



EPA/ITAS

023

FEBRUARY 16, 1989

EPA Systems Profile

Draft

CERCLIS

Prepared for

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL DATA PROCESSING DIVISION**

**INFORMATION TECHNOLOGY ARCHITECTURAL SUPPORT
CONTRACT NO. 68-W8-0083**

Prepared by the Viar Team

**Viar and Company
300 North Lee Street
Suite 200
Alexandria, Virginia 22314**

1.0 System Overview

1.1 System Purpose

The purpose of the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) is to provide tracking, scheduling, and financial management services to regional sites in support of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). CERCLIS is a tool which helps a region or site to meet Superfund program management and reporting needs. The data maintained in CERCLIS includes regional site information through a regional area network called WasteLAN and through direct linkup to the mainframe. Other site related information includes financial information such as budget allowances, administrative data such as targets and accomplishments, event tracking, site information and enforcement activities.

1.2 System Background

CERCLIS was developed by the Office of Solid Waste Emergency Response (OSWER) to support the Superfund program. Superfund provides a mechanism to track and clean up hazardous waste sites located throughout the ten national regions. Each region's activities are tracked through CERCLIS and are monitored both regionally and by headquarters.

Originally, CERCLIS was planned as a site inventory application. However, CERCLIS was expanded to accommodate other site related functions, previously available through systems external to CERCLIS. CERCLIS was expanded to maintain all necessary functions for site operation under one integrated system, the "new" CERCLIS. The systems made obsolete by this expansion are the Removal Tracking System (RTS), Removal-Remedial Financial System (RRFS), and the Case Management System (CMS). CERCLIS integrated the Superfund Comprehensive Accomplishments Plan (SCAP) into the "new" system as well. Therefore, CERCLIS is currently a full functioning system supporting all activities necessary for the collection and reporting of an integrated Superfund program and project management information.

To date, CERCLIS has been implemented in all ten regions. Two regions are currently utilizing the WasteLAN, while the remaining regions plan to link up to the regional area network shortly. Those regions and users not accessing CERCLIS via WasteLAN are currently accessing CERCLIS directly on the mainframe.

CERCLIS is currently in the development stage of its lifecycle and plans exist for moving CERCLIS into production in the near future. During development, CERCLIS was piloted at designated regions to provide a real world environment for system testing.

During this time, CERCLIS has been modified to correct problems and enhance performance. Additional computing resources and mirror image copies of the data base are used to alleviate slow response time and accommodate user community needs..

Headquarters are restricted to access to the CERHELP section of CERCLIS. They are responsible for maintaining non-site specific data and CERCLIS reference tables.

2.0 User Environment

The user community consists of Headquarters staff, the Department of Interior, the Army Corps of Engineers and the regional site staff which includes an Information Management Coordinator (IMC), Data Administrator (DA), Data Base Administrator (DBA) and Data Handler (DH). Headquarters accesses the data contained in the CERHELP data base and updates the code files and tables contained in CERHELP. The Department of Interior (DOI) wished to integrate with CERCLIS, so a copy of CERCLIS was provided to the National Computer Center (NCC) computer for access by the DOI. The need for future support and coordination with the DOI is currently unknown, pending an estimate from them regarding their required level of participation with CERCLIS. The Army Corps of Engineers is integrated with CERCLIS at some sites and take on the functions of site personnel since they are contracted through the EPA to perform cleanup activities.

Each region should have an IMC, DA, DBA and DH. The IMC is responsible for the Superfund program and systems management activities and will coordinate with the Environmental Services and Management divisions where necessary. The DA is responsible for directly maintaining and managing CERCLIS. The DA also conducts QA/QC activities, generates and designs reports, performs CERCLIS queries, maintains the regional CERCLIS data element dictionary, maintains the documentation library, and coordinates and conducts regional training. DBA functions are more technical than the DA and include the development and maintenance of Regional CERCLIS software, user support and data quality control support. Data Handlers (DHs) enter data through CERCLIS data entry screens (CICS or WasteLAN).

Contract personnel are sometimes employed to perform some technical and data entry tasks.

2.1 User Support

The CERCLIS user group or CERCLIS Management Council (CMC) as it is now called includes ten regional representatives and ten representatives from Headquarters. The CMC meets twice a year to discuss CERCLIS concerns and issues. The CMC is organized into four workgroups which meet at least four times a year and include Regional and Headquarters staff (IMC, DA, DBA). The four areas supported by the work groups are: Technical Enhancement; Report

Development; Support, Training and User Documentation; and Data Usage and Quality Improvement. The work groups support the CMC and the CMC reports to, coordinates with, and supports the Management Advisory Council (MAC). The CMC submits proposed work plans, analyses of issues and problem notifications to the MAC.

The Technical Enhancement Work Group identifies, analyzes and plans the activities needed to improve the system's hardware, software and telecommunications capabilities.

The Report Development Work Group identifies needs for new or upgraded standard reports, designs report layouts, and proposes report development priorities.

The Support, Training and User Documentation Work Group identifies, analyzes and plans the activities needed to improve user support services, training materials and strategies, and user documentation.

The Data Usage and Quality Improvement Work Group identifies the needs and planning activities necessary for the promotion of CERCLIS usage. This group ensures that the quality of all CERCLIS data is maintained at an acceptable level, is standard across user groups, and includes region specific data elements.

CERCLIS news is included in ~~two dedicated publications:~~ the CERCLIS Connection, published monthly and the CERCLIS Progress Report, published bi-weekly. The CERCLIS Connection contains update information, discussions of target CERCLIS areas, Regional report information, practical applications for data handling, new CERCLIS information, summaries of proposed and actual changes, Hotline information and upcoming system enhancements. The CERCLIS Progress Report contains information regarding development activities, training, documentation, regional implementation status, highlights of selected CERCLIS areas, CERCLIS idiosyncrasies, key milestones, and meetings.

2.2 User Training

Initial regional training is conducted by Headquarters. Any subsequent training is the responsibility of the regions. Initial regional training includes classroom presentations on the CERCLIS data base schema, system documentation and user manuals, demonstration of event and enforcement activity screens and a session where live data is entered. Personnel targeted for training range from senior management to data entry support staff.

The following courses are available upon demand:

- Introduction to the Enforcement Program
- CERCLIS Report Writer

- Genius and Interactive S2K.

Courses available through the CERCLIS training program are Headquarters courses such as:

- Superfund Overview
- CERCLIS/WasteLAN Orientation
- CERCLIS Data Quality Issues
- Using a SAS interface to S2K for CERCLIS Reporting and Customized CERCLIS Reporting.

And Regional courses such as:

- Case Budget CERCLIS
- Removal OSC and FMS Reconciliation Procedures
- RPM/OSC CERCLIS
- FMS Reconciliation
- CERHELP.

In fiscal year '89, training materials will be standardized and upgraded. A Central Training Library will be established and the CERCLIS Hotline will be expanded to serve as a mechanism for users to request training.

3.0 Technical Overview

3.1 Hardware/Software Environment

The CERCLIS computing environment uses two IBM 3090 computers, versions 200 and 300. The version 200 is available for data entry via CICS screens and the version 300 is a single-user machine dedicated to data base retrievals only. CERCLIS was built using CICS, COBOL PLEX, SAS and GENIUS utilizing the System 2000 data base management system (S2K).

WasteLAN is a regional area network providing applications written in dBASE III and access to system software such as ~~Timeline~~ and ~~Teleplan~~.

3.2 Subsystem Environment

3.2.1 Data Entry

CERCLIS supports two forms of data entry. Programs written in CICS COBOL provide screens on the central computer.

Come on, these are out put writers

mainframe only

SK

Programs written in dBASE III provide screens for the WasteLAN users.

3.2.2 Data Edits

Screen data is edited as it is submitted, therefore the edit programs are written in the same languages as the entry screens; CICS COBOL and dBASE III. Batch uploads and downloads of data directly to the mainframe are generally written in COBOL PLEX.

3.2.3 Updates

Data entered on-line is applied to the data base immediately after validation. FMS batch updates occur weekly. Other batch updates occur as needed.

3.2.4 Retrieval

Data may be retrieved from CERCLIS via on-line query or via report. Queries to the CERCLIS data base on the mainframe are implemented with S2K, the System 2000 4GL. Queries to the regional ~~base~~ are implemented in dBASE III (documentation mentioned CLOUT as a possibility for this feature). Reports are written in dBASE III for WasteLAN and are written in COBOL PLEX on the mainframe reports. Some report duplications exist between the two CERCLIS environments, however the regional reports are customized to reflect regional concerns only, while the mainframe reports employ a national perspective.

3.3 Data

Information retrieval in CERCLIS is related to the events surrounding Superfund site cleanup removal activities, enforcement activity, financial activity, budget and control activity and non-site specific activities. Regional data is also included. Data related to non-site specific incident (NSI) activities reside in the CERHELP data base. Incident and enforcement activities are part of the data domain.

Data is maintained regionally through WasteLAN and centrally at the CERCLIS mainframe. Regional data is uploaded to the mainframe on a weekly basis to permit regional integration into the national base.

NSI data is data not related to a site specific incident. It includes: Targets and Accomplishments such as, SCAP/SPMS; Target/Measure setting and tracking, and non-site specific (NSS) accomplishments reporting. IMC staff enters, updates, and maintains all WasteLAN NSI data.

Budget and Control and Advice of Allowance are functions of Superfund program management and include items like SCAP budget

development and control, and tracking of the Advice of Allowance process. This data is maintained by Headquarters and provided to regions for viewing purposes only.

Financial data may or may not be site specific and is part of the CERCLIS data base. Site-specific financial data includes obligation data, amount, operable unit and events. Non-site specific financial data encompasses all of the site-specific data except operable unit and events.

Enforcement data includes enforcement activity, planned and actual milestone dates, scheduled and achieved milestone dates, compliances statutes, actions required, remedies achieved, negotiations, judicial actions, and litigation results.

Site-specific data is all data involved in the investigation, assessment, inspection, removal, etc of Superfund sites. Site-specific data includes pre-remedial, remedial and removal. Pre-remedial data is related to the initial investigative phase of site cleanup. These activities include site-initialization, preliminary assessment, site inspections, expanded site inspections, list site inspections and site hazard ranking processing (NPL listing). Remedial data contains information related to tracking fund financial remedial projects. This includes activities surrounding site project completion, forward planning, Community Relations, Corps of Engineers design, technical assistance, and topographical mapping. Removal data contains information related to tracking removals such as removal action milestones and financial data.

3.3.1 Data Base

System 2000 is used as the CERCLIS mainframe data base. The CERCLIS data base as related data bases called CERHELP and CERTRAN. CERHELP contains non-site specific (NSS) data which is maintained by Headquarters and CERTRAN which is an audit trail type of data base which contains records of all data base transactions and who made them. System 2000 is a hierarchical data base design.

dBASE III is used as the WasteLAN regional data base system. All the data available in the WasteLAN base is regional specific only. dBASE III is a relational data base design.

The CERCLIS mainframe base contains regional data that is uploaded from the regions approximately every week. The central base contains Enforcement information and the other side contains data related to the events, subevents, financial matters and chemicals used during site cleanup.

3.3.2 Files

Files documented for use in CERCLIS are transaction files

which are used in the upload and download process. These files are temporary and are used as an intermediate cache to hold the data until it can be stripped or integrated into the data base.

3.4 Hardware

3.4.1 Type

CERCLIS mainframe uses an IBM 3090/200 and an IBM 3090/300. WasteLAN uses IBM or IBM compatible personal computers.

3.4.2 Peripherals

The peripherals used in addition to the PCs are the 3270 connector board, full screen color monitors and associated printers. Associated printers include the high speed printer in RTP and the local site dependent printers.

3.5 Software

CERCLIS mainframe programming languages include:

- CICS COBOL
- PLEX COBOL
- Genius
- S2K Natural Language
- SAS

CERCLIS/WASTELAN programming languages include:

- dBASE III or equivalent
- CLOUT

3.5.1 On-line

CICS COBOL is used for on-line CERCLIS mainframe screens and screen edits. dBASE III is used for on-line WasteLAN screens and screen edits.

3.5.2 Batch

COBOL PLEX is used for batch processes on the CERCLIS mainframe and dBASE III is used on WasteLAN.

3.5.3 Communications

Personal computers on the WasteLAN utilize Crosstalk and Carbon Copy to support their communication needs to the CERCLIS mainframe.

4.0 System Functions

4.1 System Input

4.1.1 Data Input

Data is input into CERCLIS and WasteLAN through several different mechanisms: 1) FMS data download, 2) WasteLAN upload to CERCLIS, 3) CERCLIS data screens, and 4) WasteLAN data entry screens and 5) CERHELP screens and CERHELP batch upload and download.

1) FMS data is copied from FMS into CERCLIS. The data is usually copied every Thursday, however the two weeks prior the close of a quarter and after the close of a quarter, daily updates can be run at the Regions request. The copy procedure takes place in batch mode.

Once the data is in CERCLIS the Regional WasteLAN downloads the FMS central data to the respective Regional LAN. The data is then integrated into the WasteLAN data base. Reports are generated which document all FMS activities. The WasteLAN Menu permits access to the Download FMS Data option.

2) WasteLAN Upload to CERCLIS occurs approximately every week. Regional WasteLAN data is uploaded to the mainframe upon request from the IMC. The CERHELP and CERCLIS data may be loaded separately or together. The upload process generates reports which verify data integrity. They are WasteLAN Upload Report, which prints the keys of all records contained in the upload and Generate Audit Report, which lists the records that were not accepted into CERCLIS.

3) CERCLIS data entry screens on the mainframe are a completely separate set of screens from those on WasteLAN. Once WasteLAN is implemented in every region these screens will become obsolete. The screens have the option to Change, Delete and View and are accessed through a menu. The CERCLIS data entry supports the same functional areas that WasteLAN supports: Pre-Remedial, Remedial, Removal, Enforcement and Financial. Data entry screens are designed to be user friendly.

4) WasteLAN data entry screens are designed to be user friendly. The screen design is color coded and display windows are used for messages and help information such as a list of valid entry codes. One of the beneficial features of WasteLAN screens is the operator's ability to display a window which contains a list of acceptable codes, tab to the appropriate code and have the system enter the selected code automatically. National Core data elements are highlighted with an asterisk (*) to differentiate between National and Regional data. The RETURN key must be pressed to enter data at the end of each field. At the end of the screen the operator can store the data or re-edit the screen. Status lines are displayed at the bottom of every screen. The types of screens available are menu screens, summary screens and data screens. Once the screens have been accessed the user can choose

Next screen; Prior screen; to Edit, Update, Add, Delete or Exit the screen without applying an update.

5) CERHELP data is updated by Headquarters and the Regions. Access to Regional CERHELP data is made possible through the WasteLAN CERHELP Maintenance Menu. This screen enables the operator to Insert, Edit and Delete Headquarters defined codes in WasteLAN. The screen allows NSI, Target/Accomplishments, Budget Type and Advice of Allowance codes to be updated.

The updated CERHELP data is uploaded to mainframe CERCLIS usually every week. Once the upload process is run the current version of mainframe CERHELP is available to be downloaded for integration into the WasteLAN CERHELP base. These processes are available through the Upload WasteLAN Menu.

4.1.2 Updates

Batch loads require additional edit checks and steps in order to integrate the file data into the receiving data base. Updates made through mainframe CERCLIS data entry screens are applied immediately to the CERCLIS data base after passing the edit checks. WasteLAN data entry screens work in the same manner except they update the regional base.

4.2 System Output

4.2.1 Ad-Hoc Data Retrieval

Ad-hoc retrievals are used to select information from the mainframe CERCLIS data base and Regional CERCLIS data base. Information retrieved from the mainframe CERCLIS is from the mirror image data base which resides on the IBM 3090/300. The information on this machine is typically one day behind actual data. Retrievals are requested via the S2K natural language interface, which is accessed through the corresponding option on the CERCLIS Retrieval Screen.

WasteLAN ad-hoc retrieval is available for all systems as is CERCLIS mainframe ad-hoc retrieval. The systems represented are Pre-Remedial, Removal, Enforcement, Remedial and Financial (a financial system exists as part of each other system category in addition to a separate system). Retrieval is available through the WasteLAN Reports option, using dBASE III.

4.2.2 Reports

Ad-hoc and standard CERCLIS reports exist on the mainframe and on WasteLAN.

Ad-hoc reports are also a CERCLIS/WasteLAN feature. Ad-hoc reports can be created in a variety of formats. These include Gantt Charts, data dumps, matrix, and Critical path.

There are currently approximately standard 150 reports on the mainframe, some of which are duplicates of Regional reports. Reports on the mainframe integrate data from all the regions and are often added as a request from the Regional users. Regional reports on the mainframe are usually reports which require a great deal of number crunching and ~~can be run faster on the mainframe than on a PC.~~ When a region requests a mainframe report the report is printed at the computer site in Research Triangle Park (RTP). If it is necessary the site staff can federal express a report to the requesting Region.

In order to efficiently utilize CERCLIS reporting capabilities, report usage and issuance is monitored by the Report Development Workgroup. If a report has not been requested for a while it will be targeted for investigation. If no future need for the report is discovered it will be removed from the Report Menu and the system. Regions are responsible for keeping track of their own reports.

Reports are supported by Report Library which contains a sample page from each report accompanied by documentation explaining the purpose of the report and describing its format.

Some of the report applications which CERCLIS supports are :

- SCAP, SPMS & SPR Planning and Evaluation Reports
- Site Summary which provides a site history and current status.
- Planned vs Actual which compares actual progress to planned progress.
- Project Schedule which provides a list of action items for next quarter.
- Delayed-Event which provides a listing of which activities the site has fallen behind on.
- Tickler which provides a listing of items requiring immediate action.

5.0 System Maintenance

Although CERCLIS is currently in its development stage a change control process is in effect for three types of situations which are classified as follows;

- Tier 1, requests which the project manager makes an immediate decision. Tier 1 requests are considered emergency situations.

- Tier 2, requests which go through the project manager, however the request is not expedited until it has gone through the formal change procedure outlined in 5.1.
- Tier 3, requests go through the formal change procedure and require a detailed evaluation by the EPA. The final decision is made by the CMC.

5.1 User Change Control Process

- 1) System "problems" represent the Tier 1 and Tier 2 situations and are usually identified when a user calls the CERCLIS Hotline or submits a CERCLIS Change Request Form. The process to accommodate Tier 1 requests are as follows;

The Hotline operator or technical staff member re-creates the problem, performs an analysis to determine the cause/source of the problem and documents the problem in the CERCLIS Change Control Log.

The problem is presented to the project manager, who decides whether or not to implement the change request.

If the problem is to be corrected the technical staff is notified and the problem corrected.

The outcome of the Change Request is documented and distributed to relative parties.

The Change Request Log is updated.

All changes submitted via the Hotline are published in the CERCLIS connection.

- 2) Tier 2 change requests are processed in the following manner ;
 - The problem is identified and a Change Request Form is submitted to Headquarters.
 - The request is presented to the progress forum where an analysis, and recommendation is prepared.
 - A decision about the request is made, documented and distributed to appropriate parties.

- A summary of the decision is sent to the MAC.
 - The change is implemented as indicated by the outcome of the decision.
- 3) System enhancements require users to submit Change Request Forms to their CMC representatives.

An open window for CERCLIS enhancements is activated every quarter with plans to activate bi-yearly in the future.

The submitted enhancements are reviewed by the Technical Enhancement Workgroup who perform a cost/benefits analysis for each request.

The results of the analysis are submitted to the MAC who makes the final decision as to which enhancements will be implemented.

Once a decision is reached the MAC sends out notifications, which indicate the status of the enhancement, to all users who submitted requests.

5.1.1 System Enhancement

System enhancements or Tier 3 change requests are defined as unsolicited changes to the system which effect original design or processes. The mechanics of the enhancement process are documented in section 5.1. Approved enhancements are planned and initiated by the Technical Enhancement Workgroup. System enhancements are BETA tested.

5.1.2 System "Problems"

System "problems" comprise Tier 1 and Tier 2 requests and are defined as system inadequacies which impede the intended function of the system. A problem is logged by the Hotline operator or project manager and then assigned to the technical staff for resolution. Once the problem is corrected the log is updated.

5.2 Technical Change Control Process

The mechanics of the technical change control process are the same for system enhancements and system "problems". Both require existing software to be modified and tested.

5.2.1 Change Control System Design

CERCLIS is currently in the development stage however, plan to accommodate test/development and production environments separately are in effect. The dual system environment

allows software maintenance and modification without interrupting the production system. No information has been provided regarding the type of data available for the development environment.

5.2.2 Change Control Documents

Documents involved in the change control process are ;

- CERCLIS Change Request Log
- CERCLIS Connection Publication
- CERCLIS User Change Request
- Programmer's Maintenance Manual

5.2.3 Change Control Activity

After the software has been changed the programmer(s) is responsible for testing the change.

5.2.4 Change Control Testing

CERCLIS is not implemented in the production environment therefore current software released is part of the system test.

Formal methods for interfacing to the NCC regarding changes to the production environment have yet to be defined.

5.2.5 Implementation of Changes

The NCC is responsible for moving a software change from development into production.

6.0 Documentation

The following list comprises the documentation discovered for CERCLIS ;

User Documentation

CERCLIS : Regional System Administration Handbook
 CERCLIS Data Element Dictionary
 CERCLIS Data Entry and Retrieval Guide
 CERCLIS National Reports Library

WasteLAN : Users' Guide to the WasteLAN Pre-Remedial System
 Users' Guide to the WasteLAN Remedial System
 Users' Guide to the WasteLAN Renoval System
 Users' Guide to the WasteLAN Enforcement System
 Users' Guide to the WasteLAN CERHELP System

Technical Documentation

CERCLIS System Documentation CERCLIS Programmers Manual

6.1 User Documentation

Users guides exist for each WasteLAN system and a General Data Entry and Retrieval Guide for CERCLIS. Each guide contains an overview of the CERCLIS or WasteLAN system as well as detailed procedures explaining access to each subsystem including; interactive sessions (query, ad-hoc retrievals), screen displays, prompts and reports.

Users guides for mainframe CERCLIS are maintained by the Support, Training and User Documentation workgroup which reports to the CMC.

WasteLAN documentation is maintained by the Data Administrator (DA), who is also responsible for the Regional documentation library. The DA issues Regional documentation updates.

6.2 Program Documentation

Technical documentation for CERCLIS is maintained by contractor personnel. Program documentation is included in the CERCLIS Programmer's Maintenance Manual. The manual contains information regarding program structure, subroutines, common elements, security, help processing, error messages, update logging, rollback and abend processing. The manual also lists CICS, COBOL and S2K programming standards. Each program is documented by transaction id, program id, mapset, map, functions, language, source, program type, sample screen or output and psuedocode.

The CERCLIS System Documentation manual contains general documentation or CERCLIS functions/features such as; VSAM files, implementation plan, CICS registration, system overview, program change control, change control procedure, logs, operations and test plan.

6.3 Data Dictionary

The CERCLIS Data Element Dictionary (DED) was originally implemented in BASIS on the IBM 3090 mainframe. Although BASIS provided users with a on-line search and reporting capability it was difficult to maintain and use. Therefore, a switch to dBASE III DED occurred. Currently, the DED is maintained in dBASE III and copied to floppy diskette for site distribution.

Appendix I

Sample System Function Screens

Appendix II

Documentation Matrix