Logistics Management Institute

Managerial Uses for the Army's Environmental Compliance Assessment System

AR414MR1

Douglas M. Brown
Denise R. Dellovade
H. Locke Hassrick

LMI

September 1995

Managerial Uses for the Army's Environmental Compliance Assessment System

AR414MR1

Douglas M. Brown
Denise R. Dellovade
H. Locke Hassrick

Prepared pursuant to Department of Defense Contract MDA903-90-C-0006.

Logistics Management Institute
2000 Corporate Ridge
McLean, Virginia 22102-7805

Managerial Uses for the Army's Environmental Compliance Assessment System

Executive Summary

In 1992, the Army established the Environmental Compliance Assessment System (ECAS) process to help its commanders identify environmental deficiencies and comply with environmental regulations. After completing the first three-year cycle of ECAS assessments, the U.S. Army Environmental Center (USAEC) asked the Logistics Management Institute (LMI) to evaluate the quality of the data, to use the data to identify Army-wide environmental trends and systemic problems, and to assess the potential for combining the ECAS data with other Army data sources.

We found that the quality of the initial cycle of ECAS data was poor because of incomplete and inconsistent reporting from the assessment teams. We recommend a number of corrective actions, many of which USAEC has already adopted for the second ECAS cycle.

We found the data reported in the initial ECAS cycle was not useful for conducting trend analyses. This will improve as the reports from subsequent cycles become available. We recognize that the ECAS automated system was originally designed as a means of recording and printing out team observations; it was not designed to support management information requirements. We enhanced the historical data by adding data items that will be available after the second cycle. The enhanced ECAS data, which is consistent with findings from other Army enforcement data sources, portray the vast majority of the Army's compliance problems to be administrative (that is, involving no pollution release) and stemming from human error at the installation level.

We identified useful management information that could be derived by combining ECAS data with data from other sources. During our interviews, managers at all levels of command emphasized the need to access ECAS data both independently and in conjunction with other Army environmental data systems. They need access from their own computers to assure the data are timely, flexible and useful. At present, this capability is not available to managers at any level; complex queries of the ECAS data, and data interchange between ECAS and other Army environmental data systems, can be done only at USAEC and only with special training. USAEC should develop data transfer processes and analysis tools to make its data more accessible; in the interim, USAEC should continue to work with field managers to identify and develop improved or additional outputs using the existing systems.

While reviewing ECAS, we noted other management concerns. The tools of the ECAS process (the protocols, assessment reports, and data sets) are seldom used at any level because they are very bulky and lack priority indicators that could be used to focus a commander's attention. At present, there is no follow-up from higher levels of command to boost a commander's awareness. Installations do not view ECAS findings as an Army standard against which they will be evaluated and held accountable. The belief that there will be no repercussions from failing to take action is, ironically, also the most common cause of the actual compliance deficiencies.

The wealth of compliance information provided by ECAS presents an unintended consequence. ECAS provides commanders with comprehensive information on their commands' deficiencies in meeting legally mandated compliance requirements. Once provided with this information, commanders can become personally liable for failure to take appropriate corrective action. The Director of Environmental Programs should ensure that commanders at all levels are informed of the increased responsibility for corrective action that ECAS imposes on them.

Contents

Contents (Continued)

CHAPTER 1

The Army's Environmental Compliance Assessment System

INTRODUCTION

In 1992, the Army established the Environmental Compliance Assessment System (ECAS) to help its commanders comply with Federal, state, and local environmental regulations. The ECAS is centrally funded and managed by the U.S. Army Environmental Center (USAEC). It is a continuing process in which audit teams of contractors or Army personnel assess the Active, Reserve, and National Guard Components of the Army and compile and analyze data from those assessments on a three-year cycle. The teams conduct on-site environmental assessments, provide written reports to facility managers, and enter the assessment findings into a standardized software system for inclusion in an Army-wide ECAS data base. The ECAS process has the following objectives:

- Help all Army commanders identify environmental compliance deficiencies
- Develop corrective actions to address deficiencies
- Identify the resources needed to implement the corrective actions
- Help Army commanders track corrective actions and analyze compliance trends
- Increase environmental awareness of all staff elements.

BACKGROUND

Historically, the Army's approach to managing environmental problems has been reactive. The common practice at most installations has been to solve problems as they occur, usually in response to compliance deficiencies issued by state regulating authorities and the Federal Environmental Protection Agency (EPA). The installations use these enforcement actions as a measure of their compliance performance. The Army wants to institute preemptive measures to deal with environmental deficiencies and not rely on these actions. It is for this purpose that ECAS was established.

Since FY93, ECAS has completed nearly 1,000 individual assessments at Active, Reserve, and National Guard installations. ECAS, which is centrally managed by the USAEC, performs assessments at the installation level and forwards the data to USAEC for incorporation into the ECAS data base. The Active Component comprised 356 of the 525 installations that ECAS assessed in FY93.

Findings reported from these assessments are identified in two dimensions. The first is by one of the 17 major media areas established in line with major Federal environmental compliance legislation. These media areas and the applicable citations are listed in Appendix A. The second dimension by which the findings are identified is its category as follows:

- *Class I.* These findings are observed situations that are currently out of compliance with an existing environmental regulation, compliance agreement, consent order, operating/discharge permit, or existing Notice of Violation (NOV).

- *Class II.* These findings identify situations that must be addressed to meet a future compliance deadline in an environmental regulation.

- *Class III.* These findings are deviations from good management practices and guidance contained in Army regulations and Department of Defense directives.

- *Health and Safety Findings.* These findings are related to the Occupational Safety and Health Act and National Fire Protection Assoication requirements as well as Department of Transportation regulations.

- *Positive Findings.* These findings are identified for situations in which installations have exceeded the regulatory requirements or have implemented programs or actions that exemplify good management practices.

The findings entered in the ECAS data base can be sorted and reported only by media area and by category (they are the only two structured-entry fields).[1]

The first ECAS cycle was concluded in 1994. At that time, USAEC began to evaluate the lessons learned from that initial set of assessments in order to enhance the program when new contract solicitations were offered for FY95. The second round of assessments initiated during FY95 with several modifications from the initial process is generally known as "ECAS-II."

The U.S. Army Environmental Center wished to use the ECAS data for management purposes such as identification of systemic compliance problems. To support that effort, it asked the Logistics Management Institute (LMI) to review the effectiveness of the data-collection process, to evaluate the condition of the

[1] As an example of the data that are available from the original ECAS data set, the FY93 findings, tabulated by the number of findings by category and by media, are shown in Chapter 3 in Table 3-2.

data, to analyze the data in search of Army-wide trends and systemic problems, and to identify the need and potential methods for linking the ECAS automated data with other compliance data to provide even more sophisticated management information from Army environmental data sources. This report presents our findings and recommendations with regard to the data set and the capabilities of the data management systems to support managerial needs.

Because of the close cooperation between LMI and the USAEC project managers during the course of this research, we were able to present a number of our interim findings in informal briefings. That process coupled with parallel USAEC initiatives has resulted in many of our findings being addressed and some of our recommendations being incorporated in the ECAS-II process. Thus, some of our findings with regard to the ECAS process have been corrected; however, where the earlier process defects affected the quality of the data collected prior to 1995, we have cited the findings in this report in order to note potential weaknesses in the data set.

Measuring a Commitment to Environmental Compliance

We reviewed a number of publications that address the collection and use of organizational environmental assessment data. The consensus of those publications is mirrored in a recent Department of Justice (DOJ) policy document. As part of its judicial responsibilities, DOJ developed criteria for evaluating an organization's commitment to environmental compliance.[2] Among other purposes, DOJ uses these criteria to determine apparent culpability of supervisors and executives in overseeing deficiency compliance programs. In the DOJ model, having such a system indicates a reasonable concern for environmental responsibilities (and not having one, by extension, suggests not having such concern). Thus, a compliance system that meets these criteria should be of interest to all Army installation commanders and their staffs.

Armed with such a management system, a commander cannot plead ignorance of conditions if regulatory action is being considered. In view of DOJ's general reflection of that view in the professional literature and the potential consequences of ignoring these criteria, we used the DOJ criteria to evaluate the ECAS reporting process and the USAEC's use of information generated by the external assessments.

[2]The Advisory Working Group of the U.S. Sentencing Commission, *Proposed Guidelines for Sentencing Organizations Convicted of Environmental Crimes*, November 17, 1993.

At a summary level, the DOJ criteria are as follows:

- *Regulatory Expertise, Training, and Evaluation.* An organization should maintain an understanding of all applicable environmental requirements. It should monitor and evaluate the training of all employees, ensure their ability to carry out their responsibilities in compliance with those requirements, and evaluate those employees who carry significant responsibility.

- *Auditing, Monitoring, Reporting, and Tracking Systems.* Effectiveness in managing an organization's environmental program requires that managers build a solid infrastructure for checking its progress and monitoring its results.

- *Integration of Environmental Policies, Standards, and Procedures.* Organizations should clearly communicate to their employees policies and procedures necessary to comply with environmental regulations. They should design standard operating procedures around employees' job specifications so that compliance will be achieved and integrated into the routine work of the organization.

- *Management Attention to Compliance.* Managers direct their attention to measuring, maintaining, and improving the organization's compliance with environmental laws and regulation. Line managers responsible for environmental compliance should be well versed in monitoring report contents, directing the resolution of compliance issues, and ensuring that corrective actions are carried out.

- *Incentives for Compliance.* The organization should implement a system that provides incentives and rewards to agents for their contributions to environmental compliance.

- *Disciplinary Procedures.* The organization should enforce appropriate disciplinary actions to prevent future noncompliance procedures.

- *Continuing Evaluation and Improvement.* The organization should measure the status and trends of its effort to achieve environmental compliance by conducting periodic external evaluations. Those evaluations should measure the organization's progress towards improving the process.

Aspects of these criteria (including more detailed subordinate criteria) directly address the ECAS process. We used these criteria as a measure of the system's ability to support managers with key information.

Chapters 2, 3, and 4, respectively, discuss the structure of the ECAS program, our findings and conclusions, and our recommendations for improving the ECAS data-collection and reporting process. We have also included the following appendices:

- Appendix A. Media and Citations
- Appendix B. Findings Codes
- Appendix C. Root Cause Codes
- Appendix D. Management Reports/Trend Analysis
- Appendix E. Data Base Field Recommendations.

CHAPTER 2

The Structure of the ECAS System

INTRODUCTION

The ECAS assessment of an installation's environmental compliance can be divided into four phases: preassessment, on-site assessment, postassessment, and corrective action. Those ECAS phases are shown in Figure 2-1 and are discussed in this chapter.

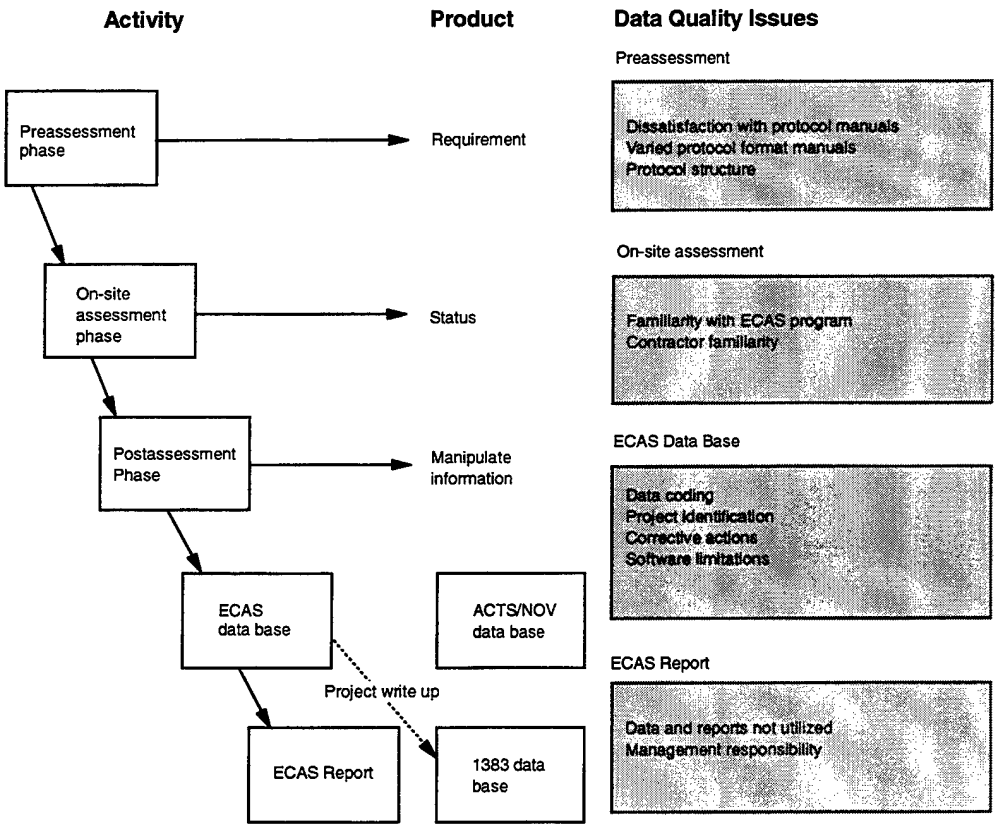


Figure 2-1.
Phases of the ECAS Process

PREASSESSMENT PHASE

The Army has prepared a standard ECAS protocol manual that its installations can use to assess environmental compliance with all Federal laws, regulations, and policies. Contractors selected to perform the environmental assessments at individual installations are responsible for identifying state and local regulations that also apply. The contractors then modify the installation's protocol manual to create a single comprehensive assessment manual that is used as the checklist for that installation's environmental assessment. Specific facilities on the installation that are to be assessed are determined at a scoping meeting during this preassessment phase between the contractor and the installation environmental management office.

ON-SITE ASSESSMENT PHASE

The on-site assessment is performed during a visit (on a major installation, generally a two-week period of intense activity) in which the ECAS protocol manual is used to evaluate designated installation facilities. The ECAS assessment team presents findings to the installation managers daily during briefings.

At the completion of the assessment, the assessment team presents an exit briefing to installation managers. At that briefing, the managers are provided with a preliminary set of findings, including a list of items requiring immediate attention.

POSTASSESSMENT PHASE

ECAS Data Base

During the on-site assessment, the team begins to develop the ECAS data for that installation. The ECAS software was originally intended to generate the assessment report (ECAS report) in a standard format; thus, findings, corrective action, cost information, and other relevant data are entered into the ECAS data base, which in turn is used to generate the required portions of the report. As the ECAS program evolved, a more readable general report has been produced with the ECAS-generated material provided as technical appendices. During the report development process, data are drawn from the following two other Army environmental data bases and new data are subsequently entered into those data bases:

- The 1383, an Army data base used for funding, tracking, and controlling environmental projects
- The Army Compliance Tracking System (ACTS), the central Army data base for tracking compliance actions.

ECAS Report

Approximately three months after the site assessment is completed, the ECAS team delivers the draft report, which consists of a list of findings, corrective actions, and estimated project costs.

The draft ECAS report is then submitted for the review and approval of the installation commander and the major Army command (MACOM). When the ECAS report has been approved for release by the installation, copies are provided to the MACOM and USAEC with its associated data in the ECAS software format.

Corrective Action Phase

The corrective action phase begins during the assessment as on-the-spot corrections are made. Additional corrective actions are initiated as soon as they are identified by the assessors at the daily briefing or the final briefing as long as the actions require no external resources or as long as the deficiencies are critical and subject to emergency project funding.

Most of the corrective actions are developed by the assessment team during the postassessment phase as recommendations for the installation. Those corrective actions are validated by the installation and adopted as part of the final ECAS report.

Local deficiencies are then corrected, and larger projects requiring external funding are entered into the 1383 data base process and are performed as funding becomes available.

ECAS-II

At the end of the FY94 ECAS assessments, USAEC made several changes to the ECAS process to answer concerns that emerged as the program matured. Some of those changes were minor adjustments to the material provided to assessment teams to ensure that everyone understands the terminology and requirements. The most far-reaching change was a shift in focus from the U.S. Army Corps of Engineer districts to the U.S. Army Center for Health Protection and Preventive Medicine (USACHPPM, formerly the Army Environmental Hygiene Agency). That change was made to provide a single focus for the assessment process, using a group with technical experience and knowledge of Army installations and with the capability of obtaining contract support on site as needed. It also shifted the ownership of the assessment from the installations and the Corps to USACHPPM and USAEC, which should greatly reduce the delay in finalizing the reports and acquiring the data. Among other procedural changes, USAEC adopted a requirement for protocol amendments for state and local regulations such that the assessment item numbering systems in the

protocol manuals would remain standard across all installations. Specific changes were made to the ECAS software to provide structured entry of findings and root cause codes, a protocol section number field for detailed tracking, and a corrective actions tracking tool.

These changes address many of the concerns noted in the remainder of this report. If they prove effective, the quality of ECAS assessments and supporting data for FY95 and beyond will improve significantly.

CHAPTER 3

FINDINGS AND CONCLUSIONS

GENERAL

We analyzed each phase of the environmental compliance assessment by reviewing ECAS Reports — documents performing quantitative analyses of the ECAS data, visiting three Army installations, and interviewing contractors and environmental managers at MACOMs and Army Headquarters. We also interviewed ECAS-counterpart program managers in the Navy and Air Force to determine how those Services conduct similar activities. Because of some acknowledged weaknesses in the early years of the Army's ECAS process, the data sets provided to us were incomplete. However, after some modifications, we were able to use the ECAS data available at USAEC to process findings and generate some initial quantitative summary data.

A summary of our findings is presented in Figure 3-1, which also shows the relationship of those findings to the DOJ criteria for effective management oversight of an environmental program. The remainder of this chapter provides a detailed discussion of each finding, listed in the order of the four assessment phases of the ECAS process (described in Chapter 2).

Again we emphasize that many of these findings have been made known to USAEC during the course of the study, and USAEC has incorporated them into ECAS-II. We discuss those findings here to document the reasons for some of the USAEC changes and, more important, to account for cases in which the deficiencies in the earlier process had an impact on the completeness and utility of the data set.

The Department of Justice has established guidelines for measuring an organization's commitment to environmental compliance. It has also outlined specific tasks to meet those criteria. In Table 3-1, those tasks are matched against the capabilities that the ECAS assessments provide or could provide.

Clearly, ECAS offers an initial framework whereby many of the DOJ standards could be met. However, as the first round of ECAS was executed, data were either unavailable or have not been used to ensure that deficiencies were corrected or that good and poor performance were identified and addressed. ECAS-II will solve some of the technical issues of the assessment process; this report provides recommendations for improving the quality and utility of the data generated through those ECAS assessments.

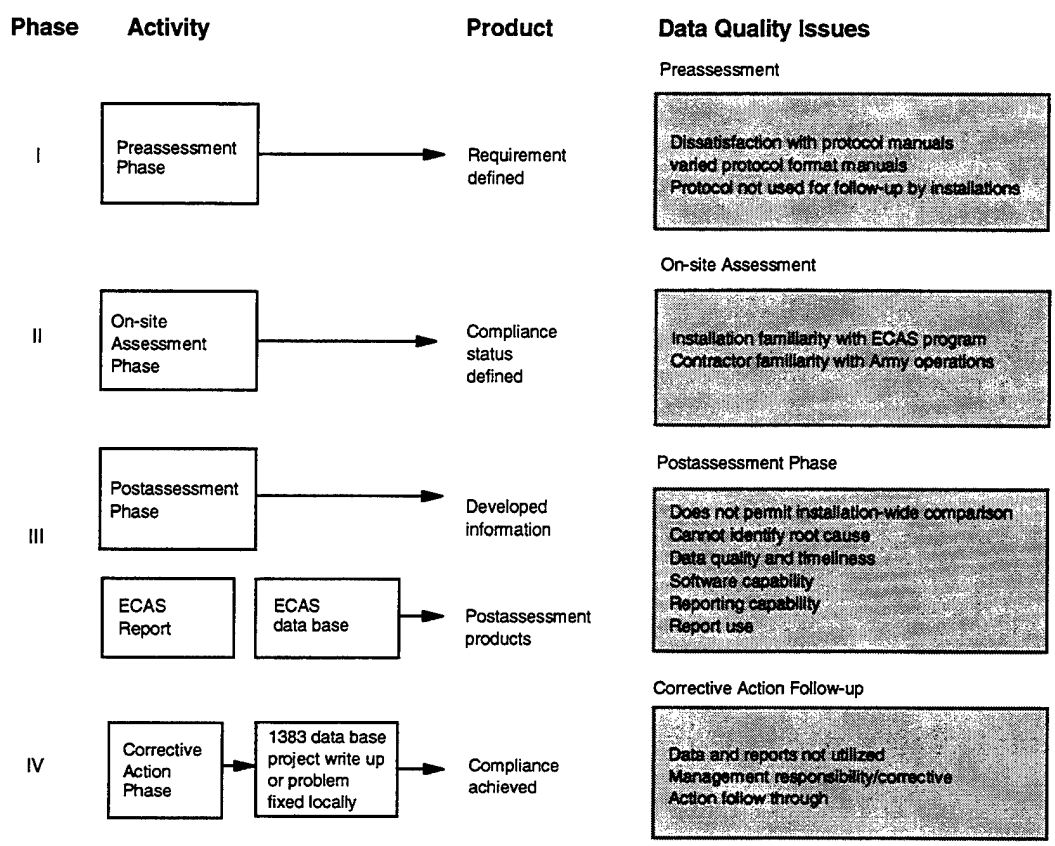


Figure 3-1.
Findings by ECAS Phase

ECAS Process Findings

This section addresses our findings vis-a-vis the ECAS process. Following this discussion, we present our findings on the analysis of the data in the data base because the limitations of the current data set are important.

Preassessment Phase

The Army spends considerable time and money in protocol preparation. However, neither the Army protocol manual nor the contractor-prepared protocol manuals used for specific assessments ensure high-quality assessments that are consistent across all Army installations. Moreover, the protocols do not facilitate use of the data at the management level.

Table 3-1.
Comparison of ECAS Assessment Capabilities with Department of Justice Criteria

ECAS phase	DOJ standards	Requirement	ECAS assessment capability
I & II	Regulatory Expertise, Training, and Evaluation	• Maintain sufficient knowledge of all environmental requirements by those whose responsibilities require such knowledge	• Some contractors did not have adequate Army experience. • Some parts of the protocol manuals are viewed as unsatisfactory. • ECAS protocols are not viewed as statements of Army policy or requirements.
		• Train, evaluate, and document the training of employees as to the applicable environmental requirements and standards necessary to carry out their responsibilities	• Army used contractors to develop protocols and conduct assessments; Army staff involvement is limited.
		• Evaluate employees and agents	• ECAS assessor's performance is not routinely evaluated. • Compliance record is not used as a part of the environmental staff evaluations.
III & IV	Auditing, Monitoring, Reporting, and Tracking Systems	• Build infrastructure for monitoring program progress	• ***Does provide way to monitor progress over time (with ECAS-II).*** Some improvements are needed.
		• Frequent auditing	• Formal auditing (ECAS) is completed once every 3-4 years. Installations are required to conduct intervening self-assessments; seldom do.
		• Internal reporting	• ***ECAS tool could permit internal reporting*** but has not been used for that purpose.

Note: Bold italic type indicates positive findings.

Table 3-1.
Comparison of ECAS Assessment Capabilities with Department of Justice Criteria (Continued)

ECAS phase	DOJ standards	Requirement	ECAS assessment capability
III & IV	Auditing, Monitoring, Reporting, and Tracking Systems (continued)	• Tracking status of responses	• Status of responses (corrective actions) are currently not tracked beyond local level.
		• Continuous on-site monitoring	• ECAS process is given little attention at installation level.
		• Documented resolution	• ***Results of assessments can be documented;*** resolution cannot.
IV	Integration of Environmental Policies, Standards, and Procedures	• Communicate compliance policies and procedures	• ECAS protocol is not viewed as a statement of the Army's expected standards.
		• Standard operating procedures (SOPs) should be designed around job specifications	• ECAS protocol is not used as a routine checklist to perform follow-up reviews.
IV	Management Attention to Compliance	• Routine review of auditing and monitoring reports	• Reports not used.
		• Directing resolution of compliance issues	• ECAS does not track resolution of findings.
		• Ensuring the application of resources and means necessary to carry out corrective actions	• ECAS is not tied to the DB1383 system, the primary means of obtaining resources.
IV	Incentives for Compliance	• Implemented reward system	• No formal reward program exists nor are any incentives included in employee evaluations.
		• Recognition of excellence	• No follow-up, positive or negative, on assessment outcome or corrective action.
IV	Disciplinary Procedures	• Enforcement of environmental policies through disciplinary actions	• No follow-up process exists to discipline failure to take corrective action.

Note: Bold italic type indicates positive findings.

Table 3-1.
Comparison of ECAS Assessment Capabilities with Department of Justice Criteria (Continued)

ECAS phase	DOJ standards	Requirement	ECAS Assessment capability
IV	Continuing Evaluation and Improvement	• Measuring status and trends for achieving environmental compliance	• ***ECAS data are currently used to measure trends in class, media and law categories.***
		• Periodic external evaluation	• ***ECAS does provide for external assessment.*** However, the Army hesitates to consider them evaluations. In the absence of a link to regulatory inspection data (through ACTS), recurring deficiencies are separated by 3 – 5 years.

Note: Bold italic type indicates positive findings.

- *Both the contractors and the installation managers are generally dissatisfied with the protocol manuals used for the assessments.*

  - *Contractors find the protocol difficult to work with and expensive to modify.*

    Contractors find the protocol manual difficult to develop because state and local regulations are not easily identifiable. (A second issue here is that developing the protocol and ensuring that it meets all requirements is dependent on how familiar the contractors are with state and local regulations. In many cases, ECAS assessments were performed by contractors in different regions of the country from the installations they were assessing, presumably because of low-bidder provisions.) Reviewing the entire Army ECAS protocol to ensure that it does, in fact, identify all of the applicable regulations is both tedious and expensive. In addition, those state or local government regulations that are either contemplated or being prepared for future implementation cannot be readily identified or incorporated into the protocol manual. Staff members at the installations at which we conducted interviews expressed a preference for using qualified professional contractors from the installation's local area. Such an approach, they felt, would be far faster, more thorough, and less expensive.

To obtain a consistent Army-wide view of its environmental program, the Army decided to use a standardized protocol system, accepting the extra cost and volume. However, until the implementation of ECAS-II, the modification of the protocol to include state and local standards often resulted in the loss of standardization of protocol item-numbering systems, and these item numbers were not recorded in the findings data base in any case. Thus, comparison of findings-level data in the pre-1995 assessment data sets across the Army is not possible (except through the findings codes that we added to the data base during the course of this research). This data-consistency problem should be resolved in the ECAS-II assessments.

- *The protocol is not used by the installation staff because it is both incomplete and yet too detailed. It is not seen as an Army performance standard.*

The protocol manuals are so bulky and the inspections so detailed that the installation staff has difficulty incorporating the protocols as part of their routine management checks. While the protocol manual identifies large numbers of activities to be assessed, it does not provide guidance on how these activities should be monitored over time nor which have the highest or lowest priorities. In the absence of Army priorities and of pressure to do anything about the protocols except during the ECAS assessments, installations ignore the protocol.

Despite the bulk and cost of the protocol manuals, installation managers concur that those manuals are still missing many — or in some cases all — applicable regulatory reports. For example, one installation had few findings in a program area in which they were later assigned a "jeopardy opinion" by regulators.

Because installation staff members oversight of the assessment program at any level is limited, they do not feel that the protocols represent an Army performance standard against which they will be evaluated. Thus, their effort to get the installation into compliance with the ECAS protocols is limited to those pressures already felt from local regulators.

- *Installation staff members are generally dissatisfied with the volumes of data and level of effort required to support the assessment team and the ECAS process.*

Because the ECAS contractors are seldom the same contractors responsible for supporting the installation's compliance programs, an enormous effort is necessary to prepare the material needed to familiarize the team with the installation's facilities at the outset of the assessment. Quite aside from the issue of familiarity with Army operations, even when the ECAS contractor is qualified, the installation staff has to establish the location and nature of regulated activities, provide operational manuals and materials, establish interviews so that the contractor can find out how procedures are being implemented, and review historical files and records. Installation staff members find the requirement to collect facility data particularly irksome because those data are the subject of constant queries and yet are never recorded in an accessible form; ACTS data require the ACTS software, and the much more elaborate facilities data are

contained in the facilities engineers' data systems that are inaccessible even to the installation staff.

On-Site Assessment Phase

We found that the ECAS assessments were generally considered to be thorough and competently performed within the limits of the protocol development process noted earlier and in spite of the inevitable oversights caused by sampling (rather than 100 percent) audits used on major installations. In addition to the excessive training that had to be provided for contractors from outside the immediate region, we noted some problems in the technical performance of a number of the assessments.

- *Installation personnel are not always supportive of ECAS.*

A central feature of ECAS is the utilization of external teams to perform the assessments. To date, the teams have been provided by civilian contractors. In the future, the Army plans to use Army teams from USACHPPM as the primary assessors and to supplement them with contractors, as necessary. In either form, this approach eliminates the installation's sense of ownership of the ECAS process.

Because they are viewed as outsiders, assessment teams sometimes do not always receive the level of support necessary to do an effective and efficient assessment. As noted earlier, the support imposed on the installation — detailed entry briefings, document preparation, visit coordination, continuous escorting, and an intensive in-progress and postassessment review process — can be extremely burdensome to the installation staff. In addition, some installations view the ECAS as an internal inspection and, hence, an opportunity to receive an adverse report that will be forwarded up the chain of command. As a result, the installation does not ask any leading questions of the team and does not receive the maximum benefit from the audit. Better communication and more expeditious assessments would result if installations' personnel were briefed on the purpose of ECAS and postinspection follow-up procedures.

- *Some contractors are unfamiliar with Army operations or regional regulations.*

Although the ECAS contractor selection process required the assessors to be familiar with the Army and with appropriate regulations, the process failed. The determination of "familiarity" was based on the fact that the company had a contract with the cognizant Corps of Engineers district, whether or not the company (or the corporate) division that would actually perform the work was located in the same region as the installation. Even where a corporate capability was in place, the personnel assigned to the assessment team were often either newly hired or drawn from non-Army projects.

As a result, installation staffs often doubted the assessors' real technical expertise. Inadequate technical expertise combined with apparent lack of experience with Army operations, led the teams to make erroneous assumptions or findings that required a great deal of retraining; what findings were not identified that should have been cannot be estimated. As noted earlier, the cost of reviewing applicable regulations and protocols is greatly increased when the contractors selected for the ECAS effort are located in, or practice mainly in, different regions or states from the installation they will assess; once on site, such teams have no practical understanding of state and local regulatory requirements and practices.

- *Corrective action cost estimates are often a subject of protracted disagreement.*

Some contractors have had difficulty reaching an agreement with Army installations on cost estimates for corrective actions because of differences in private-sector and Army estimating techniques. In addition, many Army environmental staff members have difficulty explaining how their own estimates were developed.

Postassessment Phase

In the postassessment phase, data are gathered into reports and data bases that allow managers at all levels to review the compliance status of assessed installations. Our findings focus on this phase because this is the point at which the usable data set is generated. The effectiveness of that data is affected by issues related to the data-generation process as well as the structure of the software that has been provided for reporting the data.

ECAS Process Issues

We found that the documentation of the assessment effort is possible under the current ECAS process: the collection of basic findings and the preparation of recommended corrective actions for implementation by the installation. The ECAS could be used in conjunction with other Army data systems to monitor the progress of corrective actions; that it has not been used for that purpose is the result of a philosophy that the assessments are intended to be used for assistance rather than for inspection. That philosophy has evolved in practice to a belief that any form of oversight of the postassessment phase amounts to an inspection-like process.

With limited modifications, the assessment findings entered into ECAS could be collated into useful trend analyses and program overview data. At present, however, the data are incomplete and are not structured to provide useful management information. Although ECAS-II should overcome most of the data-gathering problems in the future, a significant effort would have to be expended to make the pre-FY95 data sets consistent with data gathered in FY95 and beyond.

- *The format of the protocol manual varies among installations so that protocol question numbers cannot be readily used to compare installations. (That finding has been corrected in the ECAS-II software.)*

The protocol manuals for each installation are different because of the variation in individual state and local laws and regulations. As a result, the manual's question numbers do not match up, making trend analysis or queries across installations difficult.

- *The data-collection process, as originally structured, does not specify the root causes of compliance violations. (That shortcoming has been corrected in the ECAS-II software.)*

The protocol is a checklist of laws, regulations, and policies used to identify deficiencies in an installations' environmental program. A protocol can be used to identify a specific violation, but the assessment recording format does not provide a way to determine the actual cause of the deficiency. For example, if an ECAS team finding is that hazardous waste (HW) storage containers are incorrectly labeled, a reviewer who subsequently looks at the record cannot determine whether the mislabeling resulted from insufficient skills, lack of motivation, or a supervisory failure in which the employee's error was tolerated to the point that it became a routine procedure.

Effective corrective action depends on identifying the cause of the problem, not its symptom. Only an on-site assessor can ask the questions or make the observations needed to resolve this critical issue. It is important that the assessor be objective; we believe it unlikely that the installation environmental managers will identify inadequate supervision as a root cause of any problem. For this output, we modified the data set to include codes for such findings, and those codes have been included in the ECAS-II software. The code system is discussed at more length in Chapter 4; our assignment of codes are based on gleaning the information from the descriptions presented in the ECAS Report findings and must be deemed subject to significant interpretational error.

ECAS Data Base

The ECAS software works effectively to accomplish the task for which it was originally designed: to generate the printed copy of the findings annex to the ECAS Report. The ECAS data base could in theory be used as a means for providing managerial information such as trends and Army-wide systemic problems. However, systemic weaknesses in the process limit the accuracy of the data and limitations in the software (caused chiefly by the limited role envisaged for it) preclude significant management information from being derived.

- *The data that are entered into ECAS are often incomplete or inaccurate although by FY95, that deficiency was becoming the exception more than the rule as in the early years.*

One of the principal problems with trying to link the ECAS data base with other systems is that the project identification field is seldom used. Even where a valid project exists, project numbers from the 1383 data base are not being consistently entered into the ECAS data base, and we have found that projects identified in ECAS often cannot be located in the 1383 data base. Only 4 percent of the ECAS findings include 1383 data base project identification numbers. Many projects do not have to be entered into the 1383 data base because they can be corrected either on the spot or with local funding. Those projects could be easily identified in the record, and that identification would eliminate uncertainty about the completeness of the record. Then, if local action was sufficient, whoever was responsible for the action would then be held accountable.

- *The software used to support the ECAS data base has significant limitations for data analysis and management uses.*

The software cannot be used to sort data by the activity that is audited on an installation, by the protocol question number (specific law, regulation, policy), or by a specific finding. Both contractors and MACOM-level managers use other data base software to manipulate the ECAS information.

  - *Only a few of the fields offered are structured enough for analytic purposes, and those few (especially prior to 1995) have little value.*

The coding system used during the initial ECAS assessments is limited to identification of the category of noncompliance (i.e., Class I, II, or III), facility code, and media areas. New codes being used for ECAS-II will identify causal factors, permit installation-to-installation comparisons, and facilitate trend analyses. Without the additional coding, conditions would be the same as they were for ECAS-I: analysis of findings would be limited and management would lose visibility into a large reservoir of valuable data. The needed fields have been added to ECAS software being issued for FY95. We discuss some additional fields that may be appropriate in more detail in Chapter 4.

  - *The free-text-entry system limits the ability to categorize the data.*

To support some fields, especially the findings description, ECAS-II will provide additional structured-entry data fields to supplement the free-text entries available in the initial software. Free text makes categorization almost impossible because the user has to guess at the many different words that the assessor may have used to describe the same situation. For instance, while "container unsecured," "unlocked HW bunghole," "no lock on drum," and "improper closing of HW containment device" may all look basically the same to a qualified human, they look completely different to a computer. In any case, searches of this nature are not possible through the interfaces offered with the

software; only a user proficient in structured query language (SQL) user can go beyond the program to execute direct queries.

- *ECAS does not take different activity profiles into account.*

The ECAS software includes a facility-type code that specifies the type of facility in which the finding occurred, but it does not contain data that differentiates between activity size (such as cubic feet of storage, supported population, etc.) or other measures of the scope of the operation. Managers are currently unable to associate the size and operations of a facility with the assessment outcome. For example, comparing the condition of two installations by looking at their ECAS reports may be misleading if the size and scope of the operations are not taken into account. More detailed facility coding is included with the software release for FY95, but the issue of normalization when making comparisons remains.

- *Army users cannot currently access all of the available information resources; at no level in the Army can personnel access all the Army's existing environmental data for analysis.*

The ECAS data infrequently provide a one-time view of the installation's environmental status. Information from other assessments, either regulatory inspections or self-assessments, are stored in the ACTS data base. Because the ECAS is now conducted once every three years, its data base cannot be used alone to conduct a trend analysis that identifies progress or cause-and-effect relationships over time.

Clear conceptual links exist among the enforcement action data found in ACTS, the assessment data found in ECAS, and the corrective actions project data found in the 1383 data base system. Although those systems were envisaged as being interoperational and the data field structures are uniform, currently, the ECAS data base has no explicit linkage with those other environmental data bases in the Army Automated Environmental Management Information System (AAEMIS). ECAS data alone are not sufficient to produce valuable trend analysis or to be used to report on the installation's status.

The information the Army needs to perform valid trend analyses and create status reports is stored in various data bases. Tying this information together is difficult because the data base management system is closed to the user, structures are largely undocumented, the data bases are physically separated from each other and from the users, and no infrastructure exists for using the data sources in conjunction with each other.

Figure 3-2 shows possible linking capabilities among the three data bases. As mentioned above, all three fall under the AAEMIS umbrella, use the same underlying data base management program and were initially designed to be interactive.

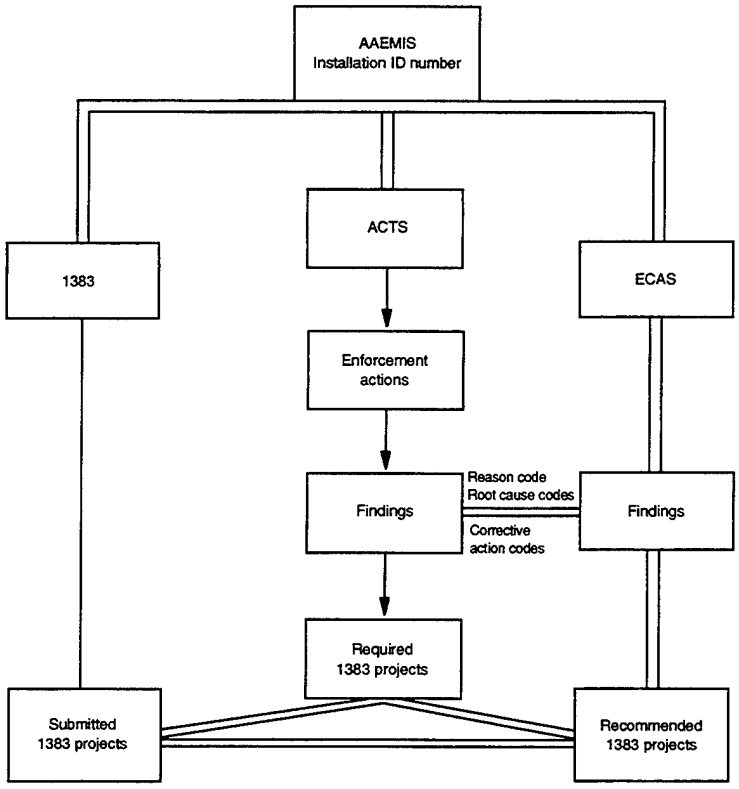


Figure 3-2.
Relationship Between Data Elements of Existing U.S. Army Automated Environmental Information Management System (AAEMIS)

Some fields that provide obvious links include the 1383 data base project number field, finding fields, and coding fields, which are discussed in detail in Chapter 4.

- *The ECAS, 1383 data base, and ACTS data bases contain a wealth of information that cannot easily be used except by USAEC-level system managers.*

For historical reasons, USAEC has favored software with extensive user-friendly interfaces to nonstandard software engines and an almost total exclusion of the user from the actual data. It has taken that position largely to prevent partially trained users from entering erroneous data into the system or even corrupting some part of the system (which has happened in the past). In addition, because each of these systems was originally designed to respond to a highly specific reporting requirement (rather than to provide management information) the data are often structured in a way that appears unhelpful to those seeking to use them as an information base; quite often the data are structured to facilitate their aggregation and compilation rather than collection or analysis. The result of the data aggregation processes and the data protection motive is that those

managers who have an idea of how they might use the data from these three data bases, either together or alone, are forced to

- formulate queries based on what they think is available, either from their best guess or from program documentation, which if it even exists, may not be available, be outdated, or be difficult to understand; and

- wait for the users' groups and program manager to incorporate their report into the software, perform the query themselves (which is time-consuming and requires special expertise), or, most likely, send the query to USAEC's data resource management team, which has the skills to access the data base using SQL commands to create a customized subroutine that answers the query. While the turnaround time is reasonable considering the size of the Army's program (often less than a week), that time is dependent on the nature of the request and the backlog of the contractor handling the request; in any event, it is not a particularly responsive method of getting information about one's own program from a system that resides on a personal computer.

Some AAEMIS data bases provide a function to export data files to a more widely recognized, commercially available, data base management system format. That capability has not yet been provided for the ECAS data base. In any event, users would still require effective data documentation.

- *The data are collected too infrequently to develop meaningful trend analyses.*

The ECAS assessments at major installations are conducted every third or fourth year. As a result, the data are not accumulated quickly and the Army has no basis for a multiyear comparison for a single installation. That gap should be filled by information developed during installation self-audits.

However, personnel who conduct those self-audits are not required to use either the ECAS protocol or the ECAS software nor does the Army enforce the requirement to enter such findings into the ACTS data base. The ACTS data base itself is not well regarded at the installation level; in fact, personnel throughout the Army make little general use of it. Further, even if such data were entered into ACTS, the installation or MACOM would have no way to relate ACTS findings to ECAS findings because the data bases are separate and not jointly accessible to those levels of command.

The data also have limited value because of the excessive time required to release them to MACOM and Department of the Army levels. The ECAS data are aggregated at the MACOM and Department of the Army levels to identify trends and problems installation-wide. To collect these data, MACOMs and USAEC receive each final ECAS Report on diskette and enter it into the data base. Consolidating the data is often time-consuming or is simply not completed within a time frame that serves the manager's information needs. Often the MACOM and USAEC are not provided with "draft" copies of the ECAS data set until as much as a year after the actual inspection date. In a system in which the

bulk of the deficiencies are easily correctable at the local level (as will be shown shortly), little value can come from such outdated data.

Corrective Action Phase

On the basis of our observations, we found that the major weakness of the ECAS process is in the corrective action phase. Some of that weakness is the result of weaknesses (noted earlier) that make it difficult to manage the corrective actions follow-up. The Army has recognized the need to have software that facilitates corrective action follow-up and has developed the ICAP, a tracking module to be added to the ECAS software; it allows managers to enter follow-up information for corrective actions.

- *The ECAS data and reports are not being fully utilized by management, either at the installation level or at the headquarters level.*

The principal structured-entry field in the ECAS software addresses the category of finding. That field enables management to identify and segregate Class I findings; i.e., current regulatory deficiencies that must be corrected and for which projects in the 1383 project data base must be funded. However, Class I information is pragmatically irrelevant; only Class I items will be funded, and only Class I items need short-term corrective actions. Class II items will not be funded, and Class III items are not supported by regulation. Our subsequent data analysis shows that the bulk of the findings are Class I since they are regulatory infractions (the detection of which is the essential purpose of the ECAS process).

Easily corrected findings or recurring findings that management could resolve with some long-term corrective actions such as new procedures, additional training, or increased command emphasis are not identified.

- *No Army organization is accountable for correcting all findings and instituting procedures to avoid the same findings in the future. No one at the command level is assigned to determine whether specific findings are ultimately resolved.*

The argument that the assessments are assistance visits and therefore should not be tracked for response ignores the fact that the Army leadership invests tens of millions of dollars annually into that assistance and is entitled to see that its findings are not ignored. If the ECAS process begins to meet the DOJ criteria for measuring an organizations' commitment to environmental compliance, the reverse side of the coin soon becomes clear: when provided with the necessary information, a commander wishing to avoid personal liability needs to monitor the progress of corrective actions. Although the ICAP has been incorporated in the ECAS-II software, the Army currently does not have any plans to roll those data up to levels higher than the installation.

The ECAS reports and the associated data are not used because their publication is unacceptably delayed.

- *It takes too long for a completed, final ECAS report to be provided to the installations. A contractor takes an average of 11 months to complete the final ECAS Report; that 11 months begins approximately 8 months after an initial draft report is sent to the MACOM. That long period of time delays corrective action, budgeting for resources, and tracking of problems already in the process of being corrected.*

On inspection of numerous ECAS reports, we found little value added by the extra time consumed. All of the necessary information could have been provided through the submittal of the ECAS data file, and the practical difference between the draft ECAS data provided after 45 – 90 days and the final data provided after 12 – 18 months was minimal. Environmental managers at the MACOM level use Notice of Violation (NOV) information from the ACTS data base rather than ECAS data to report on the status of an installation. The ECAS-II process is expected to address much of the underlying delay.

- *MACOM- and USAEC-level ECAS data for the first round of ECAS have been out of date.*

Managers above the installation level who rely on accumulated (rolled up) data to determine trend analyses have data that is often out of date or inaccurate. As discussed previously, the current procedure for rolling up data is to gather final ECAS Reports on diskette and enter them into the a central ECAS data base. By the time the final reports are approved and entered into the central data base, the data may be up to one year old. One target for ECAS-II is to reduce the lag time for completing final ECARs from 11 months to 3 months.

Another reason for time lags in obtaining data is that the diskettes mailed to MACOMs to be rolled up are sometimes incompatible with the ECAS software. In some cases, field managers indicate that diskettes with exported ECAS data are used with other software programs and then mailed to MACOMs. The information that is incompatible with the ECAS software cannot be used to roll up information. Little pressure has been placed on installations to rectify or avoid such errors.

The MACOM-level managers do not have quality, timely ECAS data for use in generating status reports for installation rollup. Diskettes containing the ECAS data are sent to the MACOM but are not immediately installed into a master data base. As a result of the time it takes to approve reports and aggregate the data, available ECAS information is usually more than a year old.

- *The ECAS Report does not provide constructive feedback on the overall results of the assessments.*

Installation and MACOM managers have no way of examining the assessments performed at other installations. Managers at both levels have expressed a need to receive information on the performance of other installations, partly to see how they compare but, more important, to take note of problems being identified by the ECAS assessment teams that may also exist at their installations. Since most installations see an assessment team only every three years, the

"comparison" role is less of a problem with ECAS than other Army programs. However, given the infrequency of observation, it is important to allow other installations to learn indirectly from the trends being observed during the current year.

- *The ECAS assessment and ECAS Report do not address training or staffing issues.*

Until the ECAS-II reports are made available through the ECAS software, installation and MACOM managers have no information to explain the underlying reasons for systemic problems. Environmental managers at the MACOM level believe that a strong relationship exists between manpower issues and environmental problems and that they need better data with which to make their case for funding and command support. Under the ECAS-II framework, the use of root-cause codes will identify the reasons for a finding.

- *The ECAS process does not have a provision to address systemic findings at the installation level.*

The assessment team frequently divides itself into issue-area specialists who examine the installation's activities in terms of their specialty. Once a consistent deficiency has been found, the ECAS process has no inherent mechanism for identifying the systemic failure that causes the deficiencies. Some contractors have taken the extra step to identify the systemic problem; we found many cases, however, in which dozens of findings were recorded at an installation for the same deficiency, once in every building checked. Aside from the cost implications of this form of wasted assessment time, multiple findings corrupt the ECAS data base. As part of the research reported here, we went through the data set and eliminated multiple findings wherever possible.

ECAS Process Conclusions

The findings can be consolidated into the following basic conclusions with regard to the data set derived from the 1992 through 1994 assessments:

- *The tools of the ECAS process (the protocols, assessment reports, and data sets) are underutilized.* The information collected from the assessment is used at the installation level to remedy immediate problems and to apply for 1383 data base projects. However, the protocol is not being used on a continuing basis to guide the compliance program, and the ECAS Report is not being used as the basis for continuous monitoring of the corrective actions.

- *Information that could or should be generated by the ECAS process is not provided or is inaccessible.* In many cases, recording of the types of information that are needed is not required. The information that would be useful for drawing comparisons and identifying recurring problems is inaccessible because it is stored and used in three separate data bases. For example, a project's progress or completion cannot be monitored (without rekeying information) once it is entered into the 1383 data base nor can the existence of a track

record of similar findings for a specific problem be determined. Furthermore, the software used to generate those data sets is itself unusual, and manipulation of the data requires SQL skills that are not generally available at the installation or MACOM level.

- *Installations are under no pressure to respond to ECAS-generated findings.* Installation commanders are not provided with information from MACOMs to challenge their progress on corrective actions. They are not provided with enough information to challenge their own staffs because the findings categories are not adequate for setting priorities. ECAS reports are not used for identifying or correcting recurring problems. Even though the ICAP was added to the software to facilitate project tracking, it is not intended for higher command levels.

- *The ECAS information is inadequate for use in command-wide or Army-wide corrective action programs.* ECAS data cannot be used as a compliance assessment because it is not timely and is infrequent enough that it provides only an outdated snapshot of an installation's environmental condition. Even if the ECAS data were timely and accessible, it lacks the structure needed to perform the necessary analyses.

The ECAS process, under the ECAS-II structure, provides the opportunity to meet DOJ criteria for adequate oversight of the compliance process. It also exposes inattentive commanders to the risk of being found liable for failure to take action. Despite the Army's significant investments in the ECAS, until FY95, the process did not provide a compliance oversight system that could assure Army commanders that they had done all that they could to ensure compliance at subordinate levels. The contrary was more nearly true: Army commanders could have found that with the ECAS assessment they are assumed to know the problems exist even though they are largely unable to sift effectively through the voluminous data to determine whether a problem exists and if one does exist, what is being done about it. The modifications under ECAS-II will make the data accessible to commanders in a more timely manner; however, until explicit linkages are developed between ECAS, ACTS and the 1383 data base, the oversight process will be challenging. The risk for commanders is that since they are now in possession of the data, particularly with a corrective-action tracking format, they cannot use ignorance as an excuse for failure to act.

The foregoing findings address weaknesses in ECAS. However, the strong positive aspect to the ECAS program is that *it can be a significant tool for the Army in improving environmental compliance.* The structure, collection, and analysis of ECAS data can be improved simply and inexpensively to eliminate some of the specific problems we have discussed. Such improved data will provide the means for drawing management's attention to environmental issues and to improved compliance. Improved compliance, in turn, will result in the Army more closely fulfilling the criteria outlined by DOJ.

The USAEC has taken action to correct many of the deficiencies in the ECAS program. The ECAS-II process is aimed at addressing many of the difficulties

we noted, including inadequate coding, the inability to track corrective actions, and other procedural challenges not noted here. Despite these corrective actions, we recorded these problems because they affect the usefulness and completeness of the currently available data and because the success of USAEC's policy modifications needs to be assessed as the actual execution of the next round of the ECAS goes forward.

DATA FINDINGS

We analyzed the data currently available in the ECAS data set and then analyzed the same data modified to include critical fields that make the data more accessible for automated analysis.

Data Findings Using the Current Data Set

Table 3-2 depicts the level of detail that is currently obtainable from the ECAS data base. Without the simple modifications we made for this report (which have also been included in new ECAS software releases by USAEC), no further analysis is possible. Table 3-2 represents the information that was used to aggregate data for the end-of-the-year report. In addition to those data, the ECAS data set can generate reports on state, geographic region, and command although such comparisons are only available at the USAEC level where the full data set resides. In addition, the ECAS data base can be used to identify facility types although the managers we interviewed did not find the initial categorization helpful; an improved categorization has been included in the ECAS-II software package, and continued efforts will be made to improve these codes.

The summary shown in Table 3-2 is all of the analysis that can be performed because the ECAS data set uses only two categorical variables that can be analyzed (class of finding and law). We do not view comparison of the counts of findings received on the basis of MACOM or state as generally useful information although that additional dimension is available through the data set as currently configured.

Data Findings Using Modified Data Set

For this study, we first reviewed the ECAS reports provided by USAEC. We then used the coding system adopted by the Army for the NOV data set in ACTS to categorize the finding and corrective action codes. This first modification required the addition of two data base fields: findings code and corrective action code. Because we could not assess the situation on site at the time, we could not include in our data set a third field, root cause codes, that would provide an even more detailed and useful data analysis.

Table 3-2.
FY93 Draft ECAS Findings by Media and Class
(25 installations reporting)

Media	Class I	Class II	Class III	Total
Clear Air Act	278	24	327	629
Clean Water Act	1,743	29	809	2,581
Safe Drinking Water Act	255	14	160	429
RCRA-C	1,737	16	784	2,537
RCRA-D	477	12	486	975
RCRA-I	617	74	208	899
Environmental Response — CERCLA	93	7	169	269
Toxic Substance Control	168	5	46	219
Insecticide, Fungicide and Rodenticide Act	95	0	327	422
National Historic Preservation Act	90	7	155	252
Endangered Species Act	66	0	276	342
National Environmental Policy Act	210	1	97	308
Asbestos Management	116	0	564	680
Noise Abatement	7	0	363	370
Radon Management	6	3	475	484
Environment Program Management	3	0	621	624
Hazardous Material Management	474	7	846	1,327
Total	6,435	199	6,713	13,347
Total — Health and Safety				2,068
Total — Positive Findings				1,006
Grand Total				16,421

Note: RCRA-C = Resource Conservation and Recovery Act Subtitle C; RCRA-D = Resource Conservation and Recovery Act Subtitle D; RCRA-I = Resource Conservation and Recovery Act Subtitle I.

With the minor modifications that we have recommended, we reviewed all the available ECAS records and entered appropriate coding data, given the information provided by the assessment team. In some cases our interpretation 12 to 36 months after the fact may vary from the determination that might have been made by an on-the-spot observer; however, through a multiple review process, we believe that our data sets are representative of actual conditions. We analyzed sample data in the ECAS, ACTS, and the 1383 data bases looking for trends, linkages, and relationships among the data, findings, and corrective actions. Our preliminary findings are shown in Table 3-3 and Figure 3-3.

As a result of coding the findings from ECAS-I, we are able to show a more concise breakdown of findings. Table 3-3 shows where most findings occurred, as an aggregate and for each media, and how the enforcement action findings and ECAS findings compare. Table 3-3 also summarizes the top six findings. The frequency of each of the top finding areas are listed by media. Figure 3-3 shows the frequency of all finding types. Further analyses of the data and reports that could be used for management are presented in Appendix D.

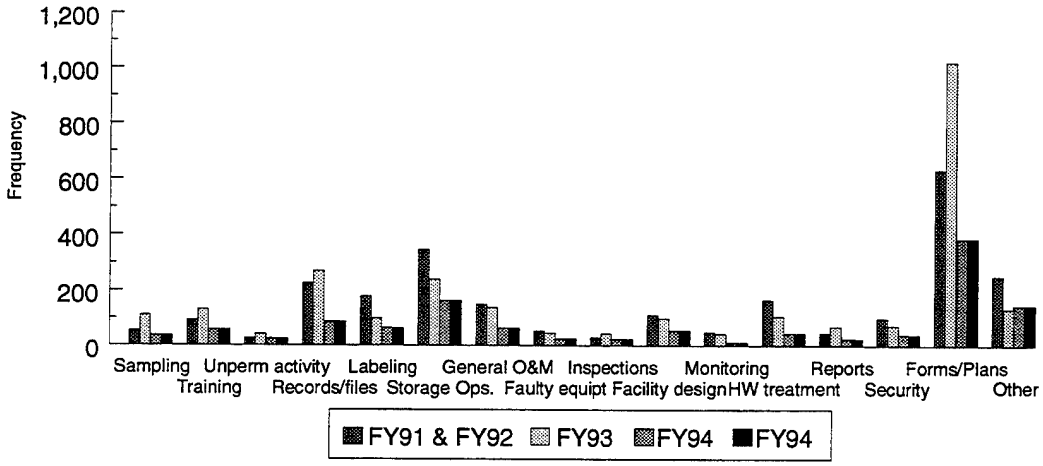


Figure 3-3.
Frequency of Finding Types, FY92 – FY94

Conclusions from the Data Analysis

- *ECAS is consistent with other Army data sources.* The data portrayed above reflect information already found in previous reports from the Defense Environmental Status Report (DESR), the ACTS NOV data base, and earlier ad hoc NOV reports: that the majority of installation deficiencies are based on procedural errors and should be easily correctable at the local level. That conclusion lends some credence to the ECAS data set as well as to the older data.

- *Categorized data are essential to management information.* The text-intensive data generated by even one ECAS assessment are too voluminous for extensive analysis by more than a few people. Those data do not permit the system-wide view that is the manager's responsibility. Even the simple categorization we used here provides a wealth of detail not previously accessible in ECAS. Categorized data can be used to develop management views of the Army's overall compliance status and to formulate efficient strategies to deal with systemic problems.

- *The Army's primary compliance problem is accountability.* The data set clearly indicates that a lack of accountability at the installation environmental staff level is the cause of most of the deficiencies. We have seen from the earlier systemic discussion of the ECAS process that a lack of accountability is pervasive in the process and can be considered part of the cause of failure to correct deficiencies once they are identified. The Army does not lack compliance data; rather, it fails to use those data to hold people accountable for their performance. The Army needs to institute a more effective follow-up system to hold people accountable. ECAS provides a highly effective tool for that effort if managers are willing to use it.

Table 3-3.
Finding Type by Regulatory Program Area

	Records/files data submissions (incomplete/late)	Labeling/ placard deficiencies
Clean Air Act	131	19
Clean Water Act	23	6
Endangered Species Act	8	–
Federal Insecticide, Fungicide, and Rodenticide Act	33	18
Multimedia	47	3
Natural resources	1	–
Noise Control Act	6	1
National Environmental Policy Act	2	–
National Historic Preservation Act	13	–
Occupational Safety and Health Administration	10	106
Resource Conservation and Recovery Act (Subtitle C)	220	136
Resource Conservation and Recovery Act (Subtitle D)	30	9
Resource Conservation and Recovery Act (Subtitle I)	31	5
Safe Drinking Water Act	21	1
Superfund	1	1
Toxic Substance Control Act	30	49
Total	607	354
Percentage	12.71	7.41

am Area

	Records/files data submissions (incomplete/late)	Labeling/ placard deficiencies	Storage/ accumulation issues (time, volume)	General operations and maintenance failures	Hazardous waste treatment, storage, or disposal	Fo docume manu proc
	131	19	6	34	23	
	23	6	67	70	216	
	8	–	–	12	–	
nticide Act	33	18	36	17	31	
	47	3	2	14	–	
	1	–	–	4	–	
	6	1	–	3	–	
	2	–	–	1	–	
	13	–	3	8	–	
ation	10	106	314	66	–	
(Subtitle C)	220	136	277	45	55	
(Subtitle D)	30	9	23	171	5	
(Subtitle I)	31	5	35	17	11	
	21	1	–	1	–	
	1	1	2	1	–	
	30	49	16	2	4	
	607	354	781	466	345	2,
	12.71	7.41	16.36	9.76	7.23	4

Labeling/ placard deficiencies	Storage/ accumulation issues (time, volume)	General operations and maintenance failures	Hazardous waste treatment, storage, or disposal	Forms, documents, plans, manuals, and procedures	Total	Percentage
19	6	34	23	368	581	12.17
6	67	70	216	316	698	14.62
–	–	12	–	82	102	2.14
18	36	17	31	49	184	3.85
3	2	14	–	148	214	4.48
–	–	4	–	13	18	0.38
1	–	3	–	200	210	4.40
–	–	1	–	132	135	2.83
–	3	8	–	111	135	2.83
106	314	66	–	433	929	19.46
136	277	45	55	200	933	19.54
9	23	171	5	19	257	5.38
5	35	17	11	60	159	3.33
1	–	1	–	31	54	1.13
1	2	1	–	49	54	1.13
49	16	2	4	11	112	2.35
354	781	466	345	2,222	4,775	100.00
7.41	16.36	9.76	7.23	46.53	100.00	–

Storage/ accumulation issues (time, volume)	General operations and maintenance failures	Hazardous waste treatment, storage, or disposal	Forms, documents, plans, manuals, and procedures	Total	Percentage
6	34	23	368	581	12.17
67	70	216	316	698	14.62
–	12	–	82	102	2.14
36	17	31	49	184	3.85
2	14	–	148	214	4.48
–	4	–	13	18	0.38
–	3	–	200	210	4.40
–	1	–	132	135	2.83
3	8	–	111	135	2.83
314	66	–	433	929	19.46
277	45	55	200	933	19.54
23	171	5	19	257	5.38
35	17	11	60	159	3.33
–	1	–	31	54	1.13
2	1	–	49	54	1.13
16	2	4	11	112	2.35
781	466	345	2,222	4,775	100.00
16.36	9.76	7.23	46.53	100.00	–

CHAPTER 4

Recommendations

OVERVIEW

In Chapter 3, we drew several principal conclusions; in this chapter, we repeat those conclusions and provide recommendations to address the issues they raise. Those recommendations that address more than one conclusion are subsequently discussed in more detail in relationship to the ECAS phase to which they apply.

With regard to the ECAS process, we present the following conclusions and recommendations:

- *Conclusion:* The tools of the ECAS process (the protocols, assessment reports, and data sets) are underutilized.

  Recommendations: The USAEC should develop protocol manuals in which each protocol has an assigned priority; use contractors with specific Army and regional experience; provide better user interaction with data sets and reports requested by users; and provide feedback (through top-down reports) to installations.

- *Conclusion:* Information that could or should be generated by the ECAS process is *either* not provided or is not accessible.

  Recommendations: USAEC should use structured-entry fields for ECAS data where possible; provide users with access to the data; and link existing parallel data sets.

- *Conclusion:* The ECAS information is not adequate to serve as the basis for command-wide or Army-wide corrective action programs.

  Recommendations: USAEC should use structured data for findings, causes, and corrective actions; enter all inspection data into one data system; document Army cost estimation methodologies; use automated data quality checks for blank or inconsistent entries; develop routines to generate reports incorporating ECAS, ACTS, and 1383 data; and improve user interface with the data and develop data fields that support user needs.

- *Conclusion:* No pressure is applied to installation commanders to respond to ECAS-generated findings.

  Recommendations: Army Headquarters should ensure that the Commander's handbook provides an overview of the purpose and value of the ECAS process; that the follow-up on findings and corrective actions is improved; and that top-down reports advise commanders of their command's performance.

- *Conclusion:* As originally implemented, the ECAS process **fails to meet DOJ criteria for adequate oversight of compliance responsibilities; with the modifications made in the ECAS-II process, DOJ criteria can be met. Commanders must be made aware of the implications of failing to use the data provided.**

  Recommendations: **Same as for the previous conclusion.**

The USAEC has taken action to correct many of these deficiencies in the ECAS program through the ECAS-II effort (second round of ECAS assessments). As noted in Chapter 3, ECAS can become a significant tool for the Army in improving environmental compliance.

With regard to findings drawn from the ECAS data itself, we drew the following conclusions:

- ECAS is consistent with other Army data sources (once USAEC completes the recommended modifications to permit such analysis).
- Structured data are essential to providing management information.
- The Army's primary compliance problem is accountability.

Most of the recommendations listed earlier address the second and third conclusion. Once the process is repaired, the quality of the data will improve.

Recommendations by ECAS Phase

Preassessment Phase

Development of Protocol Manuals

Conclusion: Protocol manuals are expensive to develop and sometimes inaccurate or inadequate.

Recommendation: The USAEC should evaluate each contractor and its employees who work on protocol development. That evaluation should provide the Army with insights on capabilities and experience levels of potential

contractors. Where possible, continuity of contractors in specific regional areas should be sought.

Prioritization of Protocol Items

Conclusion: The protocol manual is not used by installation staffs because it is too detailed.

Recommendation: The USAEC should use the Army maintenance system as a model for identifying and enforcing priority items of interest, should assess the baseline ECAS protocol to determine the priorities of items; and hold the installations accountable for meeting these priorities.

The Army's maintenance system uses this approach. On the basis of the tediousness of the operation and the stability of the situation, some items in complicated systems are checked only quarterly or even annually, while others are sufficiently important or so subject to change that they must be checked daily. Similarly, some deficiencies are critical enough that they must be corrected on the spot, while others can be noted and allowed to exist until a periodic surge in maintenance effort occurs. To be completely useful for continuous day-to-day monitoring, the protocol manual should provide priorities for each activity.

Integration of Baseline Data

Conclusion: Installations find the development of baseline data for assessment teams to be burdensome, and they do not have effective data storage and retrieval capabilities.

Recommendation: We recommend that USAEC investigate how installation, command, and Army environmental staffs can gain access to other data systems such as the Facilities Engineering data bases. USAEC should also review ACTS to determine whether data subject to frequent data calls can be stored there for one-stop data retrieval.

On-Site Assessment Phase

Improved Installation Participation

Conclusion: The installation commander and staff are not familiar with the ECAS process and tend to view it as an external inspection.

Recommendation: The USAEC should prepare a handbook that provides an operational overview of the ECAS program. Such a handbook should be distributed to each Army commander at the installation level and above and to the commander's environmental manager. Reading that manual would prepare the

commander to use the results of the ECAS more effectively and would prepare the environmental staff to work more effectively with the assessment team.

Contractor Knowledge

Conclusion: Some of the ECAS contractors have not been familiar with Army installations and/or the regions of the country in which they performed the assessments.

Recommendation: Where possible, the installations should attempt to provide continuity of contractors in specific regional areas. They must require the contractor to demonstrate both Army experience and regulatory experience in the state and to use the specific personnel identified in the proposal. As noted earlier, the USAEC should evaluate each ECAS contractor and its employees to gain insights on the capabilities and experience levels of potential contractors.

Cost Estimates

Conclusion: Some contractors have had difficulty reaching agreement with installations on cost estimates for corrective actions because of differences in private-sector and Army estimating techniques.

Recommendations:

- The assessment teams should provide backup data showing the data and procedures that they used to develop cost estimates.
- Army Headquarters should develop written guidance or documentation for its own cost estimating procedures.
- After the assessment draft is delivered, installation staff and assessors should meet to determine whether any significant discrepancies exist in cost estimates and determine the source of those differences. Where the assessors viewpoint is conceded, a report should be prepared to modify the Army's cost estimating system; where no agreement can be reached, the two estimates and supporting assumptions should be included with the final ECAS report.

Postassessment Phase

Data Quality

The contents of the data base were often missing or inaccurate, and to overcome that problem, we recommended the institution of a compliance quality control process that will highlight data problems. (Some of our general quality assurance and quality control framework and specific recommendations have

been included in the *1995 ECAS User Manual*). In addition, improving the overall ECAS process will result in greatly improving the data quality.

Upgrade the ECAS Data Base Structure

Currently, the use of assessment findings and the ability to relate those findings to applicable information in other environmental data bases are limited. One of the keys to better use of this information lies in making analyzable data fields available. The information required for those data fields must be obtained during the on-site assessment phase.

Our recommendations for upgrading the data base structure are noted in the following subsections. However, because almost all of these recommendations have now been incorporated into the ECAS-II software package, we do not provide a detailed discussion.

Structure the Data for Analysis

Recommendation: USAEC should upgrade the data base structure by adopting a standardized protocol manual format and including a field to identify the protocol section pertaining to the finding and should adopt and include a standardized entry system (codes) to identify the type of finding (see Appendix B), its root cause, and the corrective action (see Appendix C).

Installation and Facility Type Data

The range in size and activity of installations found in most MACOMs make cross-MACOM and even cross-installation comparisons unproductive for many data fields. More logical groupings, such as the presence of large numbers of aircraft, tracked vehicles, or total installation population, might make for more useful comparisons or groupings. ECAS provides facility identification codes that specify a type of facility for each finding. Identifying the facility type in even greater detail, such as considering the operations performed there, will aid managers in targeting recurring problems.

Recommendations: The USAEC should take the following actions:

- Determine appropriate measures to facilitate grouping environmentally similar installations for data aggregation.

- Provide the following facility information for each finding: type of operation, size of installation, and specific type of facility and mission. For example, managers should be able to differentiate between motor pools used by maintenance personnel and those used for military vehicles. Adding such detailed facility information to the data base will allow installation managers to identify and address problem areas better.

Corrective Actions Tracking

A new module being added under ECAS-II will require managers to track their corrective actions. Personnel in the field have resisted that approach. As a compromise, a new field could be added to the ECAS software allowing the installation to note resolution status and status date for each ECAS finding.

Recommendation: The USAEC should modify ECAS software to include corrective action status and date fields, eliminate the interim, duplicative data base, and validate entries in the ECAS against project numbers also found in 1383 data base as a quality control check.

Correlate ECAS with 1383 Data Base Project Funding Requests

All projects entered into the 1383 data base are assigned identification numbers. Data fields in the ACTS and ECAS data bases have similar identification numbers. Those data fields are entered into the ACTS data base to verify project status for enforcement actions in ACTS. However, the identification numbers are not routinely entered in the ECAS data base. Our findings report that only 4 percent of these numbers are entered.

Recommendations: The USAEC should take the following actions:

- Enter project identification numbers assigned to relevant 1383 data base corrective action projects (whether new or pre-existing) into the ECAS data base, and develop a code that indicates whether the corrective action was pre-existing or initiated by the ECAS assessment.

- To permit follow-up analyses and tracking capabilities, assign code numbers even to corrective actions that do not require 1383 projects. Allow environmental managers at all levels to track corrective actions and to account for the progress of such actions both for completion status (through ECAS) and for funding issues (through the 1383 data base).

SOFTWARE IMPROVEMENTS

Many of the process changes recommended here suggest changes in the software in terms of content or display. In this subsection, we address more general software issues.

Automated Edit and Validation Features

The power of the automated system to limit operator error should be used. For instance (assuming the earlier recommendation is adopted), each protocol question has a unique number. Only a limited number of the codes for findings,

root causes, and corrective actions *inter alia* could apply. Automated validity checks could help ensure that data were consistent and logical.

Recommendation: The USAEC should modify the ECAS software to create a validity check between related fields to improve the quality of data.

Query Capabilities

The ECAS data base does meet the needs of its users for manipulating the data in an efficient manner. It is capable of creating queries and sorting the data on selected fields, such as by law, by media, or by finding number. ECAS-II offers a point-and-shoot capability with which the user can sort on fields, count number of findings, and sum. However, installations and contractors seem to continue to have a need for using the ECAS data in a standard data base from which they can continue to extract data, develop ad hoc categorization systems, and then analyze the data in dBase or Paradox. That procedure tends to lead to neglect of the primary data system itself in favor of using the generated data set. Improved analysis of compliance actions, including tracking and sorting of various data, enhances the operation of ECAS and the Army's environmental compliance efforts.

Recommendation: The USAEC should make the necessary software modifications to permit more effective manipulation of the ECAS data without extracting data to other software programs.

Data Consolidation

As previously mentioned, environmental compliance data exist separately in the three data bases and cannot be used together to perform queries. Modifying the data base structure where necessary will create the required linkage capability.

Recommendations: To permit the use these data bases together, USAEC should make the following modifications to the data base structure:

- It should ensure that similar fields exist in all three data bases to allow for the linkage. For example, by using the same Federal facility identification number (FFID) in each data base, ECAS, 1383, and ACTS information for each facility can be tracked. (Specific recommendations for adapting these fields is presented in Appendix E.)

- It should ensure that information entered into one of the data bases is populated to all data bases. As information is entered into a field common to all three data bases, the same information would simply be copied into the fields of the others. This modification will improve the data quality and consistency among all three data bases.

- It should consider combining the ECAS, 1383, and ACTS data bases to give users access to SQL statements; executive information, such as POWER VIEWER, LIGHT SHIP, dBase V, ACCESS or a variety of other programs, to read these three data bases as one large environmental information system.

Many of the changes recommended for implementation will improve the ECAS contribution to overall environmental compliance status as well as specifically to corrective action management. In this subsection, we have recommended actions that will make this improved data even more useful.

Operating Procedures

The ECAS audit addresses compliance issues at a point in time but does not fix compliance problems over time. According to the DOJ criteria, one way an organization should demonstrate its commitment to environmental compliance is by analyzing and designing the work functions to integrate standard operating procedures (SOPs). In the course of performing the routine work of the organization, compliance will be achieved.

Recommendation: The installations should correct operational deficiencies by designing compliance checklists to establish procedures for each employee engaged in environmental management activity. The installation should ensure that these checklists are used in day-to-day activities to document that tasks are completed.

One-Source Inspection Tracking

Non-ECAS inspection information, including regulatory and self-inspections, are entered into the ACTS data base separate from the ECAS assessment information. One problem with using the ECAS information for trend analysis is that inspections on an installation are too infrequent to provide up-to-date information on the status of the installation's environmental program.

Recommendation: The USAEC should include the results of all inspections, including self-audits, follow-up assessments, and regulatory inspections, in the ECAS data base. Installation managers will then be able to track their progress in correcting recurring problems over time. Further, updating of the assessment information periodically will increase the accuracy of the trend analyses and status report information.

ECAS Report

As specified in the DOJ criteria for compliance, communication and feedback are important aspects of an effective environmental program. Information should be used as a tool for informing all elements of the Army of the status of

the installations and communicating common problems and strategies for improving compliance.

Recommendations: We recommend the following actions:

- USAEC should provide installations and MACOMs with ECAS assessment results so that they can measure their performance against that of similar installations. Findings for each installation should be presented without specifying the name of the installation.

- MACOMs currently have access only to data from installations for which they are responsible. The Army should provide aggregate reports to all MACOMs so that they can compare their results with the Army as a whole and use the reports to benchmark their performance.

- Army Headquarters should provide the Office of the Director of Environmental Programs (ODEP) with aggregate data from all installations. That information will reveal program-wide trends and problems.

- The USAEC should generate reports for each media, and those reports should comprise findings installation-wide. At the installation level, managers could justify the status of the installation. Media managers at all levels would then have a tool — made possible through coding and finding analysis — that would aid them in justifying increases or decreases in spending.

Corrective Action Phase: Improved Follow-Up on Corrective Actions and Systemic Findings

Top-Level Commitment

An organization must be committed to environmental compliance. Based on the DOJ criteria for measuring this commitment, responsibilities must be fixed at all levels, reports must be monitored and corrective actions taken, and all personnel must carry out their responsibilities. The Army cannot afford to be reactive; managers must be proactive in meeting and anticipating the environmental compliance challenge.

Recommendations: We recommend that, following an ECAS assessment, post-audit activities be routinely completed by each installation as follows: First, installations should devise an action plan to address concerns identified in the audit. They should also conduct further assessments to ensure that violations or problems, especially those identified as being recurring or of command interest, will be corrected within a reasonable time frame. Providing priority guidance that will help managers track and reassess findings will support this objective. Finally, the resolution of each finding should be documented.

- The Army should subscribe to the DOJ criteria for environmental compliance. Those criteria should be communicated to all personnel responsible for environmental actions and committed to their support.

Accountability

The DOJ criteria specify the need for incentives and disciplinary procedures within a compliance program to recognize contributions and to enforce infractions. Specifically, assigning accountability to managers would be effective in minimizing liability, especially if compliance actions and fines are to be considered in evaluating the performance of an installation's environmental personnel and managers.

Recommendation: The Army should clearly communicate the consequences of compliance violations to employees responsible for maintaining compliance and implement reward and enforcement policies to reinforce compliance standards.

Improved Use of ECAS Report Data

The information in the ECAS data base is not being fully used by management primarily because it is not timely and does not provide a baseline on the status of the installation's compliance. The Army is already taking initiatives to decrease the time required to prepare the report for delivery in final draft format. Further initiatives should be taken to integrate data from the Army's other data base sources and to increase the frequency of observations.

By taking these steps, the Army will be able to perform installation-wide queries or report on the status of installations at the MACOM level. By linking the data bases, the Army can link the findings with cost information to justify the need for project funding or determine where funds have been used in the past. Updating the data bases with the status of finding closure and follow-up assessment information would also provide a way for managers to locate findings that have not been resolved and help installations address problem areas. Further, this information will provide MACOMs with baseline information that could be used for interim status reports that they currently develop using ACTS and NOV data only.

In order to use this information better, improved reports are required, some of which should use the new data elements recommended above. In addition, more powerful reports can be developed through existing data fields simply by linking the parallel data sets. Specific reports or data compositions that may be useful are discussed subsequently in Appendix D.

Recommendation: The Army should develop more effective reports that take advantage of the combined ACTS, 1383 data base, and ECAS data sets.

New report formats for displaying ECAS data will greatly add to day-to-day management of the installation's environmental program. These report formats will provide the capability to analyze new aspects of the program such as the identification of recurring problems, root causes, project status, and budget information and the development of trend analyses by various characteristics. Sample formats for displaying data in these ways are included in Appendix D.

New report formats for use at headquarters levels will focus more on the overall characteristics of environmental compliance. Those formats will provide aggregate information that will aid management in carrying out its responsibilities. These new reports can provide analyses of findings, media, root causes, laws, costs, and installation performance. Projects can be monitored with better visibility of project completion and rate of accomplishment. Sample formats to display data in these ways are included in Appendix D.

APPENDIX A

Environmental Compliance Assessment System Media

- Clean Air Act (CAA) of 1955, 42 United States Code (U.S.C.) 7401 *et seq.*
- Clean Water Act (CWA), 33 U.S.C. 1251 *et seq.*
- Safe Drinking Water Act (SDWA) of 1974, 21 U.S.C. 349.
- Resource Conservation and Recovery Act Subtitle C (RCRA-C) of 1976, 42 U.S.C. 6901 *et seq.*
- Resource Conservation and Recovery Act Subtitle D (RCRA-D).
- Resource Conservation and Recovery Act Subtitle I (RCRA-I).
- Comprehensive Environmental Response, Compensation, and Liability Act/ Superfund Amendments Reauthorization Act (CERCLA/SARA) of 1976, 42 U.S.C. 1251 *et seq.*
- Toxic Substances Control Act (TSCA) of 1976, 15 U.S.C. 2601 *et seq.*
- Federal Insecticide, Fungicide & Rodenticide Act (FIFRA).
- National Historic Preservation Act (NHPA) and Cultural Resources of 1966, 16 U.S.C. 470 *et seq.*
- Endangered Species Act (ESA) and Natural Resources, 16 U.S.C. 1531 *et seq.*
- National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321 *et seq.*
- Asbestos Management.
- Noise Abatement.
- Radon Management.
- Environmental Program Management.
- Hazardous Materials Management

APPENDIX B

Enforcement Action Symptom and Corrective Action Codes

OVERVIEW

The symptom and corrective action codes were developed in order to systematize the data-gathering and analysis processes. We found that many field operators will record the same observation in different ways that are interpretably the same when read by a person but appear completely different to an automated system. "Label incomplete" and "incomplete label," for instance, require two separate automated searches, and the thousands of possible variations on just this simple theme ("Label not properly filled out," for instance) require a simpler and more consistent vocabulary for an automated system to be useful.

We found that any deficiency could be described in terms of three primary properties: the physical event or condition that is observed and described by the inspector (the "symptom"), the root cause (the real reason why this condition occurred), and the corrective action (how it needs to be corrected). We have used a set of symptom, root cause and corrective action codes in our earlier work. We have recommended in this report that the more detailed root cause coding system adapted from our work by the Air Force be, in turn, adopted by the Army. That coding system is presented in Appendix C. The codes shown here are those used by the Logistics Management Institute (LMI) in our previous reports and adopted by the Army.[1]

Since their initial implementation, some users have found overlaps between the more detailed levels of symptom codes. It is critical to observe that the symptom codes are tiered, as shown in Table B-1. Once a decision is made as to which general category (the first digit in the code) a symptom belongs, the selection of the appropriate second digit to make a two-digit code should be simple. Confusion begins when trying to choose between two similar two-digit codes without considering the importance of the choice of the first digit.

---

[1] LMI Report AR202RD4, *Deriving Management Information from Environmental Notices of Violation*, Douglas M. Brown, H. Locke Hassrick, and Robert J. Baxter, October 1992.

Table B-1.
Findings Code First Digit

If the event recorded is a case of . . .	The first code digit is . . .	For definitions of the second digit, go to Table . . .
EXCEEDANCE: The facility permit, or regulations, establish discharge limits. Those limits have been violated.	1	B-2
TECHNICAL WORK: Highly technical work performed by single-function specialists in special facilities (e.g., analysis of samples) has been performed improperly or not at all. This does not address general operator work that is somewhat technical in nature (e.g., taking samples): see *OPERATIONS* below.	2	B-3
PERSONNEL: Personnel actions have not been taken or recorded, e.g., failure to certify, failure to train, etc. This does not include errors by the personnel themselves; see *OPERATIONS* below.	3	B-4
OPERATIONS: A failure to operate a facility in accordance with requirements; it is a human error deficiency with regard to an environmentally relevant action that is required. This category therefore includes failures to conduct required training and take required samples; the paperwork deficiency of failing to record the events is considered a MANAGEMENT problem (see below). This assumes that the facility is capable of being operated in compliance; if not, see *FACILITIES PROBLEMS* below.	4	B-5
SPILLS/LEAKS/DISCHARGES: Pollution incidents (even if contained) that occur as a result of unauthorized and/or unpermitted discharges. Where a permit exists, but the level of discharge exceeds that allowed, use *EXCEEDANCE* above.	5	B-6
FACILITIES PROBLEMS: Because of improper or obsolete design, it is physically impossible for a facility to achieve compliance as presently configured.	6	B-7
GENERAL MANAGEMENT: Cases where required procedures are in place and generally followed, and facilities are capable of performing, but because of inadequate supervision or management, regulatory violations occur. These are principally problems of failure to prepare, submit, or maintain required documents. Note that operating without a permit is an action, not a paperwork deficiency, and would be considered an unauthorized discharge.	7	B-8
LEGAL OBLIGATIONS: The violations in this category are failures to follow compliance agreements or other legally binding orders that overcome regulatory deadlines and standards. These issues arise where an installation has an arrangement with a regulator or the courts and fails to live up to it. Thus, operating without a permit, although a violation of law, would be considered an unauthorized discharge (see above); missing a construction deadline, while not prohibited by law, would be a violation of an agreement.	8	B-9

DETAILED DEFINITIONS OF FINDINGS CODES

Table B-2.
Findings Code Descriptions for Exceedence

Code	Short title	Detailed definition
10	EXCEEDANCE	
11	Volatile organic compounds (VOCs)	Violation of permit conditions or regulation/statute limiting VOC emissions.
12	Visible	Violation of opacity limits in stationary source exhaust emissions.
13	SDWA and drinking water standards	Violations of primary drinking water standard, maximum contaminant levels (MCLs).
14	Required notifications	Failure to provide exceedance notifications to the public or regulatory agency where required by permit or regulation/statute. This type of violation is a feature of the SDWA and requires public water system operators to notify customers of MCL violations.
15	Inadequate levels of . . .	Failure to maintain mandated chemical concentrations in such facilities as public drinking water systems. This violation occurs under the SDWA when required levels of disinfectants such as chlorine are not maintained at a residual level necessary to maintain the bacteriological quality requirement. It also includes cases of excessive levels where the requirement establishes an upper limit as well as a lower limit (chlorine being such a case).
16	NPDES and pretreatment limits	Violations of NPDES permit conditions of pretreatment permit requirements designated by a local, publicly owned treatment works.
17	Emission limits, fuel use, miscellaneous	Violation of contaminant-level emission limits established by permit or regulation other than those already noted in this section. This category of exceedance also includes violations of limits on fuel (oil, coal, etc.) quality with respect to sulfur or other constituents set by Federal, state, and local agencies.
18	Unauthorized use of . . .	Utilization of surface coatings, thinners, etc., prohibited by permit or regulation.
19	Unreported exceedances	Failure to report discharge/emission exceedance to a specified regulatory agency as required per permit or regulation.

Note: SDWA = Safe Drinking Water Act; NPDES = National Pollution Discharge Elimination System.

Table B-3.
Findings Code Descriptions for Technical Work

Code	Short title	Detailed definition
20	TECHNICAL WORK	
21	Sampling, analysis, and monitoring errors/failures	Failure to perform sampling, analysis, and monitoring in accordance with prescribed procedures or permit criteria for such media as solid waste, air, water, and wastewater. This reason code also includes compliance with monitoring protocol for groundwater monitoring wells, underground storage tanks (USTs), as well as chain-of-custody procedures.
22	Calibration problems	Failure to utilize analytical equipment calibrated according to established criteria or failure to conduct required calibrations. Where the deficiency is a failure to maintain the required records, but the calibrations were in fact performed, use Code 42.
23	Lab errors/failures/certification requirements	Improper laboratory techniques relative to preservation and analysis of samples. This reason code also includes use of an uncertified lab as well as failure of a laboratory to meet state or Federal criteria for sample handling and analysis. Inspection deficiencies relative to standard procedures used by a lab are also included in this violation reason code.

Table B-4.
Findings Code Descriptions for Personnel Issues

Code	Short title	Detailed definition
30	PERSONNEL ISSUES	Failure to use personnel certified for specific functions as required by regulatory agencies. Examples include asbestos removal/remediation personnel or wastewater treatment system operators. Inadequate certification records should be coded only 42.
31	Uncertified personnel	Failure to use personnel certified for specific functions as required by regulatory agencies. Examples include asbestos removal/remediation personnel or wastewater treatment system operators. Inadequate certification records should be coded only 42.
32	Inadequate supervision certification	Failure to have properly certified supervision on site for specified operations, e.g., asbestos removal/remediation, wastewater treatment operations supervision (normally is at least one level of certification higher than supervised personnel operating the wastewater treatment plant).
33	Training: inadequate/not done	Failure to train environmental personnel in the performance of their duties as specified by applicable Federal/state/local requirements. This reason code also includes inadequate training or failure to conduct annual refresher training. Lack of training records should use Code 42; failure to have certification training, resulting in uncertified personnel, should use Code 31.
34	Operator training (not environmental staff)	Failure to train personnel outside of environmental staff organization. This may include the Defense Reutilization and Marketing Office or other personnel handling hazardous wastes or Directorate of Engineering and Housing personnel in waste or water treatment plants, landfills, etc.
35	Inadequate number of personnel	Failure to provide personnel in sufficient quantity so as to comply with permit conditions for an operation such as a sanitary landfill. State regulations may also set personnel requirements for other operations subject to environmental regulation.

Table B-5.
Findings Code Descriptions for Operational Deficiencies

Code	Short title	Detailed definition
40	OPERATIONS	
41	Unpermitted/unauthorized/ unregistered activity/ equipment	This reason code includes such violations as failure to obtain permits for equipment or operations such as boilers, paint spray booths, asbestos removal operations, and discharge of a pollutant as well as operations not identified in permit applications such as the Resource Conservation and Recovery Act (RCRA) permit. The prime focus of this reason code is on operations for which a construction and/or operating permit or registration was not obtained for a unit currently in operation. Also see Code 51.
42	Records/files data submissions (incomplete/late)	This code provides for violations involving failure to maintain operating records, files, etc., in accordance with regulations, including incomplete or late submittals. Examples of recordkeeping requirements subject to this code include maintaining manifest copies, land disposal restriction (LDR) certifications, operating records of open burning/open detonation and other treatment/disposal operations, inspection logs, polychlorinated biphenyl (PCB) item inspection records, training records, etc. Discharge monitoring reports (DMRs) are also subject to this reason code.
43	Labeling/placard deficiencies	Included in this reason code are violations of regulations requiring labeling for containers, storage areas, and facility boundaries as well as placard deficiencies for vehicles transporting hazardous waste (HW)/materials. Violations include failure to label, improper or inaccurate labeling, no placards on hazardous waste transport vehicles, as well as illegible labeling.
44	Storage/accumulation issues (time, volume)	This violation code addresses violations related to storage and/or accumulation of HW. Typical examples of this violation code include storage beyond permitted volume or time limits, failure to indicate accumulation or storage start dates on containers, or storage not in accordance with recognized standards for incompatibility.
45	General O&M failures	This reason code concerns those violations of an operations and maintenance (O&M) nature that do not readily meet criteria for classification into alternative codes. Many of these are housekeeping items such as use of defective containers, failure to close HW containers, poor/little control at a landfill, lack of proper aisle space in storage areas (see Code 72), as well as lack of maintenance of pollution control equipment (e.g., bag houses).
46	Faulty/missing equipment	This reason code is designated for violations resulting from inoperative, poorly designated, or nonexistent equipment needed to meet permit conditions and regulatory requirements or prevent releases of pollutants into the environment.

Table B-5.
Findings Code Descriptions for Operational Deficiencies (Continued)

Code	Short title	Detailed definition
47	Manifest/transport problems and LDR certification	This code provides for violations in which the manifest and/or transportation of HW for the purpose of recycling treatment or disposal is not in accordance with regulations. It does not include recordkeeping issues (violation Code 42), but it does include improper preparation of the manifest. Manifest discrepancies, including LDR certification requirements as well as transport violations (vehicle not certified for HW transport) are typical of violations to be included in this category.
48	Nonlisted/restricted waste activities	This category of violation is designated for specific HW stream activities such as generation, storage, and treatment that do not appear on the installation permit, notification of HW activity forms, or permit applications. For instance, where an installation is storing a waste that is not listed on a RCRA permit or final permit, the violation would be reason Code 48. In addition, when an installation has failed to properly identify and treat restricted wastes as required by regulations, the same reason code would be used.
49	Inspections/engineering certification	Violations included within this code result from failure to perform inspections required in permits or by Federal/state/local regulations. This code would also be used for failure to obtain engineering certification of structural integrity/proper system installation prior to use of certain waste management units such as tanks.

Table B-6.
Findings Code Descriptions for Spills, Leaks, and Discharges

Code	Short title	Detailed definition
50	SPILLS/LEAKS/ DISCHARGES	The events classified under these codes should be a significant departure from permitted standards, as opposed to minor daily exceedances envisioned in Codes 10 through 19.
51	Unauthorized discharge/disposal	This violation code indicates that discharges or disposal of regulated substances has occurred without proper permits and in violation of Federal, state, or local regulations. Examples would include discharges to "waters of the U.S." without a permit or failure to properly dispose of materials such as PCBs. Do not include unauthorized emissions from point sources in this category (Code 41). The essence of this code is that an entire environmental program is completely unpermitted (e.g., no air permit at all) or that specific discharge occurred. Note that Code 41 applies to specific activities or equipment found to be without permits within a generally permitted program.
52	Leaks/spills from container/UST	Leaks, spills, or discharges of hazardous substances from drums, USTs, or other storage vessels into the soil, surface water, or groundwater are the most common violations to be coded into this category.
53	Bypass or overflow	This code includes cases where the volume of waste overloads the containment system. Violations include bypass of wastewater or industrial waste treatment operations or spills resulting from tank overflow. It also includes temporary failures of equipment that result in excessive discharges for a short period.
54	Contamination from spill/leak/discharge — not cleaned up	This code is employed for violations resulting from inadequate spill cleanup or remediation as well as failure to respond to spills resulting in contamination of soil and groundwater. The original spills themselves are covered by other codes in this Code 5 category.
55	Procedural error causing spill or pollution	Violations coded in this category result from deficient operational procedures that result in soil and/or water contamination. Examples include land management activities that do not allow for erosion control measures or open burning unit operational procedures that fail to prevent contaminant release into adjacent soil or groundwater.
56	Not used	Not used.
57	Spills, etc., not reported	This violation reason code primarily refers to spills, releases, etc., that are not reported in a timely manner as defined by regulation. This code overrides all other codes in the 50 series.

Table B-7.
Findings Code Descriptions for Facilities Problems

Code	Short title	Detailed definition
60	FACILITIES PROBLEMS	
61	Facility design or capabilities	This violation reason code encompasses generic design deficiencies for a variety of installation structures, systems, or resources. Included as examples are inadequate cross-connection or backflow prevention systems, inadequate supply of potable water, inefficient sewage treatment systems, and other cases of inadequate capability, capacity, or containment as a result of the facility design. Hazardous waste facilities are covered separately under Code 63.
62	Monitoring/detection/ control systems	This reason code is to be used where systems designed (1) to monitor environmental contamination, (2) provide automatic detection of leaks from units such as USTs, or (3) control liquid levels either have not been installed or are not operating properly. Examples include failure to properly design and install groundwater monitoring wells, failure to maintain erosion control measures, inadequate tank level monitoring system, and failure to install interstitial leak detection system.
63	Hazardous waste treatment, storage, or disposal	This reason code applies to design deficiencies for HW treatment, storage, or disposal facilities. This can include tanks, impoundments, storage areas, oil/water separators, etc. The most common violations for this code include lack of secondary containment, structural flaws in storage areas, lack of runoff control for waste piles, or defects in impoundment liners or berms.
64	Underground storage tank	UST design deficiencies or operational capability issues are included in this violation reason code. Deficiencies relative to design requirements can be assessed given Federal/state/local regulations for USTs. Common findings include inadequate cathodic protection, lack of overfill protection, failure to provide vapor Phase I or Phase II recovery, and failure to provide pressure testing. Ancillary devices, such as lead detection systems in interstitial spaces should be coded under 62. Code 64 pertains primarily to as-built or modified structural items relating to corrosion protection, tank tightness, and fill pipe location, etc.

Table B-8.
Findings Code Descriptions for General Management Problems

Code	Short title	Detailed definition
70	GENERAL MANAGEMENT	
71	Reports	This reason code refers to general failures to submit required reports. These include reports required by Federal/state/local agencies pertaining to RCRA, the Toxic Substances Control Act, the Clean Water Act, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This should not include individual DMRs that were sent in late or were incomplete since these reports are sent in frequently enough to indicate an operational deficiency as opposed to general management deficiencies; occasional late or incomplete DMRs belong in reason Code 42. However, consistently inadequate DMRs, or outright failure to submit DMRs, indicate management deficiencies and, as such, should be coded as 71. Other report violations to be classified as reason Code 71 include failure to comply with public notification requirements, annual PCB reports, annual HW assessment reports or reports related to groundwater monitoring operations that are part of CERCLA or RCRA corrective action.
72	Security and safety	This code specifies violations that consist of primary failure to provide personal protection equipment, equipment to be utilized in response to emergencies, and items related to providing for employee safety and health as detailed in an installation contingency plan. Other common findings of violations with this code include inadequate aisle space for egress (see Code 45), failure to post HW management areas, and failure to coordinate emergency response plans with local agencies such as police and fire departments.
73	Forms, documents, plans, manuals, procedures — inadequate/incomplete (but not operating records that are covered under Code 42)	This reason code covers the failure to submit timely or adequate documentation, plans, procedures, etc., required by regulatory agencies on environmental issues of concern that require agency authorization, oversight, or approval. These documents also describe procedures in effect at an installation designed to ensure compliance with environmental agency regulations. Forms, plans, and documents of consequence per this code include waste analysis plans, contingency plans, closure and post-closure plans, Parts "A" and "B" permit applications, financial assurance documentation, groundwater sampling plans, asbestos-containing material project notices, waste disposal documentation, spill prevention and control contingency plans, or other documents that are required in order to have a permitted program but that are not of themselves essential to proper operation of environmental activities. Operating records/plans violations are not to be recorded here (see Code 42).

Table B-8.
Findings Code Descriptions for General Management Problems (Continued)

Code	Short title	Detailed definition
74	Fees not paid	This reason code identifies violations that are issued solely to document the failure to pay such as those required for permits, registration fees (USTs), or HW assessment fees.
75	Failure to respond to regulatory authority notice	Receipt of a violation due to lack of response to a prior violation notice that required action on the installation's part within a specified period of time.

Table B-9.
Findings Code Descriptions for Legal Agreements Problems

Code	Short title	Detailed definition
80	LEGAL AGREEMENTS (AND OTHER LEGAL OBLIGATIONS, PERMITS, AND PLAN REQUIREMENTS)	
81	Not in accordance with (IAW) compliance agreement	This reason code applies to violations that result from failure to correct a violation in accordance with the dictates of a compliance agreement.
82	Late in achieving compliance agreement milestones	This reason code applies to violations that result from failure to achieve a milestone per compliance agreement requirements.
83	Not IAW closure plans	Violations of this type occur when closure of specific operational units and structures is not completed according to closure plan specifications or requirements.
84	Late with closure milestones	Violations of this type occur when closure of specified operational units and structures is not completed in a timely manner in accordance with milestones in a closure plan.
85	Not IAW permit/plan/ schedule/other legal requirements	Violations of this type occur when activities are conducted in a manner not in accordance with a permit, plan, or schedule agreed to by an installation and regulatory agency. Exceedances and operational violations are covered under Codes 10 and 40; this code addresses failure to act as agreed by a legal document other than a "compliance agreement."
86	Late with permit/plan/ schedule/other milestones	Violations of this type occur when projects are not achieved in a timely manner in accordance with milestones in a permit, plan, or schedule agreed to by an installation and regulatory agency.

APPENDIX C

Root Cause Codes Adopted from the Air Force Environmental Compliance Assessment and Management Program

Materials:

M1	Supply
M2	Poor Quality

Personnel:

P1	Awareness of Requirement
P2	Understanding
P3	Not Conscientious (deals with attitude of personnel)
P4	Result vs. Action (The result did not equal the action taken. Procedures were followed which should have produced a favorable result but did not.)
P5	Accountability not Assigned
P6	Action vs. Procedure [correct procedure(s) in place but incorrect action taken]
P7	Insufficient Skills
P8	Inexperience (not an attitude of personnel)

Equipment:

E1	Controls Failure
E2	Inadequate Facility Design
E3	Monitoring Equipment Failure
E4	Poor maintenance Techniques

Training:

T1	Time to Do the Job
T2	No Procedures in Place
T3	Priority Conflict
T4	Inadequate Procedures
T5	Procedures Not Available

APPENDIX D

Management Reports

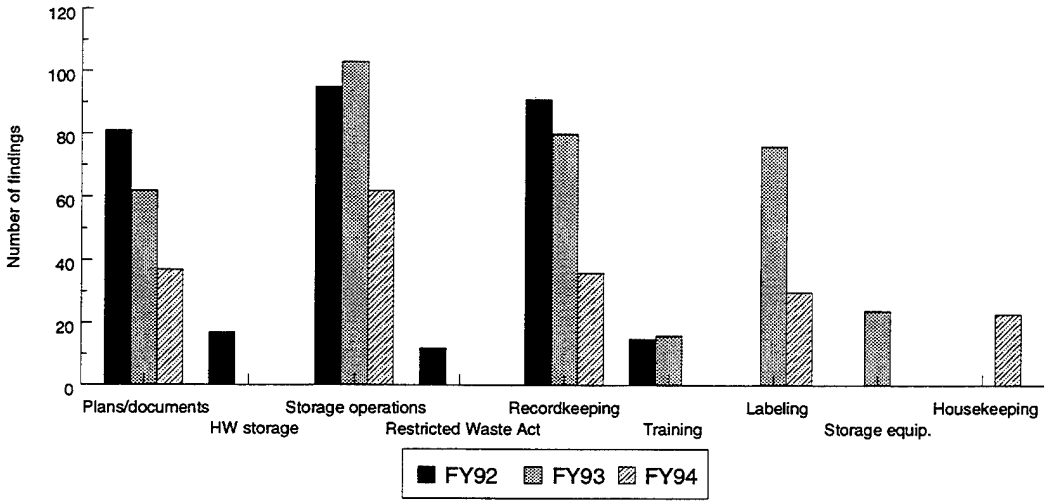
As part of the process for evaluating the Environmental Compliance Assessment System (ECAS), we assessed the information needs of managers who use the data or who are responsible for inputting the data into the Army's three environmental management systems: ECAS, the 1383 data base, and the Army Compliance Tracking System (ACTS). In this appendix, we show some of the reports that we designed by using the three Army systems to the extent that they already contain the proper codes and common fields that permit linkages and detailed analyses. The managers we interviewed requested many of the charts in this chapter. However, the reports in this chapter are but a sample of the types of information that can be drawn from these data bases if the data are accurate and the appropriate links and codes exist. The overall consensus among those interviewed was that managers need to have the capability to answer their own questions and have better, more-timely access to the information they need. In addition, managers at all levels sought the improved data understanding that is offered by simplified displays as opposed to the tables of numbers currently available.

When developing the sample reports, we adjusted the data bases somewhat so that we would have more flexibility in using the data and in creating links among the three systems. The first change was that the U.S. Army Environmental Center (USAEC) provided us with data files in the common .dbf file format that would work in MS-DOS-based applications. Once converted, nearly any Microsoft Windows-based software is compatible with the systems and could be chosen on the basis of the users' needs. We also made minor adjustments to the contents of the data bases to improve their intercompatibility and usefulness. Finding codes and corrective action codes also improved the detail of the data in the ECAS data set. USAEC has used these codes to classify its enforcement actions, which provides an additional link between the ECAS and ACTS data bases. These codes are now being used by ECAS assessment teams and will be available from the Environmental Compliance Assessment Reports (ECAS Reports) in the future. The addition of this coding system improves the information that can be extracted from the data bases and creates an additional link between the two systems. The facility identification numbers (FFID) were also adapted to fit the format of those used in the 1383 data base software, creating an essential link among all three of these systems.

The information in these reports consists of a combination of real data, notional data, and blank fields, depending on the data availability. Notional data fields were used to depict information that either is not currently available, is often ineffectively reported, or will be available after the changes to ECAS data-collection and coding, such as the use of reason codes in the next round of ECAS.

Recommended adjustments that would improve the data accessibility are listed in Appendix E.

Figure D-1 depicts the ECAS findings by finding code for three fiscal years. By coding the ECAS findings, the process of identifying specific problems within a media area or program category is greatly simplified. The ECAS assessment teams have implemented this coding system as of January 1995, after which time ECAS-coded data will be a part of the ECAS Reports.



Note: HW = hazardous waste.

Figure D-1.
Resources Conservation and Recovery Act (RCRA-C) ECAS Findings by Finding Code

Figure D-2 shows the trend in ECAS findings over time. It shows the average number of findings attributable to four causes for each year. It indicates that the results of the ECAS assessments have improved since its initiation in late 1991. This type of chart can be used to prompt further questions regarding the effectiveness of the ECAS program, trends or program health indicators.

Corrective action codes were attached to each ECAS finding. They represent the action needed to correct the deficiency found during the ECAS assessment. Figure D-3 is a breakdown of required corrective actions that were attached to the ECAS findings for all RCRA-C problems identified in the ECAS assessments. Examples of variations on this query include identifying specific corrective actions required for a specific facility type such as hazardous waste storage facilities.

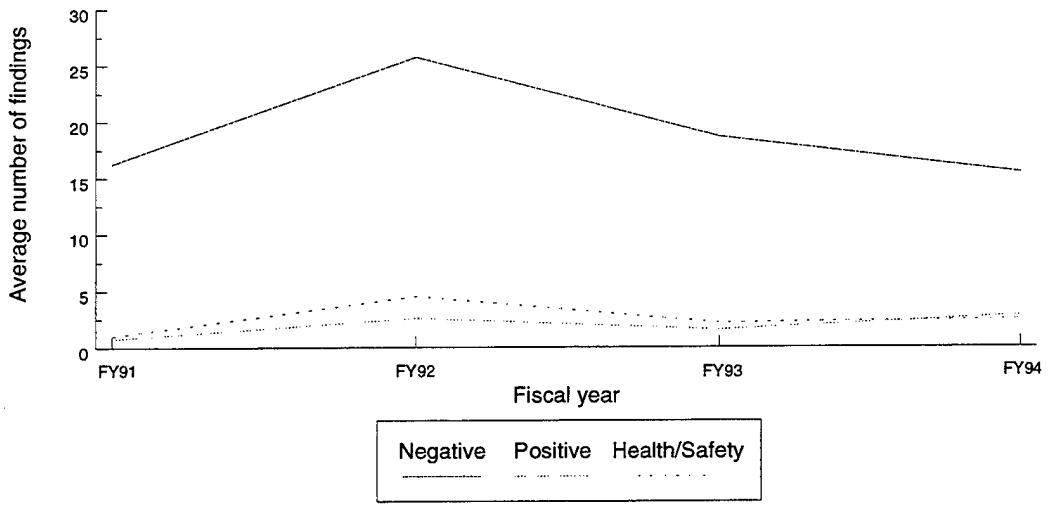


Figure D-2.
ECAS Findings for FY91 through FY94 by Average Number of Findings

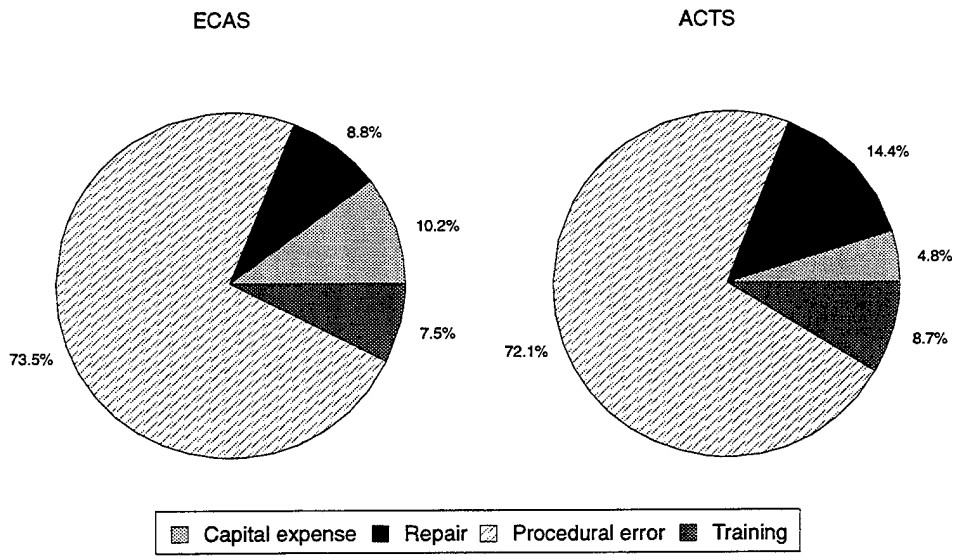


Figure D-3.
RCRA Subtitle C, Corrective Action Codes

Figure D-4 identifies facilities at which the highest number of findings occur and the nature of these findings. This particular query indicates that most RCRA-C problems exist in maintenance facilities and are caused by storage operation deficiencies.

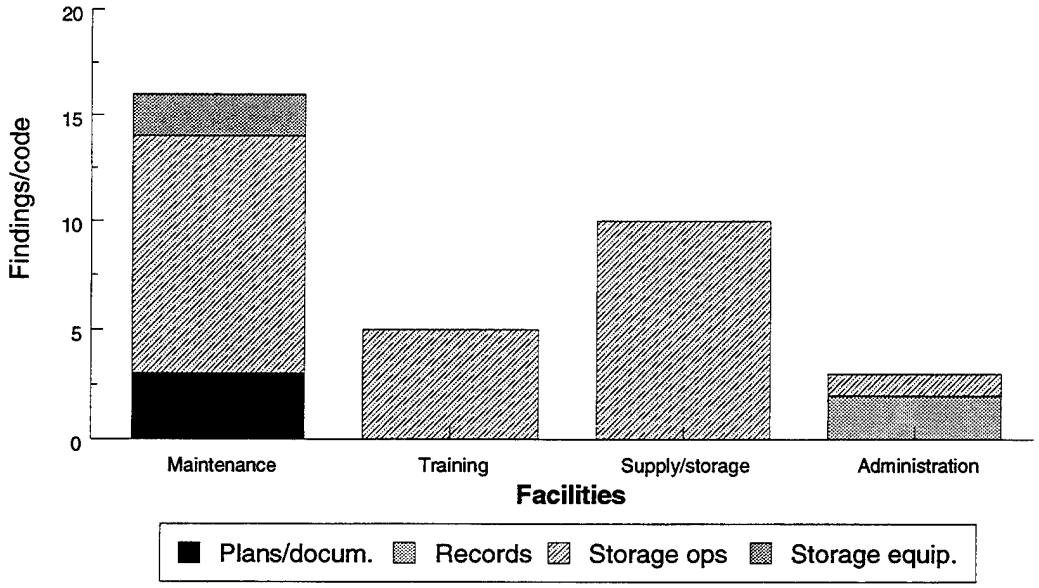


Figure D-4.
RCRA Subtitle C Facility Data for FY94

Table D-1 shows a relationship between ACTS enforcement action findings and related 1383 data base projects. Variations on this chart could produce data specific to a certain law that identifies costs incurred from fees or supplemental environmental projects.

Both ECAS and ACTS data bases contain finding codes that categorize the type of problems that assessors and regulators report. The pie charts in Figure D-5 compare the ECAS and ACTS findings by problem area indicated through these finding codes. In this case, the findings indicate the ECAS audits identified storage operations, recordkeeping, and labeling as the most common problems under RCRA-C compliance. Regulators find most problems with plans and documentation, recordkeeping, and NPDES and pretreatment limits. This is one example of queries that can be conducted comparing ECAS and ACTS-coded data.

We associated project costs with ECAS findings by linking 1383 project numbers from the 1383 data base and ECAS data base. Table D-2 shows an estimate of the costs incurred to address one problem area. For example, projects related to leaks and spills totaled $600,000 for 1992, $300,000 in 1993, and $170,000 in 1994. However, given the structure of the 1383 data base, we should note that any one project will include multiple findings, which is added into the sums of the other coded categories.

Table D-1.
ECAS Findings and Corresponding 1383 Data Base Projects

1383 Project costs incurred from NOVs (cost incurred per finding category)				
	In thousands			
Finding	1991	1992	1993	1994
NPDES and pretreatment limits	–	–	640	20
Sampling, analysis, monitoring errors/failures	–	–	20	14
Training: inadequate/not done	–	–	5	5
Unpermitted/unauthorized/unregistered activity/equipment	–	–	–	200
Storage/accumulation issues (time, volume)	25	10	110	10
General O&M failures	–	–	–	9
Faulty/missing equipment	–	–	–	–
Nonlisted/restricted waste activities	–	–	80	178
Spills/leaks/discharges	–	–	–	–
Unauthorized discharge/disposal	–	–	20	10
Contamination from spill/leak/discharge	75	115	91	295
Procedural error causing spill or pollution	–	–	–	–
Facility design or capabilities	–	–	–	–
Forms, documents, plans, manuals, procedures — inadequate, incomplete	28	29	106	60

Note: NPDES = National Pollution Discharge Elimination System; O&M = operations and miaintenance; NOVs = notices of violation..

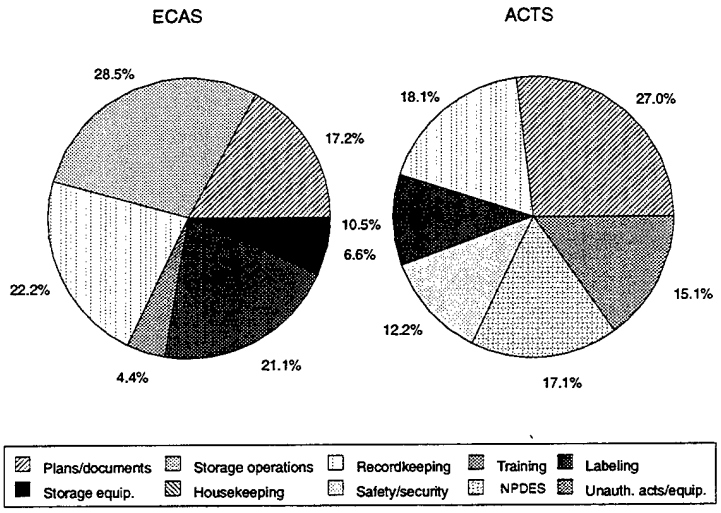


Figure D-5.
RCRA Subtitle C, ECAS Comparison Findings by Problem Area

Table D-2.
RCRA-C ECAS Enforcement Action Findings (thousands of dollars)

Enforcement Code	Requested 1992	Requested 1993	Requested 1994
NPDES and pretreatment limits	120	354	110
Sampling, analysis, and monitoring errors/failures	119	426	917
Uncertified personnel	0	0	195
Training: inadequate, not done	279	756	992
Inadequate number of personnel	0	0	158
Unpermitted/unauthorized activity or equipment	600	600	116
Records/files data submission	218	438	1,550
Labeling/placard deficiencies	500	350	483
Storage/accumulation issues	1,205	843	1,668
General O&M and housekeeping	1,296	1,062	1,150
Faulty/missing equipment	30	469	852
Restricted wastes activities	114	226	402
Inspections/engineering	590	132	1,337
Unauthorized disposal	0	351	1,418
Leak/spill from container/UST	600	300	370
Bypass or overflow	0	900	900
Contamination from spill/leak	0	100	235
Procedural error causing spill or pollution	0	0	125
Facility design or capabilities	207	220	1,068
Monitoring/detection/control systems	959	1,118	778
Hazardous waste treatment, storage, or disposal	928	1,383	2,508
UST	255	850	1,699
Reports	0	75	316
Security and safety	37	2,644	627
Forms/documents/plans/procedures	3,916	11,696	7,275
Failure to respond to regulatory authority notice	40	575	220
Late with closure milestone	250	452	879
Late with permit/plan/schedule other milestone	35	432	623

Note: UST = underground storage tank.

Table D-3 is a query that shows a total of the ECAS findings and ACTS enforcement action findings by fiscal year for FY91 through FY94. This type of query shows the relationship between ECAS findings and the impact on the overall reduction of enforcement actions.

Table D-3.
Enforcement Findings for ACTS and ECAS

	Violations and Findings	1991 ACTS
10	EXCEEDANCE	
11	Volatile organic compounds (VOCs)	7
12	Visible violations of opacity limits	2
13	Safe Drinking Water Act and drinking water standards	1
14	Required notifications	
15	Inadequate levals of . . .	
16	NPDES and pretreatment limits	67
17	Emission limits, fuel used, miscellaneous	3
18	Unauthorized use of . . .	
19	Unreported exceedances	1
20	TECHNICAL WORK	
21	Sampling, analysis, and monitoring errors/failures	38
22	Calibration problems	1
23	Lab errors/failures/certification requirements	9
30	PERSONNEL ISSUES	
31	Uncertified personnel	
32	Inadequate supervision certification	1
33	Training: inadequate/not done	2
34	Operator training (not environmental staff)	9
35	Inadequate number of personnel	1
40	OPERATIONS	
41	Unpermitted/unauthorized/unregistered activity/equipment	32
42	Records/files data submissions (incomplete/late)	88
43	Labeling/placard deficiencies	39
44	Storage/accumulation issues (time, volume)	50
45	General O&M failures	68
46	Faulty/missing equipment	20
47	Manifest/transport problems, and LDR certification	34
48	Nonlisted/restricted wastes activities	24
49	Inspections/engineering certification	18

1991		1992		1993		199
ACTS	ECAS	ACTS	ECAS	ACTS	ECAS	ACTS
						1
7		1	3	4	2	5
2		2		2		1
1		10	7	11	3	9
			1	1	2	1
		1	2	1	1	2
67		57	1	53	1	20
3	1	1	4	4	3	
1		3				1
38	1	24	64	20	130	52
1		4				2
9		3		6		4
			2		5	
		3	6	2	12	
1		1	3		3	1
2	4	4	96	9	148	15
9		10	10	8	5	
1	2	3	17		31	
			1			
32		32	30	47	42	42
88	13	76	221	56	282	63
39	3	46	181	34	103	83
50	6	57	358	21	249	72
68	7	77	204	77	175	83
20	2	27	54	12	48	37
34	1	31	20	22	10	24
24		40	29	33	26	11
18		19	30	19	46	10

	1993		1994	
ECAS	ACTS	ECAS	ACTS	ECAS
			1	
3	4	2	5	1
	2		1	
7	11	3	9	3
1	1	2	1	
2	1	1	2	
1	53	1	20	
4	4	3		1
			1	
64	20	130	52	46
	6		2	
			4	
2		5		1
6	2	12		9
3		3	1	1
96	9	148	15	65
10	8	5		2
17		31		9
1				
30	47	42	42	26
221	56	282	63	91
181	34	103	83	67
358	21	249	72	168
204	77	175	83	80
54	12	48	37	27
20	22	10	24	5
29	33	26	11	21
30	19	46	10	26

Table D-3.
Enforcement Findings for ACTS and ECAS (Continued)

	Violations and Findings	1991 ACTS
50	SPILLS/LEAKS/DISCHARGES	
51	Unauthorized discharge/disposal	31
52	Leak/spill from containter/UST	5
53	Bypass or overflow	3
54	Contamination from spill/leak/discharge — not cleaned up	2
55	Procedural error causing spill or pollution	1
56	Not used	
57	Spill, etc., not reported	3
60	FACILITIES PROBLEMS	
61	Facility design or capabilities	11
62	Monitoring/detection/control systems	8
63	Hazardous waste treatment, storage, or disposal	8
64	Underground storage tanks	8
70	GENERAL MANAGEMENT	
71	Reports	10
72	Security and safety	54
73	Forms, documents, plans, manuals, procedures — inaequate/incomplete	89
74	Fees not paid	2
75	Failure to respond to regulatory authority notice	2
80	LEGAL AGREEMENTS (AND OTHER LEGAL OBLIGATIONS)	
81	Not in accordance with (IAW) compliance agreement	
82	Late in achieving compliance agreement milestones	
83	Not IAW closure plans	4
84	Late with closure milestones	2
85	Not IAW permit/plan/schedule/other legal requirements	1
86	Late with permit/plan/schedule/other milestones	4

	1991		1992		1993		1994	
	ACTS	ECAS	ACTS	ECAS	ACTS	ECAS	ACTS	E
							4	
	31		24	30	27	15	30	
	5		9	23	5	15	7	
	3		8	6	21	3		
	2		8	25	8	18	1	
	1		1	17	3	12	12	
						1		
	3		3	1	2		1	
				3		5	1	
	11	3	11	113	15	100	17	
	8		7	54	6	45	7	
	8	2	5	171	2	118	22	
	8		2	25	3	37		
	10	1	9	48	3	70	9	
	54	1	34	110	37	86	20	
	89	21	59	672	82	1,095	54	
	2		31		3		3	
	2			3	3	2	2	
					1	3		
	4		1	1	2		2	
	2		1	14	1	11		
	1		10	1	6	1	6	
	4		4	3	3	6	2	

1993		1994	
ACTS	ECAS	ACTS	ECAS
		4	
27	15	30	8
5	15	7	9
21	3		1
8	18	1	23
3	12	12	12
	1		
2		1	1
	5	1	10
15	100	17	59
6	45	7	15
2	118	22	54
3	37		26
3	70	9	25
37	86	20	48
82	1,095	54	434
3		3	
3	2	2	
1	3		
2		2	
1	11		8
6	1	6	1
3	6	2	1

We linked polychlorinated biphenyl (PCB) information from the ACTS, ECAS and 1383 data bases and performed queries with the data. Our objective in doing this was to find links that would give media managers information they need to better manage their programs. These are just some of the queries that can be asked of the systems.

Figure D-6 depicts the deficiencies identified by the ECAS assessments on installations reporting PCB-contaminated transformers. The result of these findings show that the problems on these installations include records, labeling, and performing restricted or nonlisted waste activities.

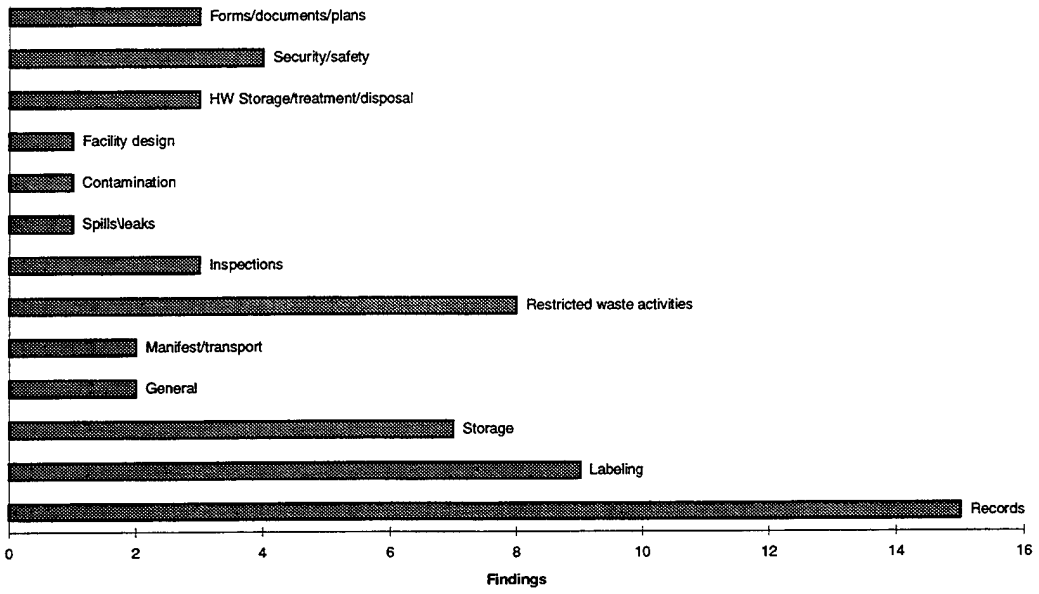


Figure D-6.
ECAS Findings for PCBs by Finding Category

By querying the installations that reported PCB-contaminated facilities, the findings indicated that the number of installations has begun to decrease in 1994 after a rise in 1993 (Figure D-7). Of these installations, the number of deficiencies found by ECAS assessments has followed the trend proportionately. As depicted in Figure D-8, the funding requirements have also dropped. Managers could use this information to speculate about the health of the program and its effectiveness in correcting the PCB problem.

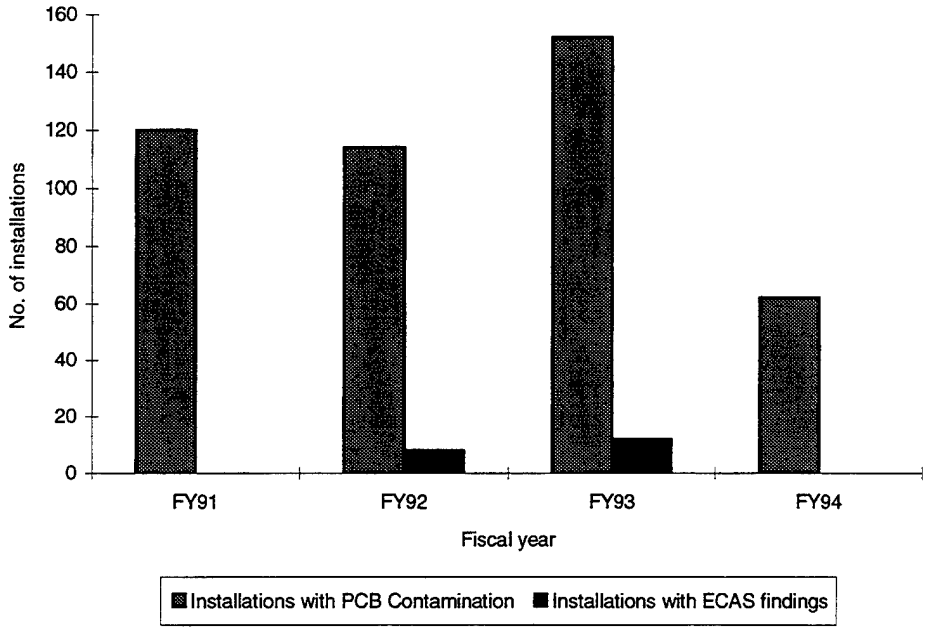


Figure D-7.
ECAS Identified Deficiencies at Installations with PCB Contamination

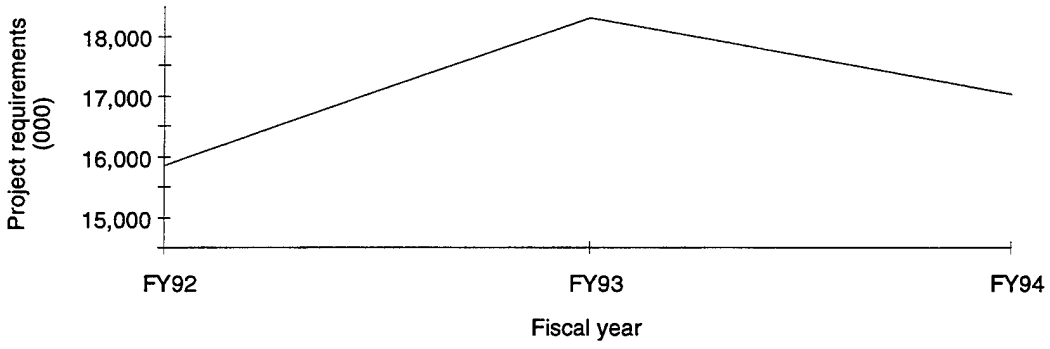


Figure D-8.
1383 Project Requirements

A query variation that managers might ask of the 1383 and ACTS data bases includes a count of installations that requested 1383 projects for PCB transformer problems that did not report PCB problems. For example, by linking the data base Installation ID numbers, managers could determine how many or which installations did not report PCB problems in ACTS and the funds requested in the 1383 data base (see Table D-4).

Table D-4.
Installations with PCB Contamination
(Notional Data)

Installation ID No.	ACTS: PCB contamination	Project requirement 1993	Project requirement 1994
602	Yes	10,000	12,000
603	No	10,000	12,000
609	Yes	11,000	13,000
803	Yes	12,000	14,000

Given the proper data, a manager could also determine where program funding has been allocated over a series of years and where problem areas continue to require projects. Table D-5 categorized projects and sums for the required spending for each fiscal year. This type of table shows one variation of many program management and cost allocation queries that could be asked of the data bases. The data in this particular chart are notional because of the structure of the 1383 data base.

Table D-5.
Program Funding for PCBs

Cost allocation for PCB transformers	FY93		FY94	
	Total	Percentage	Total	Percentage
PCB training	24,000	10.75	26,000	7.31
TSCA training	32,000	15.38	36,000	9.83
PCB surveys	42,000	10.95	40,000	7.95
PCB transformer/equipment replacement	90,000	4.64	43,000	6.47
Groundwater monitoring	70,000	4.69	45,000	5.22
Total	258,000	–	190,000	–

The reports generated here are a small sample of the types of reports that managers could ask of a system that provided information from the three data base systems. Most of the reports were accessible by creating common fields among the data bases and improving the level of detail that can be elicited from the system by adding codes. Appendix E describes in greater detail the changes we recommend to provide the required links between these systems.

APPENDIX E

Data Base Field Recommendations

The reports displayed in Appendix D are samples of the types of information Army environmental managers requested. In our evaluation of the Environmental Compliance Tracking System (ECAS), we experimented with finding new links and queries. In the course of our study, we identified fields that could be added or adjusted to improve the flexibility of three data bases: the 1383 data base, the Army's financial data base; the Army Compliance Tracking System (ACTS); and ECAS. However, the reports shown are merely examples of the numerous reports that can be generated using data from the three systems, and as information needs are further identified, the need for other links will become apparent. Currently, we recommend the field changes listed below be implemented.

Facility Identification Number (FFID). The FFID field currently exists in all three data bases but is different for each. For example, to get information from the same facility from ECAS and the 1383, a programmer has to search for conditions in which the ECAS FFID field is equal to three 1383 fields (state, agency code, and property number). ECAS and ACTS both use the field name FFID, but the ACTS FFID comprises agency code, General Services Administration (GSA) property number, and state code. This field, however comprised, should be the means by which to link information among all the three environmental data bases to create a single environmental information system.

Pollutant Category. The program category field represents the section, area of consideration, type of activity, type of pollutant, or program management area being evaluated under the environmental law. The pollutant category field facilitates sorting across all regulations or findings for subject areas such as pollution prevention, underground storage tanks, asbestos, and polychlorinated biphenyl (PCB). The programs category field is common to the ECAS and 1383 data bases. It and should be included in the ACTS data base to include enforcement action findings and in ECAS and 1383 projects to improve the query capability.

Protocol Numbers. The protocol number specifies the media and specific questions that are located in the checklist used to perform the ECAS assessment. If the protocol numbers used for the assessments were the same as those of the other two data bases, a query or roll up of all findings specific to one question would be possible. A new protocol is currently under development to bring the protocol numbers into agreement.

Type of Finding. In the ACTS data base, a field designates whether a finding is operational, administrative, or project related. That field should be common to the ECAS and 1383 data bases so that projects and findings could be separated

into these three categories. Such a capability would provide another way of linking the data bases to track problems and costs.

Project Status. To assemble information on project status from the three data bases, we recommended that the following fields be linked or presented in a single report:

- ECAS — date that the deficiency was corrected
- DB1383 — date that construction/work was completed
- ACTS — date that corrective action was taken and finding status.

Project Description Category. The project description field of the 1383 data base allows entry of a brief description of the project requested through the 1383 data base. If the project name had more conformity, sum costs for similar projects would be easier. For example, a user could calculate the funding requested for a specific type of project, such as PCB transformer testing, if the description was consistently used. However, since "project description" is a free-text field and entries vary in their description, the user cannot easily group common project entries.

REPORT DOCUMENTATION PAGE

Form Approved
OPM No.0704-0188

1. AGENCY USE ONLY *(Leave Blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	Sep 95	Final

4. TITLE AND SUBTITLE

Managerial Uses for the Army's Environmental Compliance Assessment System

5. FUNDING NUMBERS

C MDA903-90-C-0006

PE 0902198D

6. AUTHOR(S)

Douglas M. Brown, Denise R. Dellovade , H. Locke Hassrick

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Logistics Management Institute
2000 Corporate Ridge
McLean, VA 22102-7805

8. PERFORMING ORGANIZATION REPORT NUMBER

LMI– AR414MR1

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

David C. Guzewich
Chief, Environmental Compliance Division
U.S. Army Environmental Center
SFIM-AEC-EC, Bldg. E-4435
Aberdeen Proving Ground, MD 21010-5401

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

A: Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT ***(Maximum 200 words)***

In 1992, the Army established the Environmental Compliance Assessment System (ECAS) process to help its commanders comply with Federal, state, and local environmental regulations.

At the completion of the first cycle of the ECAS assessments (four years), the U.S. Army Environmental Center (USAEC) asked the Logistics Management Institute to assist in evaluating the ECAS process and to recommend how ECAS data might be analyzed to detect Army-wide trends and systemic problems. We found that while the ECAS process provides installations with detailed information, it provides little information useful to higher level commands. We found that the tools of the ECAS process (the protocols, assessment reports, and data sets) are underutilized; that the information that should be generated by the ECAS process has not been provided or is inaccessible; that the information that has been provided is inadequate to serve as the basis for command-wide or Army-wide corrective action programs; and that Army commanders are under no pressure to respond to ECAS-generated findings.

The USAEC has already taken action to correct many of the deficiencies in the ECAS program through the ECAS-II (the second ECAS cycle — this time three years) effort. When those deficiencies are corrected, ECAS and its associated software system can become significant tools for the Army in improving environmental compliance.

14. SUBJECT TERMS

ECAS, ECAS data base, assessment, protocol, ECAS findings, ECAS assessment team, ECAS report

15. NUMBER OF PAGES

82

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

Logistics Management Institute
2000 Corporate Ridge
McLean, Virginia 22102-7805