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Decision Analysis for Remediation Technologies (DART) User's Manual

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ABSTRACT

This user's manual is an introduction to the use of the Decision Analysis for Remediation Technology (DART) Report Generator. DART provides a user interface to a database containing site data (e.g., contaminants, waste depth, area) for sites within the Subsurface Contaminant Focus Area (SCFA). The database also contains SCFA requirements, needs, and technology information. The manual is arranged in two major sections. The first section describes loading DART onto a user system. The second section describes DART operation. DART operation is organized into sections by the user interface forms. For each form, user input, both optional and required, DART capabilities, and the result of user selections will be covered in sufficient detail to enable the user to understand DART capabilities and determine how to use DART to meet specific needs.

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Decision Analysis for Remediation Technologies (DART) User's Manual

1. INTRODUCTION

This manual is your guide to using the Decision Analysis for Remediation Technology Report Generator (DART). DART provides a user interface to a database containing site data, e.g., contaminants, waste depth, area, etc. for sites within the Subsurface Contaminant Focus Area (SCFA). The database also contains SCFA requirements, needs, and technology information. The database is described in more detail in the DART System Description Document. The System Description Document also covers the logic used to produce the output from DART based on user selection and data characteristics.

The manual is arranged in two major sections. The first section describes loading DART onto a user system. The second section describes DART operation. DART operation is organized into sections by the user interface forms. For each form, user input, both optional and required, DART capabilities, and the result of user selections will be covered in sufficient detail to enable you to understand DART capabilities and determine how to use DART to meet specific needs.

2. INSTALLING DART

The following sections provide the information necessary to install DART on your PC. Although the instructions below assume installation from floppy disk, the same procedure can be followed if the DART system is downloaded using the Internet. The only requirements for DART installation and operation are the Windows 95 or Windows NT operating system. In addition, Winzip, a software package for compacting files, is required to expand the compacted version of the database. If you are downloading DART from the Internet, you will also need to use Winzip to expand the file containing the DART interface.

2.1 Database Installation:

1. If this is the first time you are installing DART on your PC, create the folder c:\scfa. The database must be stored in this folder to ensure the DART system can find it.

2. Using Winzip, expand the compacted version of the database, scfadb.zip from the floppy disk to the file scfadb.mdb in the folder c:\scfa. If an existing version of scfadb.mdb currently exists, allow Winzip to overwrite the existing version or delete the existing version before expanding the database.

2.2 Interface Installation

1. Exit from currently running applications. This is not required but will minimize the likelihood of potential software conflicts during installation. Note that this is only desirable during the installation or update process.

2. If DART is being installed for the FIRST time on a desktop, it is necessary to copy the files msvcirt.dll and msvcrt.dll from the floppy disk to the folder c:\windows\system. If DART is being updated, it is necessary to first uninstall the old version of DART. To do this, choose Add/Remove Programs from the Control Panel and select ReportGenerator to uninstall the existing version

3. Insert the floppy labeled DART Disk 1 in your floppy drive and initiate the setup program. The setup can be initiated by either running the application file "setup" on the floppy or using "Add/Remove Programs" in the Windows Control Panel. Follow the instructions and the DART interface will be installed in the c:\Programs folder as ReportGenerator. If DART was downloaded via the Internet, run the setup application file in the folder that was used as the destination folder when the file containing the DART interface was uncompressed.

2.3 Screen Resolution

DART has been designed to run with a minimum screen resolution of 800 x 600 pixels, the current laptop standard, but will work best on a desktop with a screen area of 1024 x 768 pixels. To change a display to 1024 x 768, open the Control Panel and select Display. Within Display, select the Settings tab. Within the Settings window, there is a Desktop Area slide bar. Moving the bar to "More" and then selecting the "OK" button will change the desktop display area to 1024 x 768 pixels.

2.4 Running DART

Start DART by clicking the Start button in the Windows 95 Interface, selecting the Program submenu, then selecting "Report Generator." It can also be started by executing the program *ReportGenerator.exe* in the folder c:\ProgramFiles. The initial DART user screen is the top-level form shown in Figure 1.

3. DART USER INTERFACE FORMS

Each user interface form, its purpose, user inputs, and capabilities are covered in this section. A DART interface map which shows the relationships between all of the forms in the DART interface is included in Appendix A of this manual.

3.1 Top-Level

The top-level form, shown in Figure 1, is the first screen that appears when DART is started. This enables you to access the major capabilities of DART by clicking the mouse on one of six buttons.

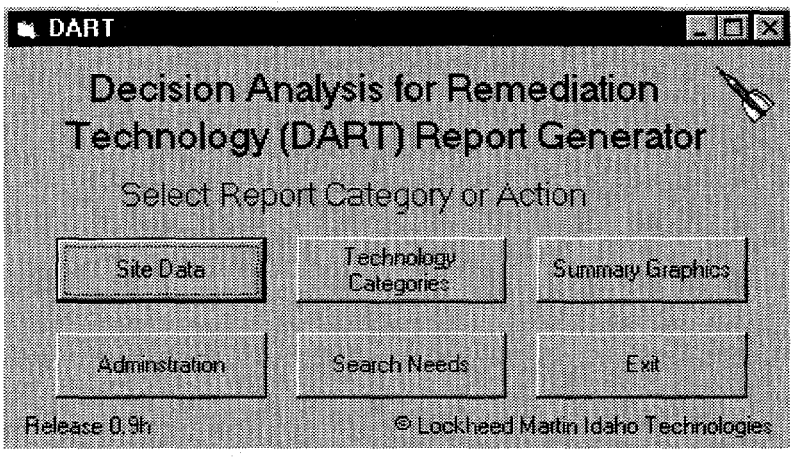

Figure 1. Top-level form

Site Data: This button opens the Site Data form, Figure 2. The Site Data form allows you to enter search criteria that enables you to find and display data for sites which meet the desired characteristics.

Technology Categories: This button opens the Select Technology Category form, Figure 11. This form provides you with a variety of capabilities that are based on technology category, e.g., excavation, in-situ bioremediation, etc.

Summary Graphics: This button opens the Summary Graphics form, Figure 38, which enables you to generate and print a variety of graphs. These graphs are available by complex or field office, and/or site type, and/or configuration option. You can also generate graphs for an arbitrary set of sites that you choose.

Administration: This button opens the SCFA Administration form, Figure 41. This capability should not be required for the average user. The functions within the SCFA DB Administration form are used to update certain tables within the database whenever new data is added to the

database. Selecting a button within Administration will only regenerate existing tables if no new data has been entered in the database.

Search Needs: This button opens the Search Needs form, Figure 40. You can search for needs by technology category, and/or complex or field office, and/or by entering one or two search strings.

Exit: Exit and close DART.

Note that as for other Windows applications, the minimize button, "-". in the upper right of the top-level form will enable you to minimize DART. However, the close button, "x", is disabled as DART is an executable program, which means using the close button would leave DART running in the background without you being able to access it. Currently, the top-level form is the only DART form with the minimize capability. Click the mouse on Exit to close DART.

3.2 Site Data

The Site Data Search Criteria form, Figure 2, is used to enter search criteria to search for sites in the database satisfying specific criteria. Data entry is strictly mouse-driven in this form. To enter search criteria, tab the cursor or move the cursor with the mouse to the desired criteria, press the left mouse button, and a window or menu will open to enable you to enter the desired data. It is not possible for you to enter data by typing input directly into the text boxes in the Site Data Search Criteria form.

To enter numeric data, e.g., to search for sites with volume greater than 1,000 cubic yards, click the mouse on the Volume text box. The Numeric Data Entry form, Figure 3, is opened. Enter the numeric value in the text box. Inequalities are selected by selecting the option buttons. The default is the option button "=". Selecting the Clear button will clear the current value entered. Selecting the Close button will close the Numeric Data Entry form without changing the current value in the Site Data Search Criteria form. Selecting the OK button will insert this value into the Site Data Search Criteria form.

The Nonnumeric Data Entry form, Figure 4, is used to input contaminants, contaminant categories, and regulatory drivers as search criteria. The menu on the left displays your current selections. To add a new selection, choose the desired value in the menu on the right side and click on "<<". The selected value will be added to the left hand menu. To deselect a currently selected value, choose the value in the menu on the left and click on ">>". Selecting the Close button will close the Data Entry form without changing the current values in the Site Data form. Clear All will clear all current selections. Selecting the OK button will enter the currently selected values into the Site Data Search Criteria. Only three contaminant choices, two contaminant categories, and two regulatory drivers can be chosen simultaneously as search criteria. In addition, either contaminants or contaminant categories can be used as criteria in a search but not both simultaneously.

The remaining data entry boxes, for example, Field Office, use pop-up menus for entry of search criteria. Only one value can be chosen from these menus as a search criteria.

After the search criteria have been entered, there are seven buttons to display results of the database search for sites which satisfy the search criteria.

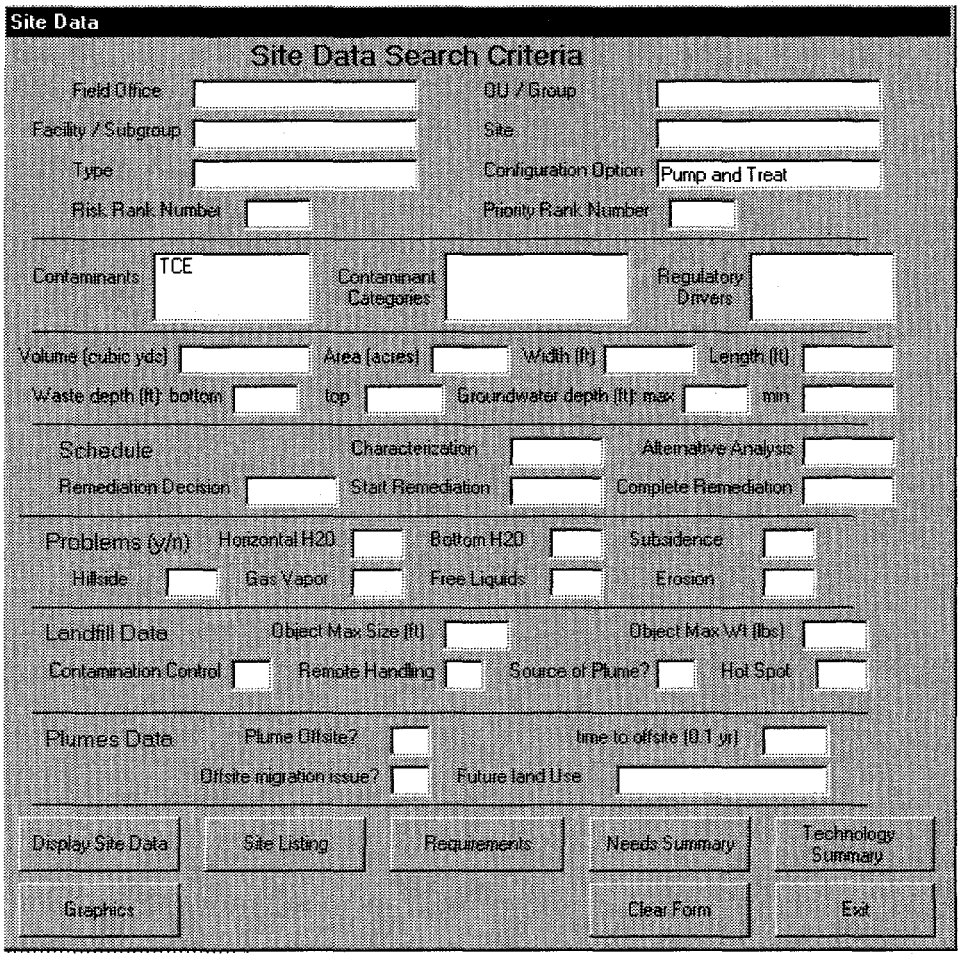

Figure 2. Site Data Search Criteria form.

Clear form: This button clears the form of all currently entered search criteria.

Exit: This button exits the Site Data Search Criteria form and returns to the Top-level form.

Display Site Data: This button opens the Site Data Display form, Figure 5, and displays single page summaries of the data available for all sites that satisfy the current search criteria.

Site Listing: This button opens the Site Listing Report form, Figure 6, that lists the names (e.g., field office, OU/group name, facility name, and subsite name) of all sites that satisfy the current search criteria.

Requirements: When you select the Requirements button, a form, Figure 6, is opened containing a menu of technology categories. After you select a technology category, the Sites and

Requirements form opens (Figure 7). This form displays all sites satisfying the user input criteria which require the selected technology category and the requirements for the selected sites and technology category.

Needs Summary: When you select the Needs Summary button, the Needs form (Figure 9) is opened, which lists all of the needs associated with the sites satisfying input search criteria.

Technology Summary: When you select the Technology Summary button, the Technology Categories form, Figure 10, displays the technology categories required by the sites satisfying the user input criteria.

Graphics: When you select the Graphics button, the sites that satisfy the criteria entered in the Site Data form are available in the Graphics form, Figure 38, as user entered site ids. These sites can then be used to generated the graphs available in the graphics form.

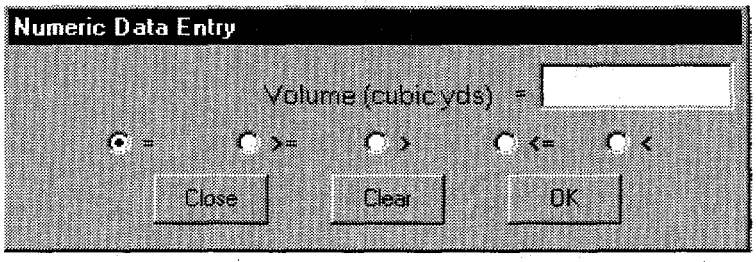

Figure 3. Numeric Data Entry form.

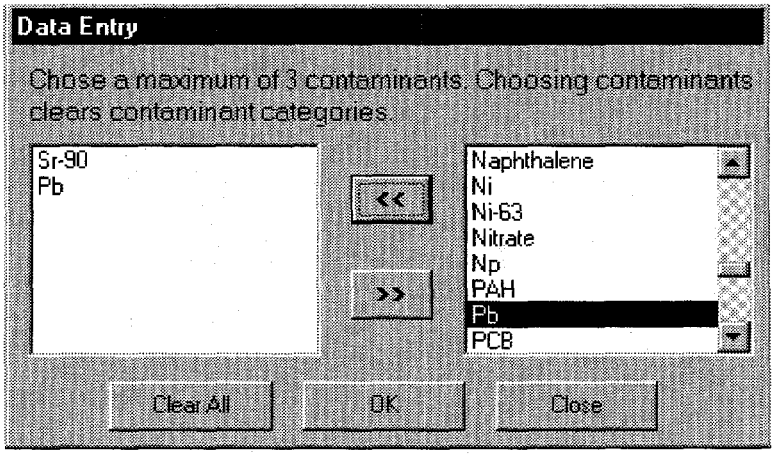

Figure 4. Nonnumeric Data Entry form.

3.2.1 Display Site Data

The Display Site Data form, Figure 5, displays the data associated with an individual site. This form can be accessed from several forms within DART. In Figure 5, the form was accessed from the Site Data Search Criteria form and the site displayed satisfies the search criteria entered in the Site Data Search Criteria form. The counter at the bottom left of the form shows that 44 sites satisfied the search criteria and the second record of the 44 is currently being displayed. Clicking on the arrows on each side of the data control will move through the set of sites satisfying the criteria entered in the Site Data form.

The buttons at the bottom of the form are used to display further data concerning the site currently displayed.

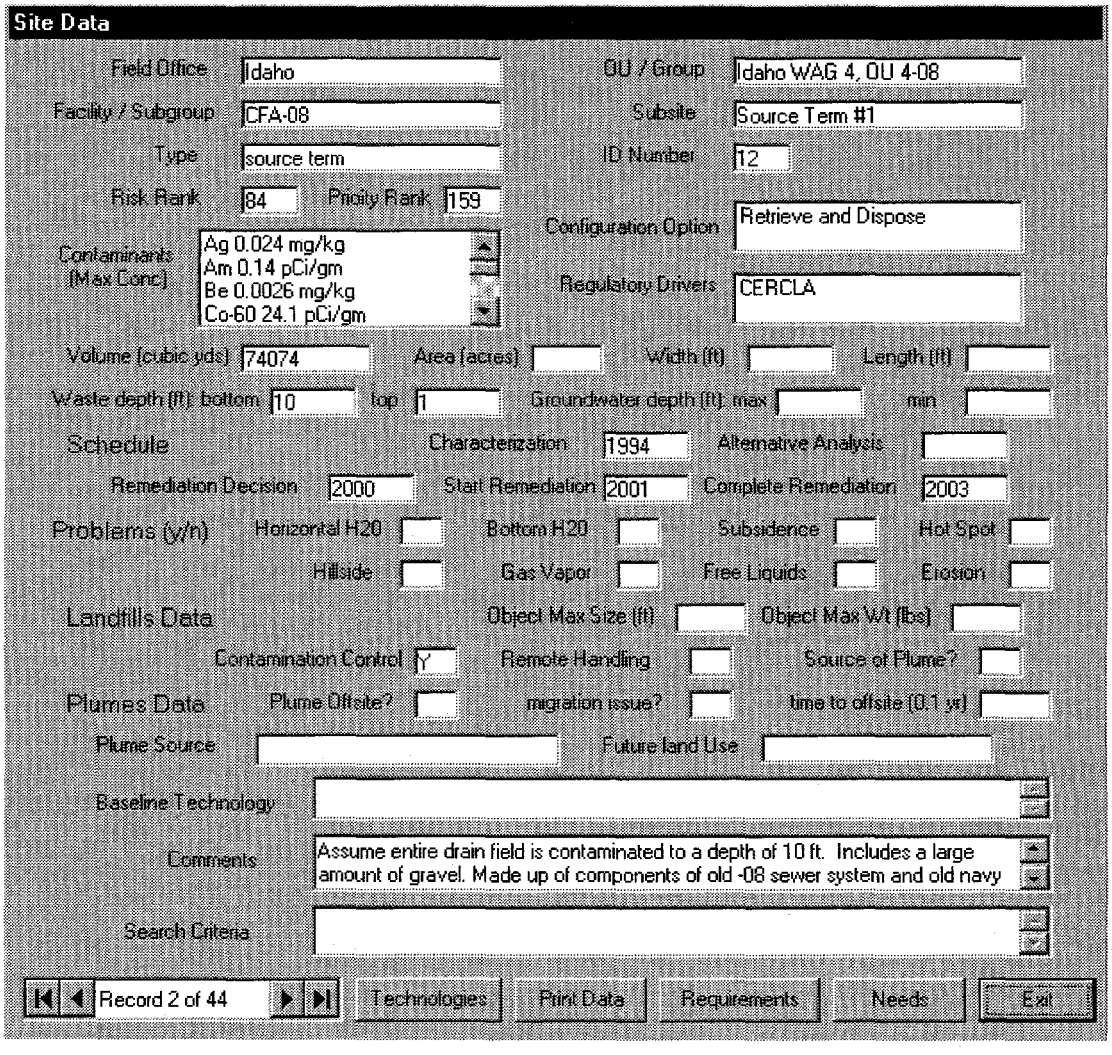

Figure 5. Site Data Display form.

Requirements: When the Requirements button is selected, a form is opened containing a menu of technology categories, Figure 6, that apply to the current site being displayed. After a technology category is selected, the Sites and Requirements form, Figure 8, is opened, which displays the site specific requirements for the selected technology category at the site currently displayed.

Needs: The Needs form, Figure 9, is opened which lists all of the needs associated with the site currently being displayed..

Technologies: The form Technology Categories, Figure 10, is opened which displays the technology categories potentially required by the site currently displayed.

Print Data: This button will print a hard copy of the data for the site currently being displayed.

Exit: Close the Site Data Display form and return to the form from which the Site Data Display form was accessed

3.2.2 Site Listing Report

The Site Listing Report form, Figure 7, is opened whenever the Site Listing button is selected in the Site Data Search Criteria form. It lists the sites satisfying the site search criteria entered in the form Site Data. This form can also be accessed from multiple forms within DART.

The sites satisfying the search criteria are displayed in a menu that is user selectable. The sites selected are used when the buttons at the bottom of the form are selected. Note: in a menu that allows multiple selections, the SHIFT and OPTION keys are used to select more than one item from the menu.

Requirements: When the Requirements button is selected, a form, Figure 6, is opened containing a menu of technology categories that apply to the selected sites. After a technology category is selected, the Sites and Requirements form, Figure 8, is opened which displays the site specific requirements for the selected technology category at the sites selected in the Site Listing Report.

Needs: The Needs form, Figure 9, is opened which lists all of the needs associated with the sites currently selected.

Technologies: The form Technology Categories, Figure 10, is opened which displays the technology categories potentially required by the sites currently selected.

Display Site Data: The form Site Data Display, Figure 5, is opened to display data associated with the sites currently selected.

Exit: Close the form Site Listing and return to the form Site Data.

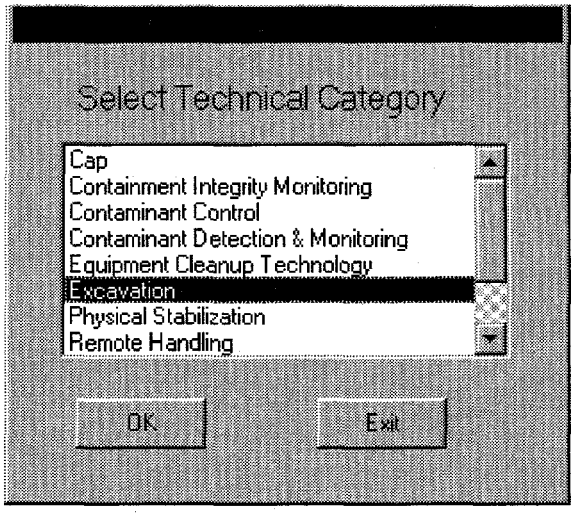

Figure 6. Technology Category Selection form.

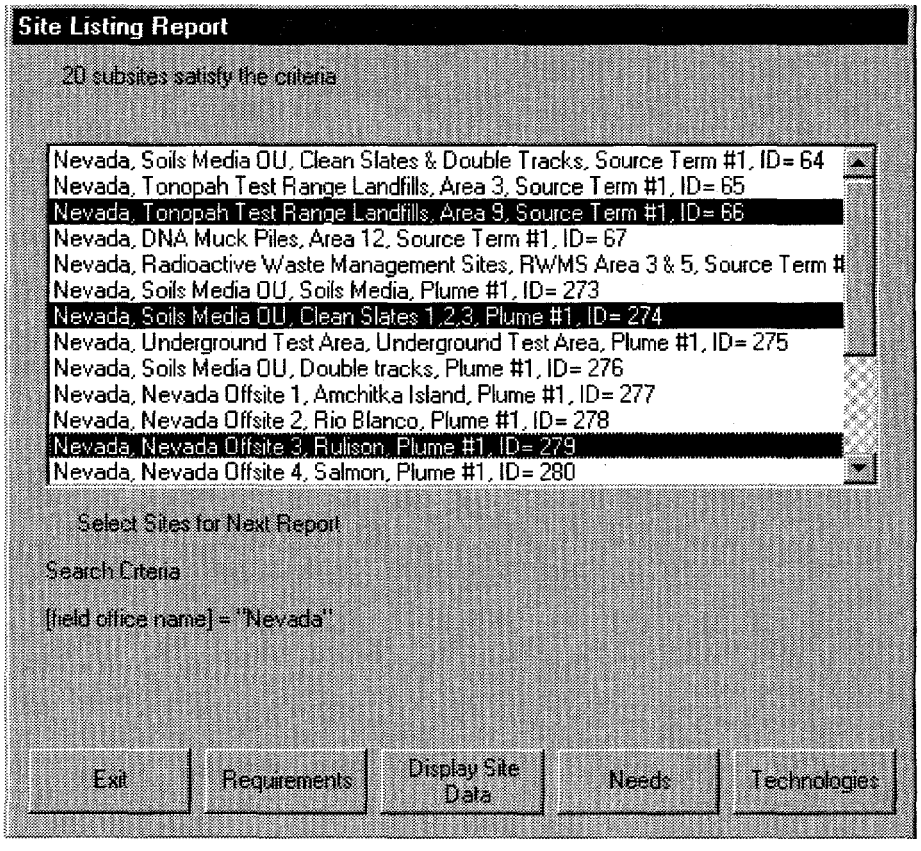

Figure 7. Site Listing Report form.

3.2.3 Sites and Requirements

To open the Sites and Requirements form, Figure 8, select the Requirements button in a form. If the technology category is not predetermined, as in the technology performance criteria forms, you can select the technology category from the Technology Category Selection Window, Figure 6. **Note:** If you access this form from the Site Data Display form, only one site is displayed in this Site Listing box. You can select the sites in this Site Listing box with the mouse. After selecting a site or sites, you may perform the following operations.

Site Data: Displays the site data in the Site Data Display form for the sites you select. This button is disabled if you access the Sites and Requirements form from the Site Data Display form.

Print: This button will generate a hardcopy printout of the sites and associated site-specific requirements.

Exit: This button returns to the form from which requirements were accessed.

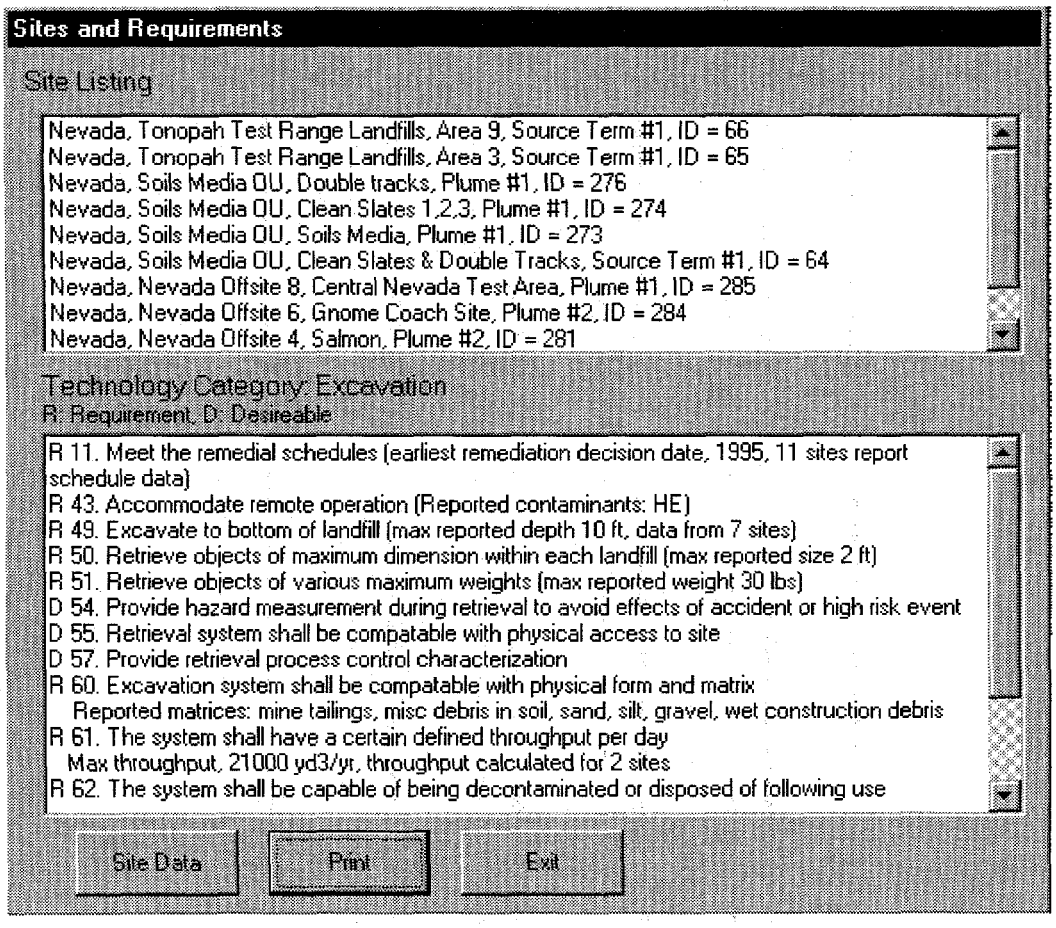

Figure 8. Sites and Requirements form.

3.2.4 Needs

The Needs form, Figure 9, displays the needs associated with a set of sites. This form is accessed from multiple locations with DART. These sites may be the sites satisfying the search criteria in the Site Data form, the site displayed in the Site Data Display form, selected from the Site Listing Report form, etc.

Exit: The Exit button returns to the form from which the Needs form was called.

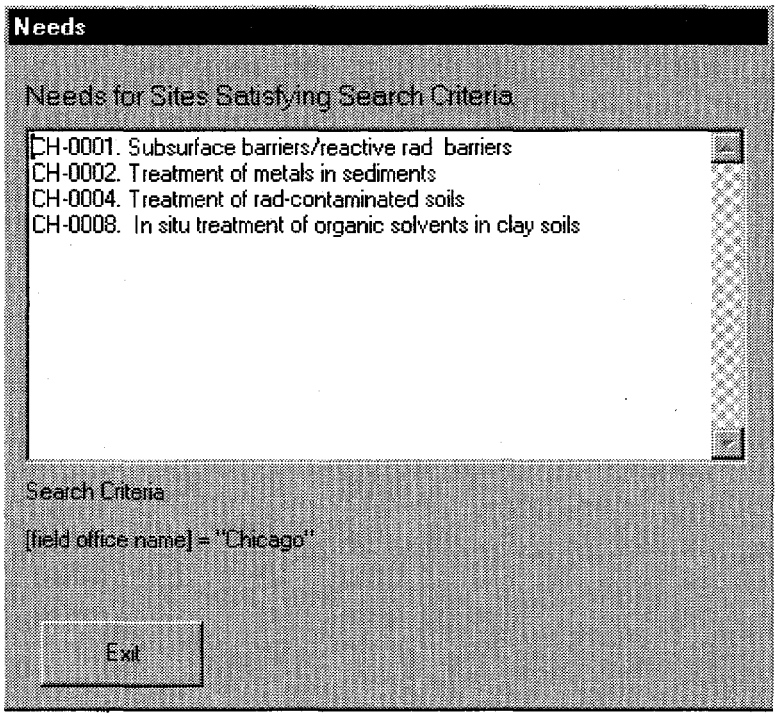

Figure 9. Needs form.

3.2.5 Technology Categories

The Technology Categories form, Figure 10, displays the technology categories potentially required for remediation of a set of selected sites. This form is accessed from multiple forms within DART. In Figure 10, the form was accessed from the Site Data Search Criteria form as evidenced by the display of the search criteria within the form.

Exit: The Exit button returns to the form from which Technology Categories was called.

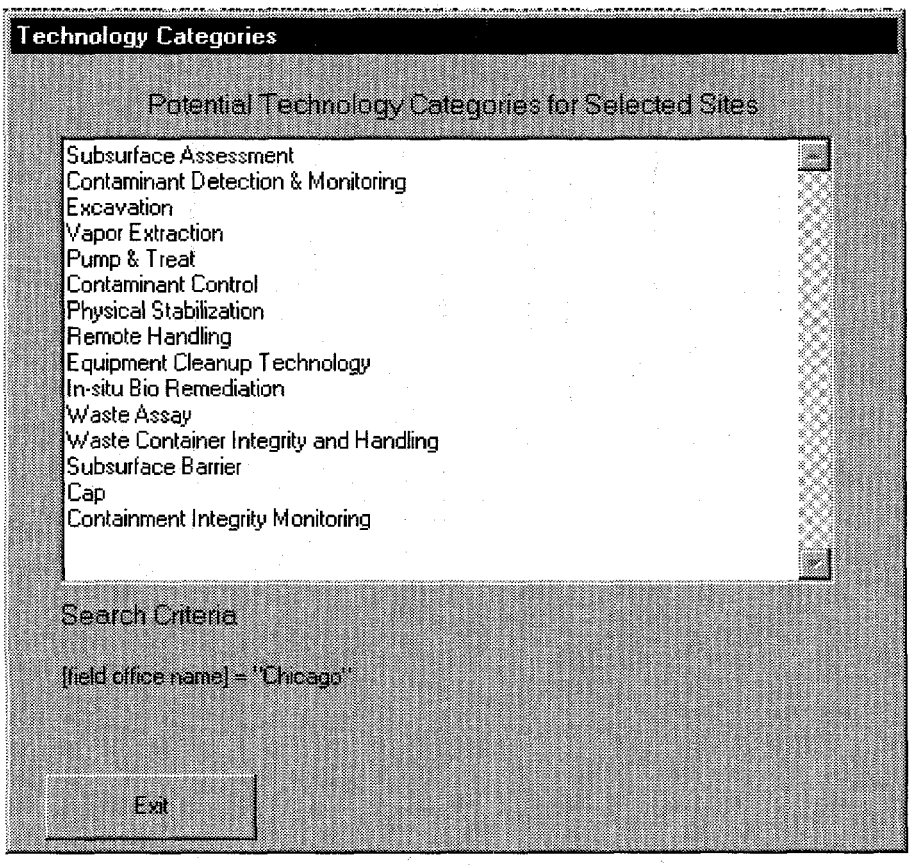

Figure 10. Technology Categories form.

3.3 Select Technology Category

The Select Technology Category form, Figure 11, allows you to investigate technologies. Access this form by selecting Technology Categories in the top-level form, then select a single technology category from the menu. **Note:** the Search Technologies button is independent of technology category selection. In addition, not all technology categories will be applicable to all applications, i.e., buttons.

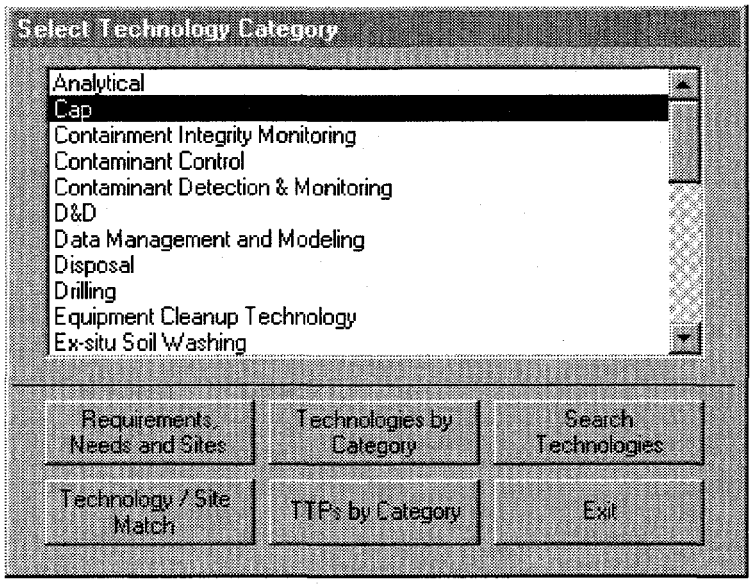

Figure 11. Select Technology Category form.

Requirements, Needs, and Sites: This button opens the form Technology Category Requirements and Needs form, Figure 12, and displays all sites, needs, and requirements for the selected technology category.

Technologies by Category: This button opens the Technology form, Figure 13, and displays the data available for all technologies associated with the selected technology category.

Search Technologies: This opens the Search Technologies form, Figure 14, to enable you to enter search criteria to find technologies, both commercial and Technology Task Plans (TTPs), which satisfy input search criteria. This is independent of technology category selection.

TTPs by Category: This opens the Technology form (Figure 13) and displays the data available concerning all TTPs in the database that are associated with the selected technology category.

Technology/Site Match: This button opens the technology performance criteria window for the selected category, Figures 16–35. **Note:** not all technology categories are associated with a technology performance criteria window.

Exit: The Exit button returns to the top-level form.

3.3.1 Technology Category Requirements and Needs

This form, Figure 12, displays all requirements, needs, and sites associated with the technology category selected in form Select Technology Category. In the example shown, the technology category "Cap" was selected. In the Requirements portion of the form, R indicates a requirement while D indicates a desirable.

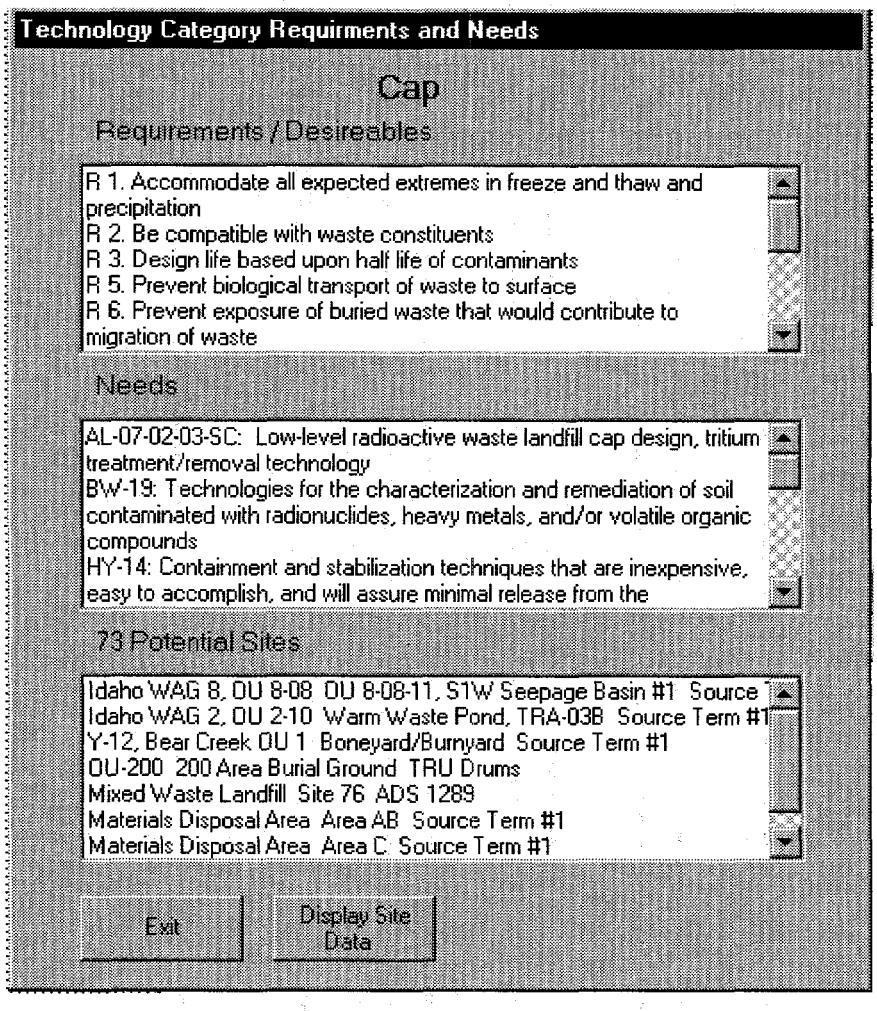

Figure 12. Technology Category Requirements and Needs form.

Display Site Data: The sites listed are user selectable. When you select a set of sites and then click on Display Site Data, the Display Site Data form, Figure 5, displays the data associated with the selected sites.

Exit: This returns to the Select Technology form.

3.3.2 Technology

Use the Technology form, Figure 13, to display technology information. The data control in the bottom left of the form is used to display each technology that satisfies the criteria used to select the technologies to display. In the example shown, the form was accessed using the Technologies by Category button with a technology category of Cap. This form is also used to display all TTPs and to show the results of a technology search, Figure 14.

Print form: This button will print a hard copy of the technology information.

Exit: This button returns to the form from which the Technology form was accessed.

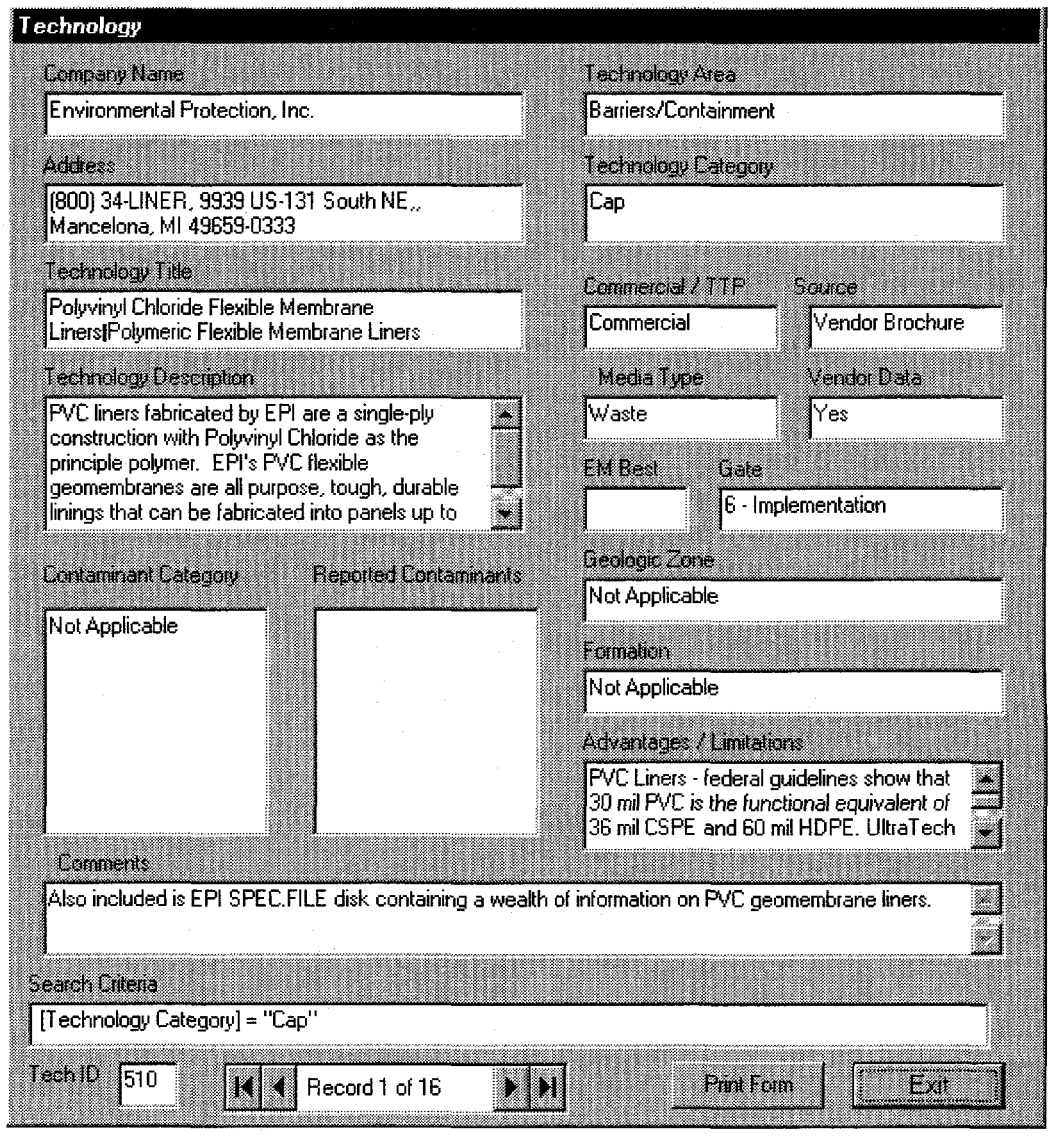

Figure 13. Technology form.

3.3.3 Search Technology

The Search Technology form, Figure 14, allows you to enter search criteria to find technologies satisfying specific criteria. This form is strictly mouse driven; e.g., to enter search criteria, click the mouse on the selected search box. Either a pop-up menu will open for user selection or a user input box, Figure 15, will open for you to enter a search string.

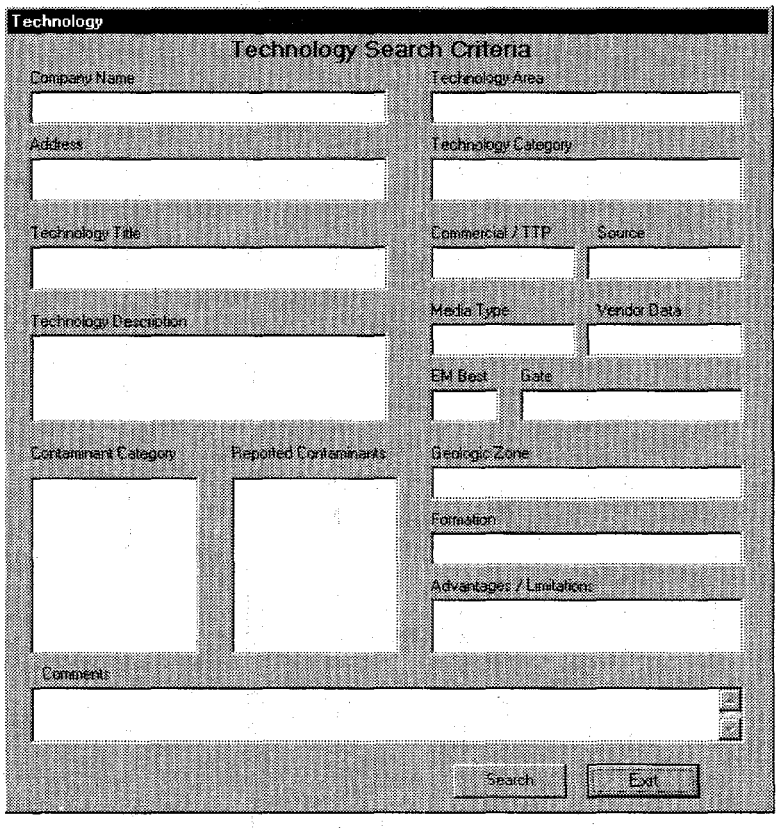

Figure 14. Search Technology form.

Search: This will find all technologies satisfying the input search criteria and display the technologies in the Technology form.

Exit: This returns to the form Select Technology Category.

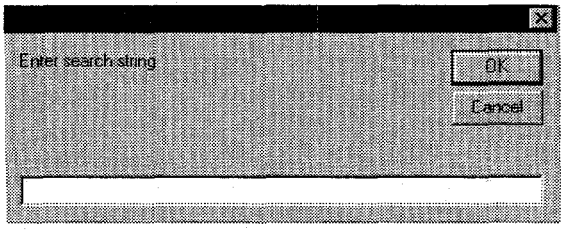

Figure 15. Search Technology Input Box.

3.3.4 Technology/Site Match

The intent of all technology performance criteria forms is to determine for the given set of performance criteria which describe a technology at what sites the requirements for applying the technology will be satisfied.

3.3.4.1 Cap Technology Performance Criteria. The Cap technology performance criteria form, Figure 16, enables you to enter Cap Technology Performance Criteria, determine the sites for which the cap requirements are satisfied, e.g., pass all requirements, by the technology, and then select sites to investigate site data, find needs and requirements, run the cost model for the technology category, and run the Effectiveness and Implementability (E/I) models, etc. for selected sites.

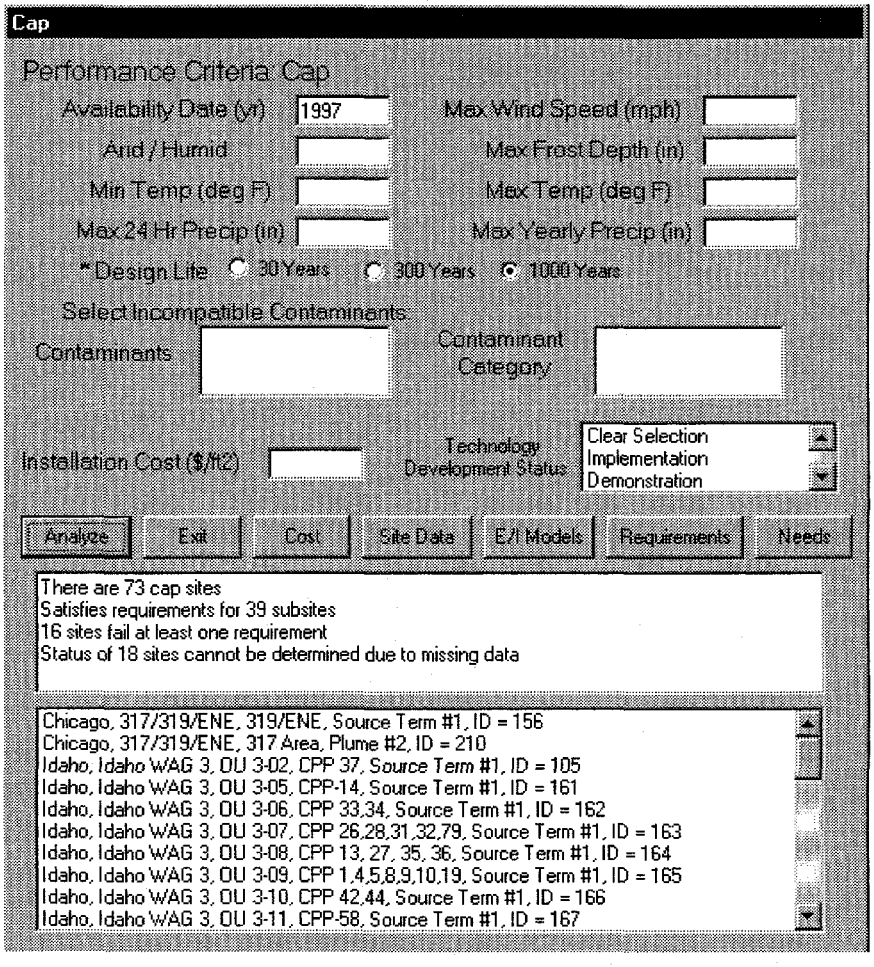

Figure 16. Cap technology Performance Criteria form.

The following describes the Cap Technology Performance Criteria that you can input. If an input is optional, the technology will pass, by default, the requirement based on the optional input.

Technology Performance Criteria Data

Availability Date	Optional	Fails if technology is available after site remediation decision date
Max Wind Speed	Optional	Fails if maximum wind speed reported at site exceeds this value
Arid/Humid	Optional	Value is arid or humid. Menu selection. Arid is defined as < 19 inches of rain per year
Max Frost Depth	Optional	Fails if maximum frost depth reported at site exceeds this value
Min Temp	Optional	Fails if minimum temperature reported at site is below this value
Max Temp	Optional	Fails if maximum temperature reported at site exceeds this value
Max 24 Hr Precipitation	Optional	Fails if maximum 24 hour precipitation reported at site exceeds this value
Max Yearly Precipitation	Optional	Fails if maximum yearly precipitation reported at site exceeds this value
Design Life	Required	Default 1000 years. Fails if site contains contaminants requiring design life exceeding value input
Incompatible Contaminants	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Categories	Optional	Fails if site contains one or more contaminants of incompatible contaminant category, e.g., VOC, EPA Toxic Metal

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Contaminants and contaminant categories are entered using the Nonnumeric Data Entry form, see Figure 4, which you can open by selecting the appropriate box with the mouse.

The cost data is required for the cost model only and does not affect whether a technology satisfies requirements at a site. In addition, the technology development status data is used only in the E/I models.

Cost and E/I Model Data

Installation Cost	Required	Used in cost model for selected sites.
Technology Development Status	Optional	Used in E/I models.

When you first open a technology performance criteria form, only the Analyze and Exit buttons are available. After you enter the appropriate technology performance data, select Analyze. The technology performance data is compared to site data for each site requiring that technology category for each technology category requirement to determine if the requirements are satisfied for that site. Data required for technology performance criteria analysis is indicated by an "*" on the form. A site will be considered to pass if ALL requirements are satisfied and will fail if at least ONE requirement is failed. Otherwise, the status cannot be determined due to missing site data.

After checking all technology category sites, the results are printed on the form and the Cost, Site Data, E/I Models, Requirements, and Needs buttons are opened. Sites that satisfy the requirements can be selected with the mouse and used as input to these functions initiated by these buttons. Multiple site selections are allowed.

Analyze: Determines which sites for which Cap requirements are satisfied by the user input criteria and prints the results on the form.

Exit: Exits the Cap Technology Performance Criteria form and returns to the Select Technology form.

Cost: Runs the cost model using the user input cost data for the user selected sites. The results of the cost model are displayed in the Cost Report form, Figure 35.

Site Data: Displays site data for the user selected sites in Site Data Display form.

E/I Models: Runs the Effectiveness/Implementability models for the user selected sites. The results if the E/I models are displayed in the Effectiveness and Implementability Model Results form, Figure 36.

Requirements: Displays the site-specific versions of the Cap requirements for the user selected sites in the Sites and Requirements form, Figure 8.

Needs: Displays the needs associated with the selected sites in the Needs form, Figure 9.

3.3.4.2 Containment Integrity Monitoring Performance Criteria. The Containment Integrity Monitoring Performance Criteria form, Figure 17, enables you to enter performance criteria and identify sites for which the technology satisfies the requirements. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

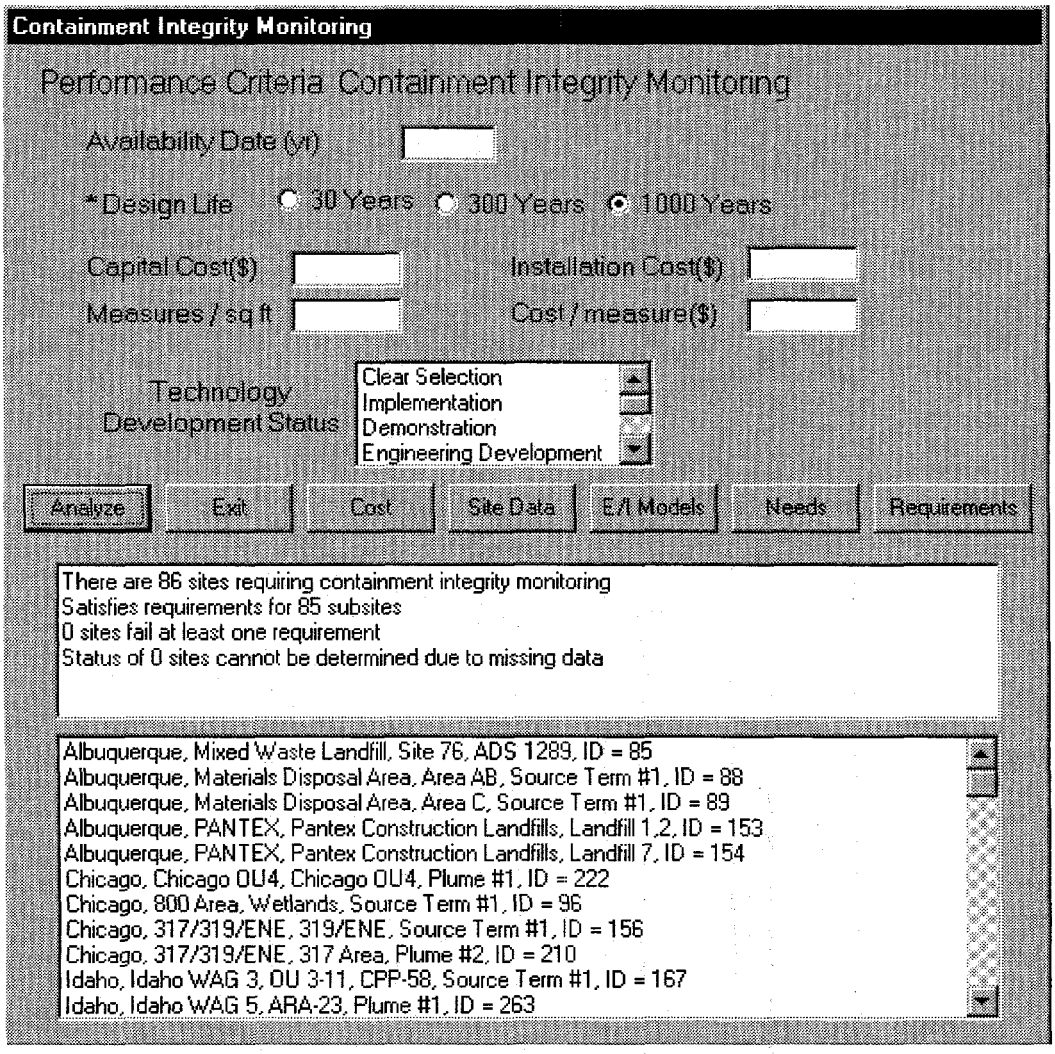

Figure 17. Containment Integrity Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Design Life	Required	Default 1000. Fails if contaminant at site requires design life greater than input value

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Cost and E/I Model Data

Capital Cost	Required	Used in cost model
Installation Cost	Required	Used in cost model
Measure/sq. ft	Required	Used in cost model
Cost/Measure	Required	Used in cost model
Technology Development Status	Optional	Used in E/I Models

3.3.4.3 Contamination Control Performance Criteria. The Contamination Control Performance Criteria form is shown in Figure 18. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

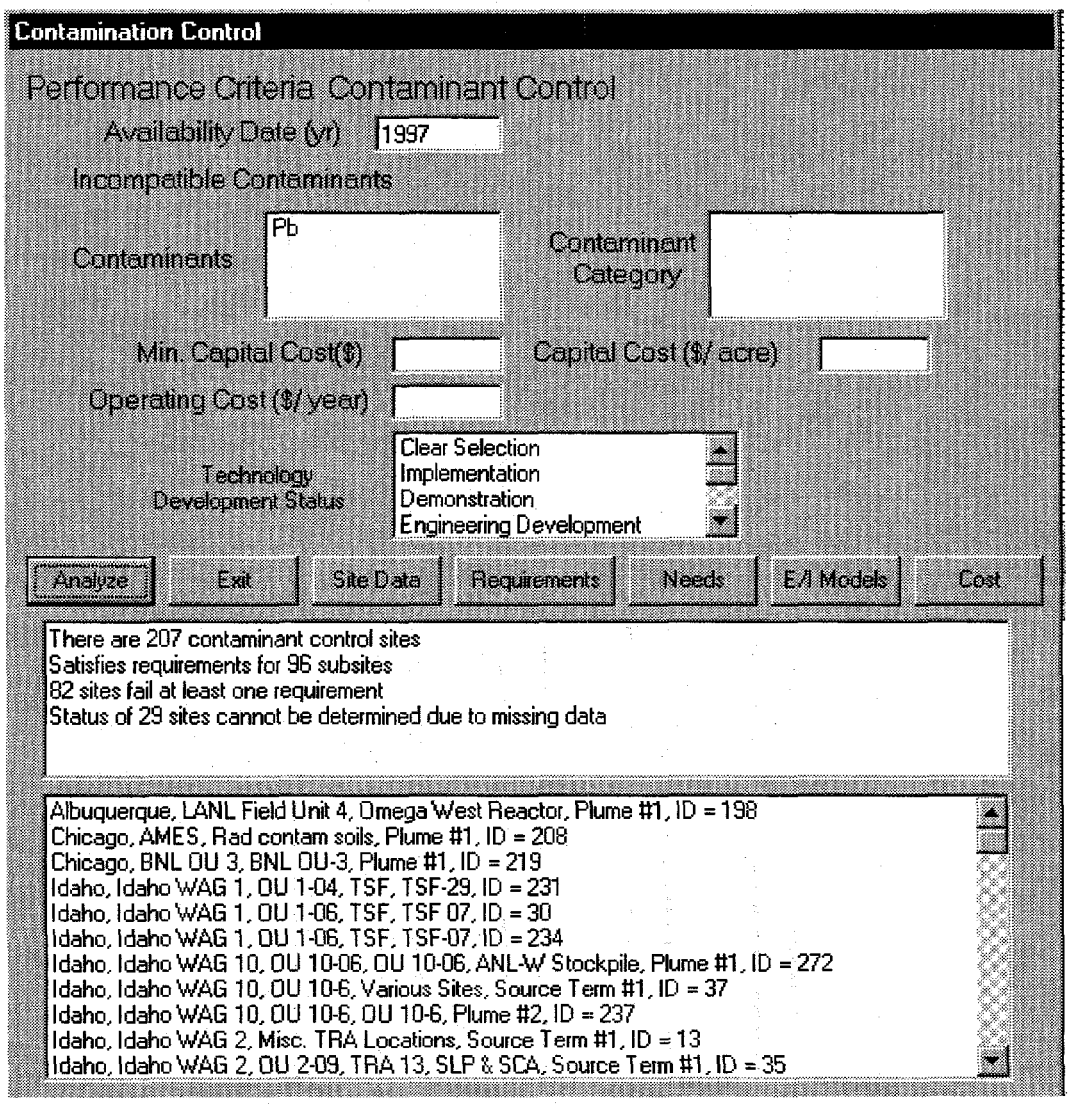

Figure 18. Contaminant Control Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to technology availability date
Incompatible Contaminants	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site has one or more contaminants of incompatible contaminant category

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Cost and E/I Model Data

Minimum Capital Cost	Required if Capital Cost / Acre not given	Used in cost model
Capital Cost ($/Acre)	Required if Minimum Capital Cost not given	Used in cost model
Operating Cost ($/yr.)	Required	Used in cost model
Technology Development Status	Optional	Used in E/I Models

3.3.4.4 *Contaminant Detection and Monitoring Performance Criteria.* The Contamination Control Performance Criteria form is shown in Figure 19. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

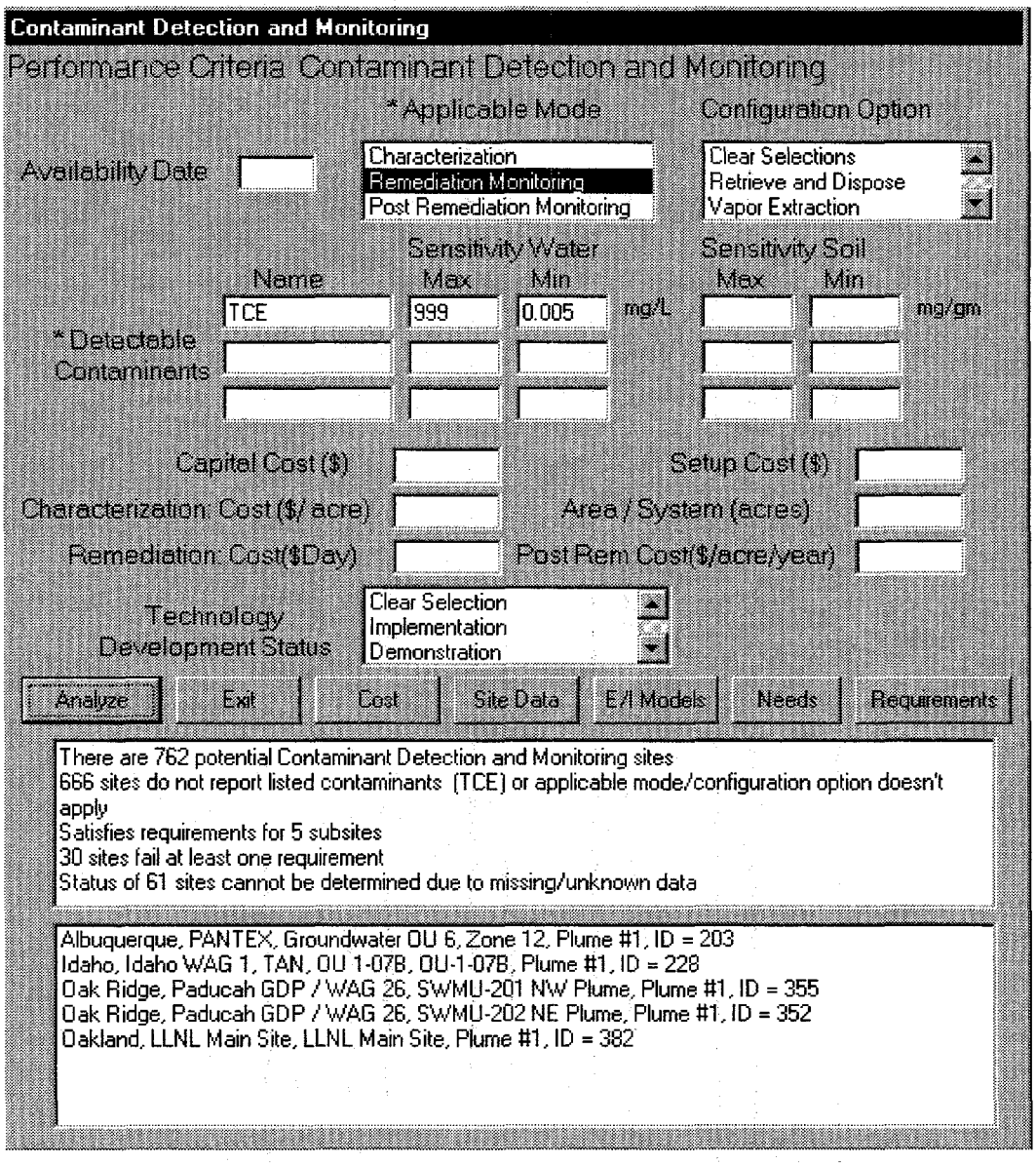

Figure 19. Contaminant Detection & Monitoring Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date prior to availability date
Applicable Mode	Required, multiple selection	Site is tested only if it requires applicable mode
Configuration Option	Optional	Only applicable for remediation monitoring. If selected, site is tested only if configuration option applies to site
Detectable contaminants	At least one contaminant required with max/min sensitivity input for soil or water	Passes if site contamination concentration less than maximum and site minimum cleanup level (MCL) greater than minimum

---

Cost and E/I Model Data

Capital Cost	Required	Used in cost model
Setup Cost	Required	Used in cost model
Area per System	Required	Used in cost model
Characterization Cost	Required if applicable mode characterization	Used in cost model
Remediation Cost	Required if applicable mode remediation monitoring	Used in cost model
Post Remediation Cost	Required if applicable mode post remediation monitoring	Used in cost model
Technology Development Status	Optional	Used in E/I models

3.3.4.5 Equipment Cleanup Performance Criteria. The equipment cleanup performance criteria form is shown in Figure 20. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

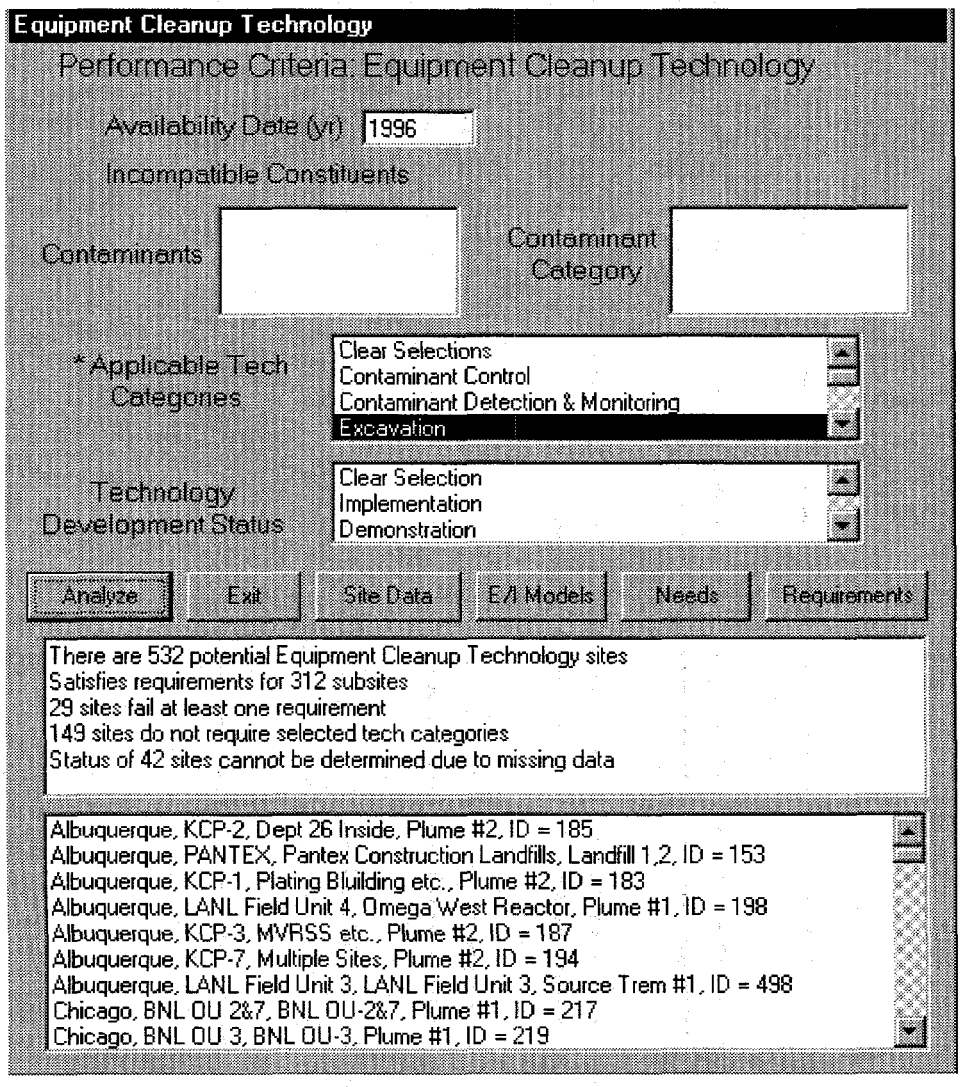

Figure 20. Equipment Cleanup Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Incompatible Contaminant	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible contaminant category, e.g., EPA toxic metal
Applicable Tech Category: multiple selection	Required	Site does not apply if assigned configuration option does not required user input tech category

---

Cost and E/I Model Data

Technology Development Status	Optional	Used in E/I models

3.3.4.6 Ex-Situ Soil Washing Performance Criteria. The ex-situ soil washing performance criteria form is shown in Figure 21. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

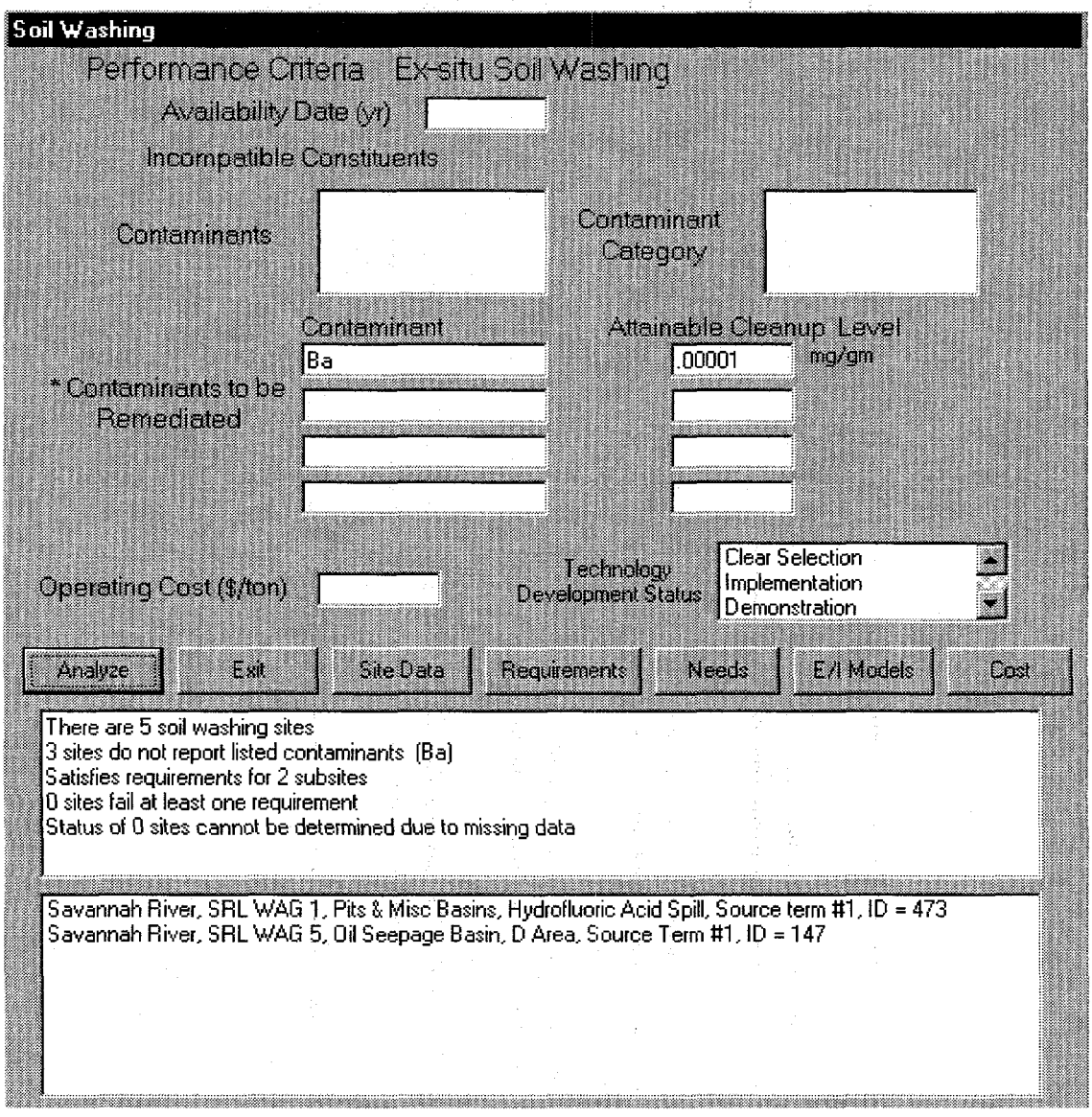

Figure 21. Ex-situ Soil Washing Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Incompatible Contaminant	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of an incompatible category
Contaminants to be Remediated	Required including cleanup level	Fails if attainable cleanup level is greater than site MCL

Cost and E/I Model Data

Operating Cost	Required	Used in cost model
Technology Development Status	Optional	Used in E/I models

3.3.4.7 Excavation Performance Criteria. The excavation performance criteria form is shown in Figure 22. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

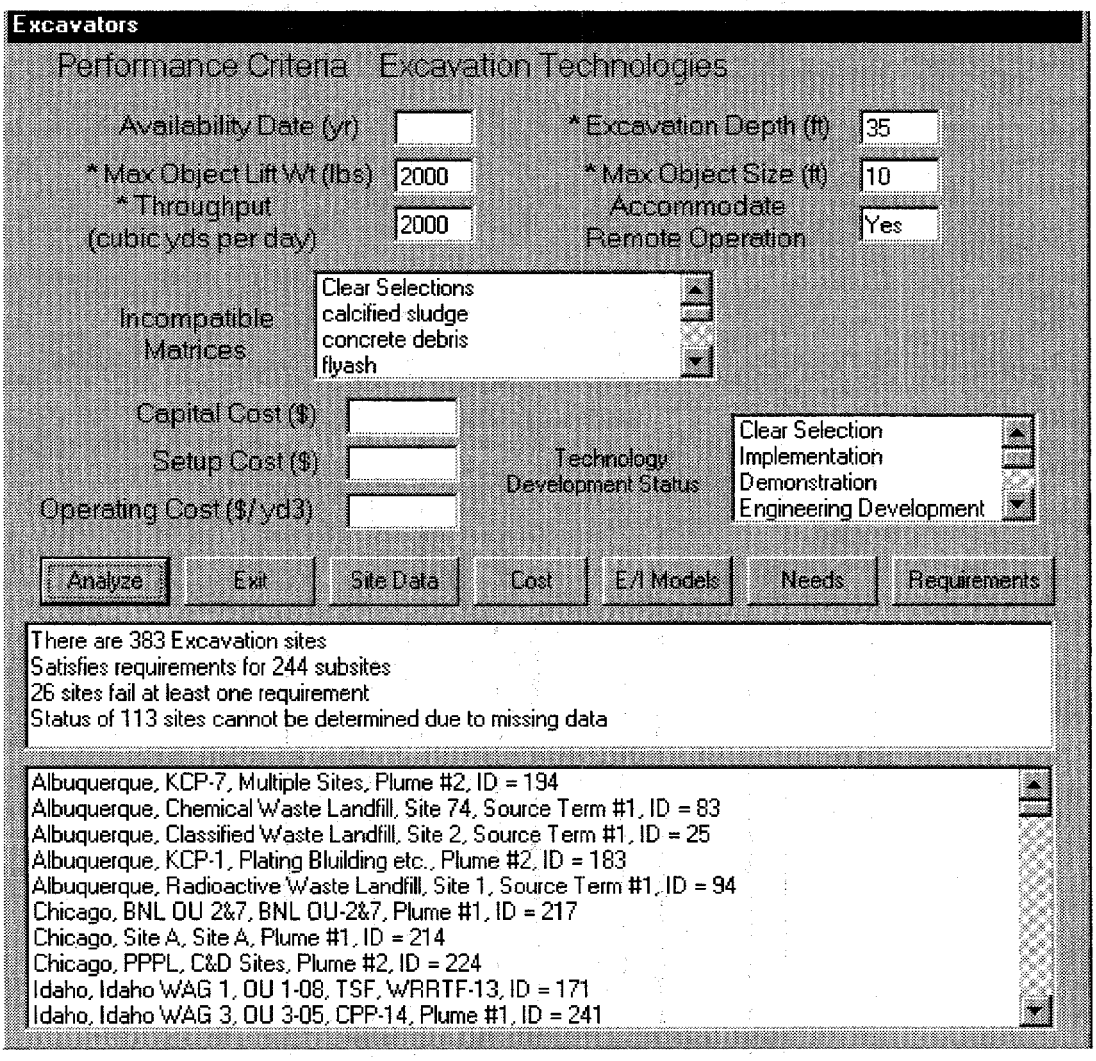

Figure 22. Excavation Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision is prior to availability date
Excavation Depth	Required	Fails if depth to bottom of waste exceeds this value
Max Object Lift Weight	Required	Fails if site contains object with weight exceeding lift weight
Max Object Size	Required	Fails if site contains object with size exceeding maximum object size
Throughput	Required	Fails if site requires throughput exceeding given value to complete remediation on schedule
Accommodate Remote Operation	Optional	Default value yes. If no, fails it site requires remote operation
Incompatible Matrices	Optional	Multiple selection, fails if site has an incompatible matrix

Cost and E/I Model Data

Capital Cost	Required	Used in cost model
Setup Cost	Required	Used in cost model
Operating Cost	Required	Used in cost model
Technology Development Status	Optional	Used in E/I model

3.3.4.8 In-Situ Bioremediation Performance Criteria. The in-situ bioremediation performance criteria form is shown in Figure 23. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

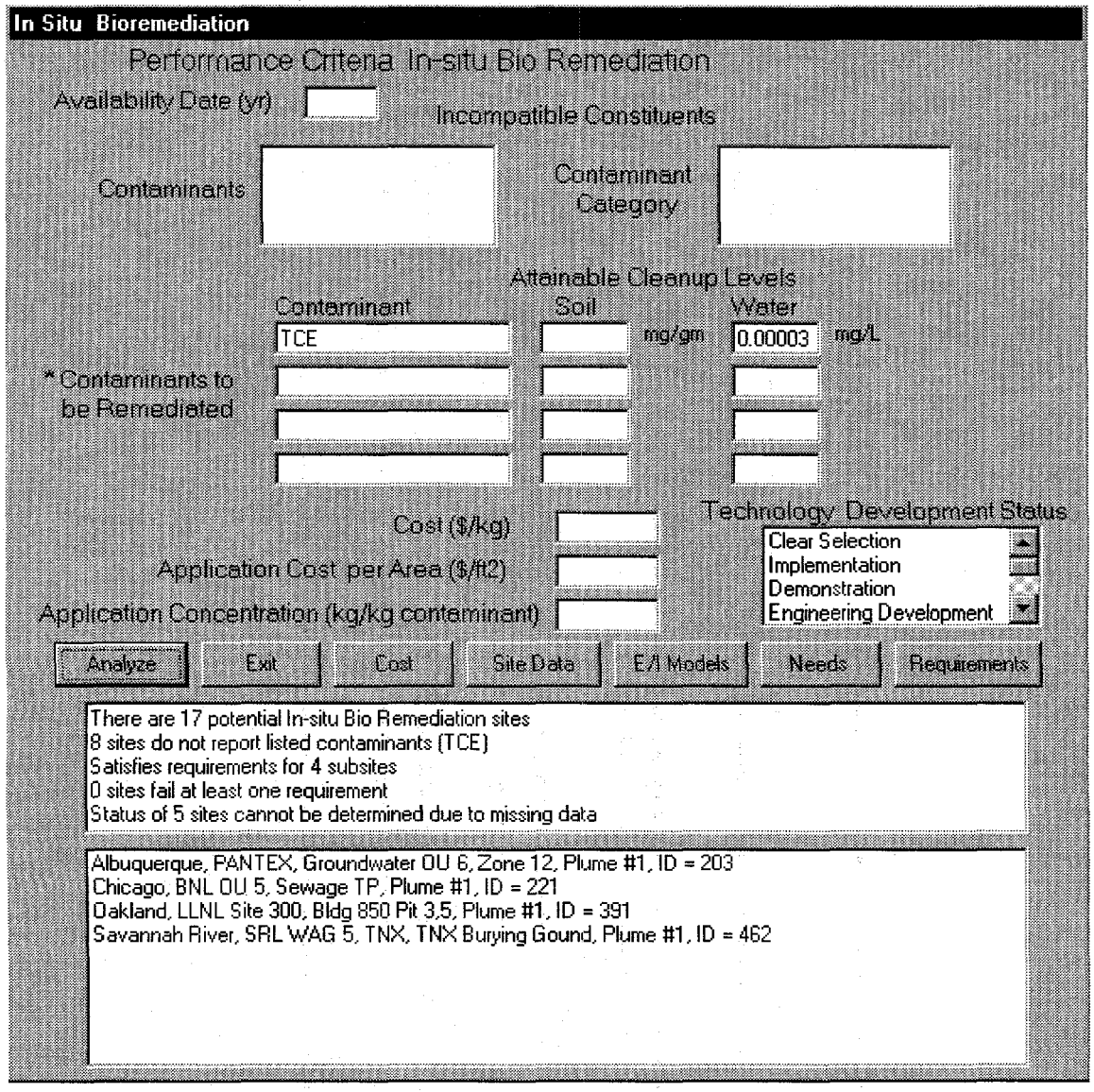

Figure 23. In-Situ Bioremediation Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Incompatible Contaminant	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible contaminant category
Contaminants to be Remediated	Required, minimum one with cleanup level	Fails if site MCL is less than technology attainable cleanup level

---

Cost and E/I Model Data

Cost (of materials)	Required	Used in cost model
Application Cost	Required	Used in cost model
Application Concentration	Required	Used in cost model
Technology Development Status	Option	Used in E/I model

3.3.4.9 In-Situ Chemical Performance Criteria. The in-situ chemical performance criteria form is shown in Figure 24. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

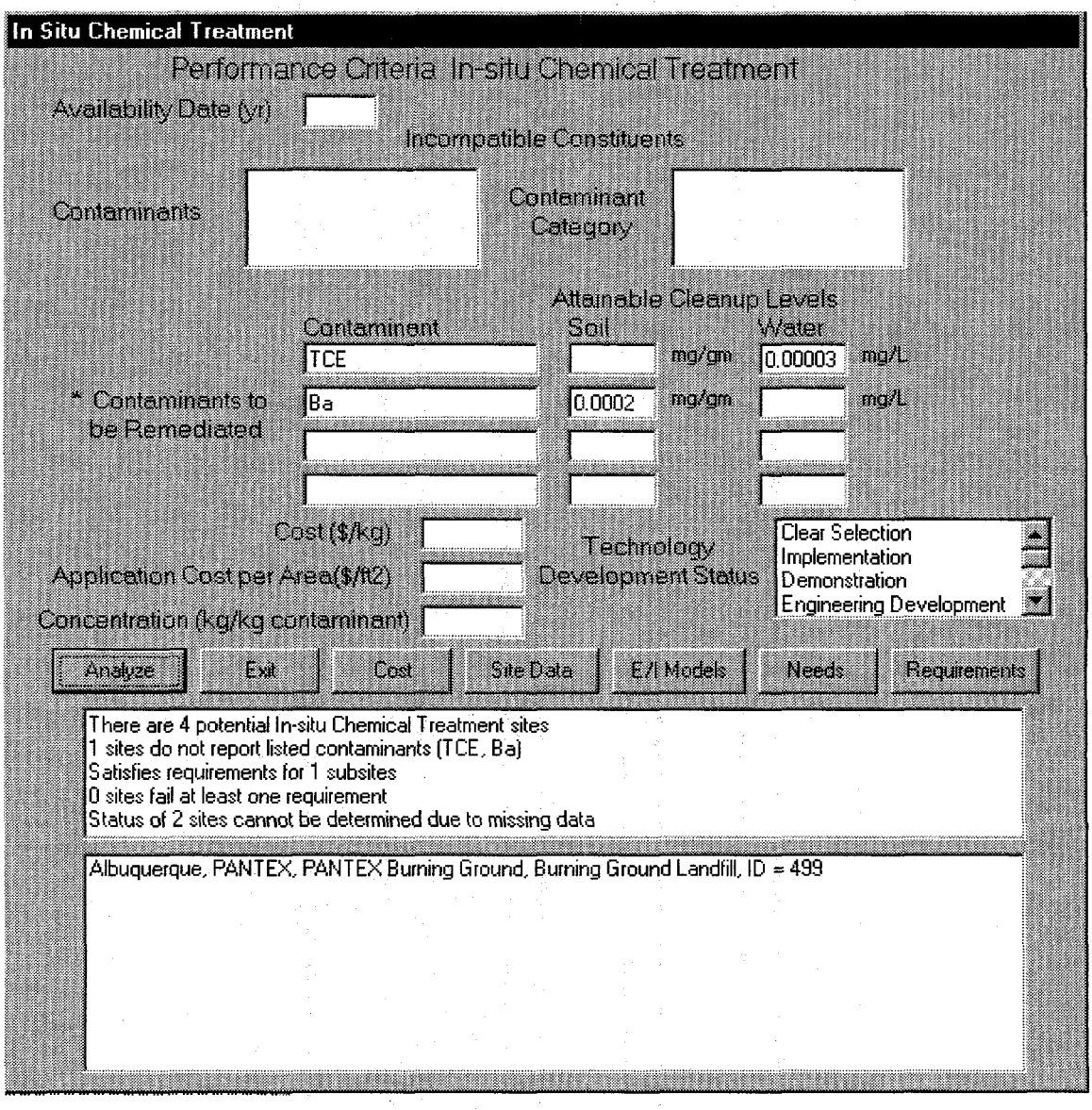

Figure 24. In-Situ Chemical Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Incompatible Contaminants	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible contaminant category
Contaminants to be Remediated	Required (minimum one with cleanup level)	Fails if site has MCL less than attainable cleanup level

---

Cost and E/I Model Data

Cost	Required	Used in cost model
Application Cost	Required	Used in cost model
Concentration	Required	Used in cost model
Technology Development Status	Option	Used in E/I models

3.3.4.10 In-Situ Thermal Performance Criteria. The in-situ thermal performance criteria form is shown in Figure 25. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

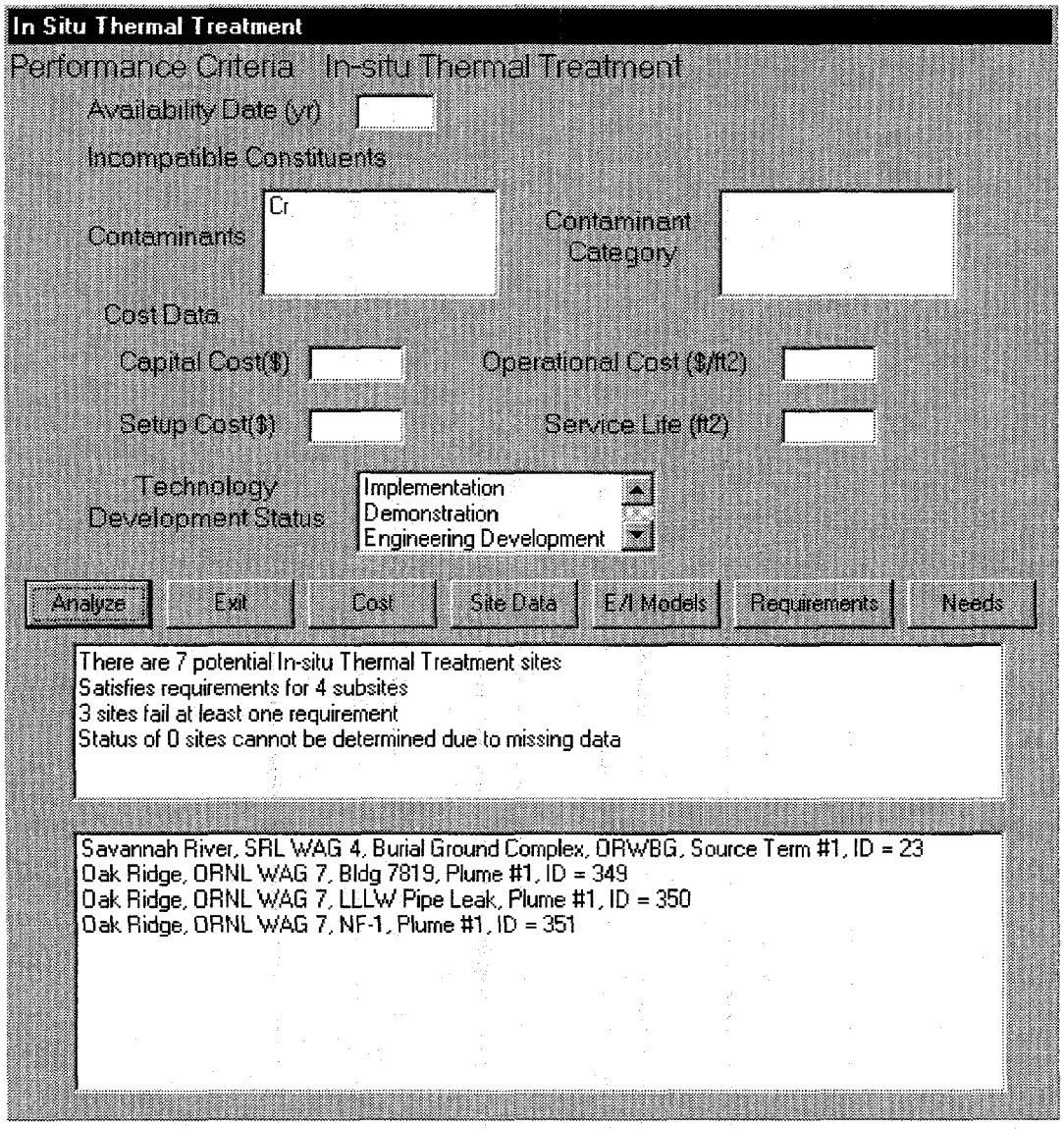

Figure 25. In-Situ Thermal Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Incompatible Contaminants	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible contaminant category

Cost and E/I Model Data

Capital Cost	Required	Used in cost model
Operational Cost	Required	Used in cost model
Setup Cost	Required	Used in cost model
Service Life	Required	Used in cost model
Technology Development Status	Option	Used in E/I models

3.3.4.11 Offgas Performance Criteria. The offgas performance criteria form is shown in Figure 26. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

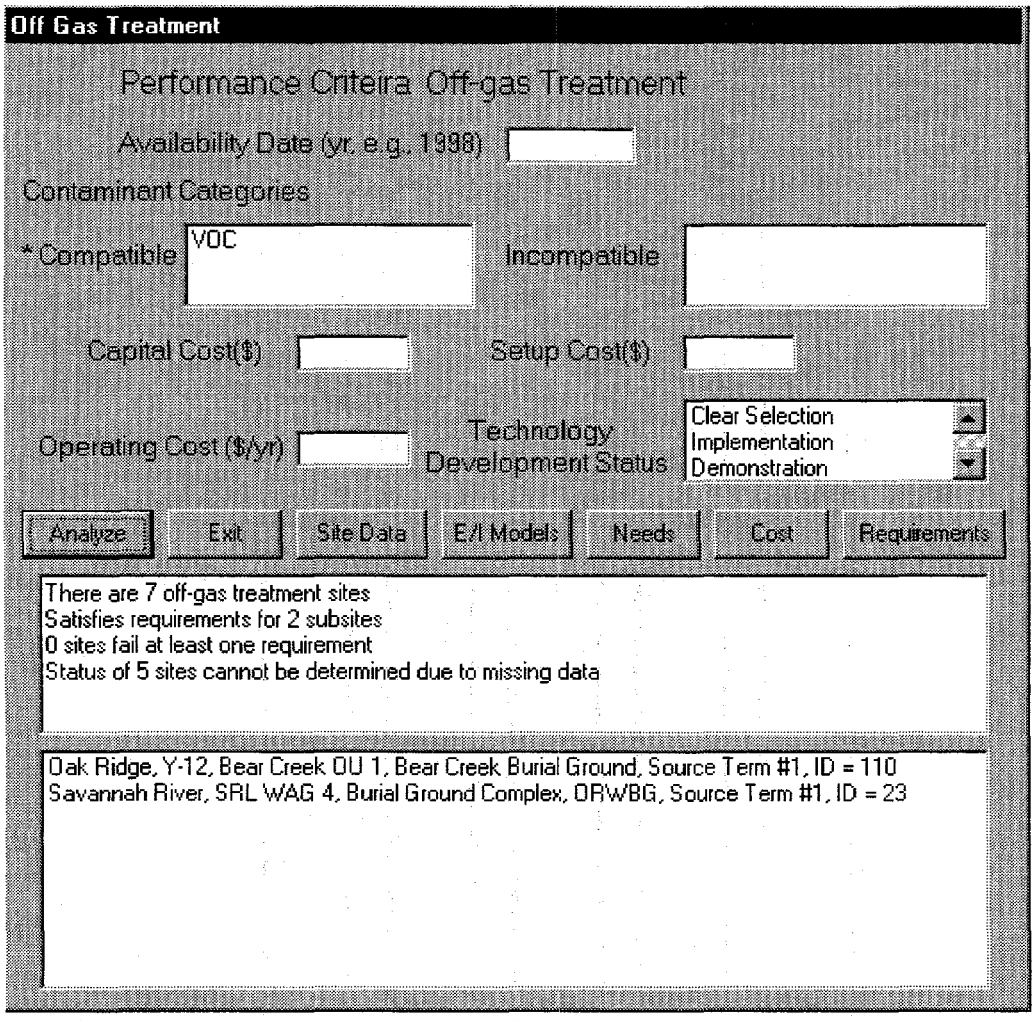

Figure 26. Offgas Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Compatible Contaminant Category	Required	Passes if site contains one or more contaminants of compatible contaminant category
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible contaminant category

---

Cost and E/I Model Data

Capital Cost	Required	Used in cost model
Operating Cost	Required	Used in cost model
Setup Cost	Required	Used in cost model
Technology Development Status	Option	Used in E/I models

3.3.4.12 Physical Stabilization Performance Criteria. The physical stabilization performance criteria form is shown in Figure 27. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

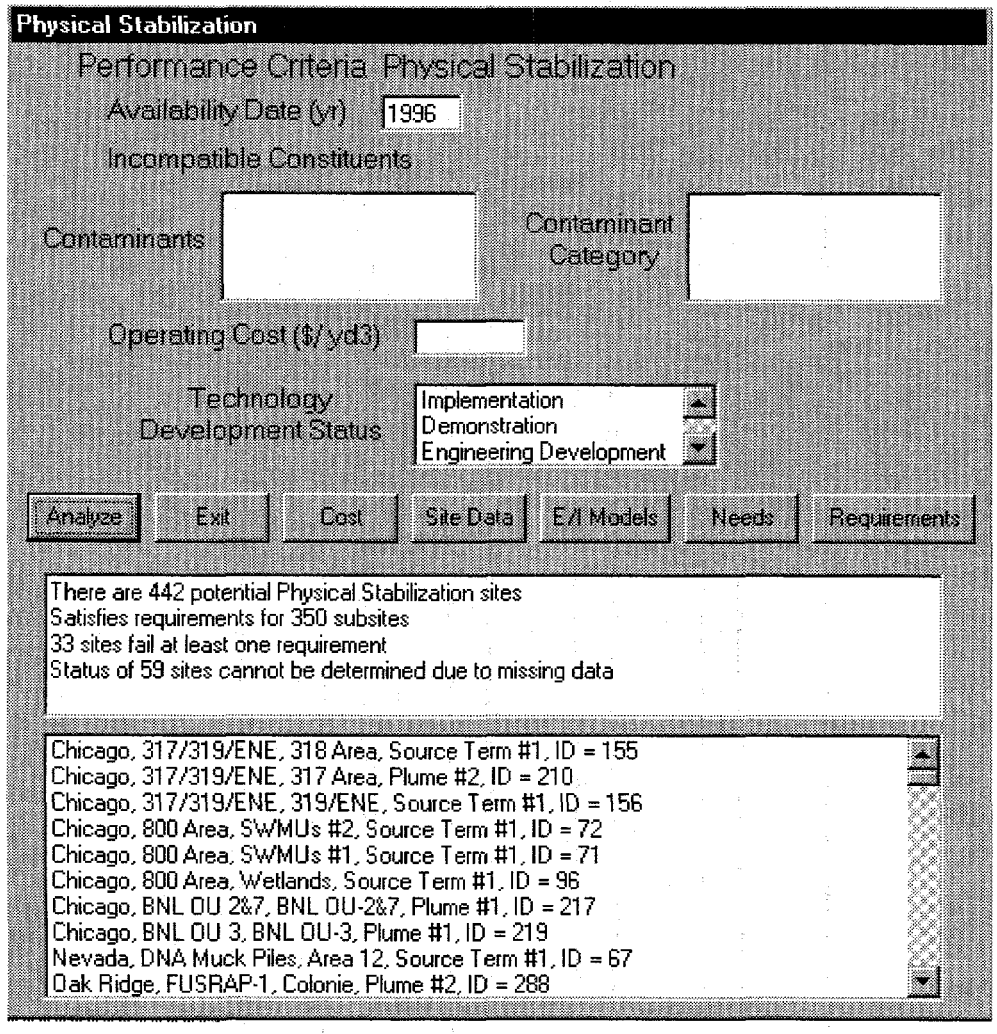

Figure 27. Physical Stabilization Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Incompatible Contaminant	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible contaminant category

Cost and E/I Model Data

Operating Cost	Required	Used in cost model
Technology Development Status	Option	Used in E/I models

3.3.4.13 Pump and Treat Performance Criteria

The pump and treat performance criteria form is shown in Figure 28. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

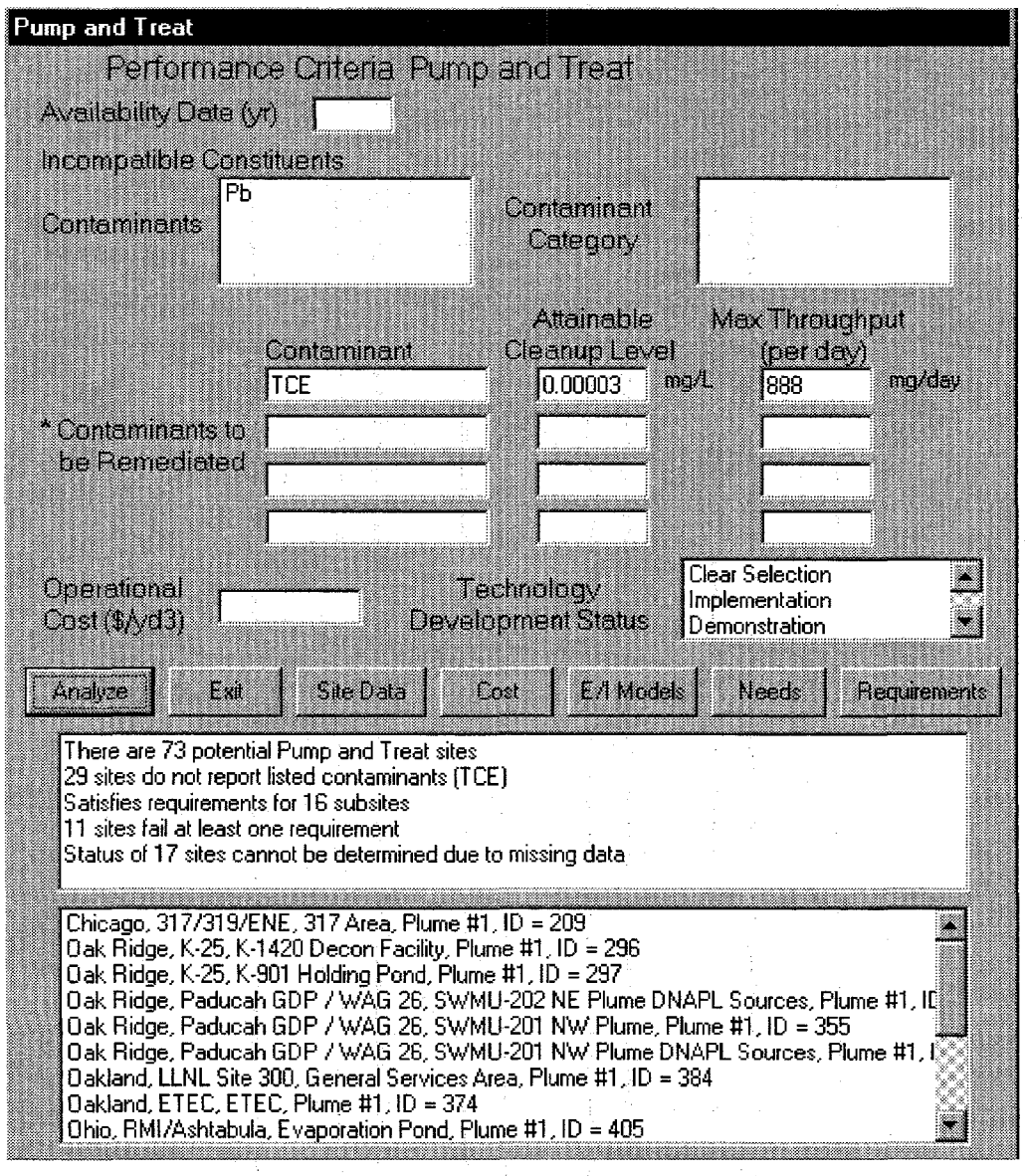

Figure 28. Pump and Treat Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Incompatible Contaminants	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible contaminant category
Contaminants to be Remediated	Required (minimum one with cleanup level and throughput)	Fails if site has MCL less than attainable cleanup level or throughput insufficient to meet schedule

---

Cost and E/I Model Data

Operational Cost	Required	Used in cost model
Technology Development Status	Option	Used in E/I models

3.3.4.14 Remote Handling Performance Criteria. The remote handling performance criteria form is shown in Figure 29. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

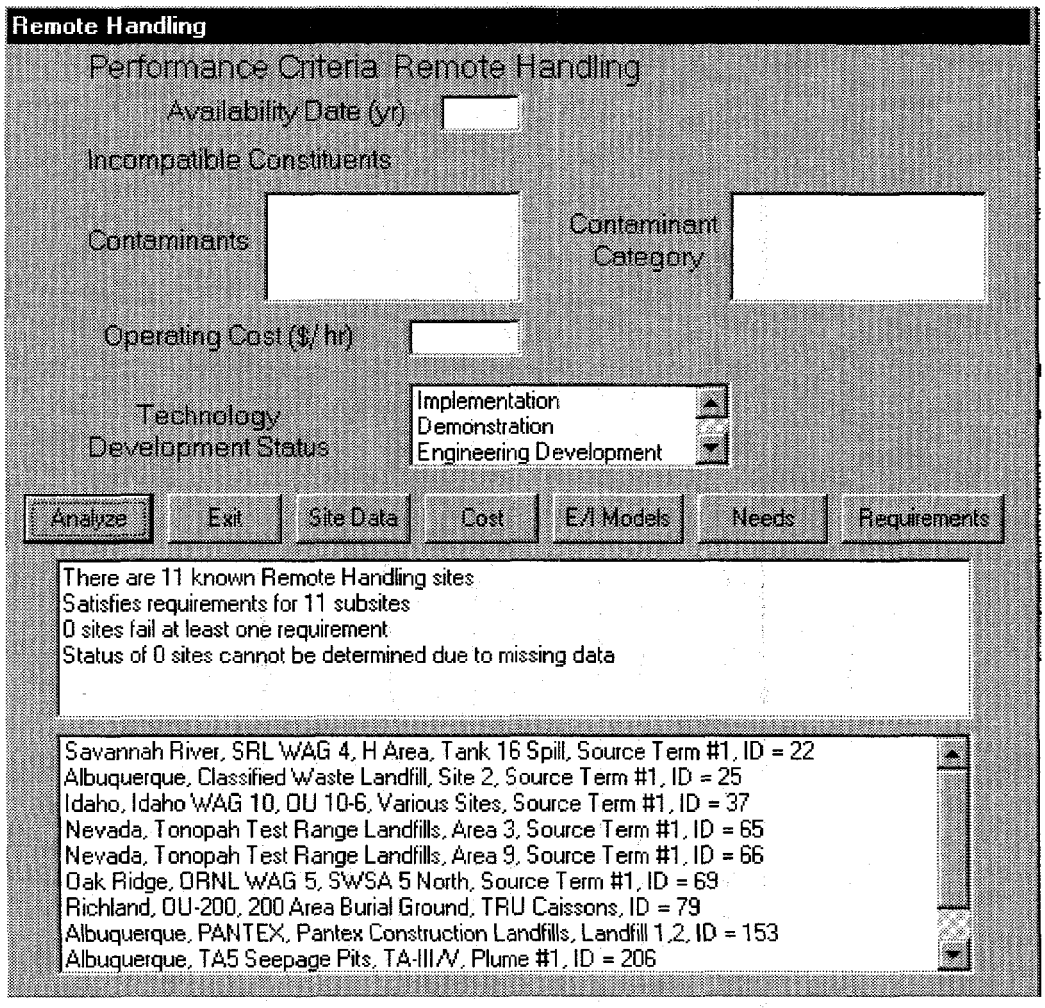

Figure 29. Remote Handling Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Incompatible Contaminants	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible contaminant category

Cost and E/I Model Data

Operational Cost	Required	Used in cost model
Technology Development Status	Option	Used in E/I models

3.3.4.15 Stabilization to Limit Mobility Performance Criteria. The stabilization to limit mobility performance criteria form is shown in Figure 30. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

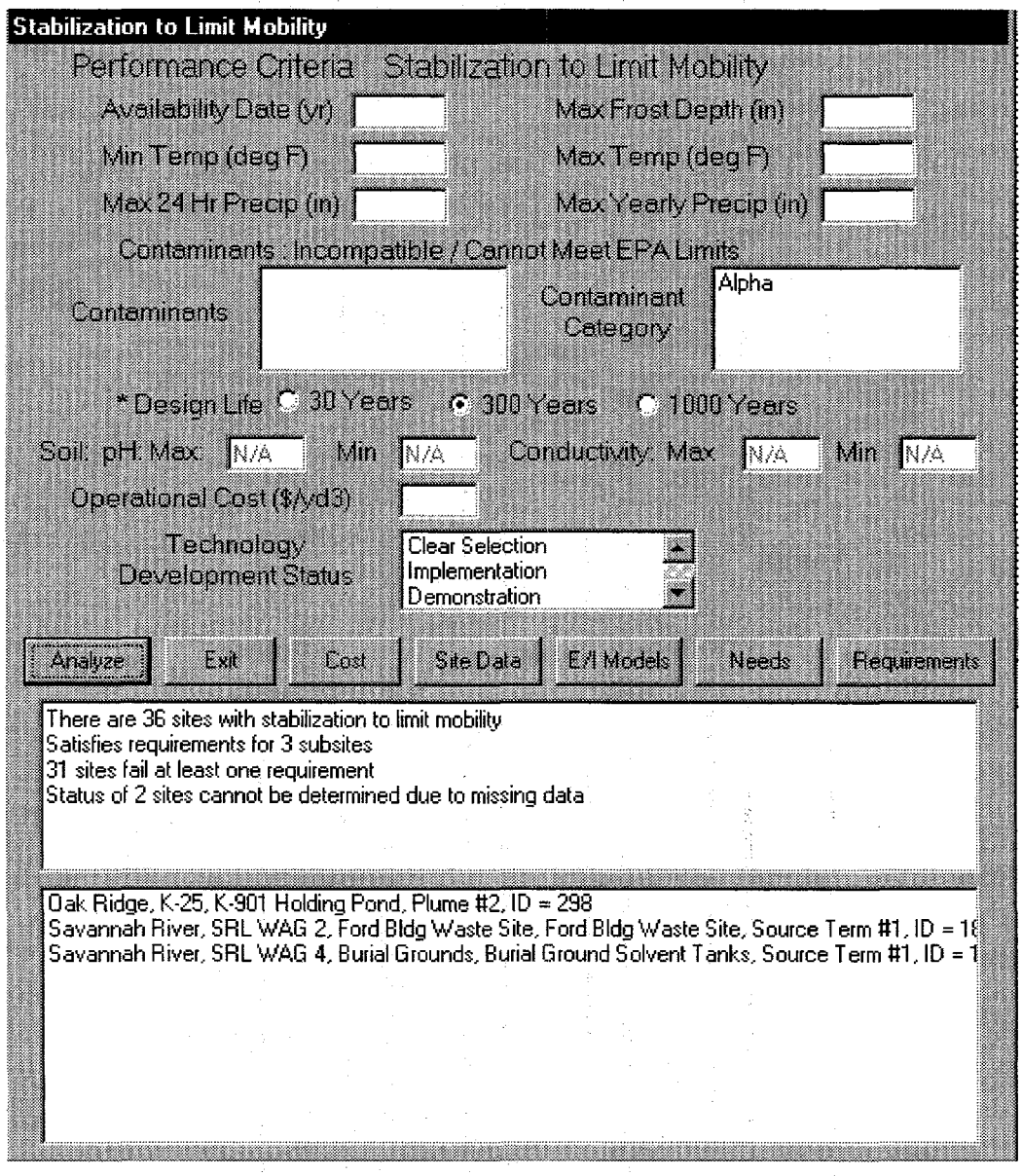

Figure 30. Stabilization to Limit Mobility Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Max Frost Depth	Optional	Fails if maximum frost depth reported at site exceeds this value
Min Temp	Optional	Fails if minimum temperature reported at site is below this value
Max Temp	Optional	Fails if maximum temperature reported at site exceeds this value
Max 24 Hr Precipitation	Optional	Fails if maximum 24 hour precipitation reported at site exceeds this value
Max Yearly Precipitation	Optional	Fails if maximum yearly precipitation reported at site exceeds this value
Incompatible Contaminants	Optional	Fails if site contains one or more selected contaminants
Incompatible Contaminant Categories	Optional	Fails if site contains one or more contaminants of selected category, e.g., VOC, EPA Toxic Metal
Design Life	Required	Default 1000, fails if site contains one or more contaminants requiring design life exceeding input value

---

Cost and E/I Model Data

Operational Cost	Required	Used in cost model for selected sites.
Technology Development Status	Optional	Used in E/I models.

3.3.4.16 Subsurface Assessment Performance Criteria. The subsurface assessment performance criteria form is shown in Figure 31. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

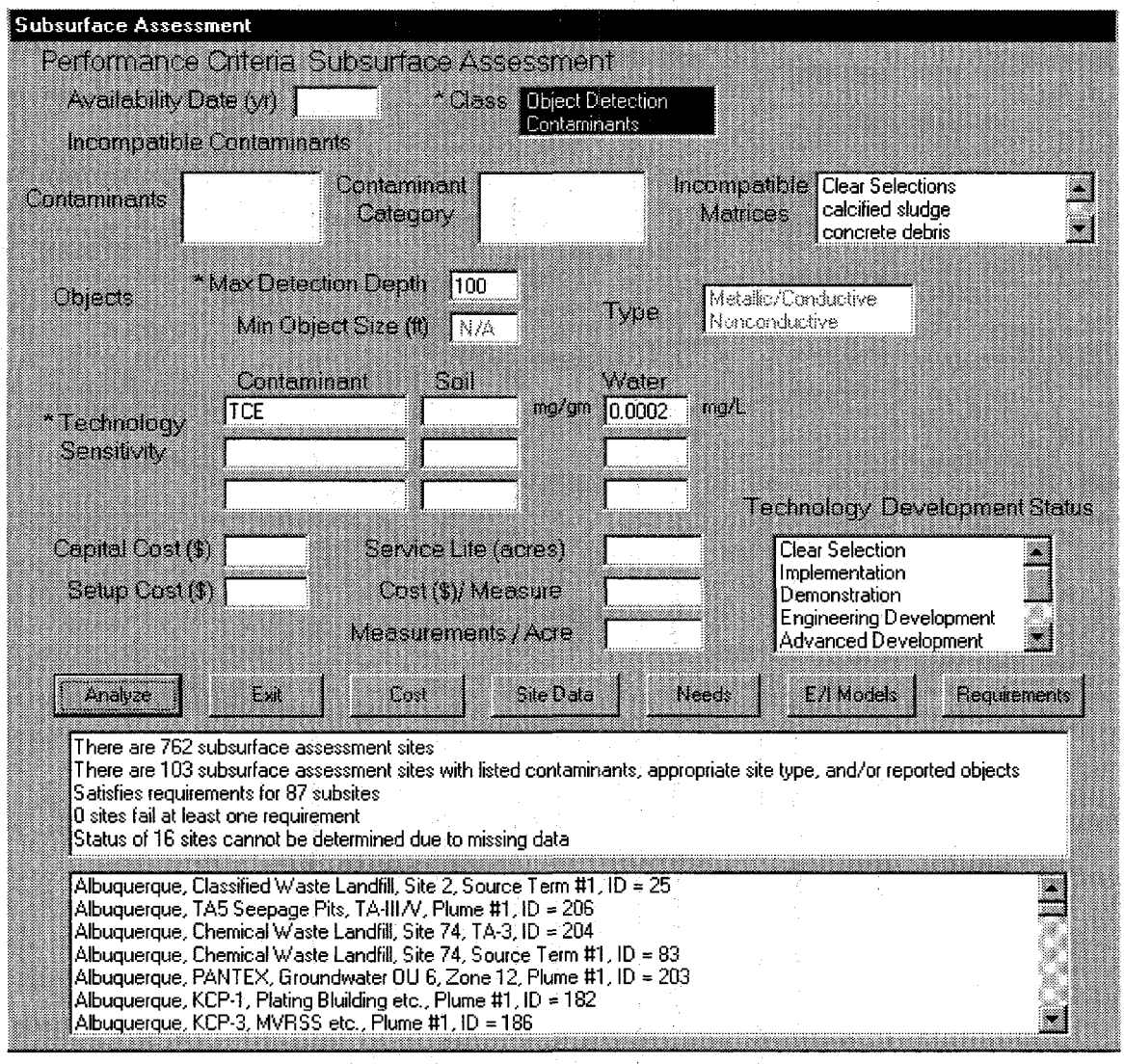

Figure 31. Subsurface Assessment Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Class	Required	Choose object, contaminants, or both
Incompatible Contaminants	Option	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible category
Incompatible Matrices	Optional	Fails if site has matrix selected as incompatible
Max Detector Depth	Required for Object Class	Fails if waste depth exceeds detection depth
Min Object Size	N/A	Inactive, no user entry
Object Type	N/A	Inactive, no user entry
Technology Sensitivity	Required for Contaminant Class: at least one contaminant and sensitivity	Fails if sensitivity value is greater than the MCL for a contaminant at the site

---

Cost and E/I Model Input Data

Capital Cost	Required	Used in cost model
Service Life	Required	Used in cost model
Setup Cost	Required	Used in cost model
Cost/Measure	Required	Used in cost model
Measures / Acre	Required	Used in cost model
Technology Development Status	Optional	Used in E/I models

3.3.4.17 Subsurface Barrier Performance Criteria. he subsurface barrier performance criteria form is shown in Figure 32. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

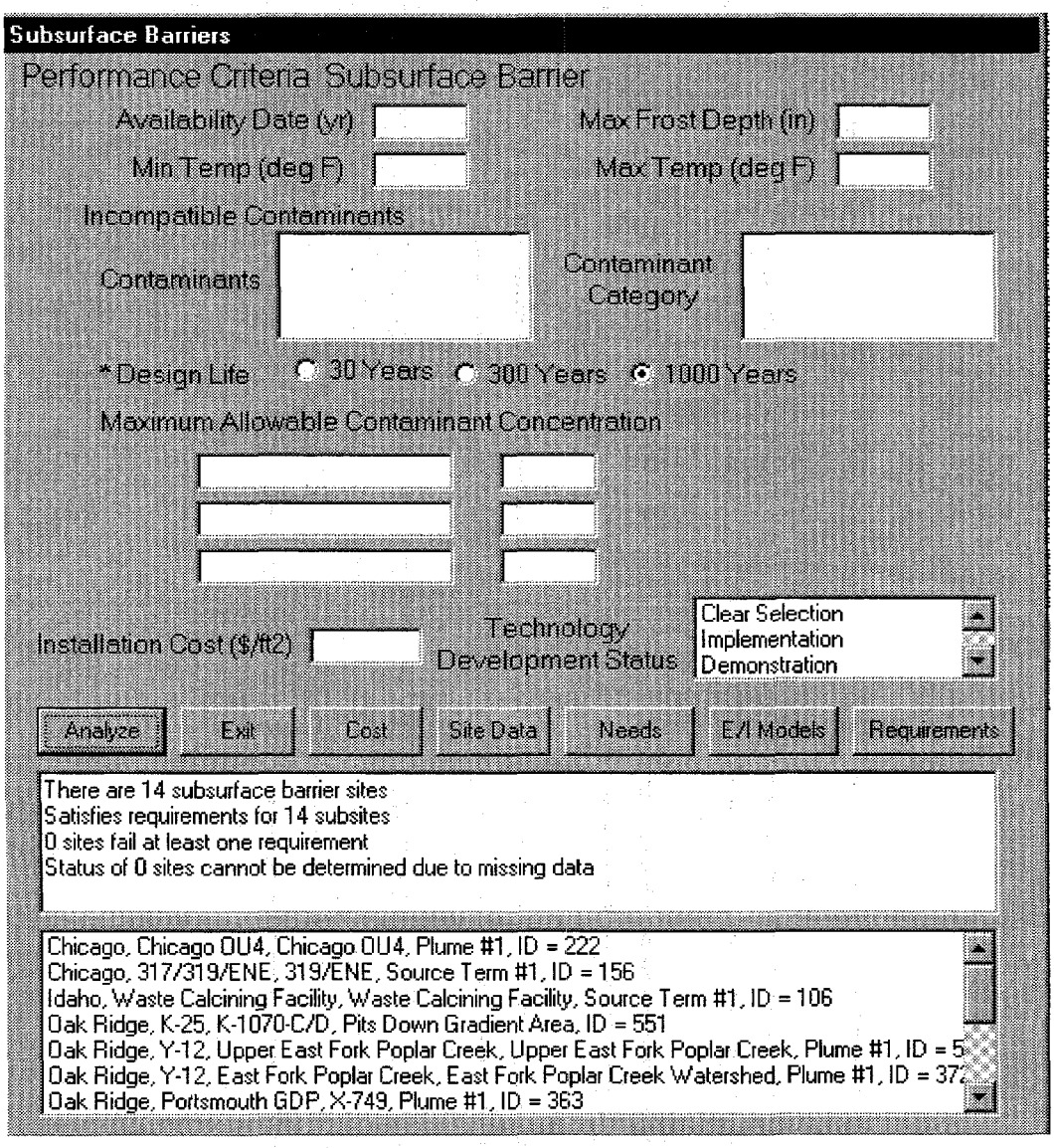

Figure 32. Subsurface Barrier Performance Assessment form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Max Frost Depth	Optional	Fails if maximum frost depth reported at site exceeds this value
Min Temp	Optional	Fails if minimum temperature reported at site is below this value
Max Temp	Optional	Fails if maximum temperature reported at site exceeds this value
Design Life	Required	Default 1000 years. Fails if site contains contaminants requiring design life exceeding value input
Incompatible Contaminants	Optional	Fails if site contains one or more selected contaminants
Incompatible Contaminant Categories	Optional	Fails if site contains one or more contaminants of selected category, e.g., VOC, EPA Toxic Metal
Max Allowable Contaminant Concentration	Optional	Fails if contaminant concentration at site exceeds this value

---

Cost and E/I Model Data

Installation Cost	Required	Used in cost model for selected sites.
Technology Development Status	Optional	Used in Effectiveness / Implementability (E/I) models.

3.2.5.18 Vapor Extraction Performance Criteria. The vapor extraction performance criteria form is shown in Figure 33. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

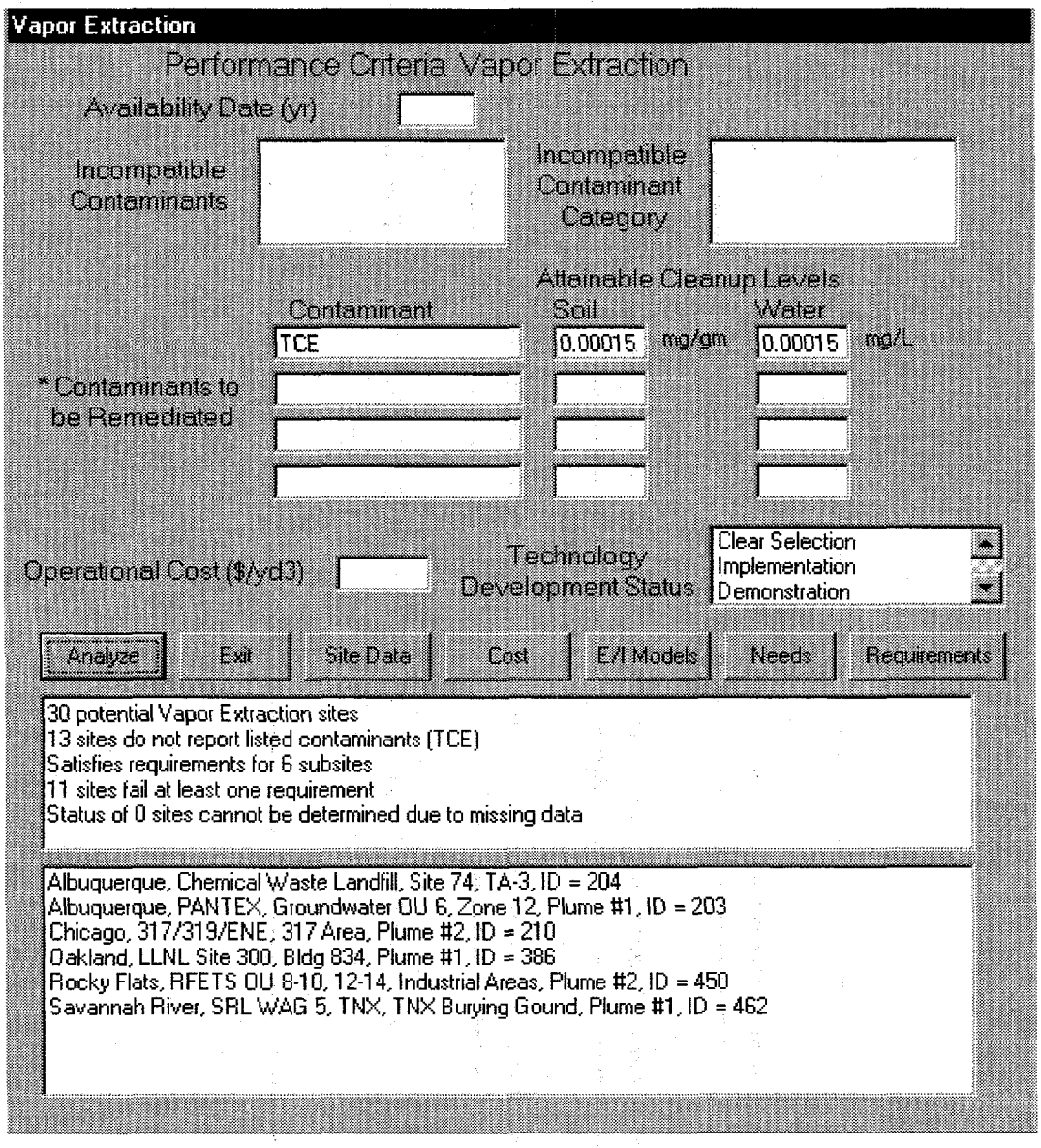

Figure 33. Vapor Extraction Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation decision date is prior to availability date
Incompatible Contaminants	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more contaminants of incompatible contaminant category
Contaminants to be Remediated	Required (minimum one with cleanup level and throughput)	Fails if contaminant at site has MCL less than attainable cleanup level or entered throughput is insufficient to meet schedule

Cost and E/I Model Data

Operational Cost	Required	Used in cost model
Technology Development Status	Option	Used in E/I models

3.3.4.19 Waste Assay Performance Criteria. The waste assay performance criteria form is shown in Figure 34. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

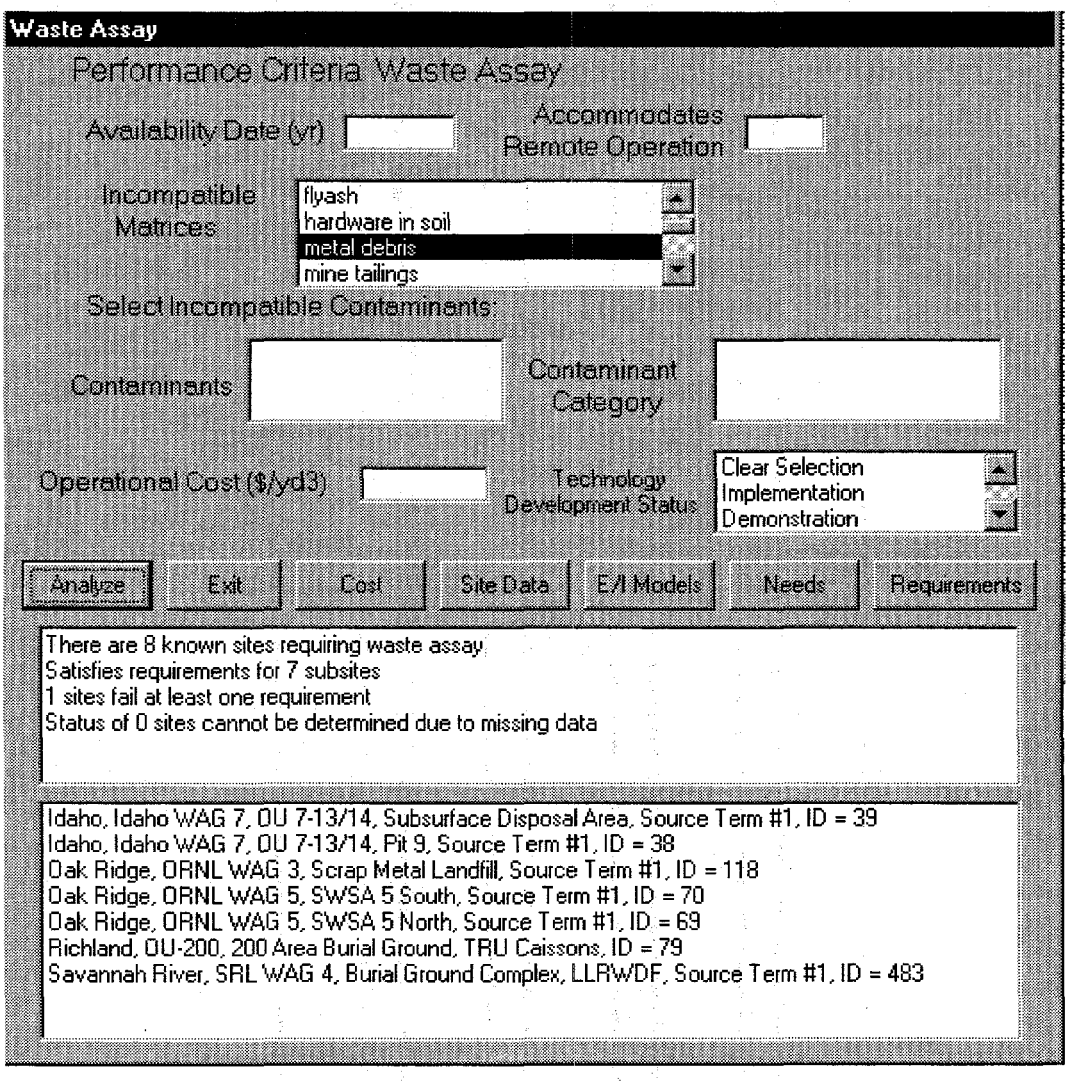

Figure 34. Waste Assay Performance Criteria form.

Technology Performance Criteria Data

Availability Date	Optional	Fails if site remediation date is prior to availability date
Accommodates Remote Operation	Optional	Fails if No is entered and remote operation is required
Incompatible Matrices	Optional	Fails if site matrix is an incompatible matrix
Incompatible Contaminants	Optional	Fails if site contains one or more incompatible contaminants
Incompatible Contaminant Category	Optional	Fails if site contains one or more incompatible of incompatible contaminant category

---

Cost and E/I Model Data

Operational Cost	Required	Used in Cost Model
Technology Development Status	Optional	Used in E/I models

3.3.4.20 Waste Container Integrity and Handling Performance Criteria. The waste container integrity and handling performance criteria form is shown in Figure 35. The buttons work the same as for the Cap Technology Performance Criteria form, see Section 3.3.4.1.

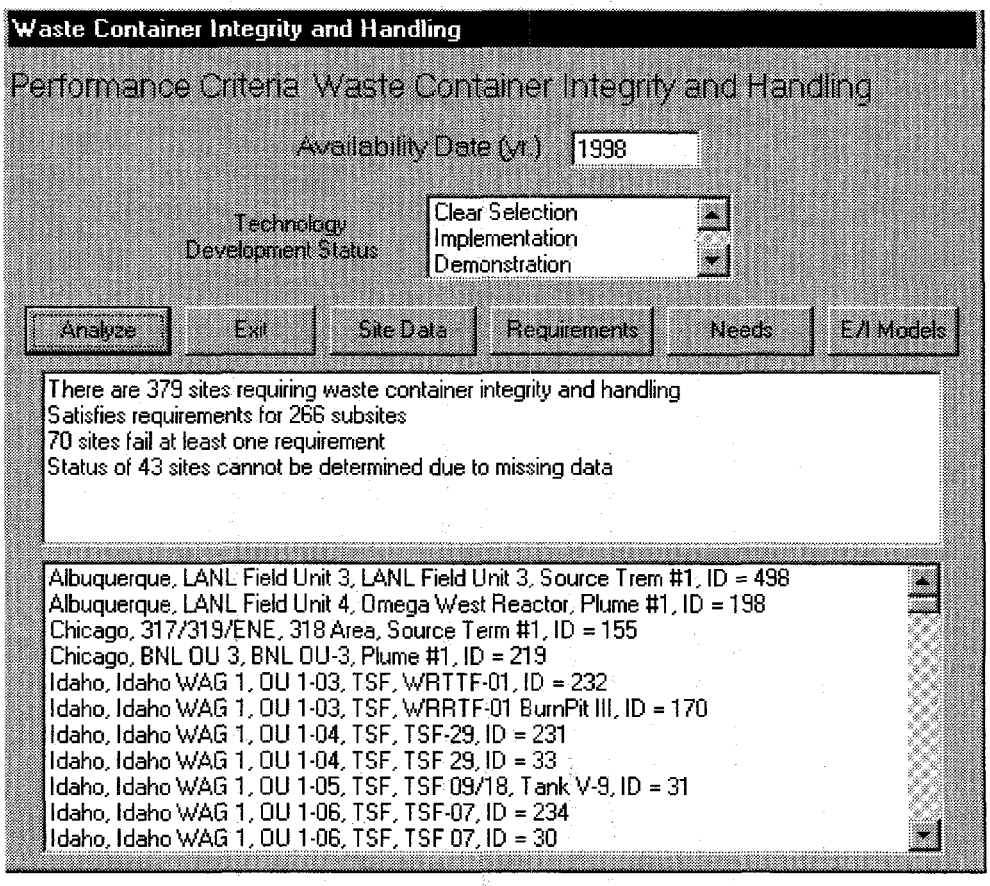

Figure 35. Waste Container Integrity and Handling Performance Criteria form.

Technology Performance Criteria Data		
Availability Date	Optional	Fails if site remediation date is prior to availability date
Cost and E/I Model Data		
Technology Development Status	Optional	Used in E/I models

3.3.5 Cost Report

The cost model output form is shown in Figure 36. Each technology category has a specific cost model. These models are described fully in the DART System Description Document. After sites have been found that satisfy the technology performance criteria, you have selected a set of sites, and all required cost model input data has been entered, selecting the Cost button in the technology performance criteria form will generate this output. The output shows the total cost of applying the technology at all of the selected sites for which sufficient data is available to calculate cost.

Exit: The Exit button will return to the technology performance criteria window from which the cost model was called.

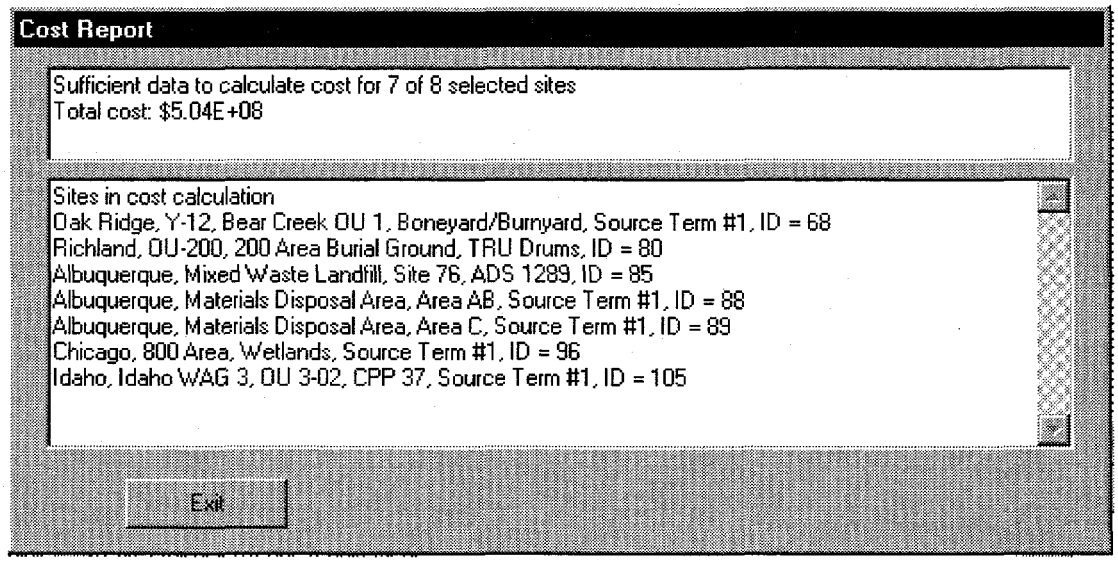

Figure 36. Cost Report form.

3.3.6 Effectiveness and Implementability Model Results

The output from running the Effectiveness and Implementability (E/I) models is shown in Figure 37. There are six models: reliability, effective benefit, site risk/residual risk, total volume, toxicity reduction, and irreversibility. These models are described fully in the DART System Description Document.

Exit: The Exit button will return to the technology performance criteria window from which the cost model was called.

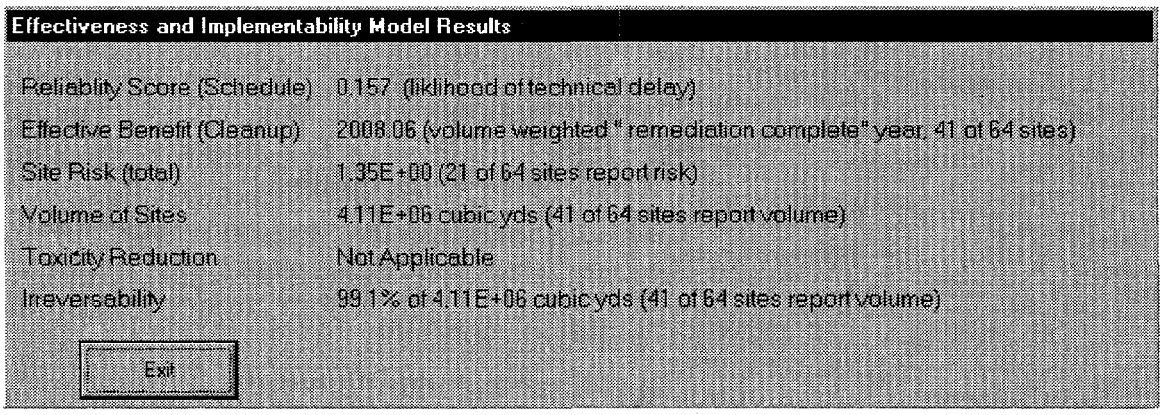

Figure 37. Effectiveness and Implementability Model Results form.

Reliability Score: This is the likelihood of technical delay averaged over all selected sites. The likelihood of technical delay is calculated using a probability of delay due to technology gate status multiplied by a factor based on the number of years from the technology availability date to the start remediation date of the site.

Effective Benefit: This measure is a volume weighted completion date, e.g., the sum over all selected sites of the remediation completion date times site volume divided by the total volume of all sites.

Site Risk/Residual Risk: Residual risk is calculated for the technology categories: in-situ bioremediation, in-site chemical treatment, in-situ thermal treatment, pump and treat, and vapor extraction. Residual risk is defined as total site risk minus the risk due to contaminants specified by you in the input template. For in-situ thermal, residual risk is the total site risk minus the risk due to all non radiological contaminants at the site. Total site risk is displayed as the output for this model for all other technology categories.

Volume of Sites: The sum of the volumes of all selected sites.

Toxicity Reduction: This applies only to treatment technology categories: in-situ bioremediation, in-situ thermal, and in-situ chemical. It is defined as the risk due to the contaminants specified by you in the input template. For in-situ thermal, the toxicity reduction is the risk minus due to all nonradiological and nonmetallic contaminants at the site.

Irreversibility: Irreversibility is the percentage of the total volume of the sites that undergoes an irreversible configuration option. Irreversible configuration options are: stabilization, retrieve and dispose, vapor extraction, in-situ bioremediation, in-site chemical treatment, in-situ thermal treatment, pump and treat, soil washing and selective retrieval. The configuration options walk away, monitor, cap, and barriers are reversible.

3.4 Summary Graphics

The Summary Graphics form, Figure 38, is accessed by clicking on the Summary Graphics button of the top-level form. Using menu selections, you can select a graph and graph type together with which sites should be used for graphs.

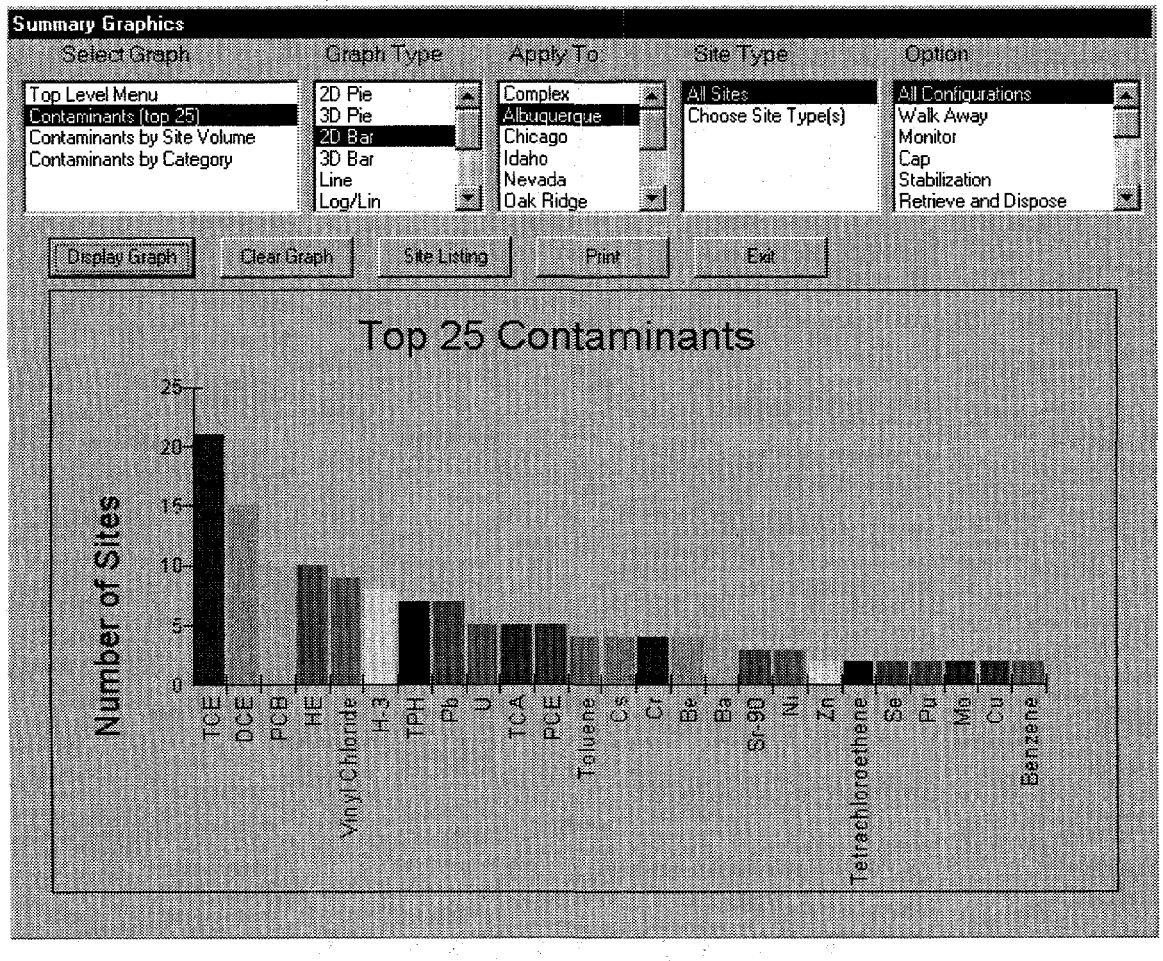

Figure 38. Summary Graphics form.

The graphs are grouped into four categories: Contaminant Graphs, Site Characteristics, Schedule Graphs, and Object Graphs.

Contaminant Graphs

- Contaminants (top 25): Number of sites by contaminant
- Contaminants by Volume: Total volume of sites by contaminant
- Contaminants by Category: Number of sites by contaminant category

Site Characteristics

- Maximum Waste Depth by site
- Minimum Depth to Groundwater by site
- Site Area by site
- Site Volume by site
- Site Priority Ranking by site
- Site Risk Ranking by site
- Site Risk / Priority Ranking by site

Schedule Graphs

- Characterization Schedule by site
- Alternative Analysis Schedule by site
- Remediation Decision Schedule by site
- Start Remediation Schedule by site
- Complete Remediation Schedule by site

Object Graphs

- Object Size
- Object Weight
- Object Size and Weight

Site selection includes: complex, field office or user input, and/or site type, e.g., groundwater plume, source term, etc. and/or sites with specific configuration options, e.g., excavation, bioremediation, etc. The user input form, User Site ID Entry form, is shown in Figure 39.

Display Graph: The Display Graph button will display the currently selected graph for the current set of sites satisfying the selection criteria.

Clear Graph: The Clear button will clear the currently displayed graph.

Site Listing: The site listing button will open the Site Listing Report form, Figure 7, and display the list of sites that satisfy the criteria used to select sites for graphing.

Print: The Print button will send a bitmap image of the Summary Graphics form to a printer.

Exit: The Exit button will close the Summary Graphics form and return to the top-level form.

To enter an arbitrary set of sites for graphing, (1) select "User Selected Sites" in the Apply To menu. Open the User Site ID Entry form (Figure 39) and enter a set of site ids separated by spaces. This set of sites will be used for graphing as long as "User Selected Sites" is selected or until the graphics form is exited.

OK: Selecting the OK button will close the User Site ID Entry form and save the sites you entered for graphing.

Clear: The Clear button will clear all currently entered site ids in the User Site ID Entry form.

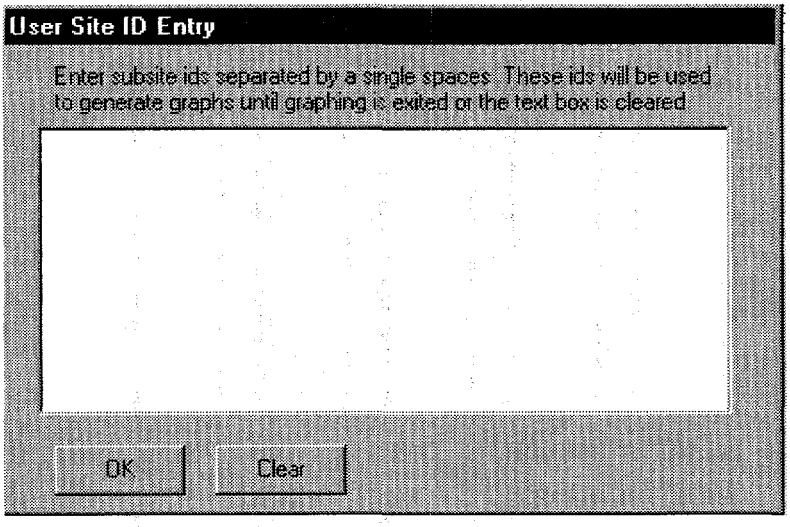

Figure 39. User Site ID Entry form.

3.5 Search Needs

The Search Needs form, Figure 40, is accessed by selecting Search Needs in the top-level form. You can search for needs by technology category, e.g., cap, excavation, etc. and/or field office or complex, and/or by entering one or two search strings. Initially, only the "Search Data" and Exit buttons are opened.

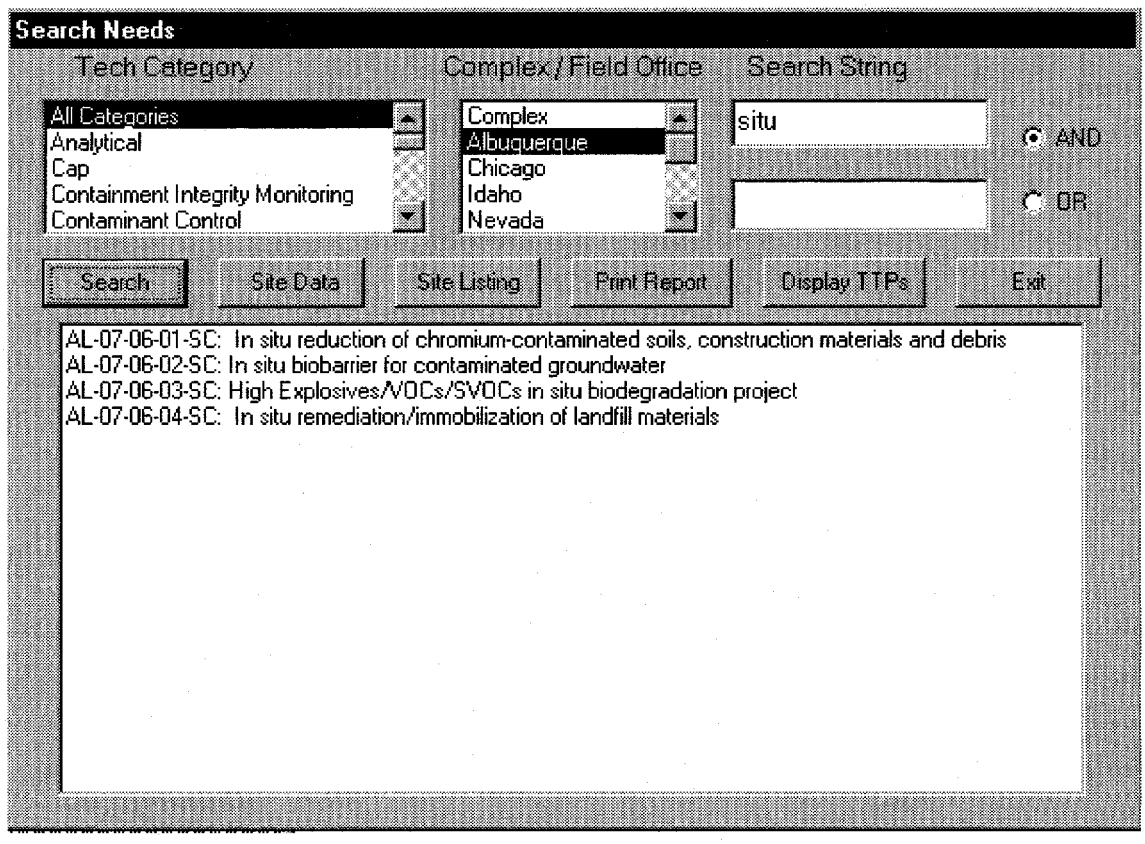

Figure 40. Search Needs form.

Search Data: This button will find all needs that satisfy the current set of search criteria entered and display the need id and need text for each need.

Exit: The Exit button will close the Search Needs form and return to the top-level form.

After the needs that satisfy the search criteria are displayed, additional buttons are available. The needs that are displayed are user selectable and choosing the Site Data button, Site Listing button, the Print Report Button, or the Display TTPs button will use the currently selected needs.

Site Data: This button will open the Display Site Data form to display site data for all of the sites that are associated with the currently selected needs.

Site Listing: This button will open the Site Listing Report form to list the sites that are associated with the currently selected needs.

Print Report: A hardcopy listing of the needs and all sites associated with each need will be printed when this button is selected.

Display TTPs: This button will open the Technology form and display the data for all TTPs associated with the currently selected needs.

3.6 SCFA DB Administration

The SCFA DB Administration form, Figure 41, is accessed from the top-level form. This form need not be accessed by the average user as it is used to perform update functions whenever the underlying database is changed. Performing these actions will not change the existing tables unless new data has been added to the database. The tables will, however, be rewritten with the same values, so selecting these buttons will have no impact on the system as long as the underlying database has not changed.

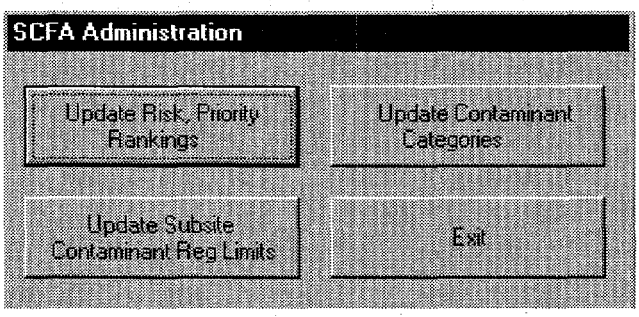

Figure 41. SCFA DB Administration form.

Update Risk, Priority Rankings: This capability should be run whenever new data is entered in the database that can affect risk or priority at a site. It is necessary to first run the query MakePRTable in Microsoft Access to recalculate the new risk and priority values.

Update Contaminant Categories: This should be run whenever site contaminant information is entered into the database.

Update Subsite Contaminant Reg. Limits: This associates sites with hazardous pollutant emission limits and ambient air concentrations. This should be run whenever new data is entered concerning this regulatory values.

4. TECHNICAL ASSISTANCE

For technical assistance, feedback or to report errors please contact system developers.

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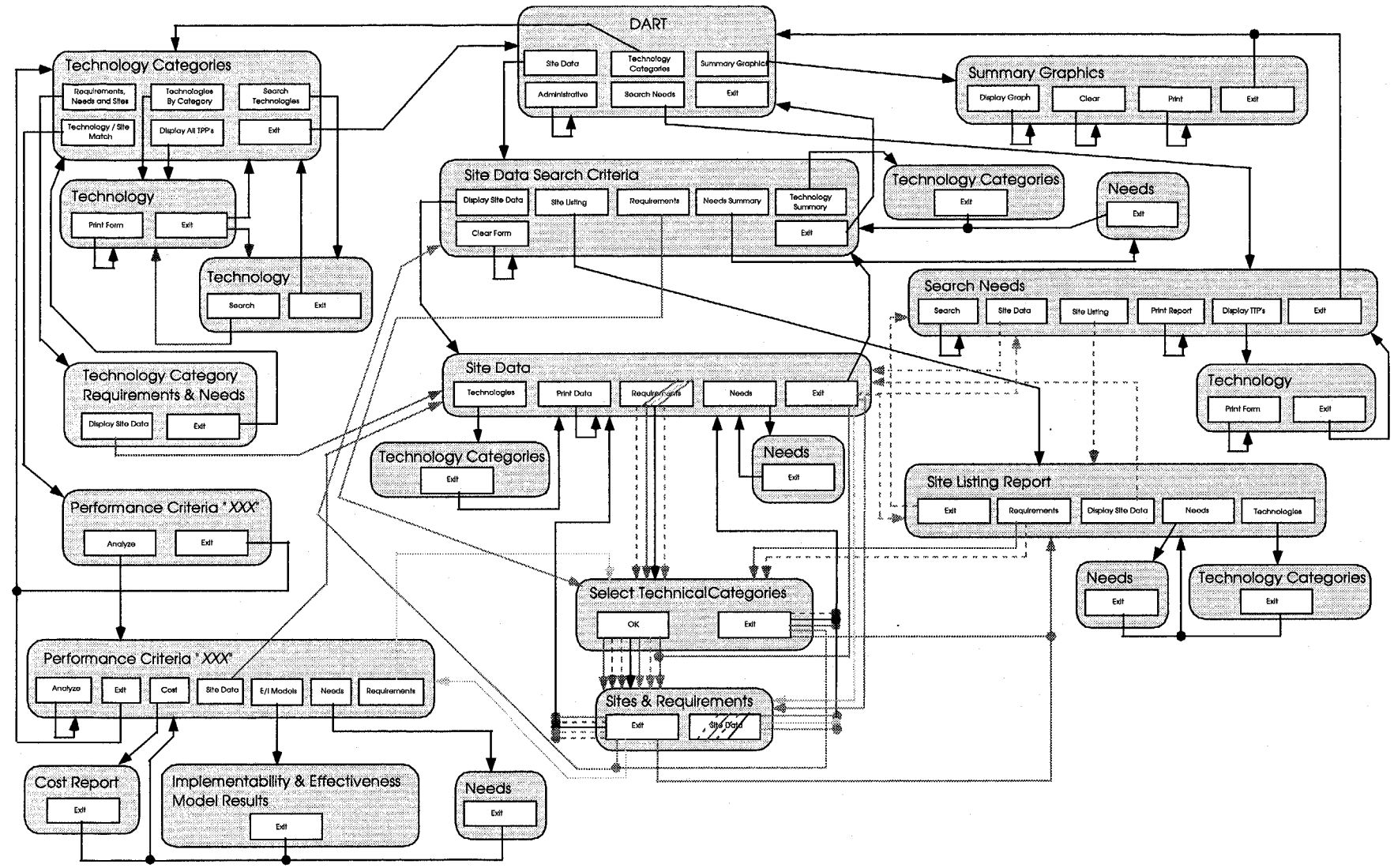
Appendix A

DART User Interface Map


DART
Site Data
Technology Categories
Summary Graphics
Administrative
Search Needs
Exit
Technology Categories
Requirements, Needs and Sites
Technologies By Category
Search Technologies
Technology / Site Match
Display All TPP's
Exit
Summary Graphics
Display Graph
Clear
Print
Exit
Technology
Print Form
Exit
Site Data Search Criteria
Display Site Data
Site Listing
Requirements
Needs Summary
Technology Summary
Clear Form
Exit
Technology Categories
Exit
Needs
Exit
Technology
Search
Exit
Search Needs
Search
Site Data
Site Listing
Print Report
Display TTP's
Exit
Technology Category Requirements & Needs
Display Site Data
Exit
Site Data
Technologies
Print Data
Requirements
Needs
Exit
Technology
Print Form
Exit
Technology Categories
Exit
Needs
Exit
Performance Criteria "XXX"
Analyze
Exit
Site Listing Report
Exit
Requirements
Display Site Data
Needs
Technologies
Needs
Exit
Technology Categories
Exit
Select TechnicalCategories
OK
Exit
Performance Criteria "XXX"
Analyze
Exit
Cost
Site Data
E/I Models
Needs
Requirements
Sites & Requirements
Exit
Site Data
Cost Report
Exit
Implementability & Effectiveness Model Results
Exit
Needs
Exit