input type="checkbox"/>
	Active Oil, Gas or Fluid Well(s)	Groundwater <input type="checkbox"/>
	Acquired Federal Facility	Surface Water <input type="checkbox"/>
	Acquired Industrial Facility	
	Acquired Private Property	
	Agricultural / Dip Vats	
	Airfield	
	DOI Facility	
	Illegal Dumping / Burning of Hazardous Substances	
	Improper Disposal	
	Firing Range	
	Landfill/Dump	
	Leaking Aboveground Storage Tank(s)	
	Leaking Underground Storage Tank(s)	
	Mixed Federal Industrial Facility	
	Pipeline Leaks/Spills	
	Reserve or Treatment Pit	
	School / Buildings	
	Spills	
	Utilities	
	Other (specify below) _____	

9. Potential Primary Contaminants of Concern (select up to 4 contaminants) (pull down)

a.	
b.	
c.	
d.	

10. State The Problem (text format)

11. What stage in the cleanup action process is currently in progress? (check appropriate stage)

- a. Due diligence complete. Site/Sub-area identified as an ECL, but no other activity.
- b. Studies/investigations (specify, e.g., PA, RI, FS, CMS, etc.) \_\_\_\_\_
- c. Remedial / Removal Action or equivalent (includes design and construction)
- d. O&M (applicable after remedy has achieved cleanup action goals and determined operational and functional, or 1 year after construction [whichever is earlier] except for water treatment alternatives)
- e. LTM (long-term monitoring)


Note: Under CERCLA, groundwater and surface water treatment actions to restore water quality to a protected level is considered part of the remedial action for the 1st 10 years of operation, and O&M for any additional years.

12. Last cleanup action document approved by EPA, State, or Other

13. Is the total cleanup cost estimable at this time? (check appropriate)

Yes

No

14. If response to 13 is yes, go to 18. If no, proceed to 15.

15. Is any portion of the total cleanup cost (interim response activities) estimable at this time?

Yes

No

16. If response to 15 is yes, go to 18 then 21. If no, proceed to 17.

17. Provide the basis for no portion of the cleanup cost estimable at this time.

18. Select the Cost Estimating Method Used.

IGCE

Contractor Estimate

RACER or Other Cost Model

Professional Judgment / Based on Comparable Site Costs

Other (specify below)



19. **Total Cleanup Cost Estimate: Specify the response alternative used for the basis of the total cleanup cost and complete the cost estimate buildup below.**

**Total Cleanup Cost Estimate Buildup**

	<b>Work Element</b>	<b>Estimated Cost - Single Amount or Low End if Range (\$)</b>	<b>Estimated Cost - High End if Range (\$)</b>	<b>Bureau's Cost - Low End (\$) (calculated)</b>	<b>Bureau's Cost - High End (\$) (calculated)</b>
a.				\$0	\$0
b.				\$0	\$0
c.				\$0	\$0
d.				\$0	\$0
e.				\$0	\$0
f.				\$0	\$0
g.				\$0	\$0
(Add additional work elements as necessary)					
<b>Total Site / Sub-area Cleanup Cost Estimate</b>				\$0	\$0

20. **Total Cleanup Cost Estimate Buildup Assumptions by Work Element**

<b>Work Element</b>	<b>Assumptions</b>
a.	0
b.	0
c.	0
d.	0
e.	0
f.	0
g.	0

(Add additional work elements as necessary or separate work sheets)

Cost Estimate Documentation Complete

21. **Interim Cleanup Action Cost Estimate Buildup (use only if Total Cleanup Cost not Estimable)**

Cost To Study					
Work Element	Estimated Cost - Single Amount or Low End if Range (\$)	Estimated Cost - High End if Range (\$)		Bureau's Cost - Low End (\$) (calculated)	Bureau's Cost - High End (\$) (calculated)
a.				\$0	\$0
b.				\$0	\$0
c.				\$0	\$0
d.				\$0	\$0
e.				\$0	\$0
f.				\$0	\$0
g.				\$0	\$0

(Add additional work elements as necessary)

**Cost to Study Estimate** \$0 \$0

22. **Cost to Study Estimate Buildup Assumptions by Work Element**

Work Element	Assumptions
a.	0
b.	0
c.	0
d.	0
e.	0
f.	0
g.	0

(Add additional work elements as necessary or separate work sheet)

23. **Interim Cleanup Action Cost Estimate Buildup (use only if Total Cleanup Cost not Estimable)**

Cost To Monitor					
Work Element	Estimated Cost - Single Amount or Low End if Range (\$)	Estimated Cost - High End if Range (\$)		Bureau's Cost - Low End (\$) (calculated)	Bureau's Cost - High End (\$) (calculated)
a.				\$0	\$0
b.				\$0	\$0
c.				\$0	\$0
d.				\$0	\$0
e.				\$0	\$0
f.				\$0	\$0
g.				\$0	\$0

(Add additional work elements as necessary)

**Cost to Monitor Estimate** \$0 \$0

24. **Cost to Monitor Estimate Buildup Assumptions by Work Element**

Work Element	Assumptions
a.	0
b.	0
c.	0
d.	0
e.	0
f.	0
g.	0

(Add additional work elements as necessary or separate work sheet)

25. **Interim Cleanup Action Cost Estimate Buildup (use only if Total Cleanup Cost not Estimable)**

Other Interim Action Cost						
	Work Element	Estimated Cost - Single Amount or Low End if Range (\$)	Estimated Cost - High End if Range (\$)		Bureau's Cost - Low End (\$) (calculated)	Bureau's Cost - High End (\$) (calculated)
a.					\$0	\$0
b.					\$0	\$0
c.					\$0	\$0
d.					\$0	\$0
e.					\$0	\$0
f.					\$0	\$0
g.					\$0	\$0

(Add additional work elements as necessary)

**Other Cost Estimate**

**\$0**

**\$0**

26. **Other Interim Action Cost Estimate Buildup Assumptions by Work Element**

Work Element	Assumptions
a.	0
b.	0
c.	0
d.	0
e.	0
f.	0
g.	0

(Add additional work elements as necessary or separate work sheet)

Cost Estimate Documentation Complete

**Combined Sub-areas Cleanup or Interim Cleanup Action Cost Estimates**

<b>Current FY Quarter</b>	0	0
<b>Site Name</b>	0	

<b>Total Cleanup Cost Estimate</b>			
<b>No.</b>	<b>Sub-area or Alternative Name</b>	<b>Total Cleanup Cost Estimate</b>	
		<b>Bureau's Cost - Single Amount or Low End if Range (\$ (calculated))</b>	<b>Bureau's Cost - High End if Range (\$ (calculated))</b>
1.	0	\$0	\$0
2.	0	\$0	\$0
3.	0	\$0	\$0
<b>Total Cleanup Cost Estimate</b>		\$0	\$0

**Interim Cleanup Action Cost Estimates**

<b>Cost To Study Estimate</b>			
<b>No.</b>	<b>Sub-area Name</b>	<b>Cost To Study Estimate</b>	
		<b>Bureau's Cost - Single Amount or Low End if Range (\$ (calculated))</b>	<b>Bureau's Cost - High End if Range (\$ (calculated))</b>
1.	0	\$0	\$0
2.	0	\$0	\$0
3.	0	\$0	\$0
<b>Cost To Study Estimate</b>		\$0	\$0

<b>Cost To Monitor Estimate</b>			
<b>No.</b>	<b>Sub-area Name</b>	<b>Cost To Monitor Estimate</b>	
		<b>Bureau's Cost - Single Amount or Low End if Range (\$ (calculated))</b>	<b>Bureau's Cost - High End if Range (\$ (calculated))</b>
1.	0	\$0	\$0
2.	0	\$0	\$0
3.	0	\$0	\$0
<b>Cost To Monitor Estimate</b>		\$0	\$0

<b>Other Interim Action Cost Estimate</b>			
<b>No.</b>	<b>Sub-area Name</b>	<b>Other Interim Action Cost Estimate</b>	
		<b>Bureau's Cost - Single Amount or Low End if Range (\$ (calculated))</b>	<b>Bureau's Cost - High End if Range (\$ (calculated))</b>
1.	0	\$0	\$0
2.	0	\$0	\$0
3.	0	\$0	\$0
<b>Other Interim Action Cost Estimate</b>		\$0	\$0

**Site Cleanup Cost Estimate**

	<b>Bureau's Cost - Single Amount or Low End if Range (\$ (calculated))</b>		<b>Bureau's Cost - High End if Range (\$ (calculated))</b>
	\$0		\$0