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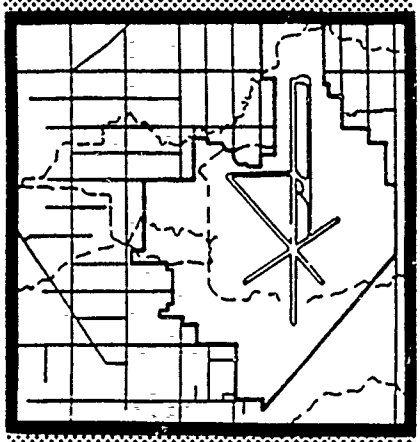
INSTALLATION RESTORATION PROGRAM (IRP)
STAGE 7

McCLELLAN AIR FORCE BASE



PREPARED BY:
Radian Corporation
10395 Old Placerville Road
Sacramento, California 95827

JULY 1991

Comprehensive CERCLA Work Plan

FINAL

PREPARED FOR:
McCLELLAN AFB / EM
McCLELLAN AFB, CALIFORNIA 95652-5990

United States Air Force
Human Systems Division (AFSC)
IRP Program Office (ESO/ER)
Brooks Air Force Base, Texas 78235-5501

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ESO/ER
Brooks, TX

DEPARTMENT OF THE AIR FORCE

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25 JUL 1991

SUBJECT: 1991 Comprehensive CERCLA Workplan (CCW) - Final

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1. The above mentioned document is attached for your record.

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3. If you have any questions, contact Mr Bud Hoda, SM-ALC/EMR, (916) 643-1250.

MARIO E. IZZARDI
Chief, Environmental Restoration Division
Directorate of Environmental Management

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CORPORATION

10395 Old Placerville Road
Sacramento, CA 95827
(916)362-5332

INSTALLATION RESTORATION PROGRAM (IRP) STAGE 7

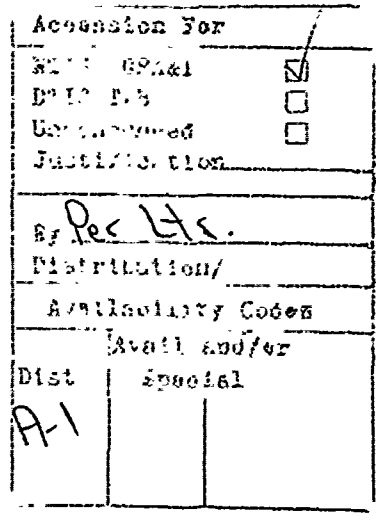
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
COMPREHENSIVE CERCLA WORK PLAN

FINAL

FOR

McCLELLAN AFB/EM
McCLELLAN AFB, CA 95652-5990

July 1991



PREPARED BY:

Radian Corporation
10395 Old Placerville Road
Sacramento, California 95827

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IRP PROGRAM OFFICE (ESO/ER)
Mr. Patrick Haas (Technical Project Manager)

HUMAN SYSTEMS DIVISION (AFSC)
IRP PROGRAM OFFICE (ESO/ER)
BROOKS AIR FORCE BASE, TEXAS 78235-5501

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NOTICE

This report has been prepared for the Air Force by Radian Corporation for the purpose of aiding in the implementation of a final remedial action plan under the Air Force Installation Restoration Program (IRP). As the report relates to actual or possible releases of potentially hazardous substances, its release prior to an Air Force final decision on remedial action may be in the public's interest. The limited objectives of this report and the ongoing nature of the IRP, along with the evolving knowledge of site conditions and chemical effects on the environment and health, must be considered when evaluating this report, since subsequent facts may become known which may make this report premature or inaccurate. Acceptance of this report in performance of the contract under which it is prepared does not mean that the Air Force adopts the conclusions, recommendations, or other views expressed herein, which are those of the contractor only and do not necessarily reflect the official position of the Air Force.

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This Comprehensive CERCLA Work Plan presents the approach to the Remedial Response Program for McClellan Air Force Base as required under the Interagency Agreement (IAG), signed on 21 July 1989.

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PREFACE

Radian Corporation is the contractor for the RI/FS program at McClellan AFB, California. This work was performed for the Center for Environmental Excellence, Environmental Services Office/Environmental Restoration (ESO/ER) under Air Force Contract No. F33615-90-D-4013, Delivery Order 0002.

Key Radian project personnel were:

Nelson H. Lund, P.E.--Contract Program Manager
Jack D. Gouge'--Delivery Order Manager
William C. Knight, P.E.--Planning/Resource Coordinator

Radian would like to acknowledge the cooperation of the McClellan AFB Office of Environmental Management. In particular, Radian acknowledges the assistance of Mr. Mario Ierardi, Mr. Bud Hoda, and Mr. Gerald Robbins.

The work presented herein was accomplished between September 1989 and January 1990. Mr. Patrick Haas, Environmental Services Office, Environmental Restoration (ESO/ER), was the Technical Project Manager.

Approved Jack D. Gouge for
Nelson H. Lund, P.E.
Contract Program Manager

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1.0 INTRODUCTION

In 1979, officials at McClellan Air Force Base (AFB) in California began to suspect that past waste disposal practices may be contaminating the groundwater in the area. Selecting a proactive approach, McClellan AFB voluntarily created a groundwater contamination committee, which identified at least four areas of potential groundwater contamination needing further investigation. Subsequent investigations confirmed contamination, and McClellan AFB developed a comprehensive program was developed to maintain drinking water quality and to remediate the contamination. In 1981, the United States Department of Defense (DOD) developed the Installation Restoration Program (IRP) to investigate hazardous material disposal sites on DOD facilities; McClellan AFB's comprehensive program was revised to conform with the IRP. Since then, numerous investigations and studies have been performed under the IRP.

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On 22 July 1987, McClellan AFB was listed on the U.S. Environmental Protection Agency's (U.S. EPA) National Priorities List (NPL). McClellan AFB integrated the ongoing IRP with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by Superfund Amendments and Reauthorization Act of 1986 (SARA); National Oil and Hazardous Substances Contingency Plan (NCP); pertinent provisions of the Resource Conservation and Recovery Act (RCRA) statutes; Executive Order 12580; the Defense Environmental Restoration Program (DERP) and all applicable or relevant and appropriate state laws and regulations.

Following McClellan AFB's listing on the NPL, the Air Force (AF) began negotiating an Interagency Agreement (IAG) with the U.S. EPA and the California Department of Health Services (DHS). On 21 July 1989, all parties signed the IAG, which establishes the process for involving federal and state regulatory agencies, and the public in the McClellan AFB response action process. The IAG sets schedules for completing specific program tasks including:

- Remedial Investigations (RI);
- Feasibility Studies (FS);
- Response actions; and
- Operation and maintenance activities related to response actions.

While the 21 July 1989 version of the IAG was signed by the three parties to the agreement, it was not made effective. While responses to public comments

received on the IAG were being prepared, an earthquake in October 1989 damaged the offices and operations of the U.S. EPA Region IX, delaying the reexecution and effective date of this agreement. During this interim period, technical work proceeded as originally planned prior to the earthquake. Responses to public comments have now been completed. The revised IAG has been amended and signed by all parties and became effective 02 May 1990.

McClellan AFB agreed to undertake, where applicable, cleanup actions at McClellan AFB in accordance with the IAG, to protect the public health, welfare, and the environment. This document, the Comprehensive CERCLA Work Plan (CCW), is the key planning document deliverable for the IAG. It describes the long-range objectives, technical approach, status of ongoing tasks, and future tasks of McClellan AFB to remediate or clean up contaminated areas. The CCW is updated annually as new data are obtained during field investigations, as the scope of additional tasks are defined, and as new priorities are established by McClellan AFB mission requirements in coordination with participating regulatory agencies, and the public. Updates to the CCW will reflect the dynamics of the CERCLA process at McClellan AFB and reflect revised priorities and tasks. The annual updates of this CCW will communicate revised strategies and management issues to the regulatory agencies and the public.

1.1 Site Background

1.1.1 Location and History

McClellan AFB is located approximately seven miles northeast of downtown Sacramento, California, as shown in Figure 1-1. The main base facility includes 2,952 contiguous acres, which are bounded by the City of Sacramento to the west and southwest, the unincorporated areas of Rio Linda/Elverta to the northwest, and North Highlands to the east.

McClellan AFB was established in 1936 when the U.S. Congress authorized the construction of a new air repair depot and supply base for the War Department (predecessor to the Department of Defense). Initially named the Sacramento Air Depot, the facility was dedicated in 1939. In the early 1950s, McClellan AFB changed from a bomber depot to a jet fighter maintenance depot. McClellan AFB currently operates as an Air Force Logistics Command Base, employing approximately 18,000 military and civilian personnel with the primary mission of management, maintenance, and repair of aircraft, electronics, and communication equipment.

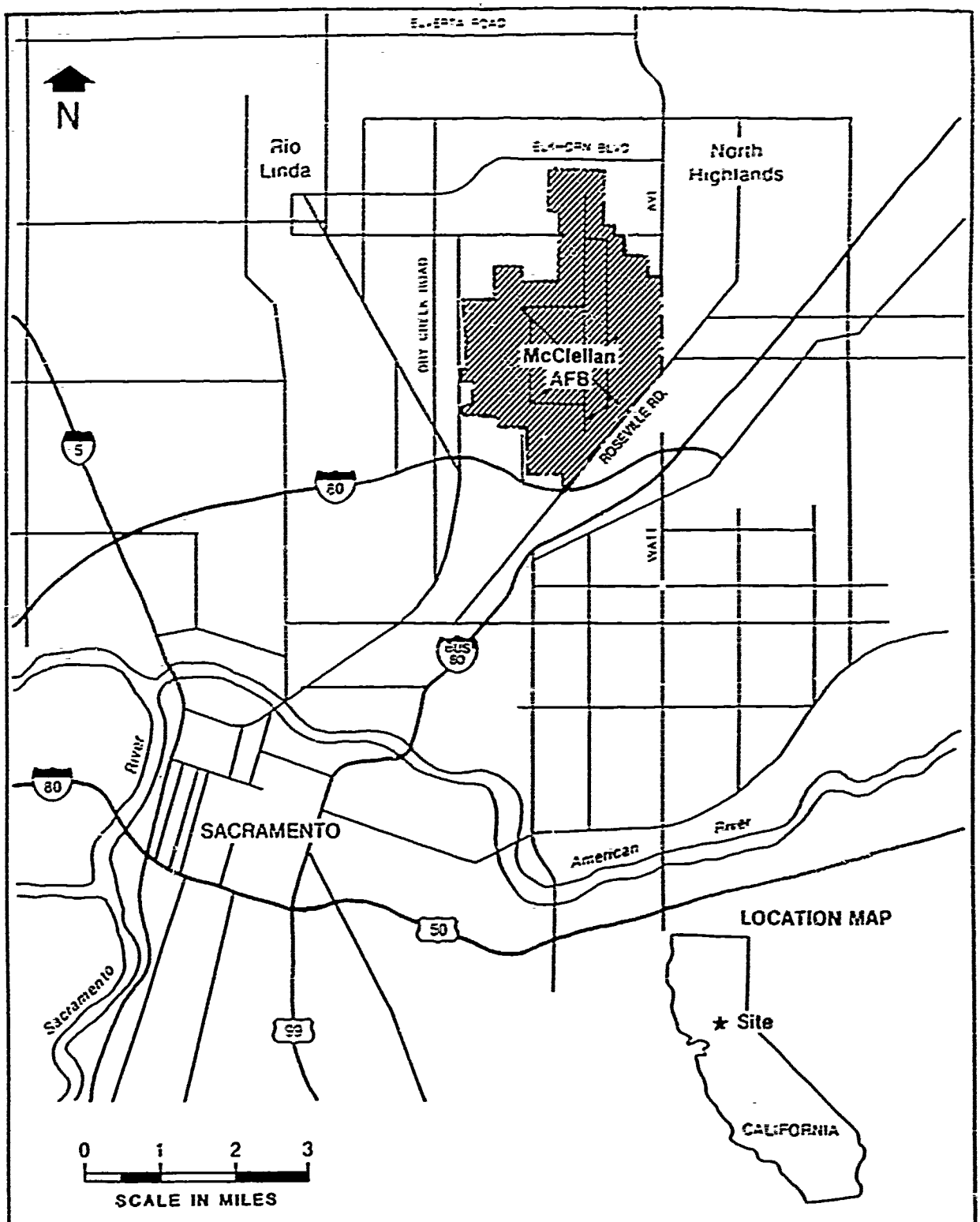

Figure 1-1. Location of McClellan AFB.

Units existing within the Air Logistics Command Center include: the 2852nd Air Base Group, which is responsible for all support and housekeeping functions at McClellan AFB; the 2951st Combat Logistics Support Squadron, which provides mobile supply and maintenance support to USAF forces worldwide; Detachment 5, 3025th Management Engineering Squadron, which provides manpower authorization and management engineering support; and the USAF Clinic, which provides McClellan AFB with medical services.

Tenant units at McClellan AFB include: Air Force Systems Command; Air Training Command; Tactical Air Command; Air Force Communications Command; Military Airlift Command; the Fourth Air Force Reserve; the Coast Guard Air Station Sacramento; Detachment 1905, 17th District, Air Force Office of Special Investigations; Canadian Forces Liaison Detachment; Royal Air Force Liaison Office; Air Force Commissary Complex Service; American Red Cross Field Office; General Accounting Office; and Defense Logistics Agency activities.

(cont)

In fulfilling its past and current mission to defend the United States through the operation and maintenance of aircraft, McClellan AFB has been engaged in a wide variety of operations that involve the use, storage, and disposal of hazardous materials including: industrial solvents, caustic cleaners, electroplating chemicals, heavy metals, polychlorinated biphenyls (PCBs), low-level radioactive wastes, and a variety of fuel oils and lubricants.

1.1.2 Physical Setting and Contaminant Sources

Groundwater beneath McClellan AFB occurs under confined and unconfined conditions. Hazardous substances have percolated into the aquifer underlying the facility at various locations on base. In 1979, groundwater testing by McClellan AFB, state, and local agencies identified the presence of volatile organic compounds (VOCs) in on- and off-base wells that led to the closure of two McClellan AFB wells and three off-base wells. Groundwater and soil samples collected on and in the vicinity of McClellan AFB have shown the presence of a variety of contaminants, principally VOCs and metals.

The watershed in the vicinity of McClellan AFB flows southwesterly. Surface water drainage on and around McClellan AFB includes Magpie, Second, Dry, and Arcade creeks. The primary recipient of on-base drainage is Magpie Creek, which

includes several creeks within the area watersheds. These creeks recieve contaminants and toxic hazards.

(to p 1-5)

(cont) → from on base drainage and then in turn

enters McClellan AFB from the east, merges with several tributaries, and exits to the west.

The soil and groundwater contamination currently existing at McClellan AFB is primarily the result of chemical releases from:

- Land disposal facilities. Disposal occurred via burial of hazardous substances in unlined pits primarily along the western edge of the base. This practice has been discontinued, and wastes are now disposed of at an approved California Class I facility or discharged to the on-base Industrial Wastewater Treatment Plant (IWTP).

- Spills and discharges. In the course of various industrial activities, accidental discharges of hazardous substances onto the ground have occurred.

- Leaks. Leakage from sumps, underground storage tanks, the Industrial Wastewater Line (IWL), and disposal ponds have occurred.

To date, McClellan AFB has identified 170 waste sites and potential release locations (PRLs) that warrant investigation. Five sites and PRLs have been shown to require no further action; these sites and PRLs, identified in Appendix A2, occur within 8 preliminary groundwater operable units (OUs) that have been designated for the purpose of managing subsequent investigations and appropriate response actions. These OUs are shown in Figure 1-2. The Operable Unit designation has now replaced the earlier "Area" designation when referring to specific portions of the base.

A more detailed discussion of the environmental conditions of McClellan AFB, equivalent to a Conceptual Site Model for McClellan AFB, can be found in Sections 2.0 and 3.0 of the Preliminary Groundwater Operable Unit Remedial Investigation Sampling and Analysis Plan (Radian, 1989).

1.2 Parties to the Interagency Agreement

The parties to the IAG are the U.S. EPA, the Air Force, and the State of California. The terms of the IAG apply to and are binding upon all three parties.

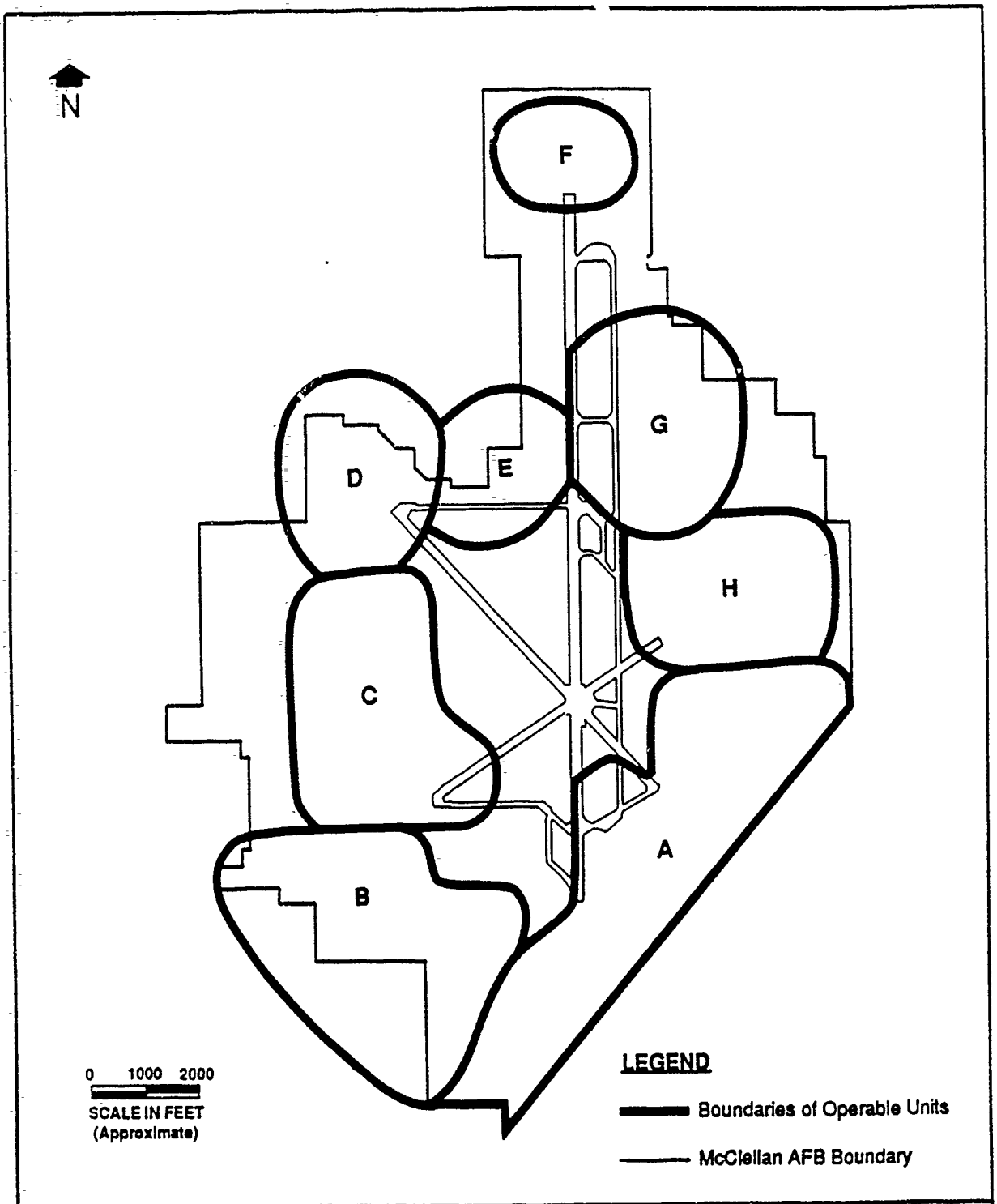

Figure 1-2. Approximate Boundaries of Operable Units at McClellan AFB.

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McClellan AFB is a facility under the jurisdiction, custody, and control of the Department of Defense, the lead agency in this action. The Department of the Air Force is authorized to act in behalf of the Secretary of Defense for all functions that are relevant to the IAG and subject to the Defense Environmental Restoration Program (DERP).

The U.S. EPA is responsible for evaluating the McClellan AFB Response Action Program to ensure compliance with CERCLA as amended by SARA. This law defines the process by which federal facilities, such as McClellan AFB, are to undertake remedial actions and provides for selection of remedies by the Air Force after consultation with the U.S. EPA and the State of California. However, specific response actions at McClellan AFB will be conducted according to the terms of the IAG.

The DHS is the designated state agency, in accordance with California Government Code section 12018 and Health and Safety Code section 25159.7, responsible for the federal programs to be carried out under the IAG and the lead agency for the State of California. As the lead state agency, DHS is involved in the initiation, development, selection, and enforcement of remedial actions to be undertaken at McClellan AFB, including the review of all applicable program activities and the development of studies, reports, and action plans.

Cooperation among all three parties is a key element in meeting the primary goals of the IAG. It is also important that all parties recognize public concerns in decision making; therefore, the public will be kept informed of all activities of the response action program by procedures outlined in the McClellan AFB Community Relations Plan (Radian, 1989). Proactive involvement by all concerned parties in the initial planning of investigations and through the eventual cleanup process will be a key to the efficient implementation of this program.

2.0 OVERVIEW OF THE McCLELLAN AFB RESPONSE ACTION PROGRAM

This section presents an overview of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process for the investigation and remediation of hazardous waste sites. It also summarizes the strategies to be applied by McClellan Air Force Base (AFB) in the implementation of the CERCLA process. The actual implementation steps are discussed in more detail in Appendix A1 of this report. Additionally, the objectives, detailed strategies, methods, and current status of the process are described in Section 3.0.

2.1 CERCLA Process

The three main phases of the CERCLA process are identification, investigation, and cleanup. These three main phases, as well as details of each phase, are shown on Figure 2-1. McClellan AFB continues to explore methods to expedite the CERCLA phases.

Identification is the first phase, and involves locating sites where past activities have led or may lead to the release of hazardous substances to the environment. After identifying locations of sites, relevant information is collected and analyzed to prioritize the sites that pose a threat to human health, welfare, and/or the environment, and may require further investigation. Specific tasks to accomplish these objectives are discussed in Appendix A1, Section A1.1.

Investigation is the second phase of the CERCLA process, where sampling and analysis plans are developed and implemented, and remedial alternatives are evaluated. As shown in Figure 2-1, there are seven steps to this phase. These steps involve:

- RI/FS scoping and planning for field investigations;
- Gathering data to determine the areal and vertical extent of contamination in a given area (site characterization);
- Conducting treatability studies to support the evaluation of cleanup alternatives;

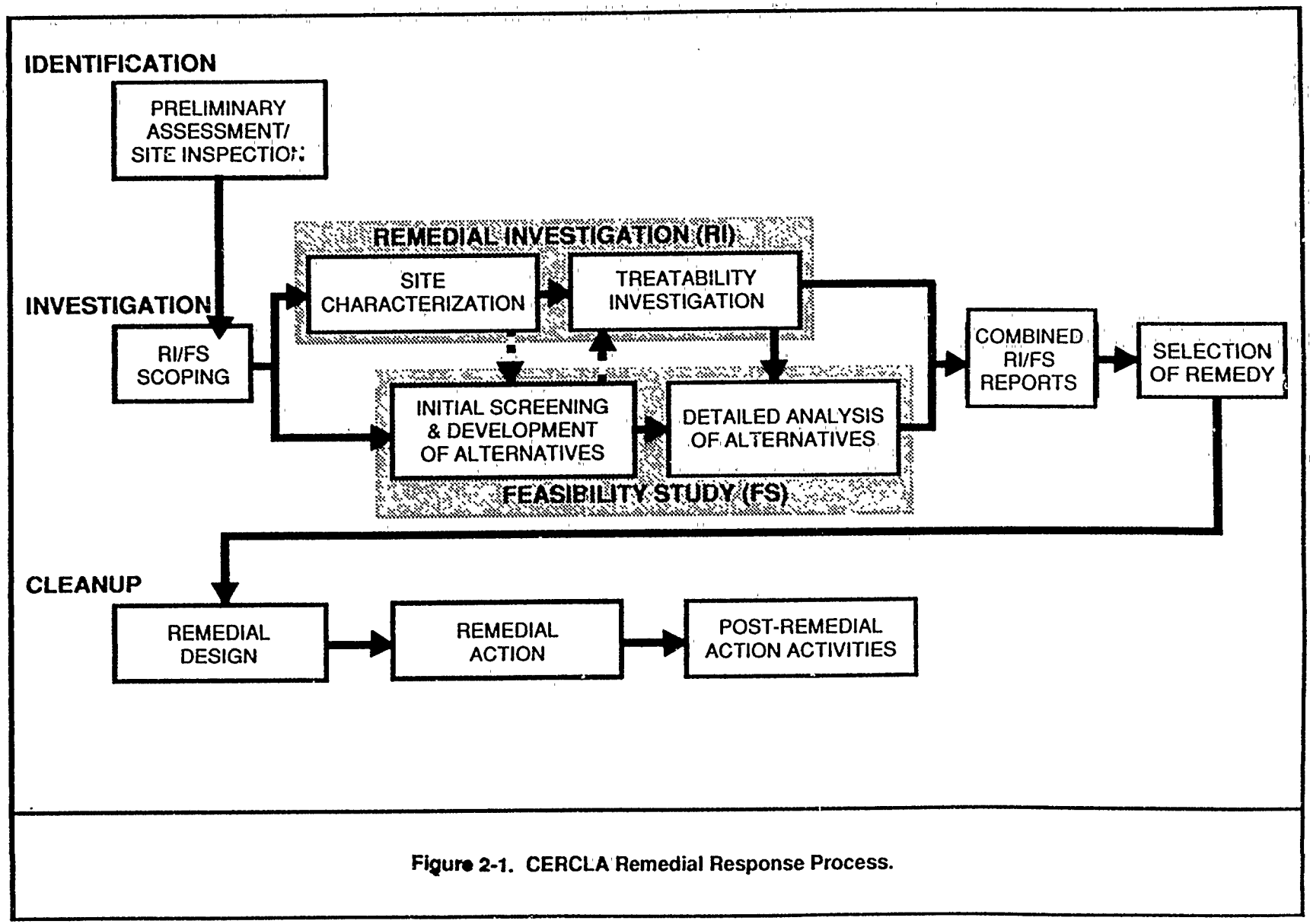


Figure 2-1. CERCLA Remedial Response Process.

- Screening and conducting detailed analyses of cleanup alternatives for the contaminated area; and

- Presenting the investigation results and the recommended cleanup remedy in a Remedial Investigation/Feasibility Study (RI/FS) report for agency and public review.

Detailed discussions about each of these steps and their relationships to one another are presented in Appendix A1, Section A1.2.

Clean up is the third phase of the CERCLA process in which the selected remedy for cleanup of a contaminated area is implemented. As shown in Figure 2-1, there are three steps in this phase involving the design and implementation of the chosen cleanup method as well as post-cleanup monitoring activities. Detailed discussions about each of these steps and their relationships to one another are presented in Appendix A1, Section A1.3.

In addition to remedial actions that would typically apply to an operable unit or a major subdivision thereof, removal actions and/or operable unit (OU) interim actions will address a limited area, volume, or zone of potentially contaminated media. Such actions would be implemented at sites where warranted. Removal actions and OU interim actions follow an abbreviated version of the remedial action process and are implemented anytime throughout the CERCLA process to stabilize a site, prevent further degradation, or achieve risk reduction. Removal actions and OU interim actions will be reevaluated as part of the Operable Unit Record of Decision (ROD). A detailed discussion of removal, OU interim actions, and remedial actions is presented in Appendix A1, Section A1.3.3.

U.S. Environmental Protection Agency policy, as presented in 40 CFR 300.415(b)(4)(ii)(B)(5) limits fund-financed removal actions to a one-year time limit and, $2 million limit. The McClellan AFB removal actions are not considered fund-financed removal actions or abatement actions ordered under 42 USC Sec. 9606 (CERCLA Sec.106). Instead, the Air Force removal actions are being conducted pursuant to the presidential authority delegated in CERCLA Section 104 and are financed under the Defense Environmental Restoration Program (DERP 10 USC Secs. 2701 et. seq.).

A key aspect of the CERCLA process is to communicate with the surrounding community and involve local citizens in the remedial and removal actions.

McClellan AFB has made public participation a high priority. They have committed resources to ensure the public is fully informed and has adequate opportunity to comment at key points in remedial and removal actions. The specific actions that are taken to meet these goals are presented in the Community Relations/Public Participation Plan (CRP), attached to this Comprehensive CERCLA Work Plan (CCW). The CRP (Radian, 1991) describes specific programs currently being implemented to explain and encourage participation in the CERCLA process. The document also traces the history of environmental events at McClellan AFB. A more comprehensive discussion of the Community Relations Program is presented in Appendix A, Section A1.2.1.

2.2 Comprehensive CERCLA Work Plan Rationale

The McClellan AFB program, described in this work plan, is the mechanism for implementing the CERCLA process at McClellan AFB. The primary long-term goal of the program is to clean up groundwater and contaminated soil. By achieving this goal, potential threats to human health, welfare, and the environment will be removed. Methods developed to achieve this goal are discussed in the following paragraphs.

Consumption of contaminated groundwater poses a potential health risk to the public. Therefore, the first priority in the McClellan AFB Response Action Program is to identify the sources of contamination and develop plans to control the off-base migration of contaminants in the groundwater flowing towards water supply wells. Complete cleanup of the groundwater cannot be achieved as long as contaminants continue to leach from on-base sources into the groundwater. Effective cleanup of the groundwater must include removal or immobilization of the contaminants present in soil and soil vapor, as well as extraction of groundwater. If contaminants in the soil column are not removed or immobilized, they will continue to slowly migrate to the groundwater, making progress in cleaning up the groundwater difficult. Contaminants volatilizing from soils into the air represent another potential exposure pathway to humans and the environment.

Groundwater extraction wells placed at the source, where the highest concentration of contaminants are normally present, are more practical and cost-effective than intercepting larger quantities of diluted contaminated groundwater at some distance away from the source. As contaminants migrate away from a source, they disperse horizontally and vertically reducing in concentration as the distance from the source increases. Extraction wells at the perimeter of groundwater contamination serve

to control further migration, not to effectively clean up the groundwater. Groundwater cleanup measures implemented far away from the source require the installation of a large number of wells and the treatment of larger quantities of groundwater with diluted contaminant concentrations, thereby requiring greater time and cost. Following this logic, it will be more effective and efficient to concentrate response actions close to or at the sources of contamination that are located within McClellan AFB.

Figure 2-2 illustrates a scenario where a source area is contributing contaminants to groundwater. In this figure, extraction wells at the source, which clean up high contaminant concentrations, are combined with extraction wells at the perimeter of contamination, which control further migration of contaminants. The use of this method to control contamination in the groundwater combined with the removal or immobilization of contaminants in the soil and soil vapor, will provide for effective mitigation of the contamination problem.

Groundwater beneath McClellan AFB flows predominantly to the south and southwest. Several areas of contaminated groundwater have been identified, principally in the western and southern portions of the base, and off base to the west and southwest. Based on the groundwater flow directions, areas of identified groundwater contamination, and locations of potential contaminant source areas, McClellan AFB has been divided into eight preliminary groundwater operable units (OUs) as shown previously (Figure 1-2). The Air Force will investigate the extent of contaminant concentrations and groundwater flow in those OUs located along the southern boundary of McClellan AFB, OUs A and B, because contaminated groundwater in this area has the greatest potential to flow off base. The size and boundaries of the groundwater OUs are preliminary and may be modified based on data obtained in Remedial Investigations.

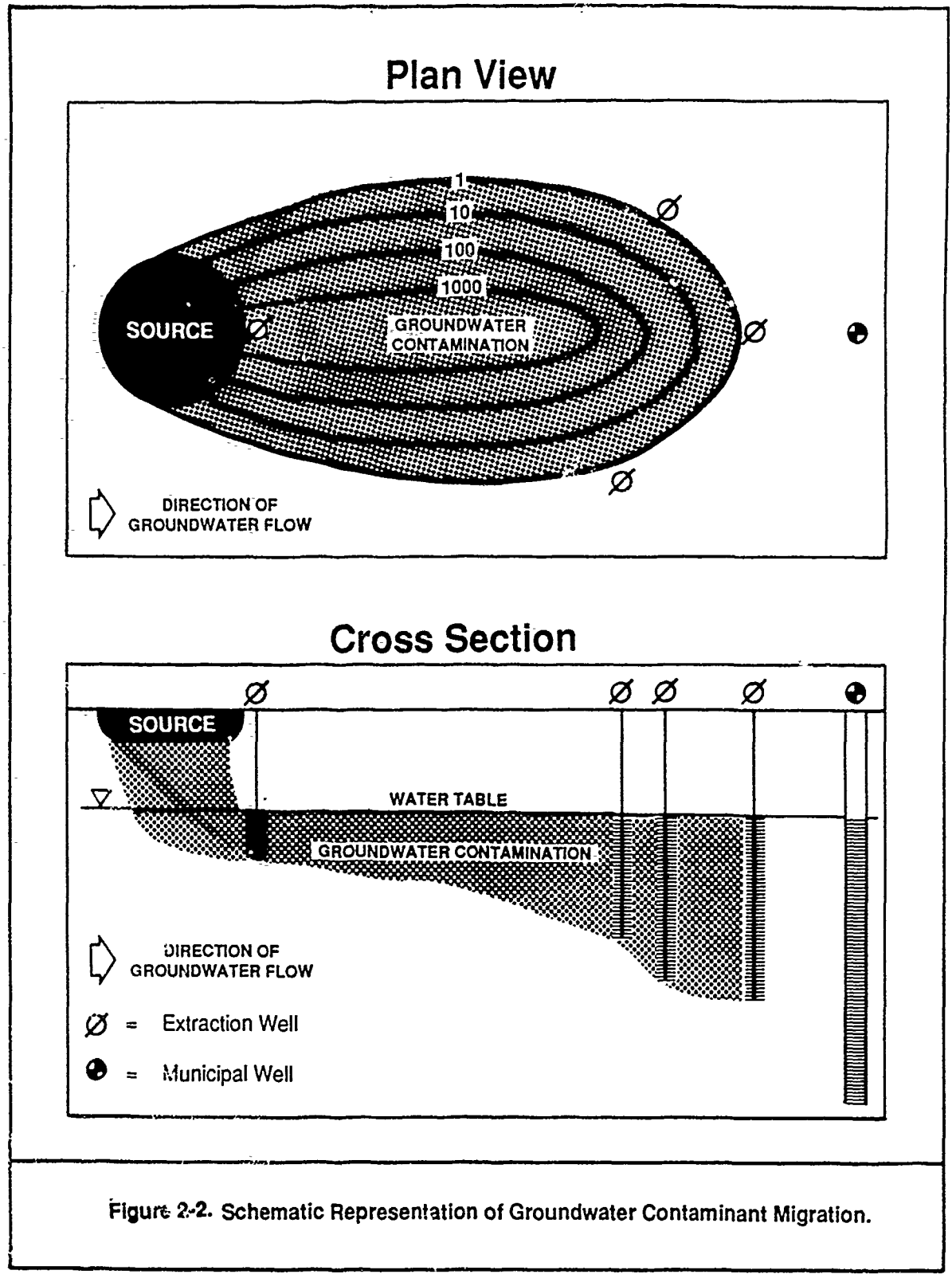


Figure 2-2. Schematic Representation of Groundwater Contaminant Migration.

3.0 RESPONSE ACTION PROGRAM

The purpose of this section is to present the status of the McClellan Air Force Base (AFB) Response Action Program and to identify the strategies and program priorities that have led to the program's current direction. The program is being undertaken by the U.S Air Force and McClellan AFB with assistance with the U.S. Environmental Protection Agency (U.S. EPA), California Department of Health Services (DHS) and other state, county, and city agencies and will be conducted in accordance with the Interagency Agreement (IAG) and applicable state and federal requirements.

The McClellan AFB program status discusses the program activities shown in the McClellan AFB IAG Schedule. The discussion includes terms and concepts developed in the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. A more detailed discussion about specific CERCLA activities and concepts is presented in Appendix A1.

Section 3.1 discusses the status of various response actions that are completed or are underway at McClellan AFB. Section 3.2 presents the McClellan AFB Response Action Program strategies and priorities. Section 3.3 briefly discusses the activities and schedule changes that have occurred since the last Comprehensive CERCLA Work Plan (CCW) (Radian, 1990) was prepared. Section 3.4 presents a general discussion about the organization and content of the McClellan AFB IAG schedule.

3.1 Response Action Program Status

This section presents the status of the various programs that have been completed or are underway at McClellan AFB. The tables showing project status will be updated annually. The tables respectively show the status of Site Characterization activities, Removal Actions, and Remedial Designs/Remedial Actions.

3.1.1 Site Characterization

The purpose and status of Site Characterization Investigation are shown in Table 3-1. Two activities, the Operable Unit B Groundwater Operable Unit Remedial Investigation and the Preliminary Surface Water Pathway Assessment, are complete. The Groundwater Sampling and Analysis Program will continue for an extended period. The remaining four programs are in various stages of completion.

3.1.2 Removal Actions

Table 3-2 reviews the purpose and status of the Removal Actions at McClellan AFB. Three actions are complete (Building 666 Demolition, the Area C Extraction System, and the Mercury Decontamination outside Building 252) and two are being planned and/or implemented (OU B EE/CA and Well Abandonment). For actions involving groundwater extraction, such as the Area C system, an operation and maintenance (O&M) period over many years is typical. Extended O&M activities are currently underway with the Area C Extraction System and will start in early 1991 following implementation of the OU B EE/CA action.

3.1.3 Remedial Designs and Remedial Actions

The three Remedial Designs and Remedial Actions (RDs/RAs) implemented on McClellan AFB are listed in Table 3-3. These Operable Unit D cleanups were conducted under the Department of Defense Installation Restoration Program (IRP). These actions, taken prior to the Superfund Amendments and Reauthorization Act (SARA) of 1986 will be documented in the McClellan AFB Response Action Program. Data collected under the IRP will be evaluated and utilized as appropriate in current and future activities.

3.2 Response Action Program Strategies and Priorities

The primary Response Action Program strategy at McClellan AFB is to implement the various CERCLA processes and ultimately remove the base from the National Priorities List (NPL). McClellan AFB is a complex CERCLA site and requires that U.S. EPA regulations and guidance be applied in an innovative manner to reach the NPL delisting goal. McClellan AFB and the regulatory agencies have worked and will continue to work together to develop and implement substrategies consistent with the primary strategy.

The CERCLA processes being implemented at McClellan AFB are Remedial Actions and Removal Actions. In addition, certain basewide and planning activities have been added to these processes to support the primary strategy. The following subsections describe the main components of the actions and activities. For this discussion, the CERCLA process has been simplified, so strategies and priorities can be emphasized.

TABLE 3-1. CURRENT SITE CHARACTERIZATION INVESTIGATIONS

Investigation[a]	Purpose	Status
Groundwater Sampling and Analysis Program	• Characterize and monitor the magnitude and extent of groundwater contamination. • Evaluate the effectiveness of response actions implemented for control and cleanup of contaminated groundwater (Areas C and D extraction systems). • Determine trends in contaminant migration. • Collect and analyze groundwater samples from monitoring wells located on and off base, and evaluate and interpret the analytical results. Monitoring and extraction wells are sampled on a quarterly, semiannual, annual or biennial basis. • Collect data to help establish the priority to further investigate the contaminant concentrations and groundwater flow for operable units located along the southern boundary of McClellan AFB, since contaminated groundwater in this area has the greatest potential to flow off base toward nearby municipal and residential water supply wells.	• Ongoing. • Data from each quarterly sampling activity are presented in quarterly Data Summary reports. Data gathered during the four quarters of the year receive a detailed evaluation and interpretation in the Annual Technical Report.
Preliminary Groundwater Operable Unit Investigation (PGOURI)	• Provide basewide data on groundwater flow and contaminant concentrations by installing additional groundwater monitoring wells. • Refine preliminary groundwater operable units.	• Sampling and Analysis Plan prepared following an evaluation of relevant hydrogeological data prepared by other contractors. • Field work completed October 1990. • Report being prepared.

(Continued)

TABLE 3-1. (Continued)

Investigation[a]	Purpose	Status
Operable Unit B Groundwater Operable unit Remedial Investigations (ABGOURI)	• Determine if any threat of contamination to active municipal water supply wells exist in the operable units defined by Area B and the area southwest of Area B (off base). • Identify hydrogeologic zones that are most appropriate for future monitoring of groundwater and contaminant migration.	• Conducted in April 1989. • ABGOURI report complete. • Based on review of the data collected during investigation, the Area B Engineering Evaluation/Cost Analysis was implemented.
Operable Unit B Engineering Evaluation/ Cost Analysis	• Further characterize contaminant concentrations and aquifer characteristics by installation of 15 groundwater monitoring wells and aquifer testing. • Identify and evaluate response alternatives to address groundwater contamination in Operable Unit B.	• Field work began in September 1989. • Document preparation began in December 1989. • Document submitted to agencies October 1990.
Operable Unit B Remedial Investigation (RI)	• Identify, characterize, and prioritize contaminant sources within Operable Unit B.	• Sampling and Analysis Plan is being prepared following completion of the Soil Gas Survey Preliminary Assessment for Operable Unit B. • Field work to begin on Operable Unit B in Spring 1991.

(Continued)

TABLE 3-1. (Continued)

Investigation[a]	Purpose	Status
Preliminary Surface Water Pathway Assessment	• Determine the potential for migration of hazardous constituents via surface water.	• Sampling and Analysis Plan prepared. • Field work completed. • Report completed in Fall 1989. • Data potentially used to refine Operable Units, ERAs, Remedial Actions, or No Further Actions, as appropriate.
Operable Unit D Soil Gas Testing	• Define the nature and extent of soil gas contamination in Operable Unit D. • Validate various soil gas sampling methods. • Determine temporal relationships between ambient soil gas contaminant concentrations and soil gas extraction well concentrations.	• Sampling and Analysis Plan has been prepared. • Field activities will begin in late 1990.

[a]The Preliminary Groundwater Operable Unit Investigation and Remedial Investigations are described in more detail in the text.

TABLE 3-2. ~~EXPEDITED RESPONSE~~ REMOVAL ACTION STATUS

Action	Purpose	Status
Building 666 Demolition and Removal (Completed, Final Response Action)	• Former electroplating and hazardous waste storage structure that was contaminated beyond economical rehabilitation. • Dismantle and remove building. • Cap sumps.	• Final action complete for structure. • Remediation of remaining contamination and removal of foundation and sumps will be completed in future ERA or in the OU B RD/RA process.
Area C Extraction System	• Remove and treat contaminated groundwater in Area C.	• System complete and operating. Extracted groundwater treated and released from Groundwater Treatment Plant.
Mercury Decontamination Outside Building 252 (Emergency Removal)	• Clean up mercury contamination between Buildings 251 and 252.	• Final emergency action comp. • Area will be investigated further in the OU A RI/FS.
Operable Unit B Engineering Evaluation/Cost Analysis (EE/CA)	• Prevent off-base migration of 100+ ppb contaminant concentration groundwater. • Protect Base Well 18 from higher contaminant concentration groundwater. • Monitor off-base groundwater.	• Initial groundwater extraction/ treatment system under construction. • EE/CA report under public review. • Second groundwater/extraction system will be implemented in 1991.

(Continued)

TABLE 3-2. (Continued)

Action	Purpose	Status
Base and City Production Well and Monitoring Well Abandonment	• Eliminate potential for contaminant migration between aquifers.	• Well Closure Methods and Procedures Report will be produced in 1990.
	• Eliminate monitoring wells where the groundwater level has dropped below the monitoring zone.	• Production and monitoring wells will be abandoned in late 1990 and 1991.
Soils Holding Area	• Manage soils and debris pending future treatment and/or disposal.	• Currently in operation.

TABLE 3-3. REMEDIAL DESIGN AND REMEDIAL ACTION STATUS

Action	Purpose	Status
Operable Unit D (OU D) Groundwater Extraction and Treatment System (Remedial-Type Action)	• Limit infiltration of precipitation by installing low permeability cap. • Extract contaminated groundwater from six wells. • Treat and discharge groundwater.	• Remedial design and implementation completed. • Extraction wells and treatment facility (GWTP) are operating. • Operations and maintenance plans have been prepared and are being implemented. • Decision Document for extraction wells and treatment system is being prepared and will be completed in 1992. • Decision Document for the cap will be prepared in the future.
Off-Base Residential Alternate Water Supply (Remedial-Type Action)	• Hook up 548 residences west of McClellan AFB to municipal drinking water supply. • Provide bottled water until hookups were made to municipal supply. • Monitor private wells until hookups were made to municipal supply. • Continue to sample off-base monitoring wells. • Resume sampling off-base private wells if contaminant levels outside the remedial action area exceed state or federal action levels.	• Remedial design and implementation complete. • Hook up of 548 residences complete. • Sampling monitoring wells continues. • Decision Document or ROD for the residential connectons to municipal supply is being prepared and will be completed in 1992.

(Continued)

TABLE 3-3. (Continued)

Action	Purpose	Status
Repair of Industrial Wastewater Line (Remedial-Type Action)	• Determine integrity of the pipeline. • Prevent further leakage of chemicals from the pipeline.	• Remedial design and implementation complete. • Minor cracks and holes sealed with grout. • Sections lined with cure-in-place grout that could not be patched. • No Decision Document is planned.

The CERCLA process is typically conducted at a single site where wastes are known to have been released to soil or groundwater. At McClellan AFB, 170 confirmed sites (known to be contaminated) and Potential Release Locations (PRLs) (where contamination is suspected to exist, but not confirmed) have been identified. Five sites and PRLs have been eliminated as requiring no further action. McClellan AFB has developed substrategies to efficiently implement the CERCLA process on a large number of sites. As an efficient management strategy, investigation activities will be performed on groups of sites within an Operable Unit. In addition, a number of basewide and scoping activities have been performed, such as the Groundwater Sampling and Analysis Program, the Preliminary Groundwater Operable Unit Remedial Investigation, the Community Relations Plan, and the CCW.

The McClellan AFB Response Action Program plans to abate any immediate public health and/or environmental threat. Flexibility to reassess priorities and respond quickly to conditions that pose risks to the public health or environment will allow McClellan AFB to conduct cost-effective programs that protect human health and the environment. A major goal is to efficiently characterize the nature and extent of contamination, assess the impacts to public health and the environment, and to select and implement the appropriate cleanup actions.

3.2.1 Remedial Actions

The McClellan AFB Remedial Response Program focuses on implementing remedial action activities. The sequence of major activities that will lead to remedial actions during the McClellan AFB program include:

- Preliminary Assessment/Site Inspection (PA/SI);
- Remedial Investigation Sampling and Analysis Plan (RI SAP);
- Remedial Investigation Sampling and Analysis field program;
- Remedial Investigation/Feasibility Study Report and Proposed Plan;
- Record of Decision (ROD); and
- Remedial Design/Remedial Action.

To simplify this discussion, the remedial action activities have been been grouped into the following categories:

- Identification;
- Investigation; and
- Implementation of Remedial Alternatives.

Identification

The need for remedial actions is generally identified initially through the PA/SI activity, which results in identification of known locations of contamination and potential locations where releases may have occurred. Substrategies used during the PA/SI activity include:

- Perform PA/SIs for each Operable Unit (OU) in order of the established OU priority; and
- Inspect current operating facilities that may have previously utilized hazardous materials for evidence of contaminant release to the environment where evident;
- Inspect facilities no longer in operation that previously utilized hazardous materials or show evidence of previous hazardous materials use;
- Group all known and new PRLs and sites initially within preliminary OU boundaries;
- Evaluate all existing and and newly discovered PRLs and sites that are identified within each operable unit; and
- Expedite assessment of newly identified PRLs for high priority OUs to allow for a remedial investigation using an integrated soil and groundwater sampling approach.

Preliminary Assessments/Site Inspections of PRLs and sites have been or will be conducted within the boundaries of each OU. Operable Units located along the southern boundary of McClellan AFB are being investigated first to identify areas of contaminated groundwater that could migrate off base and the sources of the contaminants detected in the groundwater. Groundwater Operable Unit B is scheduled for investigation first, followed by Groundwater Operable Unit A. This approach is consistent with the established OU priority because they lie along the southern boundary of McClellan AFB where the regional groundwater flow direction is generally southward. Preliminary Assessments/Site Inspections for any new PRLs identified for these operable units will be prepared to allow timely integration of the available information into the

planning process and will lead to more detailed remedial investigations (RIs). The PA/SI data will be collected and compiled into Summary Reports and will assist in the evaluation of other Operable Units.

As shown in the IAG schedule in Section 3.4, the Operable Unit Summary Report(s) are documents that have been identified and scheduled for each of the OUs.

Investigation

Site characterization is an activity conducted during the investigation phase in which detailed, site-specific remedial investigations are implemented for the purposes of defining sources of contaminants, determining the nature and extent of contamination, assessing the potential threat to human health, welfare, or the environment, and providing data for developing cleanup remedies. This activity involves the preparation of RI SAPs and conducting RI field efforts. Integral to the RI is the development of conceptual site models to provide an understanding of the sources of contamination, migration pathways of contaminants, and potential receptors. Development of the preliminary models will assist in identifying sampling locations, and refinement of the models will assist in identifying potential remedial technologies. Preliminary conceptual models will utilize the information provided by PA/SI activities. The IAG submittal dates for the OU RI SAPs and OU ROD Decision Documents are all shown in Table 3-4.

Substrategies and priorities developed for site characterization activities include:

- Planning and conducting Operable Unit RIs;
- Expediting additional detailed investigations of operable units in high priority areas; and
- Shortening the overall schedule duration by combining reports.

To facilitate planning and implementation of the McClellan AFB Remedial Response Program, McClellan AFB has been tentatively divided into eight OUs. These operable units, shown in Figure 1-2, were originally defined in 1989 by an assessment of groundwater contamination, groundwater flow directions, and a review of likely sources of the contamination. The operable unit boundaries are subject to change and are currently being reevaluated during the Preliminary Groundwater Operable Unit

TABLE 3-4. McCLELLAN AFB IAG DELIVERABLE SCHEDULE FOR DRAFT DOCUMENTS OF THE OPERABLE UNIT REMEDIAL INVESTIGATION SAMPLING AND ANALYSIS PLAN, THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY, PROPOSED PLAN, AND THE OPERABLE UNIT RECORD OF DECISION

Operable Unit RI SAP RI/FS and Proposed Plan		Operable Unit Record of Decision	
Document Title	Deadline	Document Title	Deadline
Operable Unit B		**Operable Unit B**	
OU B RI SAP	05 MAR 91	OU B Record of Decision	03 MAY 94
OU B RI/FS Report and Proposed Plan	29 JUN 93	**Operable Unit A**	
		OU A Record of Decision	11 FEB 97
Operable Unit A			
OU A RI SAP	14 MAY 92	**Operable Unit C**	11 FEB 97
OU A RI/FS	09 APR 96	OU C Record of Decision	
Operable Unit C		**Operable Unit D**	
OU C RI SAP	08 NOV 93		
OU C RI/FS	02 APR 98	OU D Record of Decision	22 JUL 99
Operable Unit D		**Operable Units E, F, G, & H**	
OU D RI SAP	25 JAN 95	OUs E, F, G, & H Record of Decision	22 NOV 00
OU D RI/FS	18 SEP 98		
Operable Units E, F, G, & H			
OUs E, F, G, & H RI SAP	17 APR 96		
OUs E, F, G, & H RI/FS	12 JAN 00		

OU = Operable Unit
RI = Remedial Investigation
SAP = Sampling and Analysis Plan
RI/FS = Remedial Investigation/Feasibility Study

Remedial Investigation (PGOURI) effort. Factors affecting operable unit boundaries include contaminant sources, groundwater plumes, and volatilization of contaminants.

A two-pronged approach has been developed to implement the RI program on an operable unit basis. This approach first determines if contaminated groundwater is migrating off base and will identify actions to slow or halt contaminant movement off base. The RI will then characterize the nature and extent of contamination in all environmental media (soil, soil gas, air, surface water, and groundwater). These efforts have been scheduled so that contaminated groundwater, which potentially poses the greatest contamination exposure potential to the public, is evaluated early in the program. The contaminant source investigations are being performed concurrently or shortly after the contaminated groundwater investigations. The early detection of groundwater contaminant migration can allow timely remediation to protect off-base groundwater and water supply sources while continuing to investigate the more concentrated contaminant sources. These remedial investigations provide the data necessary for selecting long-term cleanup remedies.

It is important to characterize groundwater contamination first in areas where groundwater contamination has been previously identified, where base and public drinking water supply wells are located, and where groundwater contamination may be migrating to off-base areas. The first priority in the groundwater investigation is to evaluate the extent of groundwater contamination and flow directions along the southern boundary in OUs B and A. It is in these areas where contaminated groundwater has the greatest potential to flow off base.

The site characterization of contaminant sources is initially being performed within each preliminary groundwater OU in the order of OU priority. The results from the PGOURI will better define OU areas on which to focus the OU RI efforts. It may be necessary to establish contaminant source OUs that are distinct from groundwater OUs if contaminant data support such a differentiation. As activities on the OUs progress through the McClellan AFB Remedial Response Program, areas requiring a quicker response will be identified. When warranted, the necessary documentation to support an expedited response will be prepared, the agencies and the public will be informed of McClellan AFB's intent and the action will be initiated.

Remedial Investigations will evaluate both contaminant sources and the impacts they have had on the environment. Site characterization will be planned for each OU, beginning with OU B, and described in detail in the RI SAP. The site

investigation at each potential release location will be performed in phases. The scope of work for multi-phase investigations will be developed in RI SAPs prepared for each operable unit. Operable Unit B will be the first area subjected to phased investigations. Integral to the development of RI SAPs will be the selection of data quality objectives that specify the quality of the data required to support decisions during remedial response activities as provided in the U.S. EPA guidance document, *Data Quality Objectives for Remedial Response Activities*, (March, 1987). In a three-phase approach to conduct an RI for each site in an Operable Unit, separate objectives are required for each phase. The objectives for each subsequent RI phase will build upon the results of the previous RI phases. Because the level of detail and data quality needed will vary with the decision to be made with the data, data quality objectives will be established to meet the requirements of the decisions. The general objectives and uses of data for each phase are listed in Table 3-5. The five analytical levels and uses of the data for each level is presented in Table 3-6. Levels 1 through 3 will be used in the Phase 1 investigation; levels 4 and 5 will be used in subsequent phases. The first phase of the RI is a screening phase to determine if contaminants are present in soils, to locate the probable sources of contaminants and if present, to determine if contaminants have migrated to groundwater.

A soil gas investigation will be implemented first in the Phase I investigation to target areas for the collection of soil, soil gas, and groundwater samples during later Phase I activities. A detailed description of soil gas sampling and analysis methods will be documented in the respective RI SAPs for each OU.

Phase II investigations will be conducted after the Phase I effort is completed and represents the principal data collection phase of the RI. If the evaluation of the Phase I data indicates that contaminants are present, a complete characterization of the nature and extent of contamination will be conducted. The full site characterization will include data from past investigations, and will be performed in conformance with CERCLA guidance. The investigation will use an integrated approach, including characterization of contaminants in soil, surface water, groundwater, and soil vapor. This phase will implement a decision making protocol to assist in developing sampling and analysis efforts. Decisions made in the Phase II will be based on the adequacy of the data to determine health risk assessment and the need for remediation. During this phase, appropriate removal actions may also be initiated.

TABLE 3-5. QUALITY OBJECTIVES AND USES OF DATA FOR REMEDIAL INVESTIGATION PHASES

Phase	Quality Objectives	Data Uses
1 - Contaminant Source Identification	Identify sources of soil and groundwater contamination at suspected sites and confirm that no sources are present at sites without contamination. Collect levels 1, 2, and 3 analytical data to detect contaminant concentrations in soil, soil gas, surface water, and groundwater. Collect lithologic and physical parameter data to evaluate contaminant migration pathways and define the conceptual model.	Site characterization. Identification of sources.
2 - Site Characterization	Determine the magnitude and extent of contamination at identified sites with known sources of contamination. Collect levels 3, 4, and 5 analytical data to define the extent of contaminants in soil, soil gas, and groundwater resulting from sources identified in Phase I and to begin health risk assessment. Collect lithologic and physical parameter data required for conceptual model definition and evaluation of remedial alternatives.	Site characterization. Evaluation of alternatives. Engineering design. Health risk assessment.
3 - Remedial Alternative Evaluation	Identify remedial action alternatives and gather data to aid in evaluation of alternatives and selection of remedial action. Collect levels 3, 4, and 5 analytical data from soil, soil gas, and groundwater during the course of treatability studies to evaluate health risk reduction and cleanup levels.	Evaluation of alternatives. Engineering design. Determination of cleanup levels. Feasibility Study.

TABLE 3-6. SUMMARY OF ANALYTICAL LEVELS

Analytical Level	Description	Data Uses
Level 1	Field screening or analyses using portable instruments. Results are often not compound specific and not quantitative, but results are available in real-time.	Health and safety monitoring. Site characterization.
Level 2	Field analyses using more sophisticated portable analytical instruments, generally in a mobil laboratory on site. Data generated are semi-quantitative to quantitative and may be compound specific.	Site characterization. Evaluation of alternatives. Engineering design.
Level 3	Analyses typically performed in an off-site laboratory. Analyses generally use CLP-type procedures, but do not include the same level of validation or documentation procedures required for CLP Level 4 analysis.	Site characterization. Evaluation of alternatives. Engineering design. Health risk assessment.
Level 4	All analyses are performed in an off-site CLP analytical laboratory following CLP protocols. Level 4 is characterized by rigorous QA/QC protocols and documentation. It is typically used for confirmation of lower level data, and to obtain highly documented data.	Health risk assessment. Evaluation of alternatives. Engineering design.
Level 5	Analyses are generally non-standard methods. All analyses are performed in an off-site laboratory which may or may not be a CLP laboratory. Method development or method modification may be required for specific constituents or detection limits.	Health risk assessment

CLP = Contract Laboratory Protocol
QA/QC = Quality Assurance/Quality Control

Concurrent with Phase I and Phase II activities, Phase III investigations will be conducted in the RI to allow evaluation of remedial alternatives in the Feasibility Study. If data from Phase II indicate that remediation is required at a site to meet health risk or environmental objectives, further data will be collected and become the basis for selection and design of cleanup alternatives. Sampling of soils, groundwater, and soil gas for treatability studies may also be conducted. Aquifer testing will be conducted to obtain groundwater data needed to evaluate and select remedial alternatives. None of these investigations have been identified to date for specific sites within any operable unit. However, a soil treatability study has been identified to assist in the development of treatment methods for contaminated soil that may be found during the RIs that may be applicable to soils in any OU.

Implementation of Remedial Alternatives

This activity results in the evaluation and selection of cleanup remedies. It follows and utilizes information provided by the identification and investigation efforts. The remedy selection activity would result in preparation of several IAG documents including:

- Remedial Investigations/Feasibility Study (RI/FS);
- Proposed Plan;
- Record of Decision (ROD); and
- Remedial Design/Remedial Action.

The remedy selection substrategies for an OU will include:

- Preparing combined RI/FS Reports for individual operable units;
- Selecting remedies for PRLs or groups of PRLs within operable units; and
- Providing active regulatory agency involvement during the remedy selection activity.

As shown in the IAG schedule, an RI/FS Report will be prepared for each of the OUs. The RI/FS Report and subsequent remedy selection activities will be completed for operable units in the order of their priority to ensure that operable units that pose the greatest threats to public health and welfare are evaluated first. The

highest priority OUs include those that potentially pose the greatest exposure to the public. The reports will be prepared to document the RI/FS evaluation and will include results from treatability studies, if completed at that time. The IAG schedule shows the RI/FS report and Proposed Plan will be submitted concurrently.

As shown in the IAG schedule, an ROD will be prepared for each of the Operable Uni . After completion of the RI/FS Report and the Proposed Plan, a public comment period is conducted. The public comments received will then be assessed before the Proposed Plan is finalized as an ROD. IAG submittal dates for both the OU RI/FS reports and the OU RODs are shown in Table 3-4.

The selected remedy is then implemented. Substrategies developed for the remedial design and post-remedial action activities for both remedial actions and removal and OU interim actions include:

- Preparing a comprehensive work plan for the remedial design and remedial action phases early in the remedial design process;
- Completing the remedial design and ensure continuity in the remedial action phase by providing design reviews during construction;
- Implementing the remedial action, as appropriate, on an operable unit basis;
- Operating and maintaining the remedial technology for the duration of the remedial action;
- Performing post-remedial action activities first for completed removal actions and OU interim actions; and
- Performing post-remedial action activities as required for future removals, OU interim actions, and remedial actions.

Removal actions and interim actions can be identified at any time during the CERCLA process.

3.2.2 Removal Actions and Operable Unit Interim Actions

The selection and implementation of removal actions and OU interim actions follow an abbreviated version of the remedial action process and are implemented before the entire RI/FS activity and the remedial design and remedial action are completed. These actions are performed to stabilize a site, prevent further degredation or achieve risk reduction caused by contamination in situations that pose an imminent threat to the public or to the environment. Removal or OU interim actions can be identified and implemented any time during the CERCLA process when a threat to health or the environment is identified. McClellan AFB has conducted several removal and OU interim actions which are listed in Table 3-2.

An Engineering Evaluation/Cost Analysis (EE/CA) Report and the associated Action Memorandum will be prepared to document the decision making process that was followed to select the preferred remedy for a non-time critical removal action. If an EE/CA action was implemented in an OU before completion of the OU RI/FS, it will be reevaluated and incorporated, if appropriate, in the remedial action recommendation. Otherwise, the action will be reevaluated during periodic reviews of removal and remedial actions. The removal actions will be reviewed in the RI/FS to determine if it will be part of the final remedy.

When more immediate actions are necessary, time-critical removal actions will be implemented to protect human health and the environment. An EE/CA is not required documentation for a time-critical removal action. Time-critical response actions are reevaluated periodically as are the nontime-critical actions.

Between the remedial and removal actions is the OU interim action. An OU interim action would be implemented rather than a removal action when a more comprehensive action with a longer planning period is required. An OU interim action would provide a quicker cleanup than is available in the final remedial action. An OU interim action may be taken to abate, prevent, minimizing, stabilize, mitigate or eliminate the release or threat of release. The use of OU interim actions will allow for early actions or actions to be implemented in phases. An OU interim action also could focus on a specific medium within an Operable Unit, for example.

The OU interim action would address a larger area such as the groundwater in an entire operable unit. An OU interim action would approach the breadth and complexity of a full remedial action, but could be identified and

implemented more quickly. The OU interim remedial action would be selected in an interim Record of Decision.

McClellan AFB has recently (December 1990) completed a time-critical removal action. This action cleaned up mercury contamination outside the area between two buildings (251 and 250) in OU A.

Currently, one OU interim action, the OU B EE/CA is identified in the IAG schedule. This action consists of groundwater extraction, treatment, and discharge of treated waters. It is being implemented due to the current and potential future impacts that could result from the presence of contaminated groundwater in the vicinity of on-base and off-base public water supply wells. The activities and deadlines shown in the IAG schedule for this OU interim action include preparation of the EE/CA report and Action Memorandum.

The selected OU B EE/CA is considered to be protective of public health and the environment and will be consistent with any long-term remedies. When appropriate, the priorities for conducting removal actions and OU interim actions will be evaluated and incorporated into the priorities for remedial activities. For example, the OU B EE/CA has focused on minimizing the impacts from contaminated groundwater to on-base and off-base public drinking water supply wells. This selected remedy will be reassessed during the OU B RI/FS and possibly during the basewide RI/FS.

3.2.3 Other Response Actions

In addition to the remedial actions and removal actions, and OU interim actions, there are other activities that fall in the general category of remedial response actions. Various activities in this category are described below.

Treatability Studies

A technology assessment of soil treatability methods will be conducted during the Operable Unit B RI field sample collection effort to provide information that will be usable in all OUs. Other treatability studies that will be performed under the McClellan AFB program will document remedial technology developments that occur during the progress of the RI program to avoid unnecessary costs, duplication of other's treatability work, and delays in implementation. These studies will emphasize the use of

technologies that are available or can be designed to operate in a modular or mobile fashion.

No Further Action Sites

A determination for No Further Action (NFA) can be made for a PRL after sufficient data is available to show that no public health or environmental impacts arise from the site conditions. The NFA recommendation is submitted for review and concurrence by the regulatory agencies. Target dates for the preparation and submittal of NFAs have not been identified in the IAG schedule.

CERCLA Soil and Debris Management Plan

The McClellan AFB Remedial Response Program will generate increasing volumes of contaminated soils and debris as the work progresses through characterization, expedited response actions (removals and interim remedial actions), and final remedial actions. Until soil and debris treatment options are addressed and treatment/disposal programs implemented, environmentally sound management is critical to the program. McClellan AFB is initiating a program to evaluate soils and debris management options and to track wastes from initial identification/ characterization through final disposal. This program will begin early in 1991.

3.2.4 Basewide and Scoping Activities

Basewide activities performed at McClellan AFB consist of a variety of field investigations and recurring annual activities. The field investigation efforts include PGOURI and the Groundwater Sampling and Analysis Program (GSAP). Both these activities have characterized the groundwater flow and extent of groundwater contamination beneath McClellan AFB and adjacent areas. The PGOURI results will be presented in the PGOURI Report. Subsequent focused groundwater investigations will be done as part of the Remedial Investigation effort conducted on individual operable units.

The Groundwater Sampling and Analysis Program will continue. The results of groundwater sampling and analysis will be presented in informational reports.

Annually recurring activities include scoping and management tasks. These tasks include preparation of the following:

- Comprehensive CERCLA Work Plan Updates; and
- Community Relations Plan (CRP) Updates.

The CRP includes plans for informational open houses about the current work being performed at McClellan AFB, public review and comment periods, task forces, and notifications. Each of these documents will be updated annually in accordance with CERCLA and NCP guidelines.

The McClellan AFB program contains several activities that provide a comprehensive review process to confirm the selection of response actions that will become the long-term cleanup remedies. One activity is the use of periodic reviews for both removal and remedial actions, the other activity is the preparation of a basewide Feasibility Study Report, Proposed Plan, and ROD.

A periodic review of future removal and remedial actions is required as long as hazardous substances, pollutants, or contaminants that may pose a threat to human health or the environment remain at the site. Five-year reviews will be scheduled and performed on the remedial actions completed at McClellan AFB and for new response actions as they are implemented. The five-year review period will begin upon the acceptance of an ROD for response actions performed under the IRP. Two-year review periods will be scheduled and performed on removal actions completed and for new removal actions as they are implemented. The two-year review period will begin upon acceptance of an Action Memorandum for removal actions.

A Basewide FS Report will be prepared followed by a Proposed Plan and ROD. The FS document will consider the accumulation of all previous Operable Unit FS results and reevaluate whether previously conducted removal actions and OU actions and remedies and consistent with the final Basewide remedy. The Proposed Plan will be submitted for public comment prior to the issuance of the ROD. The ROD will document the decision making process for selecting the final remedy for McClellan AFB.

3.3 Changes to the McClellan AFB Remedial Response Program

This section presents any changes that have been made since the last update to the IAG schedule of documents or to the submittal deadlines. This update is organized into three primary activities:

- Remedial Actions;
- Removal and Operable Unit Interim Actions; and
- Basewide Activities.

3.3.1 Remedial Actions

No deletions have been made to the IAG documents for remedial action activities. Some additions have been made to the list of deliverables and to the schedule deadlines for some documents. A previous OU D document consisted of a single effort to prepare a Health Risk Assessment, FS, Proposed Plan, and ROD. The new schedule proposes that these documents be prepared separately; an OU D Groundwater Treatment Plant/Groundwater Extraction System and an Off-Base Residential Water Supply, FS and Proposed Plan; and a separate ROD document.

3.3.2 Removal and Operable Unit Interim Actions

No changes have been made to the IAG schedule for removal actions. One removal actions is currently being conducted in OU B. This consists of actions to abate the threat of contaminated groundwater from a trichloroethene/tetrachloroethene (TCE/PCE) plumes. Two additional plumes have been identified within the OU B EE/CA as potential areas for future removal actions. The IAG schedule has identified two deliverables associated with the OU B removal action. The EE/CA Report and the Action Memorandum deliverables will document the remedy selection process.

3.3.3 Basewide Actions

No changes in priorities, the list of deliverables or to the scheduled deadlines have been made to the basewide actions.

Five sites and PRLs in OU B have been eliminated from further consideration. The OU B Summary Report showed that no further actions are needed at these sites.

In recent years, especially since U.S. EPA added McClellan AFB to the National Priorities List, the usefulness and effectiveness of the Task Force has diminished. At the 26 July 1990 meeting, it was decided that the Task Force would not meet in its previous form again, but would respond to public concerns by meeting in a

more constructive form such as workshops or open houses. Congressmen Vic Fazio and Robert Matsui concurred with this change. The Community Relations Environmental Steering Committee, which meets quarterly, is the sounding board for community concerns and calls public meetings as needed. In order to ensure the public remain informed on cleanup activities, former public members of the Task Force participate in Technical Review Committee (TRC) meetings, which take place quarterly to review technical progress and plans.

3.3.4 Changes Under Discussion

Several changes in priorities, documents and scheduled deadlines have been discussed since the last revision of the CCW. These changes have not been adopted within the McClellan AFB Remedial Response Program, but are presented here as an indication of possible program strategies that may be accepted in the future. The proposed changes include:

- Implementing an interim RI/FS and an interim ROD for the groundwater contamination in OU A;
- Implementing an interim RI/FS and an interim ROD for the southern TCE/1,2-DCE plume and the PCE plume in Operable Unit B;
- Reevaluating OU boundaries in the Preliminary Groundwater Operable Unit Remedial Investigation (PGOURI); and
- Revising McClellan AFB Soils Management Program.

3.4 McClellan AFB Interagency Agreement Schedule

The IAG obligates McClellan AFB to meet the primary document deliverable dates as shown in Table 3-7. Each primary and secondary document is prepared as a draft, draft final, and final report. Responses to agency comments are addressed as appropriate in the document preparation cycle.

The current IAG deliverable schedule lists the documents to be prepared for most phases of the McClellan AFB Remedial Response Program, including the identification, investigation, and remedy selection activities. The IAG requires that

deadlines for the Remedial Design and Remedial Action Work Plans be scheduled and delivered 21 days after the issuance of the Record of Decision (ROD). Because no RODs have been prepared to date, no IAG schedule has been developed for these design or remedial action activities. However, the IAG schedule does provide estimated target dates for the submittal of remedial action designs and identifies deadlines for submitting schedules to conduct the remedial designs and remedial actions.

The McClellan AFB IAG Schedule is composed of two parts: a list of primary and secondary documents showing respective due dates and target dates for submittal of these documents, and a bar graph presentation of program activities showing their temporal relationships. The project deliverable documents are presented in Table 3-7 and will be updated annually. Figure 3-1 is a bar chart schedule for tasks that are planned or underway.

In general, the deliverables shown in the McClellan AFB IAG Schedule are either primary, secondary, or informational documents. Primary documents are major planning or decision statements resulting from RI/FS activities. Secondary documents are reports, plans, and summaries of discrete portions of RI/FS activities that support primary documents. Informational documents are identified in the IAG and will contain analytical results.

Primary documents are prepared to describe sampling activities and remedial design decisions for the McClellan AFB Remedial Response Program. Primary documents will be prepared and submitted to the U.S. EPA and the State of California Department of Health Services (DHS) and other appropriate agencies for review. In general, primary documents will include:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Workplans, including updates;
- Quality Assurance Project Plans (QAPP), including updates;
- Community Relations Plan, including updates;
- Sampling and Analysis and Treatability Investigation Plans;
- RI/FS Reports;

- Proposed Plans and Records of Decisions;
- Remedial Designs; and
- Remedial Action Work Plans.

Secondary documents include those reports prepared before the primary documents and present data and information that is later incorporated into the primary documents. These reports are also reviewed by the regulatory agencies. In general, secondary documents include:

- Sampling and Analysis Data Results;
- Site Characterization Summaries;
- Treatability Study Reports;
- Reports documenting the results of Initial and Detailed Development of Remedial Alternatives;
- Risk Assessments;
- Engineering Evaluation/Cost Analysis Report for non-time-critical removal actions;
- Action Memorandums for Removal Actions;
- Work plans for supplemental site characterization activities; and
- Well closure plans.

Additional primary and secondary documents may be proposed by the Air Force, the U.S. EPA, or the DHS at any time during the McClellan AFB Remedial Response Program.

The IAG schedule is divided into Operable Unit (OU) and Basewide activities. The sequence of Operable Unit activities presented in the schedule corresponds to the priorities established from local community needs, statutory

TABLE 3-7. McCLELLAN AFB IAG DELIVERABLE SCHEDULE

Document Title	Document Category	Document Type	Dates Deadline[a]	Dates Target
OPERABLE UNIT B				
OU B Summary Report	S	RC	--	15 AUG 90
OU B RI Sampling and Analysis Plan (SAP)	P	D	05 MAR 91	--
		DF	Per IAG Section 7 (Consultation)	05 JUL 91
		F	Per IAG Section 7 (Consultation)	06 AUG 91
OU B Remedial Investigation/ Feasibility Study Report and Proposed Plan	P	D	29 JUN 93	--
		DF	Per IAG Section 7 (Consultation)	29 OCT 93
		F	Per IAG Section 7 (Consultation)	30 NOV 93
OU B Technology Assessment/Soil Treatability Study	S	D	--	04 JUN 92
		RC	--	06 OCT 92
OU B Record of Decision	P	D	03 MAY 94	--
		DF	Per IAG Section 7 (Consultation)	02 SEP 94
		F	Per IAG Section 7 (Consultation)	04 OCT 94
OU B Remedial Design/Remedial Action (RD/RA) Schedule	--	--	23 SEP 94[d]	--
OU B Remedial Action Workplan	P	D	--	25 OCT 94[b]
		DF	Per IAG Section 7 (Consultation)	24 FEB 95
		F	Per IAG Section 7 (Consultation)	28 MAR 95
OU B Remedial Design	--	--	--	08 NOV 95[b]
Removal Actions				
OU B EE/CA Report	S	D	--	01 OCT 90
		RC	--	01 FEB 91
OU B EE/CA Action Memorandum	S	D	--	08 MAR 91

See Legend at end of table for meaning of symbols.

(Continued)

TABLE 3-7. (Continued)

Document Title	Document Category	Document Type	Dates Deadline[a]	Dates Target
OPERABLE UNIT A				
OU A Summary Report	S	D	--	11 FEB 91
		RC	--	10 JUN 91
OU A RI SAP	P	D	14 MAY 92	--
		DF	Per IAG Section 7 (Consultation)	15 SEP 92
		F	Per IAG Section 7 (Consultation)	15 OCT 92
OU A Remedial Investigation/ Feasibility Study Report and Proposed Plan	P	D	09 APR 96	--
		DF	Per IAG Section 7 (Consultation)	09 AUG 96
		F	Per IAG Section 7 (Consultation)	10 SEP 96
OU A Record of Decision	P	D	11 FEB 97	--
		DF	Per IAG Section 7 (Consultation)	13 JUN 97
		F	Per IAG Section 7 (Consultation)	15 JUL 97
OU A Remedial Design/Remedial Action (RD/RA) Schedule	--	--	04 JUL 97[d]	--
OU A Remedial Action Workplan	P	D	--	05 AUG 97[b]
		DF	Per IAG Section 7 (Consultation)	05 DEC 97
		F	Per IAG Section 7 (Consultation)	06 JAN 98
OU A Remedial Design	--	--	--	19 AUG 98[b]
OPERABLE UNIT C				
OU C Summary Report	S	D	--	29 JUL 92
		RC	--	30 NOV 92
OU C RI SAP	P	D	08 NOV 93	--
		DF	Per IAG Section 7 (Consultation)	10 MAR 94
		F	Per IAG Section 7 (Consultation)	11 APR 94

See Legend at end of table for meaning of symbols.

(Continued)

TABLE 3-7. (Continued)

Document Title	Document Category	Document Type	Dates Deadline[a]	Dates Target
OPERABLE UNIT C (Continued)				
OU C Remedial Investigation/ Feasibility Study Report and Proposed Plan	P	D	02 APR 98	--
		DF	Per IAG Section 7 (Consultation)	04 AUG 98
		F	Per IAG Section 7 (Consultation)	03 SEP 98
OU C Record of Decision	P	D	05 FEB 99	--
		DF	Per IAG Section 7 (Consultation)	24 JUN 99
		F	Per IAG Section 7 (Consultation)	26 JUL 99
OU C Remedial Design/Remedial Action (RD/RA) Schedule	--	--	15 JUL 99[d]	--
OU C Remedial Action Workplan	P	D	--	16 AUG 99[b]
		DF	Per IAG Section 7 (Consultation)	16 DEC 99
		F	Per IAG Section 7 (Consultation)	17 JAN 00
OU C Remedial Design	--	--	--	01 SEP 00[b]
OPERABLE UNIT D				
Area D Groundwater Treatment Plant/Groundwater Extraction System and Off-Base Residential Water Supply Feasibility Study Report and Proposed Plan	P	D	06 SEP 91	--
		DF	Per IAG Section 7 (Consultation)	08 JAN 92
		F	Per IAG Section 7 (Consultation)	07 FEB 92
Area D Groundwater Treatment Plant/Groundwater Extraction System and Off-Base Residential Water Supply Record of Decision	P	D	09 JUN 92	--
		DF	Per IAG Section 7 (Consultation)	09 OCT 92
		F	Per IAG Section 7 (Consultation)	10 NOV 92
OU D Summary Report	S	D	--	21 JAN 94
		RC	--	25 MAY 94
OU D RI SAP	P	D	25 JAN 95	--
		DF	Per IAG Section 7 (Consultation)	30 MAY 95
		F	Per IAG Section 7 (Consultation)	28 JUN 95

See Legend at end of table for meaning of symbols.

(Continued)

TABLE 3-7. (Continued)

Document Title	Document Category	Document Type	Dates Deadline[a]	Dates Target
OPERABLE UNIT D (Continued)				
OU D Remedial Investigation/ Feasibility Study Report and Proposed Plan	P	D	18 SEP 98	--
		DF	Per IAG Section 7 (Consultation)	20 JAN 99
		F	Per IAG Section 7 (Consultation)	19 FEB 99
OU D Record of Decision	P	D	22 JUL 99	--
		DF	Per IAG Section 7 (Consultation)	23 NOV 99
		F	Per IAG Section 7 (Consultation)	23 DEC 99
OU D Remedial Design/Remedial Action (RD/RA) Schedule	--	--	14 DEC 99[d]	--
OU D Remedial Action Workplan	P	D	--	14 JAN 00[b]
		DF	Per IAG Section 7 (Consultation)	18 MAY 00
		F	Per IAG Section 7 (Consultation)	20 JUN 00
OU D Remedial Design	--	--	--	09 FEB 01[b]
OPERABLE UNITS E, F, G, & H				
OUs E, F, G, & H Summary Report	S	D	--	26 JUL 95
		RC	--	01 DEC 95
OUs E, F, G, & H RI SAP	P	D	17 APR 96	--
		DF	Per IAG Section 7 (Consultation)	21 AUG 96
		F	Per IAG Section 7 (Consultation)	23 SEP 96
OUs E, F, G, & H Remedial Investigation/Feasibility Study Report and Proposed Plan	P	D	12 JAN 00	--
		DF	Per IAG Section 7 (Consultation)	16 MAY 00
		F	Per IAG Section 7 (Consultation)	16 JUN 00
OUs E, F, G, & H Record of Decision	P	D	22 NOV 00	--
		DF	Per IAG Section 7 (Consultation)	30 MAR 01
		F	Per IAG Section 7 (Consultation)	01 MAY 01

See Legend at end of table for meaning of symbols.

(Continued)

TABLE 3-7. (Continued)

Document Title	Document Category	Document Type	Dates Deadline[a]	Dates Target
OPERABLE UNITS E, F, G, & H (Continued)				
OUs E, F, G & H Remedial Design/Remedial Action (RD/RA) Schedule	--	--	20 APR 01[d]	--
OUs E, F, G, & H Remedial Action Workplan	P	D	--	22 MAY 01[b]
		DF	Per IAG Section 7 (Consultation)	26 SEP 01
		F	Per IAG Section 7 (Consultation)	29 OCT 01
OUs E, F, G, & H Remedial Design	--	--	--	19 JUN 02[b]
BASEWIDE				
PGOURI Report	S	D	--	13 SEP 91
		RC	--	15 JAN 92
Basewide Feasibility Study Report and Proposed Plan	P	D	09 JAN 02	--
		DF	Per IAG Section 7 (Consultation)	10 MAY 02
		F	Per IAG Section 7 (Consultation)	11 JUN 02
Basewide Record of Decision	P	D	09 OCT 02	--
		DF	Per IAG Section 7 (Consultation)	13 FEB 03
		F	Per IAG Section 7 (Consultation)	15 MAR 03
Groundwater Sampling and Analysis Program	I	--	--	28 SEP 90
	I	--	--	31 DEC 90
	I	--	--	29 MAR 91
	I	--	--	29 JUN 91
	I	--	--	28 SEP 91
	I	--	--	31 DEC 91
	I	--	--	29 MAR 92
	I	--	--	29 JUN 92
	I	--	--	28 SEP 92
	I	--	--	31 DEC 92
	I	--	--	29 MAR 93
	I	--	--	29 JUN 93
	I	--	--	28 SEP 93
	I	--	--	38 DEC 93
	I	--	--	29 MAR 94
	I	--	--	29 JUN 94

See Legend at end of table for meaning of symbols.

(Continued)

TABLE 3-7. (Continued)

Document Title	Document Category	Document Type	Dates Deadline[a]	Dates Tar. .
BASEWIDE (Continued)				
Groundwater Sampling and Analysis Program (Continued)	I	--	--	28 SEP 94
	I	--	--	31 DEC 94
	I	--	--	29 MAR 95
	I	--	--	29 JUN 95
	I	--	--	28 SEP 95
	I	--	--	31 DEC 95
	I	--	--	29 MAR 96
	I	--	--	29 JUN 96
	I	--	--	28 SEP 96
	I	--	--	31 DEC 96
	I	--	--	29 MAR 97
	I	--	--	29 JUN 97
	I	--	--	28 SEP 97
	I	--	--	31 DEC 97
	I	--	--	29 MAR 98
	I	--	--	29 JUN 98
	I	--	--	28 SEP 98
	I	--	--	31 DEC 98
	I	--	--	29 MAR 99
	I	--	--	29 JUN 99
	I	--	--	28 SEP 99
	I	--	--	31 DEC 99
	I	--	--	29 MAR 00
	I	--	--	29 JUN 00
	I	--	--	28 SEP 00
	I	--	--	31 DEC 00
	I	--	--	29 MAR 01
	I	--	--	29 JUN 01
	I	--	--	28 SEP 01
	I	--	--	31 DEC 01
	I	--	--	29 MAR 02
	I	--	--	29 JUN 02
	I	--	--	28 SEP 02
	I	--	--	31 DEC 02[c]
SCOPING				
1990 Comprehensive CERCLA Workplan	P	DF	Per IAG Section 7 (Consultation)	20 JUN 90
		F	Per IAG Section 7 (Consultation)	21 JUL 90

See Legend at end of table for meaning of symbols.

(Continued)

TABLE 3-7. (Continued)

Document Title	Document Category	Document Type	Dates Deadline[a]	Dates Target
SCOPING (Continued)				
1991 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	21 JAN 91	--
		DF	Per IAG Section 7 (Consultation)	23 MAY 91
		F	Per IAG Section 7 (Consultation)	24 JUN 91
1992 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	20 JAN 92	--
		DF	Per IAG Section 7 (Consultation)	21 MAY 92
		F	Per IAG Section 7 (Consultation)	22 JUN 92
1993 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	20 JAN 93	--
		DF	Per IAG Section 7 (Consultation)	24 MAY 93
		F	Per IAG Section 7 (Consultation)	23 JUN 93
1994 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	20 JAN 94	--
		DF	Per IAG Section 7 (Consultation)	24 MAY 94
		F	Per IAG Section 7 (Consultation)	23 JUN 94
1995 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	20 JAN 95	--
		DF	Per IAG Section 7 (Consultation)	24 MAY 95
		F	Per IAG Section 7 (Consultation)	23 JUN 95
1996 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	22 JAN 96	--
		DF	Per IAG Section 7 (Consultation)	23 MAY 96
		F	Per IAG Section 7 (Consultation)	24 JUN 96
1997 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	20 JAN 97	--
		DF	Per IAG Section 7 (Consultation)	22 MAY 97
		F	Per IAG Section 7 (Consultation)	23 JUN 97

See Legend at end of table for meaning of symbols.

(Continued)

TABLE 3-7. (Continued)

Document Title	Document Category	Document Type	Dates Deadline[a]	Dates Target
SCOPING (Continued)				
1998 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	20 JAN 98	--
		DF	Per IAG Section 7 (Consultation)	22 MAY 98
		F	Per IAG Section 7 (Consultation)	23 JUN 98
1999 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	20 JAN 99	--
		DF	Per IAG Section 7 (Consultation)	24 MAY 99
		F	Per IAG Section 7 (Consultation)	23 JUN 99
2000 Comprehensive CERCLA Workplan (CCW, & CRP Update	P	D	20 JAN 00	--
		DF	Per IAG Section 7 (Consultation)	24 MAY 00
		F	Per IAG Section 7 (Consultation)	26 JUN 00
2001 Comprehensive CERCLA Workplan (CCW) & CRP Update	P	D	20 JAN 01	--
		DF	Per IAG Section 7 (Consultation)	25 MAY 01
		F	Per IAG Section 7 (Consultation)	27 JUN 01

[a] Primary documents follow the IAG schedule and do not include dispute resolution.

[b] Deadlines for RD/RA documents will be submitted 21 days following issuance of the draft final ROD per Section 8.3 of the IAG. Target dates are shown for discussion purposes.

[c] Groundwater sampling and analysis activities may continue past this date; deliverables are only shown through 2002 for brevity.

[d] Schedule will be submitted 21 days following the target date for the issuance of the draft final ROD. Deadline shown may change if the target date for the draft final ROD is adjusted per Section 7 (Consultation) of the IAG.

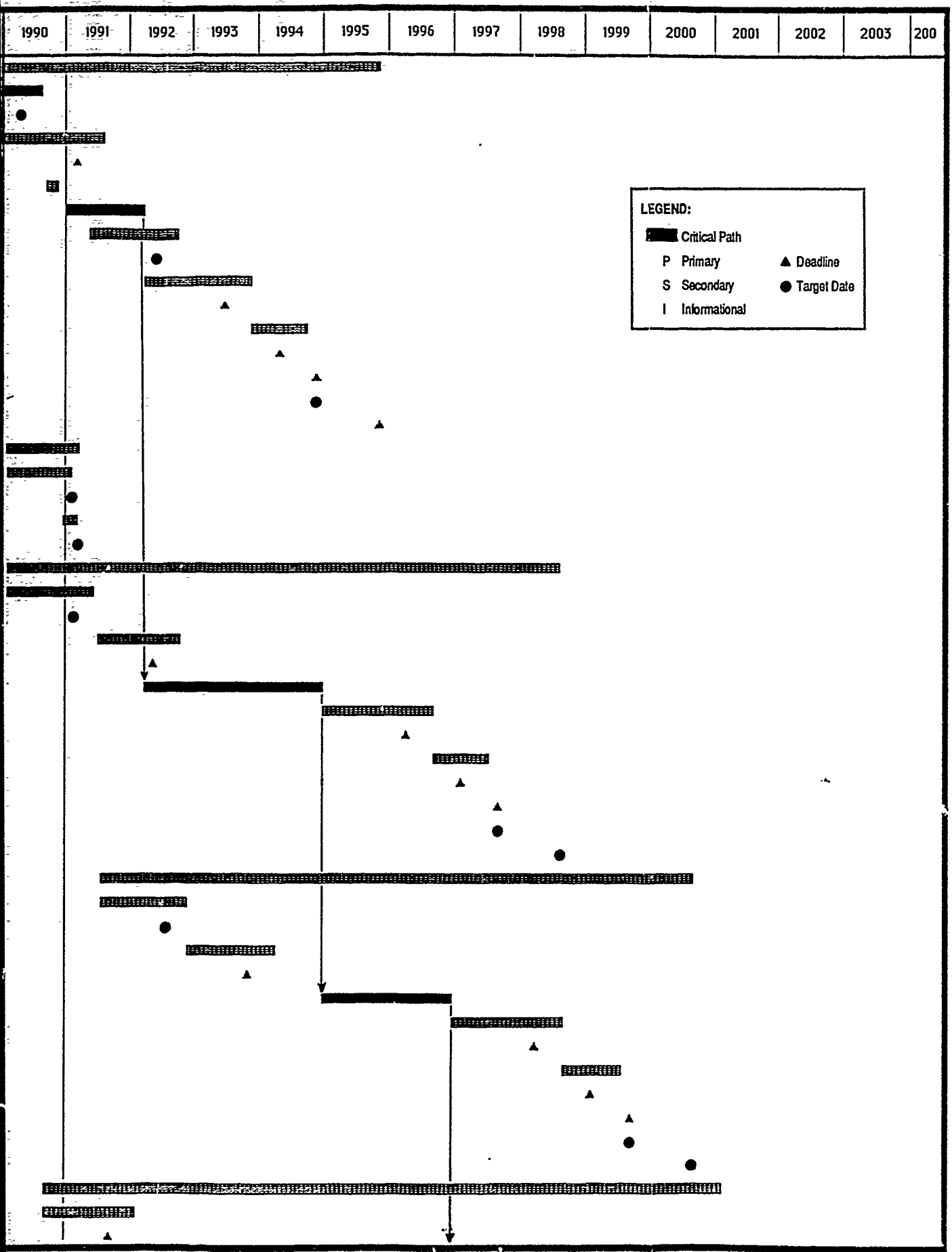
P = Primary Document
S = Secondary Document
I = Informational
D = Draft for Agency Review
DF = Draft Final
F = Final
RC = Response to Comments
TBD = To Be Determined

Task Name			1990	1991	1992
OPERABLE UNIT B					
OU B SUMMARY REPORT	S				
SUBMIT DRAFT COPY		13-Apr-90			
OU B RI SAP	P				
SUBMIT DRAFT COPY		5-Mar-91			
OU B SOIL GAS INVESTIGATION					
OU B RI					
TECH.ASSESS/SOIL TREATABILITY	S				
SUBMIT DRAFT COPY		4-Jun-92			
OU B RI/FS RPT/PP	P				
SUBMIT DRAFT COPY		29-Jun-93			
OU B ROD	P				
SUBMIT DRAFT COPY		3-May-94			
OU B REMEDIAL ACTION WORKPLAN	P				
SUBMIT DRAFT COPY		25-Oct-94			
OU B REMEDIAL DESIGN		8-Nov-95			
OU B EXPEDITED RESPONSE ACTION					
OU B EE/CA REPORT	S				
SUBMIT DRAFT COPY/RSP TO COMMS		1-Feb-91			
OU B ACTION MEMORANDUM	S				
SUBMIT DRAFT COPY		8-Mar-91			
OPERABLE UNIT A					
OU A SUMMARY REPORT	S				
SUBMIT DRAFT COPY		11-Feb-91			
OU A RI SAP	P				
SUBMIT DRAFT COPY		14-May-92			
OU A RI					
OU A RI/FS RPT/PP	P				
SUBMIT DRAFT COPY		9-Apr-96			
OU A ROD	P				
SUBMIT DRAFT COPY		11-Feb-97			
OU A REMEDIAL ACTION WORKPLAN	P				
SUBMIT DRAFT COPY		5-Aug-97			
OU A REMEDIAL DESIGN		19-Aug-98			
OPERABLE UNIT C					
OU C SUMMARY REPORT	S				
SUBMIT DRAFT COPY		29-Jul-92			
OU C RI SAP	P				
SUBMIT DRAFT COPY		8-Nov-93			
OU C RI					
OU C RI/FS RPT/PP	P				
SUBMIT DRAFT COPY		2-Apr-98			
OU C ROD	P				
SUBMIT DRAFT COPY		5-Feb-99			
OU C REMEDIAL ACTION WORKPLAN	P				
SUBMIT DRAFT COPY		16-Aug-99			
OU C REMEDIAL DESIGN		1-Sep-00			
OPERABLE UNIT D					
GWTP/EXT.SYS/OFFBASE FS/PP	P				
SUBMIT DRAFT COPY		6-Sep-91			

McCLELLAN AFB CERCLA PROGRAM

IAG Schedule Logic Diagram

2 of 2



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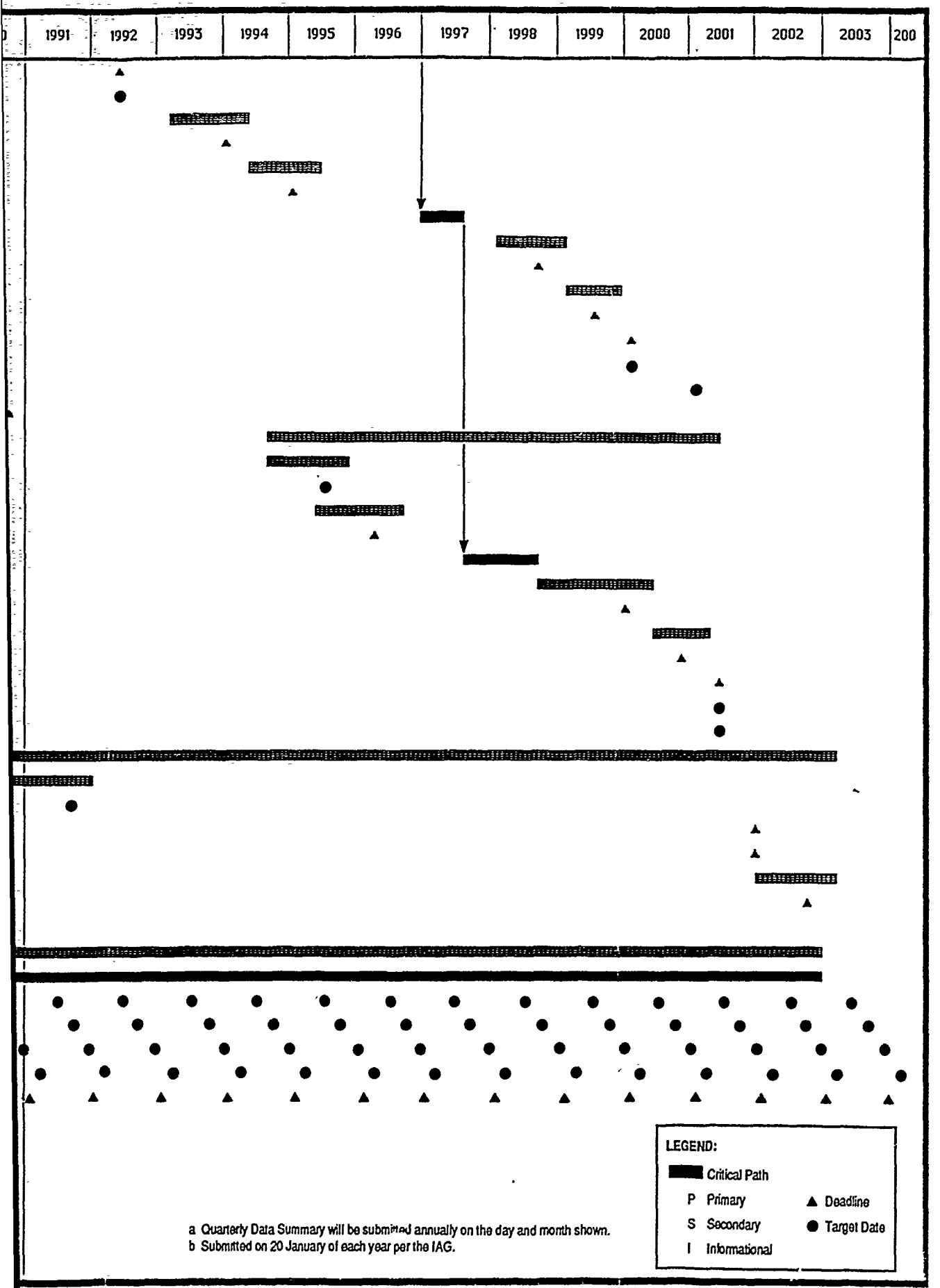
McCLELLAN AFB CEI
IAG Schedule Log

Task Name			1990	1991	1992
GWTP/EXT.SYS/OFFBASEWATER ROD	P				▲
SUBMIT DRAFT COPY		9-Jun-92			●
OU D SUMMARY REPORT	S				
SUBMIT DRAFT COPY		21-Jan-94			
OU D RI SAP	P				
SUBMIT DRAFT COPY		25-Jan-95			
OU D RI					
OU D RI/FS RPT/PP	P				
SUBMIT DRAFT COPY		18-Sep-98			
OU D ROD	P				
SUBMIT DRAFT COPY		22-Jul-99			
OU D REMEDIAL ACTION WORKPLAN	P				
SUBMIT DRAFT COPY		14-Jan-00			
OU D REMEDIAL DESIGN		4-Feb-01			
OU D SOIL GAS TREATABILITY STY	S		▲		
OPERABLE UNITS E,F,G,&H		21-Jun-01			
OUs E-H SUMMARY REPORT	S				
SUBMIT DRAFT COPY		26-Jul-95			
OUs E-H RI SAP	P				
SUBMIT DRAFT COPY		17-Apr-96			
OUs E-H RI					
OUs E-H RI/FS RPT/PP	P				
SUBMIT DRAFT COPY		12-Jan-00			
OUs E-H ROD	P				
SUBMIT DRAFT COPY		22-Nov-00			
OUE-H REMEDIAL ACTION WORKPLAN					
SUBMIT DRAFT COPY		22-May-01			
OUE-H REMEDIAL DESIGN		19-Jun-02			
BASEWIDE RI/FS ACTIVITIES					
PGOURI REPORT	S				
SUBMIT DRAFT COPY		13-Sep-91		●	
BASEWIDE FS/PP	P				
SUBMIT DRAFT COPY		9-Jan-02			
BASEWIDE ROD	P				
SUBMIT DRAFT COPY		9-Oct-02			
PROD/MONITOR WELL ABANDONMENT			▲		
GROUNDWATER SAMPLING PROGRAM					
FIELD ACTIVITIES					
FIRST QUARTER DATA SUMMARY	S	29-Jun a	●	●	●
SECOND QUARTER DATA SUMMARY	S	28-Sep a	●	●	●
THIRD QUARTER DATA SUMMARY	S	31-Dec a	●	●	●
FOURTH QUARTER DATA SUMMARY	S	29-Mar a	●	●	
CCW/CRP UPDATES		20-Jan b	▲	▲	

2 of 2



a Quarterly Data Summary will be submitted annually on the day and month shown.
b Submitted on 20 January of each year per the IAG.

environmental obligations, and Air Force Logistics Command mission requirements. The CERCLA process will be followed sequentially while completing activities in each one of the OUs. This sequence of activities is reflected in the IAG schedule. The order in which OUs will be addressed on the basis of established priority is:

- Operable Unit B;
- Operable Unit A;
- Operable Unit C;
- Operable Unit D; and
- Operable Units E, F, G, and H.

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APPENDIX A1

REMEDIAL RESPONSE PROGRAM DESCRIPTION

A1.0 RESPONSE ACTION PROGRAM DESCRIPTION

The following section presents a more detailed description of the McClellan Air Force Base (AFB) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response program. The objective of this program is to identify, investigate, and clean up contaminated areas at McClellan AFB, thereby fulfilling the requirements of the Interagency Agreement (IAG) and CERCLA. The overall CERCLA process was described in Section 2.1. The specific activities are detailed in this section and are presented in a schedule format in Section 3.0. A general CERCLA process flow chart is shown in Figure A1-1. The number above and to the left of each step in the chart refers to the specific section that provides a more detailed description of the steps.

The order in which the Operable Units will be identified and investigated has been agreed upon by the parties to the IAG. The CERCLA process will be followed sequentially at each one of the Operable Units or groups of Operable Units as reflected in project schedule shown in Section 3.0. For example, the Summary Reports, which contain Preliminary Assessment/Site Investigation (PA/SI) information, will be completed in the order of the Operable Unit(s) priority cited below. The accepted priority is:

- Operable Unit B;
- Operable Unit A;
- Operable Unit C;
- Operable Unit D; and
- Operable Units E, F, G, and H.

A1.1 Identification Phase

The identification phase for the remedial activities will consist of tasks to compile and review all available information regarding use, storage, and disposal of hazardous materials at McClellan AFB. The objectives of the identification phase are to:

- Identify possible sources of soil and/or groundwater contamination;

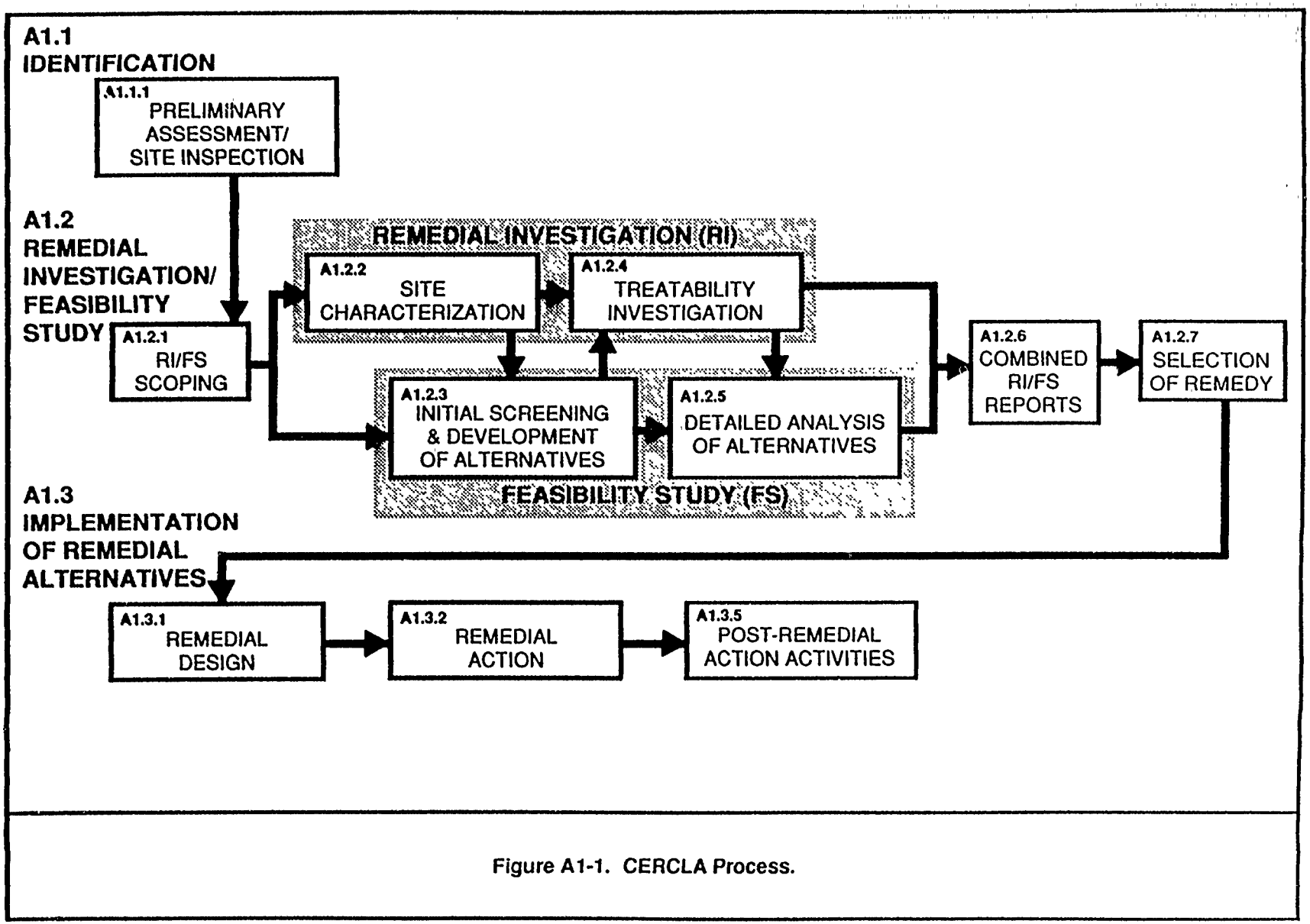


Figure A1-1. CERCLA Process.

- Collect and summarize available information for potential contaminant sources to determine if historic or current operations have affected the environment;
- Provide recommendations for further investigations at sites and potential release locations (PRLs);
- Identify any immediate response needs including Expedited Response Actions; and
- Provide data to support site and PRL prioritization and grouping.

An overview of the objectives, tasks, strategies, and deliverables associated with this activity is presented in Figure A1-2.

A1.1.1 Preliminary Assessment/Site Inspection

Preliminary assessments (PAs) and site inspections (SIs) are currently being done to identify sites and PRLs at McClellan AFB. A list of these PRLs and sites, along with an update of their status, is presented in Appendix A2.

The term "site" refers to a location that has been previously investigated and found to be contaminated. Potential release locations have received little or no previous investigation, and are being reviewed to determine if further investigation is warranted. Potential release locations were formerly divided into two categories, Unstudied PRLs (UPRLs) and Partially Studied PRLs (PSPRLs). These designations have now been combined into the general category of PRLs. The sites and PRLs currently being assessed were initially identified during record searches and investigations conducted by McClellan AFB and previous Air Force contractors (CH2M Hill, 1981; McLaren Environmental Engineering, 1986).

Tasks performed as part of the PA/SIs include record searches, aerial photograph interpretation, interviews with base personnel, site visits, compilation and evaluation of past analytical data collected by McClellan AFB and its contractors, and preparation of summary reports and site files. Any PRLs that are identified from information obtained in PA/SIs will also be investigated as part of this task.

PRELIMINARY ASSESSMENT / SITE INSPECTION → **REMEDIAL INVESTIGATION / FEASIBILITY STUDY SCOPING**

PURPOSES:

- Identify, collect, and organize available information for known and new McClellan AFB potential release locations (PRLs)
- Determine sources and nature of potential releases, pathways of exposure, exposure targets, and threats to public health or the environment
- Identify needs for additional site/analytical data
- Identify sites that pose no threat or potential threat to public health, welfare, or the environment

TASKS:

- Record searches
- Aerial photo interpretation
- Interviews with base personnel
- Site visits
- Prepare site files and summary reports
- Compilation and evaluation of past analytical data collected by McClellan AFB and its contractors

POTENTIAL SUBSEQUENT ACTIONS:

- No further action
- RI/FS scoping
- Expedited Response Actions

STRATEGIES:

- Inspect currently operating facilities that use hazardous materials for evidence of contaminant release to soils; add to list of new PRLs, locations where evidence of release is discovered
- Evaluate all old and new PRLs and sites that are identified within each operable unit
- Expedite assessment of newly identified PRLs for high priority PGOUs to allow integrated soil and groundwater sampling plans to be prepared

DOCUMENTATION:

- Preliminary Assessment Report (for each PRL)
- Technical Memoranda (for each site)
- Site files (site-specific information that is not included in the above reports)

Figure A1-2. Preliminary Assessment / Site Inspection.

In addition to the sites and PRLs listed in Appendix A2, currently operating facilities will be assessed for compliance with substantive provisions of the Resource Conservation and Recovery Act (RCRA) as they relate to the release of hazardous substances, wastes, pollutants, or contaminants. The RCRA is considered an applicable or relevant and appropriate requirement (ARAR) under CERCLA and the IAG. Other McClellan AFB activities directly regulated by RCRA are being addressed by other ongoing programs at McClellan AFB. Contamination in environmental media (soil, soil gas, surface water, groundwater, and air) are the primary focus of this assessment.

To address the substantive requirements of RCRA, as required under the IAG, a list has been compiled of currently operating facilities that now use or have historically used, stored, or disposed of hazardous materials. Many of the facilities on this list are also on the current list of PRLs (Appendix A) and will be investigated as part of the PA/SI task. Those facilities not investigated as part of the PA/SI task will be reviewed to determine if there is a potential for the presence of hazardous materials in the soil or migration of contaminants to groundwater. This inspection will include visual observation, review of operating records and engineering drawings, and interviews with current employees. If a potential for the presence or migration of contaminants exists in environmental media, the facility or area will be considered a new Study Area and investigated further.

The PA/SI will result in one of three recommendations for each site:

- Conduct a Remedial Investigation and Feasibility Study at sites where the presence of contamination is indicated, but where no immediate threat exists;

- Implement a prompt and appropriate Response Action where contamination poses an immediate threat to human health, welfare, and/or the environment; and

- Determine that no further action is necessary, if the results shown that the site has not contributed to or has/had the potential for contaminant releases to soil and groundwater.

Preliminary Assessments/Site Inspections of PRLs and sites will be conducted within the boundaries of each preliminary operable unit previously identified

(Section 1.1). Operable units located along the southern boundary of McClellan AFB will be investigated first to identify areas of contaminated groundwater that could migrate off base and the sources of the contaminants. Operable Unit B is slated for investigation first, followed by Operable Unit A. Preliminary Assessments/Site Inspections for any new PRLs identified for these operable units will be expeditiously prepared to allow integration of the available information into the planning process for the more detailed investigations. In a similar manner, PA/SI data will be collected into Summary Reports for the other Operable Units. The Operable Unit(s) order listed in Section A1.0 (C, followed by D, and E, F, G, and H) will be used.

Preliminary Assessment reports will be prepared for those PRLs where no analytical data have been collected. Technical Memorandums will be prepared for sites. The contents of these two types of reports are similar; both include a summary of historical operations conducted at the site, a compilation and evaluation of information collected, an evaluation of potential hazards, an evaluation of previous recommendations, and current conclusions and recommendations. A Summary Report will be prepared for all sites and PRLs within an Operable Unit summarizing all current and historic operations and previous investigations.

Site and location files are also prepared for all sites and PRLs, respectively. These files contain data reports, as well as information and references not included in the summary report for a particular site, such as interview notes, information from base files, inspection notes, soil boring logs, and analytical data. Site and location files will be updated as additional information is obtained for a particular site.

A1.2 Investigation Phase

The second phase of the McClellan AFB CERCLA response program consists of seven investigation activities:

- Remedial Investigation Scoping;
- Site Characterizations;
- Initial Screening & Development of Alternatives;
- Treatability Investigations;
- Detailed Analysis of Alternatives;
- Remedial Investigation and Feasibility Study Reports; and
- Selection of Remedial Action.

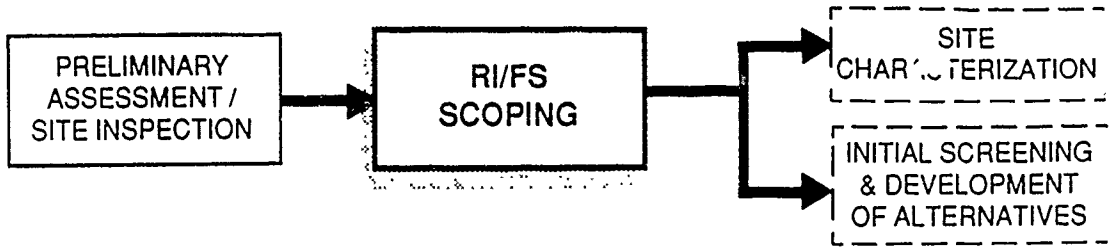
Discussions of each of these activities and their relationship to each other follow.

A1.2.1 Remedial Investigation/Feasibility Study Scoping

Remedial Investigation/Feasibility Study (RI/FS) scoping is the initial step in the investigation phase where the site management strategy is developed and project plans are prepared to guide future activities at McClellan AFB. During RI/FS scoping, criteria are also established to determine the priorities for site investigation activities and for conducting appropriate expedited or remedial response actions. Figure A1-3 presents an overview of the specific objectives, tasks, strategies, and deliverables associated with this activity. Discussions of specific project plans and RI/FS scoping activities follow.

The documents that will govern the implementation and document progress of the McClellan AFB Program include:

- The Comprehensive CERCLA Work Plan (CCW);
- Project Plans that serve as guidance documents for the overall program, including:
  - Quality Assurance Project Plan,
  - Sampling and Analysis Plans, which provide a mechanism for planning and managing field activities,
  - Health and Safety Plan,
  - Community Relations Plan,
  - Preliminary Applicable or Relevant and Appropriate Requirements (ARARs),
  - Risk Assessment Protocol Manual,
  - Data Management Plan;



PURPOSES:

- Determine appropriate Expedited Response Actions and set priorities for conducting actions
- Develop project plans and management strategies to implement a comprehensive CERCLA Program for McClellan AFB that is consistent with the IAG
- Develop a schedule for implementation of plans and strategies

TASKS:

- Prepare Comprehensive CERCLA Workplan
- Prepare detailed project plans
- Establish Data Quality Objectives to be included in Sampling and Analysis Plans
- Develop conceptual site model
- Identify and reach agreement with federal, state, and local regulatory agencies on preliminary ARARs
- Begin formulation of potential remedial alternatives
- Evaluate the need for treatability studies

STRATEGIES:

- Group sites and develop remedial plans according to operable units (OUs). Focus on highest priority OUs first
- Streamline the McClellan AFB CERCLA Program to provide technical and cost effective response actions that are consistent with established priorities
- Involve the public during the initial planning of the overall McClellan cleanup program, and in the review of the documents

POTENTIAL SUBSEQUENT ACTIONS:

- Expedited Response Actions (for highest priority sites/OUs that pose an immediate threat to public health, welfare, or the environment)
- Site characterization (where additional data are needed)
- Initial screening and development of alternatives (if available data are sufficient to allow a cost-effective remedial program to proceed)

DOCUMENTATION:

- Comprehensive CERCLA Workplan (CCW) and updates
- Community Relations Plan (CRP) and updates
- Health and Safety Plan
- Quality Assurance Project Plan
- Administrative Record and Information Repository
- Monthly status reports
- Sampling and Analysis Plans for site characterization efforts
- Ranking Package
- Risk Assessment Manual

Figure A1-3. Remedial Investigation / Feasibility Study (RI/FS) Scoping.

- Administrative Record Work Plan; and
- Regulatory Agency Status Reports and Meetings.

Comprehensive CERCLA Work Plan (CCW)

The Comprehensive CERCLA Work Plan (CCW), presented here, is the conceptual framework for conducting remedial activities to meet CERCLA and IAG requirements. It defines the objectives, rationale, and schedules to be followed throughout the McClellan AFB Program. The CCW will be updated each January by the Air Force to reflect the dynamics of the program and to revise the cleanup effort plan, as appropriate. Although this work plan addresses the entire CERCLA process, descriptions of specific tasks vary depending on the amount and quality of existing data. Where additional data are required to plan tasks, the level of detail provided herein is limited. The scope of these future activities will be refined in future revisions to the CCW.

Project Plans and Communications

A Quality Assurance Project Plan (QAPP) has been prepared (Radian, May 1990) to ensure that data collected during the RI are gathered in a consistent and defensible manner. The QAPP includes specifications for all field sampling, laboratory analysis, and data management activities and follows guidelines presented in the U.S. Environmental Protection Agency (EPA) *Interim Guidelines and Specifications for Preparing Quality Project Plans.* Other regulatory documents consulted include the U.S. EPA's Interim Final *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (October 1988), as well as the *California Site Mitigation Decision Tree Manual* (May 1986) prepared by the California Department of Health Services (DHS). The McClellan AFB QAPP will be reviewed periodically and modified as appropriate. The QAPP includes the following sections:

- Introduction;
- Project Description;
- Project Organization and Responsibility·
- Quality Assurance Objectives for Measurement and Geologic Data;

- Field Procedures:
  - -- Geophysical Techniques,
  - -- Drilling,
  - -- Well Installation,
  - -- Sample Storage and Preservation Requirements,
  - -- Groundwater Sampling,
  - -- Surface Water Sampling,
  - -- Soil Sampling,
  - -- Sediment Sampling,
  - -- Soil Vapor Sampling, and
  - -- Ambient Air Monitoring;
- Sample Custody;
- Calibration Procedures and Frequency;
- Analytical Procedures and Calibration;
- Data Reduction, Validation, and Reporting;
- Internal Quality Control;
- Performance and Systems Audits;
- Preventive Maintenance;
- Data Assessment Procedures;
- Corrective Action;
- Quality Assurance Reports; and
- Site Management.

General Data Quality Objectives (DQOs) have been developed as part of the QAPP in accordance with the U.S. EPA guidance document *Data Quality Objectives for Remedial Response Activities Development Process* (March 1987). Data quality objectives are qualitative and quantitative specifications developed during the RI/FS process to ensure that data are adequate for supporting decisions. Specific DQOs will be developed, as appropriate, for each data collection effort during the development of

distinct Sampling and Analysis Plans and must be considered to determine the selection of the number, type, frequency of samples, and the type of analytical methods and quality assurance procedures to be used. Some highlights from the QAPP are described below. Data Quality Objectives are discussed at greater length in the Data Management Plan discussion found later in this section.

The Field Procedures section of the QAPP includes descriptions of all sampling protocols to be used in the field. These protocols include: geophysical techniques; groundwater, surface water, soil, soil vapor, and air sampling or direct measurement techniques; well drilling and installation; and field management (work site access, work site logistics, and contractor coordination).

The Analytical Procedures section of the QAPP includes a brief description of standard analytical methods and lists of parameters to be measured along with detection limits that are attainable with the specified techniques. The data assessment section identifies statistical calculations and assessment procedures that will be used to evaluate and document data quality.

The Data Reduction, Validation, and Reporting section includes data generation, data processing and storage, standard data reporting requirements, and numbering methodology, and describes the procedures used to establish and maintain a data management system for McClellan AFB analytical data. This system provides for the efficient storage, retrieval, and analysis of data gathered during the McClellan AFB RI/FS. The data management functions include:

- Verified data entry/transfer from the laboratory to the database;
- Incorporation of new data as it is obtained during the RI/FS;
- Quality assurance/quality control information to verify analytical data;
- Data and file manipulation capabilities as required by project personnel;
- Data retrieval for analysis and interpretation, reporting, mapping, and graphics; and

- Maintenance of a file system containing all raw data sheets for verification and quality control audits.

A copy of the QAPP will be in the possession of field sampling teams for all sampling efforts. Subcontractors will also be required to comply with the procedures documented in the QAPP.

If revisions and/or new sections of the QAPP are required as part of a new field data collection task, they will be prepared as part of that task and incorporated into the comprehensive RI/FS QAPP. This includes revisions to information regarding subcontractor qualifications for sampling, well drilling, and analytical tasks.

Sampling and Analysis Plans

Sampling and Analysis Plans are specific work plans that are prepared for all field activities. They describe the:

- Site background;
- Specific sampling objectives (including DQOs);
- Initial sampling location and analysis methods;
- The decision matrix for sampling and analysis at each site;
- The sample numbering system to be used;
- Sampling equipment and procedures; and
- Sample handling and analysis.

Where possible, specific sections may be referenced to the appropriate section within the QAPP. Details of these Sampling and Analysis Plans (SAPs) are presented in the following Section A1.2.2. Specific SAPs will be prepared for distinct phases in the investigations as noted in Section 3.0.

Health and Safety Plan

The Health and Safety Plan (Radian, January 1989) has been prepared and forms the basis of a safety program designed to protect the health and safety of workers conducting hazardous waste investigations at McClellan AFB and employees at McClellan AFB. This plan was prepared in accordance with applicable U.S. EPA, National Institute for Occupational Safety and Health (NIOSH), Air Force, and DHS

guidelines. The primary guidance document is *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (October 1985) prepared as a joint effort by NIOSH, OSHA, U.S. EPA, and the U.S. Coast Guard. Applicable requirements of the California Administrative Code, Title 8 (General Industrial Health and Safety Orders) and the Federal OSHA Standard "Hazardous Waste Operations and Emergency Response," 29 CFR 1910.120, as well as all other applicable OSHA requirements, standards, and regulations, have been incorporated.

The complete Health and Safety Plan includes the following sections:

- Introduction, with a statement of activities and responsibilities of key personnel;
- General site information;
- Contaminant characterization;
- Hazard analysis--physical and chemical;
- Monitoring program;
- Hydrocarbon hazard response criteria;
- Personal protective equipment;
- Site control and work zones;
- Employee/contractor training;
- Medical considerations;
- Emergency response plan; and
- Recordkeeping requirements.

The characterization section includes hazard evaluation and safety precautions for all applicable field procedures that have been implemented to date or are anticipated to occur in the near future. If additional procedures are required for a new

task, or if work activities are anticipated for an area containing potential contaminants and/or health and safety hazards not adequately addressed in the current plan, addendums will be prepared by an appropriate health and safety professional as part of that task and will be incorporated into the Health and Safety Plan.

Community Relations Activities

The Air Force considers outreach to the community a key aspect of its response action program. Accordingly, they have given high priority to community relations activities in allocating resources.

A quarterly newsletter is produced and mailed to more than 2,400 residents, local officials, and interested groups. Fact sheets explaining aspects of the cleanup are produced periodically. In addition, McClellan AFB hosts open houses to provide opportunities for the public and the Environmental Management technical staff to interact. McClellan AFB is producing a video and a brochure in 1991.

McClellan AFB Environmental Management staff participates in a Community Relations Environmental Steering Committee, which tracks public sensitivity and proposes community relations activities as needed. The Technical Review Committee, which meets quarterly, also involves appointed public representatives who participate in reviews of technical project documents and plans.

A Community Relations Plan for McClellan AFB was prepared in August 1988 in accordance with CERCLA guidelines and updated in November 1990. The Community Relations Plan (CRP) describes the USAF's public participation objectives, the current situation, a history of the McClellan AFB waste problem, and what response actions have been implemented to date, focusing on public concerns. The plan also chronicles community involvement in McClellan AFB activities, provides a profile of the community, records community concerns, and outlines the Air Force's plans for communicating with and responding to these concerns. Eighteen specific methods for meeting public involvement objectives are spelled out in the CRP. The CRP identifies a schedule for these activities and explains their relationship to scoping, investigation, and cleanup activities. Also included in the CRP are the names, addresses, and phone numbers of the Environmental Community Relations Steering Committee members; a public contacts list including Installation Restoration Program (IRP) Task Force members, elected officials and media contacts; correspondence from Congressmen Fazio and Matsui regarding evolution of the IRP Task Force; questions posed during inter-

views with the affected community; and results of a survey conducted in July 1990. The CRP will be reviewed and revised to respond to current community concerns and needs as determined through interviews with members of the community and public officials.

Vehicles for communicating RI/FS progress to interested citizens are open house and other public meetings. These are coordinated by the Community Relations Steering Committee. This group comprises representatives from McClellan AFB, the California Congressional Offices, U.S.EPA, California DHS,and public representatives from the county and city of Sacramento, and the union of base employees. The group meets quarterly to review progress to address community concerns and to identify potential community issues. The county and city government members and union representatives serve as a communications link with the local community by bringing concerns and questions before the other Steering Committee members.

The public representatives also participate in the quarterly meetings of the Technical Review Committee (TRC). The TRC is made up of the Remedial Project Managers (RPMs) from the base, DHS, and EPA who review project progress and plans. It is the public representatives' function to convey information from these meetings to concerned citizens in the community at large.

Preliminary Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d) of CERCLA as amended by Superfund Amendments and Reathorization Act (SARA) requires that remediation activities at McClellan AFB meet applicable or relevant and appropriate requirements (ARARs). Identification of ARARs is an integral and ongoing component of the RI/FS process. The intent of meeting ARARs is to select and implement remedies that are protective of human health and the environment in accordance with other regulatory requirements.

The *Technical Approach: Evaluation and Selection of ARARs and Other Cleanup Levels* (Radian, August 1988) identifies ARARs that are potentially applicable to the remediation of hazardous waste sites at McClellan AFB, providing potential cleanup levels for most of the contaminants identified on the base to date. A method for determining cleanup levels in the absence of ARARs is also specified. This document will be updated, as appropriate, as new regulations are promulgated or if new compounds are discovered.

Other ARARs, such as those required for a specific type of cleanup, may be identified during the course of the McClellan AFB remedial investigation. Prior to issuing draft reports requiring ARAR determinations, the Project Managers will meet to identify pertinent ARARs. DHS will identify potential state ARARs. Draft ARAR determinations will be prepared by the Air Force to facilitate discussions among the parties; ARAR determinations will be reexamined throughout the RI/FS process.

Risk Assessment Protocol Manual

The Risk Assessment Protocol Manual (Radian, March 1987) was prepared as a basis for all risk assessment activities and will be updated in 1991. This manual identifies the relationships among the supporting processes including: data needs; exposure assessment methods and assumptions; types of fate and transport models to be used; toxicological assessment methods; uncertainty analysis methods; data management requirements; quality assurance; and peer review procedures. It will ensure that decision-making throughout the McClellan AFB CERCLA Response Program is based on consistent, defensible, and clearly documented analyses.

Data Management Plan

An information-management needs assessment is being conducted by McClellan AFB for their internal, as well as regulatory agency requirements. The assessment will evaluate current and future information needs for the participating organizations involved in the McClellan AFB CERCLA Project. From this evaluation, the feasibility of creating an automated information system to meet the participants' needs will be determined. McClellan AFB will then determine specific details for implementing the information management system. McClellan AFB anticipates that the detailed implementation plan for the information management system will serve as the Data Management Plan.

McClellan AFB currently uses a data management system. The major system components, data tracking and storage, reporting, data quality documentation, and data security are described below. A discussion of data quality objectives is included below.

Reporting--Several types of reporting from the computerized database are required to support RI/FS activities. Analytical results for field samples, and geologic and lithologic information are reported in specified formats for the central IRP data

base. Standard and custom reports for technical reports and data analysis and intrepretation are produced. Standard reporting guidelines and specifications have been established in the QAPP. Standard quality control (QC) data reports are also required for data validation.

Data Quality Documentation--Data quality is evaluated and documented as part of data management and QA/QC activities. Data assessment and review procedures are specified in the QAPP. These procedures consist of initial review of all analytical and field results for consistency and completeness. The analytical results are electronically transferred to the Installation Restoration Program Information Management System (IRPIMS) database, and QC checks are conducted to ensure accurate data loading. Standard QC reports are produced and used to validate the data. Suspect results are investigated and corrective actions taken as needed; data flags are used to document data quality problems for analytical results. Data assessment reports are prepared for each data collection activity and included as part of the technical report.

Soil and groundwater data collected prior to 1985 do not have adequate control data. Data quality assessments are not proposed for these data. Groundwater data, collected prior to 1985 and stored in a database, have been transferred into the project database. The remaining groundwater data and the soil data collected prior to 1985 is archived in hard copy format.

Data Security--Security of all data is ensured by controlled access to Radian offices, and strict checkout procedures for any technical reports or data files. The computer systems are password-protected to restrict access to data files.

Data Quality Objectives--DQOs guide data collection efforts for each phase of the RI/FS. Data Quality Objectives are qualitative and quantitative statements that specify the quality of data required to support decisions made during remedial activities. They are developed to ensure that data of known and adequate quality are obtained as part of these activities. Data Quality Objective development is a staged process that consists of identifying the types of decisions to be made about a site, identifying data needs and uses required to support the decision-making process, and design of a data collection program to obtain and report the data. DQO development is an ongoing, iterative process where the data collection objectives may be reevaluated and revised on the basis of new data and results from earlier phases of the RI/FS. A brief description of each DQO development stage and how the process is being applied to the McClellan AFB RI/FS is presented in this section.

Identification of decision types is the first stage of DQO development, in which data users are identified and involved at the beginning of the site investigation phase of the RI/FS. The available data are evaluated and a conceptual model of the site is developed. From this, specific investigation objectives and types of decisions to be made are determined. The remedial action objectives and decision types for sites at McClellan AFB are being developed within the designated operable units and, in general, are used to:

- Identify potential or known locations of hazardous materials release;
- Determine the type, magnitude, and extent of contamination at those locations;
- Identify contaminant pathways and determine threats to human health or the environment; and
- Select and implement the most cost-effective remedial actions to clean up the sites to nonhazardous levels.

The remedial action objectives and decision types for an operable unit or individual potential release locations will be stated explicitly in technical reports, work plans and/or sampling and analysis plans developed for the RI/FS investigations.

The second stage of DQO development is to identify data uses and the need for additional data. Included in this stage is establishing criteria for data adequacy or quality, and selection of appropriate sampling and analytical methods. The data quality criteria are called quality assurance objectives (QAOs) and are expressed in terms of precision, accuracy, representativeness, completeness, and comparability (PARCC) objectives for all types of measurement data. The QAOs are presented in the McClellan AFB RI/FS Quality Assurance Project Plan (QAPP). Determining the appropriate locations, number and type of samples, including QA/QC samples, and selection of sampling and analytical methods is an important aspect of this stage of DQO development. This stage of DQO development is represented in specific sampling and analysis plans for individual sample collection efforts, and in the QAPP.

Data uses include health and safety monitoring during field activities, establishing baseline conditions and monitoring trends in contaminant concentrations, risk assessment or comparison to human health criteria, model input parameters, evalua-

tion of remedial alternatives, and engineering design specifications for soil or groundwater remedial measures. When multiple uses are intended for the data, they can be prioritized in terms of data quality requirements and other factors that influence the data collection activity. Other factors to consider are required detection limits and contaminants and concentrations of concern that will dictate selection of specific analytical methods. Critical samples or locations will also include the number and type of samples to be collected. When data have multiple uses within one or more phases of the RI/FS, selection of the sampling and analytical methods will be based on satisfying the highest priority or highest level use of the data. This approach is the most cost-effective, and limits the potential to collect multiple samples at a given location over time to satisfy different data use and quality requirements that are currently known.

Data collection efforts to date have primarily focused on the initial investigation phases of the RI/FS to establish baseline conditions and determine the type, magnitude, and extent of contamination basewide. The data have also been used to perform trend analyses by well and general location, and to monitor the effect of remedial measures that have already been implemented, such as the extraction systems in OUs D and C. These data have also been used to define the operable units for continued investigation. Additional data have been collected to support selection of response alternatives. These data have been integrated into the overall data collection and reporting scheme.

The third phase of the DQO development process is design of a data collection program. This is specified in the sampling and analysis plan for each sample collection effort and incorporates QAPP elements directly or by reference. Because the QAPP has developed in a comprehensive format, the sampling and analysis plans must specify the number and type of samples, locations, and QA/QC requirements for the sampling effort. Data handling and reporting also is addressed in both the QAPP and individual sampling and analysis plans.

Administrative Record and Information Repository

The Superfund Amendments and Reauthorization Act (SARA) requires that an Administrative Record supporting the selection of a response action be established in a location accessible to the general public at or near the facility under investigation. Additionally, each item developed, received, published, or made available to the public under SARA 117(d) must be available for public inspection and copying at an information repository at this location.

The Administrative Record Work Plan for McClellan AFB states that the Administrative Record and Information Repository will be established in accordance with SARA. The McClellan AFB Administrative Record is currently being developed and will contain all documents used by McClellan AFB in the RI/FS decision-making process, including all documents considered or relied on to select or design response actions. The Administrative Record will be updated on a quarterly basis. Each update will include an index of documents in the complete record.

Several information repositories located near McClellan AFB have been established. They are:

Sacramento Central Library, 828 I Street, Sacramento, CA 95814
Phone: 449-5203, Ms. Abe -- Complete Reports

Rio Linda Branch Library, 902 Oak Lane, Rio Linda, CA 95673
Phone: 991-4515, Mr. Tomasik -- Executive Summary of Reports

McClellan AFB Library, McClellan AFB, CA 95652
Phone: 643-4640, Mr. Champneys -- Complete Reports

Administrative Records will also be located at the following regulatory agency offices:

Department of Health Services
10151 Croydon Way
Sacramento, California 95827

U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Regulatory Agency Status Reports and Meetings

Regulatory Agency Status Reports will be prepared and meetings will be conducted on a scheduled basis to facilitate communication with regulatory agencies. Agency status reports describing the technical progress of the McClellan AFB Remedial Response Program will be prepared monthly and submitted to the regulatory agencies.

The McClellan AFB tasks will be organized and presented in a consistent manner and will discuss the following items for each task or activity:

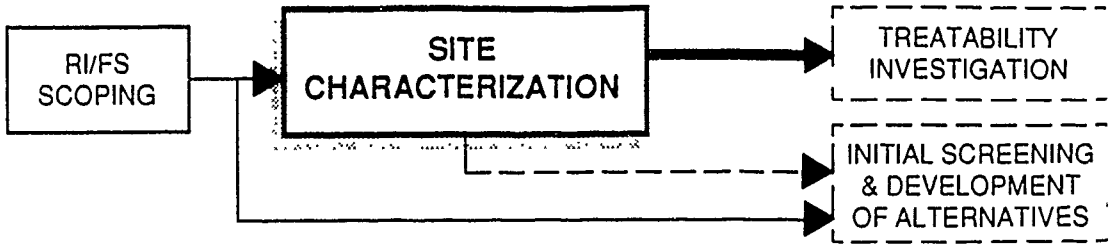
- Identification of the activity;
- Status of work and progress during the reporting period;
- Schedule status;
- Difficulties encountered during the reporting period;
- Actions being taken to rectify problems; and
- Key activities planned for the next reporting period.

In addition to monthly status reports, quarterly meetings with the regulatory agencies and public members will be held. Technical planning meetings with the agencies will also occur during the preparation of key documents. Fifteen days after the documents have been submitted to the agencies, a meeting will be held to present the contents, and explain the conclusions if so requested by the project managers. Fifteen days after the close of the 60-day agency review period for draft documents, the agencies and McClellan AFB will meet to discuss comments. Forty-five days after this meeting, McClellan AFB will transmit either a response to agency comments or a draft final report for secondary and primary documents, respectively. A final document will be transmitted 30 days after the draft final document is issued if no comments are made in the draft final document.

A1.2.2 Site Characterization

Site characterization is the step within the investigation phase where detailed site-specific remedial investigations are implemented for the purposes of defining sources of contaminants, determining the nature and extent of contamination, assessing the potential threat to human health, welfare, or the environment, and providing data for developing and evaluating potential remedial alternatives. Figure A1-4 presents a summary overview of the objectives, tasks, strategies, and deliverables associated with this activity.

Since groundwater poses the greatest potential route of exposure to the public, these investigations address both the extent of groundwater contaminant migration and the sources of contamination. This two-pronged approach allows control of contaminant migration to protect off-base groundwater while the investigation of the more concentrated sources of contamination continue. The investigations form the basis for long-term remedial actions.



PURPOSES:	• Identify sources of contamination • Define the nature and extent of contamination (waste types, concentrations, distribution) • Determine potential threats to human health, welfare, or the environment; identify needs for Expedited Response Actions • Provide data for developing and evaluating potential remedial alternatives
TASKS:	• Implement sampling and analysis plans (field investigations) • Refine RI/FS operable units for different pathways • Refine remedial action goals
POTENTIAL SUBSEQUENT ACTIONS:	• Initial screening and development of alternatives • Treatability investigation • Expedited Response Action • No further action
STRATEGIES:	• Expedite additional detailed investigations of groundwater operable units in high priority areas. • Plan Operable Unit Remedial Investigation • Perform a detailed site characterization for all pathways after the initial screening has been completed • Streamline reporting efforts through the preparation of secondary documents as individual tasks are completed for later inclusion in combined RI/FS Report(s)
DOCUMENTATION:	• Preliminary Groundwater Operable Unit Remedial Investigation Report • Groundwater Sampling and Analysis Program Data Summary Reports • Operable Unit Remedial Investigation Sampling and Analysis Plan

Figure A1-4. Site Characterization.

The steps involved with site characterization are briefly described below.

1. **Sampling and Analysis Plans**

   A Sampling and Analysis Plan (SAP), as described in Section A1.2.1, initiates all formal site characterization activities. This plan documents the characterization steps that will be taken and is a primary document agreed to by McClellan AFB and the regulatory agencies.

2. **Preliminary Groundwater Operable Unit Remedial Investigation (PGOURI)**

   The objective of the PGOURI is to collect data for the entire base to allow characterization of the local hydrogeology. Specific purposes of the PGOURI include developing a better understanding of:

   -- On- and off-base groundwater flow,
   -- Relationships between saturated zones,
   -- Extent and migration of contaminated groundwater, and
   -- Effects of on- and off-base pumping on contaminant migration.

   The results of this assessment will help evaluate groundwater impacts, refine groundwater operable units and remedial alternatives in the RI/FS, and identify the type of groundwater modeling needed to evaluate the effectiveness of remedial alternatives.

   Should results of the PGOURI indicate the potential for contaminated groundwater to migrate off base and threaten nearby water supply wells, then a Groundwater Operable Unit Remedial Investigation will be planned and implemented. This investigation will define the extent of contamination, direction of migration, and threats to city wells, and will evaluate the feasibility of initiating a removal action to alleviate defined threats. A Groundwater Operable Unit Remedial Investigation will be only a phase of a full-scale remedial investigation.

3. Operable Unit (OU) Remedial Investigation (RI)

The purpose of the OU RI is to identify the sources, nature, and extent of contamination in the environmental media.

-- Phase I investigations will be the first investigation described in RI SAPs prepared for the operable units. Operable Unit B will be the first area subjected to Phase I investigations because a contaminant plume is migrating off base from this area. Phase I is a screening phase of data collection to determine if contaminants are present in soils, to locate the probable sources of contaminants and if present, to determine if contaminants have migrated to groundwater. If no contaminants are detected above background levels in soils at a site during Phase I, no further action will be taken at the site. Samples of soil, groundwater, surface water, or soil vapor will be selected for quantitative analyses in a certified laboratory.

A soil gas investigation may be implemented prior to the Phase I investigation to guide the collection of samples during Phase I. This approach must be verified in the field prior to general implementation. A detailed description of soil gas sampling and analysis methods will be documented in the respective RI SAPs.

Integral to the development of RI SAPs will be the selection of data quality objectives which specify the quality of the data required to support decisions during remedial response activities as provided in the U.S. EPA guidance document, *Data Quality Objectives for Remedial Response Activities*, (March, 1987). In a three phase approach to conduct an RI for each site in an Operable Unit, separate objectives are required for each of the previous RI phases. Because the level of detail and data quality needed will vary with the decision to be made with the data, data quality objectives will be established to meet the requirements of the decisions. The general objectives and uses of data for each phase are

listed in Table A-1. The five analytical levels and uses of the data for each level is presented in Table A-2. Levels 1 through 3 will be used in the Phase 1 investigation; levesl 4 and 5 will be used in subsequent phases.

In addition to prioritizing sites for further investigation, data from Phase I will be used to initiate Removal Actions (if appropriate), or to support the determination for no further action.

Integral to the RI is the development of a conceptual site model to provide an understanding of the sources of contamination, migration pathways of contaminants, and potential receptors. This activity will assist in identifying sampling locations and also will assist to identify potential remedial technologies.

-- Phase II investigations will be the principal data collection phase of the RI. Site characterization will be planned for each OU, beginning with OU B, and described in detail in the RI SAP. Following completion of Phase I for a site, a logical sampling decision protocol will be implemented to complete characterization of the nature and extent of contamination and to collect data to support selection and design of cleanup alternatives. The sampling decision protocol allows flexible decision making, based on field conditions that meet established objectives and environmental parameters. Data developed during Phase I will be evaluated against criteria and may result in recommendations for additional field sampling. The full site characterization will include data from past investigations, and will be performed in full conformance with CERCLA guidance. The investigation will include characterization of contaminants in soil, surface water, groundwater, and soil vapor. Sampling

TABLE A-1. OVERALL OBJECTIVES AND USES OF DATA FOR EACH PHASE

Phase	Objectives	Data Uses
1 - Contaminant Source Identification	Identify sources of soil and groundwater contamination at suspected sites and confirm that no sources are present at sites without contamination.	Site characterization. Identification of sources.
2 - Site Characterization	Determine the magnitude and extent of contamination at identified sites with known sources of contamination.	Site characterization. Evaluation of alternatives. Engineering design. Health risk assessment.
3 - Remedial Alternative Evaluation	Identify remedial action alternatives and gather data to aid in evaluation of alternatives and selection of remedial action.	Evaluation of alternatives. Engineering design. Determination of cleanup levels. Feasibility Study.

TABLE A-2. SUMMARY OF ANALYTICAL LEVELS

Analytical Level	Description	Data Uses
Level 1	Field screening or analyses using portable instruments. Results are often not compound specific and not quantitative, but results are available in real-time.	Health and safety monitoring. Site characterization.
Level 2	Field analyses using more sophisticated portable analytical instruments, generally in a mobil laboratory on-site. Data generated are semi-quantitative to quantitative and may be compound specific.	Site characterization. Evaluation of alternatives. Engineering design.
Level 3	Analyses typically performed in an off-site laboratory. Analyses generally use CLP-type procedures, but do not include the same level of validation or documentation procedures required for CLP Level 4 analysis.	Site characterization. Evaluation of alternatives. Engineering design. Health risk assessment.
Level 4	All analyses are performed in an off-site CLP analytical laboratory following CLP protocols. Level 4 is characterized by rigorous QA/QC protocols and documentation. It is typically used for confirmation of lower level data, and to obtain highly documented data.	Health risk assessment. Evaluation of alternatives. Engineering design.
Level 5	Analyses are generally non-standard methods. All analyses are performed in an off-site laboratory which may or may not be a CLP laboratory. Method development or method modification may be required for specific constituents or detection limits.	Health risk assessment

CLP = Contract Laboratory Protocol
QA/QC = Quality Assurance/Quality Control

and analysis of the environmental media (soil and groundwater) will be performed to determine geotechnical, geological, and hydrogeological properties. Data compiled in this phase will be used for risk assessment, determination of cleanup levels, and preliminary evaluation of remedial alternatives. During this phase, appropriate Expedited Response Actions may also be initiated.

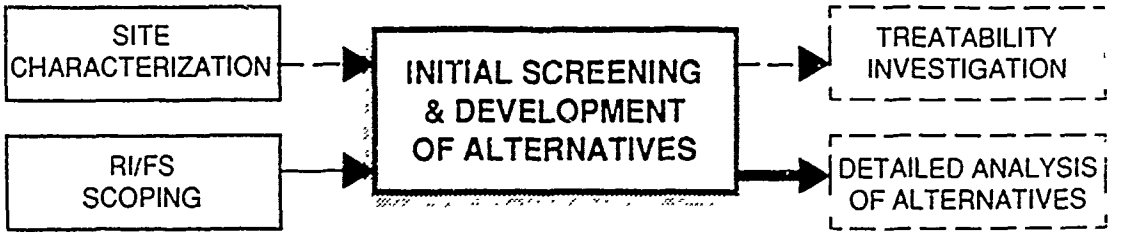
-- Phase III investigations will be conducted in the RI to allow evaluation of remedial alternatives in the Feasibility Study. If data from Phase II indicate that remediation is required at a site to meet health risk or environmental objectives, data collected in Phase III will be the basis for evaluating remedial alternatives. Sampling soils, groundwater, and soil gas for treatability studies, and aquifer testing will be conducted in Phase III.

Status of site characterization activities is shown in Table A2-1.

A1.2.3 Initial Screening and Development of Alternatives

The purpose of the Initial Screening and Development of Alternatives task is to identify potential remedial action alternatives and to narrow the list of remedial action alternatives for detailed analysis. As is depicted in Figure A1-1, the Initial Screening and Development of Alternatives is a part of the overall Feasibility Study. Figure A1-5 presents a summary of the objectives, tasks, strategies, and deliverables associated with this activity.

This task will begin during the planning of the site characterization task by utilizing information gathered during the RI field investigations to identify and screen candidate remedial technologies. The screening process will occur by comparing the potential technologies against the Remedial Action objectives and technical implementability. Those technologies that remain after screening will be assembled into remedial alternatives. Remedial alternatives are formulated by combining technologies to address all contaminant pathways and points of exposure. Once a list of remedial action alternatives is developed, alternatives will be screened to eliminate those which are an order of magnitude more costly than other acceptable alternatives or which have adverse environmental impacts which preclude their use. Alternatives that satisfy the



PURPOSES:	• Identify potential remedial action alternatives • Narrow list of remedial action alternatives for detailed analysis
TASKS:	• Refine/confirm location- and chemical-specific ARARs developed in RI/FS scoping task • Identify potentially applicable treatment technologies • Identify containment/disposal requirements for residual or untreated wastes • Evaluate/screen technologies • Assemble suitable technologies into alternative remedial action scenarios • Screen alternatives considering: - Effectiveness - Implementability - Cost
POTENTIAL SUBSEQUENT ACTIONS:	• Treatability investigations • Detailed analysis of alternatives • Expedited Response Actions
STRATEGIES:	• Perform screening of alternatives on an operable unit basis • Perform screening on a priority basis; highest priority operable units and sites first
DOCUMENTATION:	• Initial Screening and Development of Alternatives Report including: - Documentation of ARARs - Technologies and alternatives considered - Alternatives to be carried through subsequent evaluation

Figure A1-5. Initial Screening and Development of Alternatives.

remedial response objectives and contribute substantially to the protection of public health, welfare, and the environment will be considered further. Alternatives may also be added during this and remaining stages as a result of new technologies or new program concerns.

Several potential subsequent actions are possible as a result of the Initial Screening and Development of Alternatives task. These actions include:

- Initiation of expedited response actions;
- Treatability investigation(s); and
- Detailed analysis of alternatives.

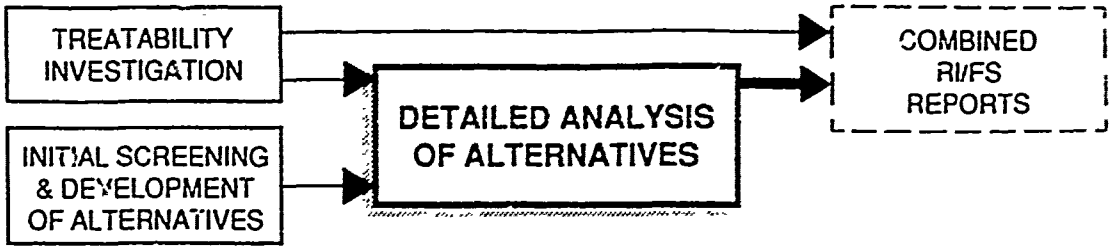
The identification and initiation of expedited response actions is a possibility throughout the McClellan AFB program. Based on this initial feasibility evaluation, additional site characterization data or bench and pilot scale studies may be needed before the feasibility evaluations can be completed.

For the screening phase, evaluations will be performed on an operable unit basis. This and subsequent feasibility study activities will be performed on a priority basis to ensure that any operable units which pose the greatest threats to public health and welfare are evaluated first. Potential candidates for priority treatment include those operable units that present the greatest potential for off-base contaminant migration.

The Initial Screening and Development of Alternatives effort will be documented in two ways. First, the Remedial Technology Assessment (Radian, May 1988) will be updated to reflect developments in remediation technologies. Second, appropriate groupings of remediation technologies will be recommended for further investigation in the Detailed Analysis of Alternatives, which is described in Section A1.2.5. The groupings and their respective justification will be communicated to the regulatory agencies in a letter from McClellan AFB. The Initial Screening and Development of Alternatives, the Detailed Analysis of Alternatives. and preparation of the FS report comprise the FS effort.

A1.2.4 Treatability Investigations

The purpose of treatability investigations is to obtain needed data to support the evaluation of remedial alternatives. Figure A1-6 presents a summary of the objectives, tasks, strategies, and deliverables associated with this activity. In addition,



PURPOSES:

- Select from among technically feasible remedial alternatives, the most attractive, based upon a consideration of the following criteria:
  - Short-term effectiveness
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume
  - Implementability
  - Cost
  - Safety
  - Compliance with ARARs
  - Overall protection of human health and environment
  - Regulatory agency acceptance
  - Community acceptance

TASKS:

- Evaluate performance, reliability, implementability, and safety features of selected alternatives
- Perform comparative Risk Assessment to determine relative impacts of alternatives on public health and the environment
- Cost analysis
- Obtain community input

POTENTIAL SUBSEQUENT ACTIONS:

- RI/FS Report
- Expedited Response Actions

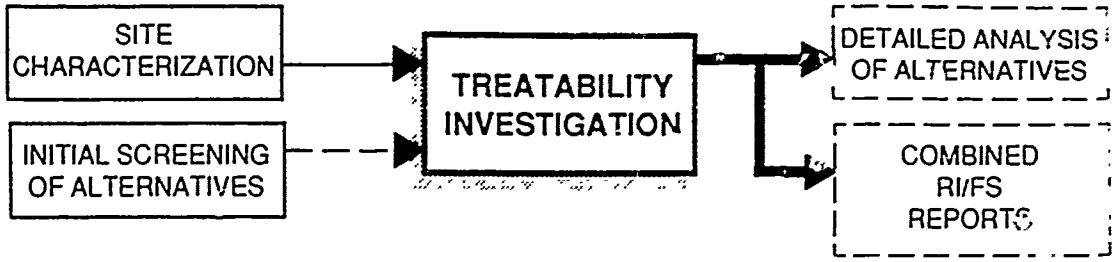
STRATEGIES:

- Integrate Feasibility Study results with site characterization, treatability investigation, and risk assessment results in the combined RI/FS Reports
- Obtain active regulatory agency involvement and review of the Detailed Analysis of Alternatives Report

DOCUMENTATION:

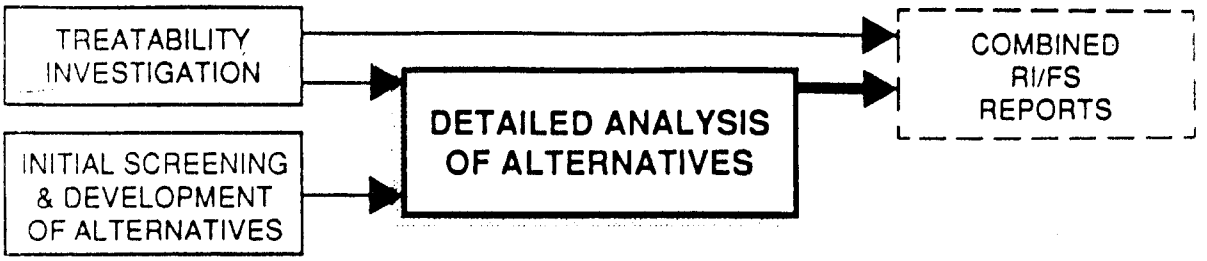
- Detailed Analysis of Alternatives Report

Figure A1-7. Detailed Analysis of Alternatives.



PURPOSES:	• Obtain data for detailed evaluation of alternatives • Obtain further site characterization data as needed to develop workable remedial technology designs
TASKS:	• Conduct literature survey and document the need for treatability testing • Perform bench and pilot scale feasibility and treatability tests • Collect site-specific field data
POTENTIAL SUBSEQUENT ACTIONS:	• Detailed analysis of alternatives • Expedited Response Actions
STRATEGIES:	• Closely track remedial technology developments during the progress of the RI program to avoid unnecessary costs, duplication of others' treatability work, and schedule delays • Emphasize the use of technologies that are available or can be designed to operate in a modular or mobile fashion
DOCUMENTATION:	• Treatability Study Workplan • QAPP (Revised) • Sampling and Analysis Plans (by sites) • Treatability study reports (by technologies) • Treatability study Health and Safety Plan

Figure A1-6. Treatability Investigation.



PURPOSES:

- Select from among technically feasible remedial alternatives, the most attractive, based upon a consideration of the following criteria:
  - Short-term effectiveness
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume
  - Implementability
  - Cost
  - Safety
  - Compliance with ARARs
  - Overall protection of human health and environment
  - Regulatory agency acceptance
  - Community acceptance

TASKS:

- Evaluate performance, reliability, implementability, and safety features of selected alternatives
- Perform comparative Risk Assessment to determine relative impacts of alternatives on public health and the environment
- Cost analysis
- Obtain community input

POTENTIAL SUBSEQUENT ACTIONS:

- RI/FS Report
- Expedited Response Actions

STRATEGIES:

- Integrate Feasibility Study results with site characterization, treatibility investigation, and risk assessment results in the combined RI/FS Reports
- Obtain active regulatory agency involvement and review of the Detailed Analysis of Alternatives Report

DOCUMENTATION:

- Detailed Analysis of Alternatives Report

Figure A1-7. Detailed Analysis of Alternatives.

tives, tasks, strategies, and deliverables associated with this activity. This task begins after the completion of the Initial Screening and Development of Alternatives task. If existing data are inadequate to support the detailed analysis, then additional information may be collected during the treatability investigations. This final step in the alternatives evaluation process involves an assessment of the selected alternatives with respect to the following criteria:

- Short-term effectiveness;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume;
- Implementability;
- Cost;
- Compliance with ARARs;
- Overall protection of human health and environment;
- Regulatory agency acceptance; and
- Community acceptance.

Those alternatives that remain after the initial screening will be subjected to a detailed analysis and will aid in selecting the most cost-effective and technically acceptable alternative as required by the National Contingency Plan (NCP).

Several potential subsequent actions can occur after completion of the Detailed Analysis of Alternatives. One of the possible actions is the identification and initiation of an Expedited Response Action, which may involve removal, treatment, or the implementation of an interim measure to mitigate the short-term impact of a contamination problem.

Another potential subsequent action is the preparation of a Feasibility Study Report which will summarize treatability investigations (if performed), and the results/conclusions of the remedial alternatives evaluation.

The results of the Detailed Analysis of Alternatives task will be documented in a report that will contain:

- Descriptions of the combined technologies that make up each remedial alternative;

- Control, storage, treatment and/or disposal requirements;

- Special engineering, safety, environmental, public health, and welfare, or other considerations that affect the feasibility of each alternative;

- Operation, maintenance, and monitoring requirements for the short and long term;

- Public health and/or environmental impacts associated with each alternative; and

- Implementation schedule.

A follow-on Risk Assessment to the Health Risk Assessment (Section A1.4) will be performed as part of the public health and environmental impact assessment in this task. This follow-on Risk Assessment will focus on reduction of risks to potential receptors if various proposed remedial actions are implemented.

During the Detailed Analysis of Alternatives task, as in the initial screening task, the evaluations will be performed on an operable unit basis and will focus first on those operable units with the highest unmitigated risks. Regulatory agency participation will be encouraged throughout this process.

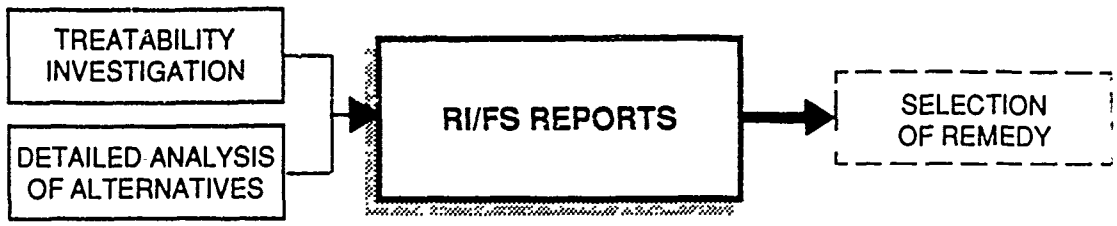
A1.2.6 Remedial Investigation/Feasibility Study Report

The Remedial Investigation/Feasibility Study (RI/FS) report, a primary document, summarizes the results of data collection and characterization activities and the evaluation of the remedial alternatives. Figure A1-8 presents a summary of the objectives, tasks, strategies, and deliverables associated with this activity. The RI/FS Reports will present the information obtained from the following activities:

- Site characterization investigations;

- Risk assessments;

- Selection of Applicable or Relevant and Appropriate Requirements; and



PURPOSES:	• Present results of data collection and remedial alternatives evaluation
TASKS:	• Summarize site characterization data • Present risk assessment results • Finalize selection of ARARs • Present remedial alternatives evaluation • Obtain public comments
POTENTIAL SUBSEQUENT ACTIONS:	• Expedited Response Actions • Selection of a final remedy • No further action
STRATEGIES:	• Prepare RI/FS Reports for individual operable unit investigations • Integrate Operable Unit RI/FS Reports into the final remedy
DOCUMENTATION:	• Draft and Final RI/FS Reports • Public notice of availability of Final RI/FS Reports • Transcripts of public meetings • Response to comments

Figure A1-8. RI/FS Reports.

- Selection and evaluation of remedial alternatives.

The RI/FS Reports will summarize the results and present the interpretation of data collected during site characterization investigations. An RI/FS Report and the associated secondary documents will be prepared for each operable unit investigation.

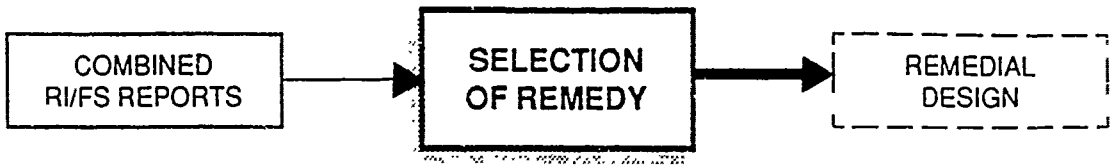
A basewide RI/FS Report may also be prepared. This document will consider the accumulation of all previous Operable Unit investigation results, reevaluate whether previously conducted interim Expedited Response Actions and Operable Unit actions will remain as part of the final remedy, and support the selection of a final remedy.

After an Operable Unit RI/FS Report has been prepared, several subsequent actions, associated with decisions made in the Selection of Remedy task, are possible:

- Initiate Removal Actions;
- Initiate Operable Unit Interim Actions;
- Select a final remedy; or
- Determine that no further action is appropriate either for individual operable units or for specific sites within the operable units.

Removal actions (including time-critical and non-time-critical) or operable unit (OU) interim or final actions may be initiated at any point in the CERCLA process. Removal Actions and OU interim actions will be conducted in accordance with state and federal laws and procedures.

The selection of a final remedy will be based upon data summarized in the RI/FS Report. Final remedies may involve either a single operable unit or the overall base (all operable units). Details on remedy selection are provided in the next section.



PURPOSES:	• Select remedial action • Initiate necessary response actions and prepare documentation presenting the need for remedial action
TASKS:	• Select remedial action • Prepare Decision Document(s) for recommendation of no further action • Prepare Record of Decision(s) • Prepare final site scores in accordance with Defense Priority Model (DPM)
POTENTIAL SUBSEQUENT ACTIONS:	• Remedial design • Expedited Response Action • No further action
STRATEGIES:	• Identify and document the need for Expedited Response Actions and remedial actions and initiate steps to perform the appropriate actions during the McClellan AFB program • Promote the use of removal actions to streamline cleanups
DOCUMENTATION:	• Proposed plan • Decision Document • Record of Decision (ROD), including Responsiveness Summary • Final DPM site scores

Figure A1-9. Selection of Remedy.

A1.2.7 Selection of Remedy

The selection of a final remedy involves a number of activities performed concurrent with and following the RI/FS report. Figure A1-9 presents a summary of theobjectives, tasks, strategies, and deliverables associated with this activity. These activities include:

- Proposed Plan;
- Responsiveness Summary; and
- Record of Decision.

Proposed Plan

The Proposed Plan is a required primary document in the IAG, and is the step in the process where the recommended remedy is proposed. The Proposed Plan will be prepared by McClellan AFB and will include:

- A summary of the alternatives considered in the Detailed Analysis of Alternatives task during the Feasibility Study;
- A description of the preferred alternative; and
- The rationale for selecting the preferred alternative.

A Proposed Plan will be issued for public comment and may result in the selection of an alternative other than the preferred alternative or may result in modifications to the preferred alternative. The Proposed Plan may address operable unit actions or basewide initiatives, as appropriate. This document will be issued concurrently with the RI/FS report.

Responsiveness Summary

At the end of the public comment period for the Proposed Plan, a Responsiveness Summary will be prepared and included in the Record of Decision (ROD) that receives concurrence from the agencies. The responsiveness summary will present a complete summary of the significant comments received from the public along with responses to the comments. Responsiveness summaries will be prepared for each Proposed Plan.

Record of Decision (ROD)

Following the agency and public review of the Proposed Plan, an ROD document will be prepared. The ROD is a primary document that provides a description of the rationale for selection of a remedy. It contains a detailed summary of site conditions, the contaminants and their status, pathways for release, and alternatives considered for addressing the hazardous substances at the site. The ROD also provides documentation required by CERCLA, as amended, and the NCP. An ROD will be prepared following completion of the Proposed Plan for each response action. Records of Decision also will be prepared for response actions which have already been completed under the Air Force's IRP. These response actions include the installation of the OU D Groundwater Extraction System, the Groundwater Treatment Plant, and the Off-Base Residential Alternate Water Supply.

Several potential actions are possible after selection of the remedy. These potential actions include, remedial design, initiation of an expedited response action, or no further action for sites or operable units. If a remedial action alternative is selected for an operable unit action, the evaluation proceeds to the first step in the cleanup phase, the remedial design.

A1.3 Implementation of Remedial Alternatives

The final phase of the McClellan AFB remedial program is the implementation of the selected remedy for cleanup of a contaminated area. There are three steps in this phase that involves the design and implementation of the chosen cleanup method and post-construction activities. This section presents a discussion about the application of expedited response actions in the McClellan AFB Remedial Response Program, and is preceded by a detailed discussion of the Remedial Design and Remedial Action phases and their relationship to each other.

A1.3.1 Remedial Design

Remedial design is the first major activity in the remedial response process that shifts the focus from planning to actual cleanup. Remedial design typically begins after completion of the Remedial Investigation/Feasibility Study and acceptance of the recommended remedy as described in the Proposed Plan and Record of Decision. Figure A1-10 presents a summary of the objectives, tasks, strategies, and deliverables associated with this activity. The objective of the Remedial Design is to prepare a set of

PURPOSES:	• Prepare a plan to guide the remedial implementation process • Prepare design specifications and bid documents • Select remedial action contractor(s)
TASKS:	• Revise community relations plan, as necessary • Conduct pilot scale testing, as necessary • Prepare design specifications, and bid documents • Solicit and evaluate bids, select contractor(s), and award contract(s)
POTENTIAL SUBSEQUENT ACTIONS:	• Remedial action • Monitoring
STRATEGIES:	• Prepare a comprehensive work plan for the remedial design and remedial action phases early in the remedial design process • Implement the remedial program, as appropriate, on an operable unit by operable unit basis • Complete the remedial design and ensure continuity in the remedial action phase by providing design reviews during construction
DOCUMENTATION:	• Design specifications and bid documents • Remedial design and remedial action work plans • Revised community relations plan (if needed)

Figure A1-10. Remedial Design.

final plans and design specifications for the selected remedial alternative. Utilizing these design documents, a bid package is prepared and released. A contractor is then selected through a competitive bidding process.

In general, the preparation of the remedial design will involve the following activities:

- Prepare Remedial Action Work Plan;
- Revise Community Relations Plan, as necessary;
- Conduct pilot scale testing, as necessary;
- Perform property and field surveying;
- Prepare preliminary design;
- Prepare final design; and
- Establish project schedule.

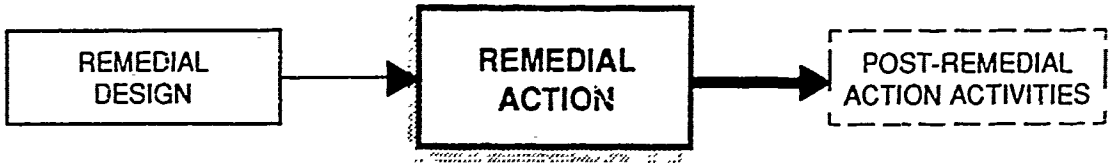
The Remedial Action Work Plan will serve as a management tool for activities conducted during the Remedial Design and Remedial Action tasks. This Work Plan will be updated annually as new data are obtained during design and implementation of response actions and ongoing RI/FS activities. The Remedial Action Work Plan, the Community Relations Plan revision (if necessary), and the final remedial design package are deliverables that will receive review and comment.

The final remedial design will include the final design plans and specifications, site description with maps, performance expectations, general operation and maintenance requirements, health and safety requirements, and construction cost estimates and project schedules.

Remedial designs developed under the Air Force's Installation Restoration Program that have been completed are shown in Table A2-3. These remedial alternatives have been constructed and have planned Operations and Maintenance procedures.

A1.3.2 Remedial Action

Remedial Action is the construction phase of the cleanup and must begin within 15 months of the completion of the ROD. Figure A1-11 presents a summary of the objectives, tasks, strategies, and deliverables associated with this activity. Successful management of the construction includes protection of public health and the environment during construction activities. Several potential actions are possible during and



PURPOSES:	• Construct, operate, and maintain the selected response action
TASKS:	• Construction management • Project Quality Assurance • Operation of facilities • Health and Safety Monitoring
POTENTIAL SUBSEQUENT ACTIONS:	• Expedited Response Actions • Post-remedial action monitoring and maintenance
STRATEGY:	• Construct the selected remedial action while protecting workers and the public from potential impacts
DOCUMENTATION:	• Site health and safety plan • Documentation of work performed, equipment installed, site worker and visitor logs, compliance with site health and safety plan, and compliance with QA/QC protocols • Preparation of "as-built" drawings

Figure A1-11. Remedial Action.

after completion of the remedial action. Emergency situations or site conditions requiring quick response to releases or threatened releases of hazardous substances could be needed during the construction or implementation of the remedial alternative. In addition, upon completion of the remedial action, post-remedial action activities are performed.

Deliverables associated with the Remedial Action task include:

- Site Health and Safety plan;
- Documentation of work performed, equipment installed, site worker and visitor logs, compliance with site Health and Safety Plan, and QA/QC protocols; and
- Preparation of "As-Built" drawings.

Revisions to the final design drawings will be made to reflect the actual constructed design and a set of "As-Built" drawings will be prepared. The preparation and submittal of daily project records including site worker and visitor logs will be maintained and compiled.

Before implementation of the remedial action begins, an approved Site Health and Safety Plan will be developed. The Site Health and Safety Plan will describe the monitoring program designed to protect on-site workers and the public from releases from the site during the cleanup. The McClellan AFB Health and Safety Plan (Radian, September 1989) will provide some of the technical basis for the Site Health and Safety Plan used for remedial actions. Remedial actions implemented under the Air Force's Installation Restoration Program that have been completed or are underway are shown in Table A2-3.

A1.3.3 Removal Actions and Operable Unit Interim Actions

Removal actions and Operable Unit (OU) Interim Actions are performed to stabilize a site, prevent further degredation, or achieve risk reduction. Removal actions and OU interim actions can be identified and implemented any time throughout the CERCLA process. The relationship between removal actions and OU interim

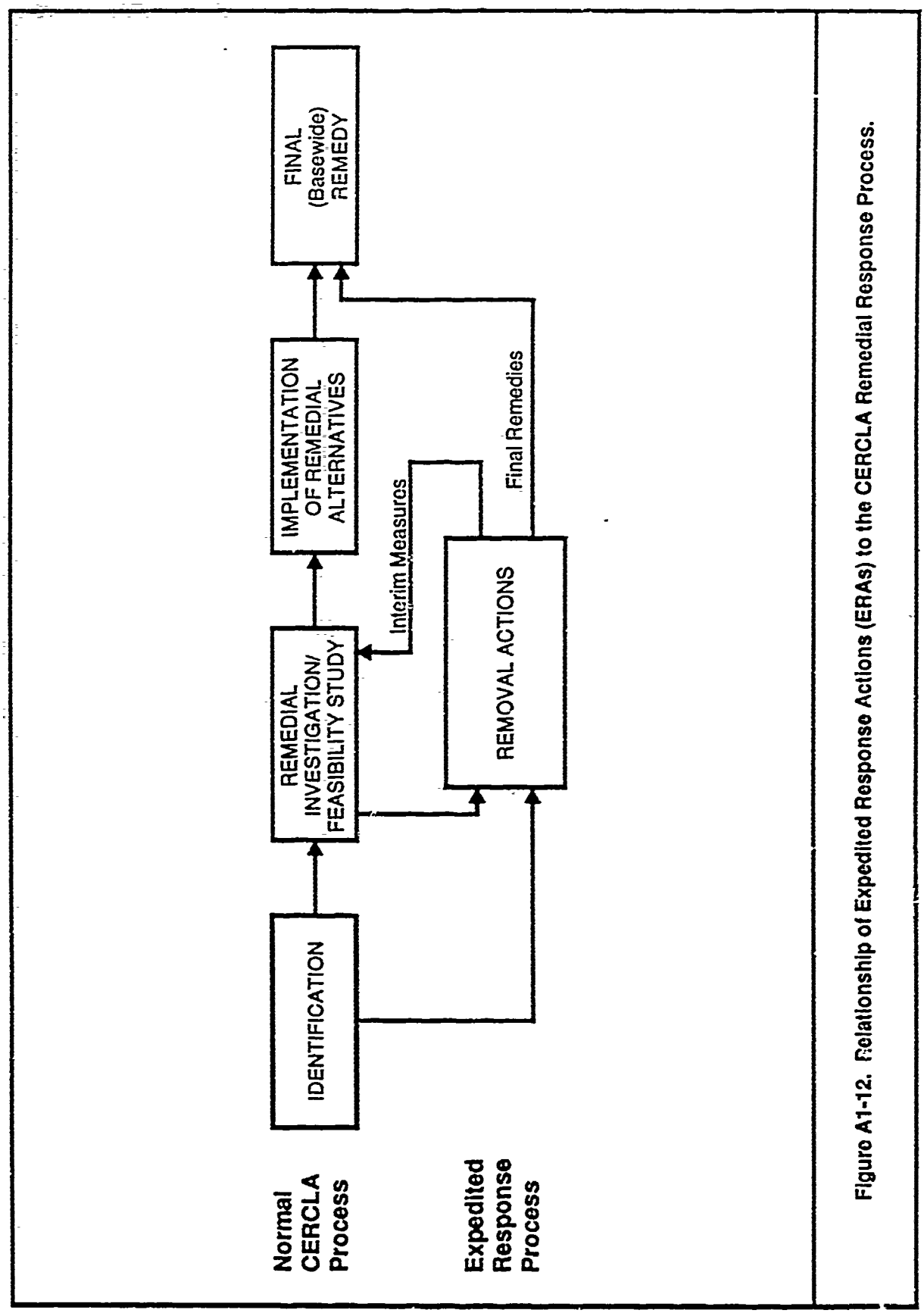


Figure A1-12. Relationship of Expedited Response Actions (ERAs) to the CERCLA Remedial Response Process.

actions and the normal CERCLA process for identifying, investigating, and remediating contamination is presented in Figure A1-12.

Removal actions involve the isolation or elimination of contamination or an exposure pathway in response to a threat to public health or the environment. Removal actions can be either time-critical or non-time critical actions, but in either case, the process of implementing the removal does not follow all the steps that are part of the normal RI/FS process. Time-critical removal actions are emergencies requiring immediate response. Non-time critical removal actions do not require the immediate response of time-critical removal actions, but are actions that should be performed on a timely basis. McClellan AFB has conducted several non-time-critical removal actions. Removal actions follow an abbreviated version of the RI/FS process and are implemented to achieve site stabilization, risk reduction and to prevent further degredation. A list of McClellan AFB removal actions which are already implemented is presented in Table 3-2.

Removal actions and OU actions can be either interim remedies or final remedies. An interim remedy is implemented to reduce short-term environmental or public health impacts and may not represent a long-term remedy. Removal actions that provide more permanent protection and emphasize alternative treatment technologies will generally be preferred. Operable unit interim and removal actions will be reassessed during the appropriate operable unit RI/FS evaluations, within ROD documentation, and during the final (basewide) RI/FS when any final remedial actions are selected. Appropriate deliverables will be prepared during the identification, investigation, and implementation phases of OU interim and removal actions.

A final removal action or OU action is part of the final (basewide) remedy. McClellan AFB has completed several Removal actions and OU interim actions that are considered part of the final remedy. Final remedies are so noted in Table A2-2.

Regulatory agencies and the public will be notified whenever removal action or OU interim actions are proposed. All removal actions and OU interim actions will be supported by appropriate documentation. An Action Memorandum will be transmitted to the agencies within 45 days following completion of a time-critical removal. For non-time critical removals, McClellan AFB will prepare an Engineering Evaluation/Cost Analysis and an Action Memorandum. This information will be transmitted to the agencies 45 days before the removal action begins. As actions are

implemented, progress reports will be prepared to keep regulatory agencies and the public informed as to the progress of the removal action. For OU interim actions, McClellan AFB will prepare focussed Feasibility Studies and Record of Decisions.

Several removal-type actions were initiated by McClellan AFB prior to passage of the SARA in 1986. The activities were in accordance with the spirit of CERCLA and are listed under Removal Action in Table A2-2.

Action Memorandum

An Action Memorandum (AM) is similar to a Record of Decision, but has a more limited purpose and application. An AM will present a description of site location and history; current site status; site conditions including soils, groundwater, surface water, potential receptors, risk assessment (if prepared); a discussion of the alternatives evaluated; and a rationale that is consistent to the extent practicable with ARARs.

Operable Unit Remedial Actions

Several remedial-type actions were initiated by McClellan AFB prior to passage of SARA in 1986. These activities were in accordance with the spirit of CERCLA, and are listed under Operable Units in Table A2-3.

A1.3.4 Additional Removal Programs

There are several other removal programs that are of importance to the overall program at McClellan AFB. These are briefly described below.

- **McClellan AFB Underground Storage Tank Program**--The McClellan AFB Underground Storage Tank (UST) Program is responsible for the monitoring, testing, and remediation of underground storage tanks in accordance with federal and state laws. The program is currently managing 76 operating tanks and has investigated nonoperating tanks. No tanks were found at 37 potential tank locations. Past underground storage tank remediation activities have included:

  -- Removal of 32 USTs during the period June 1985 to June 1988; and;

-- Removal of 27 USTs during the period June 1988 to present.

The current McClellan AFB UST Program has scheduled plans for remediating 36 USTs in 1990, 16 in 1991, and for replacing Tank Farm No. 3 with an aboveground storage facility.

- **McClellan AFB Soils Management Program**--As a result of past investigations, McClellan AFB recognizes that areas of contaminated soil beyond those areas currently planned for investigation may exist within the confines of the base. As a result, McClellan AFB has developed a Soils Management Program to proactively identify and prudently manage potentially contaminated soils.

A prime motivation for the development of this plan was the recognition that CERCLA/SARA was not intended to address such an active site as McClellan AFB and its 2,952 acres. In addition, it was recognized that there is an absence of soil cleanup standards for many chemicals and that the interface of CERCLA and RCRA complicates the contaminated soil issues.

The objectives of this program are: (1) to ensure that contaminated soil is identified early enough during ongoing base activities (i.e., construction, repairs, maintenance efforts); and (2) to ensure that contaminated soil, once it is identified, is prudently managed in accordance with federal and state requirements and in a way that minimizes the effect to ongoing base operations.

This plan will also be implemented in a two-phased approach. In the Interim Period (first phase), this plan may require some temporary storage of contaminated soils if Land Disposal Restrictions (LDR) prohibit off-site disposal or if the cost-effectiveness of off-site soil treatment can only be accomplished with certain volumes of contaminated soil. However, in the Long-Term (second phase), particularly with the phase-in of the LDRs for CERCLA wastes and as RI/FS studies and proposed remedial actions for the base progress, there will be a need to develop on-site soil treatment capability. This plan is set up to ensure that as the objectives of

this plan are implemented, both in the interim and long-term, it will be accomplished in coordination with all interested parties so that all the applicable requirements are incorporated into this plan, both now and in the future.

The full McClellan AFB Soils Management Program is included as Appendix B. It is submitted annually for agency review and comments in accordance with IAG requirements, so a common understanding will be developed among all parties as to how McClellan AFB will identify and manage potentially contaminated soil.

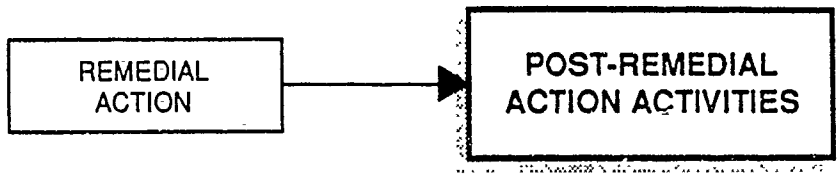
A1.3.5 Post-Remedial Action Activities

Figure A1-13 presents a summary of the objectives, tasks, strategies, and deliverables associated with post-remedial action activities. Post-remedial actions include those activities that are performed after the remedial action phase is completed. Some of these actions include:

- Operation and Maintenance of the remedial facilities;
- Monitoring of remedial action performance compared to design specifications;
- Monitoring of remediation performance and compliance with pre-determined remedial response goals; and
- Removing a site from the National Priorities List.

Collectively, these activities are designed to ensure that the action is successfully implemented. Operation and maintenance activities are ongoing and will continue for the McClellan AFB remedial actions listed in Table A2-1.

A periodic review of remedial actions, at least every five years after the initiation of the remedial action, is required as long as hazardous substances, pollutants, or contaminants that may pose a threat to human health or the environment remain at the site. If it is determined during a five-year review that the remedial action no longer



PURPOSES:	• Ensure compliance with remedial response goals • Operate and maintain equipment used in ongoing treatment or monitoring programs
TASKS:	• Prepare operation and maintenance plans • Monitoring of remedial action conformance to design specifications • Periodic review of remedial response goals and remedial action compliance with goals
POTENTIAL SUBSEQUENT ACTIONS:	• Reinitiation of response action, if necessary • Monitoring
STRATEGIES:	• Perform post-remedial action activities first for completed expedited response actions • Perform post-remedial action activities as required for future expedited response actions and remedial actions
DOCUMENTATION:	• Operation and Maintenance Plans • Compliance reports • Five-Year Review • Procedures to take a site off the list (NPL sites) - Publish formal notice of removing a site from the list

Figure A1-13. Post-Remedial Action Activities.

protects human health and the environment, further remedial actions will be considered.

Deliverables associated with post-remedial actions include:

- Compliance review reports;
- Five-Year Revisions; and
- Notices of taking the facility off the National Priorities List.

Taking a site off the list is appropriate for National Priority List (NPL) sites and would apply to the McClellan AFB facility. The McClellan AFB facility can be removed from the U.S. EPA National Priorities List when the final (basewide) remedy has been completed or if no further remedial actions are shown to be necessary. Procedures for taking a facility off the list include the following:

- Notice of intent to take a facility off the list in local publications and in the Federal Register (include a 30-day comment period); and

- Publication of the formal declaration of removal from the National Priorities List.

A1.4 Risk Assessment

The Risk Assessment process provides an evaluation of the potential threat to human health and the environment in the absence of any remedial action. It will provide a basis for determining whether or not a remedial action is necessary, the justification for performing remedial action, and also the reduction in risk to potential receptors if various proposed remedial actions are implemented.

During the Initial Screening and Development of Alternatives, remedial response objectives will be established based on the baseline risk assessment and the identification of ARARs. Remedial response objectives will be developed to specify contaminants and media of interest, exposure pathways, and remediation goals that permit a range of treatment and containment alternatives to be evaluated.

During the Detailed Analysis of Alternatives, a more detailed assessment of risk will be performed. This assessment will reevaluate indicator chemicals, identify potential exposure pathways, determine target concentrations at human exposure points,

estimate target release rates, assess chronic risk for noncarcinogens, and assess potential short-term health effects of each remedial alternative.

Guidance documents consulted in determining the protocol include the U.S. *EPA Superfund Public Health Evaluation Manual* (1986) and *Exposure Assessment Manual* (1986), the California DHS *Site Mitigation Decision Tree Manual* (1986), U.S. EPA health risk assessments guidelines, as published in the *Federal Register* (1986), and U.S. EPA *Methods for Assessing Exposure to Chemical Substances* (1985). Most recently the U.S. EPA document *Risk Assessment Guidance for Superfund, Human Health Evaluation Manual Part A (Interim Final)* (1989) has been utilized to update the risk assessment effort.

Data developed from a risk assessment may support a Natural Resource Damage Assessment (NRDA). An NRDA is a separate process performed in parallel to the RI/FS process which involves claims for the cost of "restoring, rehabilitating, replacing, or acquiring the equivalent of natural resources injured as a result of the release of a hazardous substance." An NRDA will be performed during the detailed evaluation of remedial alternatives in the FS. Activities under an NRDA include identifying damage to natural resources, determining if pathways exist from source areas to potentially affected resources, quantitation of the extent of damage and potential for recovery of the resource, and development of a plan to restore the resource. Natural resources are broadly defined, including land, fish, wildlife, biota, air, water, groundwater, and drinking water supplies. A Preliminary Natural Resources Survey conducted for McClellan AFB in August 1987 by the U.S. Fish and Wildlife Service found that releases from the site have not affected any lands, minerals, water, endangered or threatened species, anadromous fish, or Native American resources managed or protected by the Department of the Interior.

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APPENDIX A2

Confirmed Sites and Potential Release Locations
Inventory and Status

A2.0 CONFIRMED SITES AND POTENTIAL RELEASE LOCATIONS INVENTORY AND STATUS

The following two tables list all known Confirmed Sites (CSs) and Potential Release Locations (PRLs) and graphically depict the status of each. These tables will be updated annually. Changes to the overall number of CSs and PRLs and status of CSs and PRLs are tabulated at the end of Table A2-1. Table A2-2 provides a more detailed status and shows progress toward cleanup in the CSs and PRLs.

TABLE A2-1. SITES AND POTENTIAL RELEASE LOCATIONS, McCLELLAN AFB

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Comment
Operable Unit A					
CS 24	Landfill	E of Bldg. 621	41,000	Priority pollutants	
CS 34	Waste solvent storage tanks	E of Bldg. 640	100	Priority pollutants	
CS 37	Landfill	Adj. to taxiway 7165	125,000	Solvents, oil/grease	
CS 38	Underground tanks/sludge landfill	Bldg. 475	240,000	Solvents, priority pollutants, metals	
CS 40	Industrial wastewater sludge	NE of Sanitary WTP	21,000	Solvents	
CS B-5	Landfill	S of Bldg. 375	12,500	Solvents, petroleum products	
CS P-5	Open ditch	N of Bldg. 475	2,200	Solvents, other	
CS P-6	Open ditch	N of Bldg. 475	2,200	Solvents, other	
CS S-7	IWTP #3	NE of Bldg. 475	8,100	Solvents, other	
CS S-21	Degreaser/spray booths	In Bldg. 351	28,000	Solvents, petroleum products	
CS S-24	Depaint washrack	At Bldg. 375	25,000	Solvents, petroleum products	
CS S-26	Maintenance shop/spray booth	Bldg. 473	38,000	Solvents, petroleum products	
CS S-27	Solvent recovery stills	Bldg. 478	7,200	Solvents	
CS T-12	Waste oil/solvent tank	Bldg. 342	2,400	Solvents	
CS T-16	Tank farm	N of Bldg. 475	6,700	Solvents, petroleum products	
CS T-17	Tank farm	S of Bldg. 350	2,800	Solvents, petroleum products	
CS T-20	Tank farm	W of Bldg. 475	20,000	Solvents, petroleum products	
CS T-21	Underground solvent tank	W of Bldg. 342	10,000	Solvents, petroleum products	
CS T-30	Underground solvent tank	S of Bldg. 252	3,600	Solvents	
CS T-36	500-Gallon Stoddard solvent tank	Near Bldg. 329	6,700	Solvents	
CS T-37	Stoddard solvent tank	S of Bldg. 360	6,700	Solvents	
CS T-47	Oil/water separator	E of Bldg. 346A	6,700	Petroleum products	
CS T-57	IWL drain at Bldg. 431	W of Bldg. 431	75,000	Priority pollutants	
CS T-59	Underground storage tank	Near Bldg. 340	2,500	Petroleum products	
CS T-61	Underground storage tank	Bldg. 614	1,000	Gasoline	
PRL 25	Landfill	S end of N/S runway	110,000	None detected	
PRL 39	Landfill	S of Bldg. 351	100,000	None Detected	
PRL B-2	Spoil pit/borrow pit	Under N/S runway	Unknown	Unknown	
PRL B-3	Landfill	Under Bldg. 251	Unknown	Solvents, petroleum products	
PRL B-4	Sludge drying bed	S of Bldg. 344	2,500	Solvents, metals	
PRL L-2	Industrial wastewater line	Area A1	--	Priority pollutants	
PRL L-3	Industrial wastewater line	Area A2	Unknown	Priority pollutants	
PRL L-4	Industrial wastewater line	Area A2	Unknown	Priority pollutants	
PRL P-3	Oil pit	S of Bldg. 251	6,272	Solvents, petroleum products	
PRL P-4	Sump	E of Bldg. 351	3,360	Solvents, petroleum products	
PRL P-8	Acid and cyanide pit	S end of N/S runway	38,000	Acid, metals	

(Continued)

TABLE A2-1. (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Comment
Operable Unit A (Continued)					
PRL S-1	Plating shop	In Bldg. 343	12,000	Solvents, metals, cyanide	
PRL S-2	Chemical warehouse	In Bldg. 447	9,400	Solvents	
PRL S-3	Acid storage warehouse	W of Bldg. 447	5,600	Acid	
PRL S-4	Treatment plant/sludge beds	N of Bldg. 431	13,000	Solvents, metals, petroleum products	
PRL S-6	IWTP #1	E of Bldg. 346	4,200	Solvents, metals	
PRL S-9	Asbestos storage	E of Bldg. 642	10,000	Asbestos	
PRL S-14	Paint shop/spray booths	Bldg. 22	8,400	Solvents, petroleum products	
PRL S-16	Solvents/paint spray booths	Bldg. 250	250,000	Solvents, petroleum products	
PRL S-17	Repair shop/spray booths	Bldg. 251	27,000	Solvents, petroleum products	
PRL S-18	Repair shop/cleaning shop	Bldg. 252	27,000	Solvents, petroleum products	
PRL S-19	Entomology storage area	NE of Sanitary WTP	3,600	Pesticides	
PRL S-20	Photo lab	Bldg. 336	14,000	Solvents, metals	
PRL S-22	Repair shop/spray booths	In Bldg. 355	10,000	Solvents, petroleum products	
PRL S-23	Plating shop	In Bldg. 358	14,000	Solvents, metals, cyanide	
PRL S-25	Transformer shop	Bldg. 440	27,000	PCBs, solvents, petroleum products	
PRL S-36	Oil drum storage	N of Bldg. 410	27,000	Solvents, petroleum products	
PRL S-37	Oil drum storage	N of Bldg. 410	27,000	Solvents, petroleum products	
PRL S-38	Drum storage	N of Bldg. 431	15,000	Solvents	
PRL T-6	Underground solvent tank	Bldg. 640	3,100	Solvents	
PRL T-7	Solvent pit/waste thinner tank	Bldg. 640	14,000	Solvents	
PRL T-10	Solvent tank	Bldg. 362	56,000	Solvents	
PRL T-15	Tank farm	N of Bldg. 447	25,000	Solvents, petroleum products	
PRL T-18	Tank farm	E of Bldg. 343	5,400	Solvents, petroleum products	
PRL T-19	Tank farm	E of Bldg. 344	5,400	Solvents, petroleum products	
Operable Unit B					
CS 23	Landfill	Bldg. 781	24,000	Priority pollutants	
CS 30	Radio/chem lab/landfill	E of Bldg. 628	39,000	Solvents, metals	
CS 31	Incinerator ash burial pit	Near Bldg. 680	53,000	Arsenic	
CS 36	Open storage area	N of Bldg. 666	30,000	Solvents, cyanide	

(Continued)

TABLE A2-1. (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Comment
Operable Unit B (Continued)					
CS 47	Abandoned plating shop	Bldg. 666	44,000	Solvents, metals	
CS 48	Aband.ed IWTP	IWTP #4	2,500	Solvents, metals, oil/grease	
PRL 29	Landfill	NE of Bldg. 700	120,000	None detected	
PRL 35	Scrap metal burial pit	Bldg. 652	35,000	None detected	Deleted -- No Further Action
PRL B-1	Landfill	E of Bldg. 700	109,200	Unknown	Deleted -- No Further Action
PRL B-9	Landfill	E of Bldg. 700	Unknown	Unknown	Deleted -- No Further Action
PRL L-5	Industrial wastewater line	Area B2	Unknown	Priority pollutants	
PRL L-6	Industrial wastewater line	ARea B2	Unknown	Priority pollutants	
PRL P-2	Waste pond	S of Bldg. 687	18,816	Solvents, petroleum products	
PRL P-9	Open drainage ditch	W of Bldg. 660	1,700	Solvents, metals	
PRL S-5	Abandoned IWTP	IWTP #2	5,500	Solvents, oil/grease, metals, other	
PRL S-12	PCB storage	Bldg. 624	20,000	PCBs	Deleted -- No Further Action
PRL S-13	Open storage	Bldgs. 709, 727, 729	120,000	Solvents	
PRL S-28	Oil/paint storage	N of Bldg. 600	5,000	Oil/grease	
PRL S-29	PCB storage	In Bldg. 655	190,000	PCBs	
PRL S-30	Depaint washrack	Bldg. 658	15,000	Solvents, petroleum products	
PRL S-33	Hazardous materials storage	Bldg. 786	84,000	Solvents, other	
PRL S-34	Degreaser/paint spray booth	Bldg. 652	35,000	Solvents, other	
PRL S-35	Solvent spray booth	Bldg. 654	25,000	Solvents, other	
PRL S-41	Mat K drainage	S of Bldg. 711	125,000	Solvents, petroleum products, lead	Deleted -- No Further Action
PRL T-8	Fuel tank	Bldg. 756	16,000	Solvents, petroleum products	
PRL T-45	Oil/water separator	N of Bldg. 74	3,600	Petroleum products	
PRL T-46	Oil/water separator	S of Bldg. 764	6,700	Petroleum products	
PRL T-48	Oil/water separator	S of Bldg. 765	6,700	Petroleum products	
PRL T-60	Underground storage tank	NW Bldg. 656	2,500	Petroleum products	
Operable Unit C					
CS 7	Sludge/oil pit	E of Bldg. 701	35,000	Priority pollutants, oil/grease, PCB	
CS 10	Landfill	W of Bldg. 774	32,000	Priority Pollutants, PCB	
CS 11	Landfill	W of Bldg. 774	32,000	Priority Pollutants	
CS 12	Landfill	SW of Bldg. 774	55,000	Priority Pollutants	
CS 13	Landfill	W of Bldg. 774	54,000	Priority Pollutants	
CS 14	Landfill	S of Bldg. 701	54,000	Priority Pollutants	
CS 22	Burn pit/landfill	S of IWTP Aera. Bsn.	40,000	Priority pollutants, PCB, oil/grease	

(Continued)

TABLE A2-1. (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Comment
Operable Unit C (Continued)					
CS 42	Oil storage/landfill	IWTP Aeration Basin	11,000	Priority pollutants, oil/grease, PCB	
CS 43	Landfill	NW of Bldg. 704	20,000	Priority Pollutants	
CS 52	Burn pit	NW of Bldg. 704	20,000	Priority Pollutants	
CS 67	Landfill	NW of Bldg. 702	40,000	Priority pollutants, petroleum products	
CS 69	Burn pit	SE of Bldg. 704	Unknown	Priority pollutants	
PRL 8	Sludge/refuse landfill	NW of Bldg. 774	59,000	Solvents, priority pollutants	
PRL 9	Landfill	W of Bldg. 774	40,000	Priority pollutants	
PRL 15	Sodium valve trench	SW of Bldg. 774	30	None detected	
PRL 16	Sodium valve trench	S of Bldg. 701	30	None detected	
PRL 17	Landfill	SE of Bldg. 704	40,000	Solvents	
PRL 18	Landfill	SE of Bldg. 704	40,000	None detected	
PRL 19	Landfill	SE of Bldg. 704	40,000	None detected	
PRL 20	Sludge/oil pit	SE of Bldg. 704	50,000	Solvents	
PRL 21	Sludge/oil pit	SE of Bldg. 704	50,000	Solvents	
PRL 28	Sludge pit	W of IWTP	3,000	Priority pollutants	
PRL 32	Radio/hazardous waste storage	S of IWTP	160	Priority pollutants	
PRL 41	Landfill	Bldg. 704	106,000	Priority pollutants	
PRL 49	Landfill	NE of Bldg. 704	45,000	None detected	
PRL 50	Settling pond	NW of Bldg. 704	11,000	None detected	
PRL 51	Holding pond	NW of IWTP	180,000	None detected	
PRL 53	Settling pond	NW of Bldg. 704	96,000	Solvents	
PRL 54	Storage area	S of Bldg. 704	6,300	None detected	
PRL 55	Acid storage area/landfill	S of Bldg. 704	900	Solvents	
PRL 56	Storage area	S of Bldg. 704	100,000	None detected	
PRL 57	Landfill	S of Bldg. 704	25,000	None detected	
PRL 60	Holding pond	S of IWTP	80,000	None detected	
PRL 61	Chemical waste pit	E of Bldg. 722	500	None detected	
PRL 62	Chemical waste pit	E of Bldg. 722	500	None detected	
PRL 63	Unlined ditch	SE of Bldg. 704	20,000	None detected	
PRL 64	Unlined ditch	SE of Bldg. 704	20,000	None detected	
PRL 65	Landfill	E of Bldg. 692	400,000	None detected	
PRL 66	Ditches and pond	W of Bldg. 721	Unknown	None detected	
PRL 68	Sludge ponds	W of Site 42	13,000	Priority pollutants	
PRL L-7	Industrial wastewater line	Area C2	Unknown	Priority pollutants	
PRL P-10	Magpie Creek	N of Bldg. 783	Unknown	Volatile organic compounds	
PRL S-11	BCE/PCE storage	Bldg. 636	47,000	PCB, solvents, petroleum products	

(Continued)

TABLE A2-1. (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Comment
Operable Unit C (Continued)					
PRL S-31	Aircraft paint hangar	Bldg. 692	47,000	Paints, solvents, petroleum products	
PRL S-32	Paint storage area	Bldg. 694	10,080	Paints, solvents, petroleum products	
PRL S-46	Unknown	N of Bldg. 774	Unknown	Volatile organic compounds	
PRL S-48	Unknown	W of Bldg. 720	Unknown	Volatile organic compounds	
Operable Unit D					
CS A	Sludge disposal pit	NW corner of base	Unknown	Solvents, priority pollutants, metals	
CS S	Fuel/solvent/oil burn pit	NW corner of base	9,200	Solvents, priority pollutants, petroleumproducts	
CS T	Fuel/solvent sludge pit	NW corner of base	8,400	Solvents, priority pollutants, metals, petroleum prod.	
CS 1	Landfill	NW corner of base	10,500	Priority pollutants	
CS 2	Sludge/oil pit	NW corner of base	20,000	Priority pollutants	
CS 3	Sludge/oil pit	NW corner of base	50,700	Priority pollutants	
CS 4	Sludge/oil pit	NW corner of base	15,000	Priority pollutants	
CS 5	Sludge/oil pit	NW corner of base	15,600	Priority pollutants	
CS 6	Oil burn pit	NW corner of base	7,500	Solvents, metals	
CS 26	Sludge/oil burn pit	NW corner of base	40,000	Solvents, metals	
PRL 27	Sodium valve trench	Bldg. 1085	100	None detected	
PRL 33	IWTP sludge landfarm	NW corner of base	2,000,000	Solvents	
PRL T-11	Underground storage tank	Bldg. 1093	1,000	Solvents	
Operable Units D, E, G, H					
PRL P-7	Open ditch	NE to Area D	5,000 linear	Petroleum products, solvents	
Operable Unit E					
PRL 45	Paint waste landfill	N end of base	150,000	None detected	
PRL S-10	Storage area	NW of Bldg. 1086	63,000	Solvents, radiation	
Operable Unit F					
PRL B-6	Waste area	N of N/S runway	627,200	Unknown	
Operable Unit G					
PRL L-1	Industrial wastewater line	Area G	Unknown	Priority pollutants	
PRL S-42	Hobby shop/M&R washrack	N of Bldg. 1439	8,100	Solvents, petroleum products	
PRL S-43	Aircraft washrack	NE corner of Mat V	49,000	Solvents, petroleum products	
PRL S-44	Aircraft maintenance area	S of Bldg. 1071/Mat U	275,000	Solvents, petroleum products	

(Continued)

TABLE A2-1. (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Comment
Operable Unit G (Continued)					
PRL T-31	Underground storage tank	Near Bldg. 1028	12,500	Solvents	
PRL T-32	Underground storage tank	Near Bldg. 1023	12,500	Solvents	
PRL T-33	Underground storage tank	Near Bldg. 1021	12,500	Solvents	
PRL T-44	Stoddard solvent tank	NW of Bldg. 1048	10,000	Solvents	
PRL T-62	Underground storage tank	NE of Bldg. 1075	Unknown	Volatile organic compounds	
Operable Unit H					
PRL B-7	Spoil area	N of Bldg. 243	627,200	Unknown	
PRL P-1	Drainage ditch/ponds	W of Bldg. 878	56,448	Solvents, petroleum products	
PRL S-8	Electroplating shop	In Bldg. 243G	35,000	Solvents, metals, cyanide	
PRL S-15	Degreaser/spray booths	Bldg. 243	290,000	Solvents, petroleum products	
PRL S-39	New museum site	Dudley Blvd./Palm St.	94,000	Solvents	
PRL S-40	Troop issue site	NW of Bldg. 910	19,000	Unknown	
PRL S-45	Aircraft maintenance area	W of Bldg. 878	615,000	Solvents, petroleum products	
PRL S-47	Unknown	NE of Bldg. 943	Unknown	Volatile organic compounds	

CS = Confirmed Site.
PRL = Potential Release Location.
IWL = Industrial Wastewater Line.
IWTP = Industrial Wastewater Treatment Plant.

Total PRLs	117
Total Sites	53
TOTAL PRLs and Sites	170

	TOTAL
Sites and PRLs Deleted (No Futher Action)	5
Sites and PRLs Recommended for No Furth[illegible] Action	
Sites and PRLs Completely Remediated	0
Sites and PRLs Closed and Monitored	0
Sites and PRLs Awaiting Action	165
TOTAL	170

RADIAN CORPORATION

AREA A
LOCATION STATUS

	IDENTIFICATION NUMBER																														
	39	40	B3	B4	B5	L2	P3	P4	S1	S6	S14	S16	S17	S18	S19	S20	S21	S22	S23	S24	T10	T12	T17	T18	T19	T21	T30	T36	T37	T47	T59
DISCOVERY & SCOPING:																															
Preliminary Assessment / Location File	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Site Inspection	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●							●		
Interviews	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●						●			●	
No Further Action																															
REMEDIAL INVESTIGATION*:																															
SAMPLING & ANALYSIS PLAN:																															
Soil Gas Investigation																															
Soil Sampling																															
Surface Water Sampling																															
Air Monitoring																															
RI DATA COLLECTION:																															
First Round Sampling																															
Second Round Sampling																															
Third Round Sampling																															
Sampling Complete																															
Data Summary																															
RI REPORT:																															
Health Risk Assessment																															
RI Report																															
No Further Action Recommended																															
FEASIBILITY STUDY:																															
Identify & Screen Remedial Technologies																															
Develop & Screen Remedial Alternatives																															
FS Risk Assessment																															
FS Report																															
Treatability Study																															
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REMEDIATION - OPERABLE UNIT:																															
Record of Decision																															
Remedial Design																															
Remedial Action (Construction)																															
Five-Year Review																															
REMEDIATION - BASEWIDE FINAL:																															
Record of Decision																															
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Remedial Action (Construction)																															
Operation & Maintenance																															

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites.

AREA A
LOCATION STATUS

	IDENTIFICATION NUMBER																												
	CS 38	25	37	B2	L3	L4	P5	P6	S2	S3	S4	S7	S25	S26	S27	S36	S37	S38	T15	T16	T20	T57							
DISCOVERY & SCOPING:																													
Preliminary Assessment / Location File	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							
Site Inspection	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							
Interviews	●				●	●	●	●	●	●		●	●	●	●	●				●	●	●							
No Further Action																													
REMEDIAL INVESTIGATION*:																													
SAMPLING & ANALYSIS PLAN:																													
Soil Gas Investigation																													
Soil Sampling																													
Surface Water Sampling																													
Air Monitoring																													
RI DATA COLLECTION:																													
First Round Sampling																													
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Third Round Sampling																													
Sampling Complete																													
Data Summary																													
RI REPORT:																													
Health Risk Assessment																													
RI Report																													
No Further Action Recommended																													
FEASIBILITY STUDY:																													
Identify & Screen Remedial Technologies																													
Develop & Screen Remedial Alternatives																													
FS Risk Assessment																													
FS Report																													
Treatability Study																													
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REMEDIATION - REMOVAL ACTION:																													
REMEDIATION - OPERABLE UNIT:																													
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Remedial Design																													
Remedial Action (Construction)																													
Five-Year Review																													
REMEDIATION - BASEWIDE FINAL:																													
Record of Decision																													
Remedial Design																													
Remedial Action (Construction)																													
Operation & Maintenance																													

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

AREA A LOCATION STATUS

	IDENTIFICATION NUMBER						
	[illegible]	34	P8	S9	T6	T7	T61
DISCOVERY & SCOPING:							
Preliminary Assessment / Location File	●	●	●	●	●	●	●
Site Inspection	●	●	●	●	●	▲	●
Interviews							
No Further Action							
REMEDIAL INVESTIGATION*:							
SAMPLING & ANALYSIS PLAN:							
Soil Gas Investigation							
Soil Sampling							
Surface Water Sampling							
Air Monitoring							
RI DATA COLLECTION:							
First Round Sampling							
Second Round Sampling							
Third Round Sampling							
Sampling Complete							
Data Summary							
RI REPORT:							
Health Risk Assessment							
RI Report							
No Further Action Recommended							
FEASIBILITY STUDY:							
Identify & Screen Remedial Technologies							
Develop & Screen Remedial Alternatives							
FS Risk Assessment							
FS Report							
Treatability Study							
No Further Action Recommended							
REMEDIATION - REMOVAL ACTION:							
REMEDIATION - OPERABLE UNIT:							
Record of Decision							
Remedial Design							
Remedial Action (Construction)							
Five-Year Review							
REMEDIATION - BASEWIDE FINAL:							
Record of Decision							
Remedial Design							
Remedial Action (Construction)							
Operation & Maintenance							

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

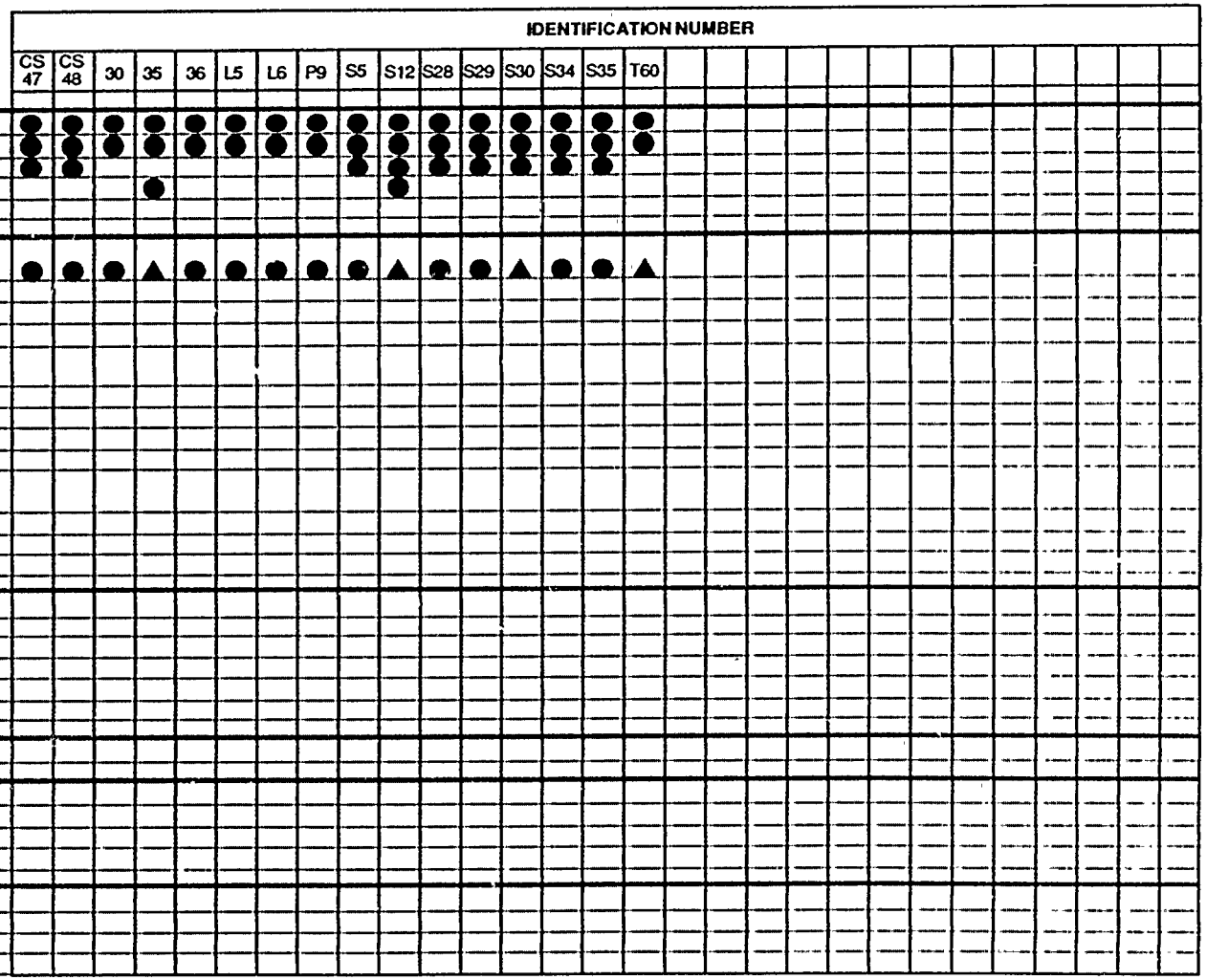
AREA B
LOCATION STATUS

	IDENTIFICATION NUMBER												
	CS 23	29	31	B1	B9	P2	S13	S33	S41	T8	T45	T46	T48
DISCOVERY & SCOPING:													
Preliminary Assessment / Location File	●	●	●	●	●	●	●	●	●	●	●	●	●
Site Inspection	●	●	●	●	●	●	●	●	●	●	●	●	●
Interviews	●		●	●			●	●		●	●		
No Further Action				●	●				●				
REMEDIAL INVESTIGATION*:													
SAMPLING & ANALYSIS PLAN:													
Soil Gas Investigation	●	▲	●	▲	▲	●	●	●	▲	●	●	●	▲
Soil Sampling													
Surface Water Sampling													
Air Monitoring													
RI DATA COLLECTION:													
First Round Sampling													
Second Round Sampling													
Third Round Sampling													
Sampling Complete													
Data Summary													
RI REPORT:													
Health Risk Assessment													
RI Report													
No Further Action Recommended													
FEASIBILITY STUDY:													
Identify & Screen Remedial Technologies													
Develop & Screen Remedial Alternatives													
FS Risk Assessment													
FS Report													
Treatability Study													
No Further Action Recommended													
REMEDIATION - REMOVAL ACTION:													
REMEDIATION - OPERABLE UNIT:													
Record of Decision													
Remedial Design													
Remedial Action (Construction)													
Five-Year Review													
REMEDIATION - BASEWIDE FINAL:													
Record of Decision													
Remedial Design													
Remedial Action (Construction)													
Operation & Maintenance													

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

AREA B
LOCATION STATUS



LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

RADIAN CORPORATION

AREA C
LOCATION STATUS

	IDENTIFICATION NUMBER																													
	CS 7	CS 10	CS 11	CS 12	CS 13	CS 14	CS 43	CS 52	CS 67	8	9	15	16	49	50	51	53	S46												
DISCOVERY & SCOPING:																														
Preliminary Assessment / Location File														●	●	●	●													
Site Inspection														●	●	●	●													
Interviews																●														
No Further Action																														
REMEDIAL INVESTIGATION*:																														
SAMPLING & ANALYSIS PLAN:																														
Soil Gas Investigation																														
Soil Sampling																														
Surface Water Sampling																														
Air Monitoring																														
RI DATA COLLECTION:																														
First Round Sampling																														
Second Round Sampling																														
Third Round Sampling																														
Sampling Complete																														
Data Summary																														
RI REPORT:																														
Health Risk Assessment																														
RI Report																														
No Further Action Recommended																														
FEASIBILITY STUDY:																														
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Develop & Screen Remedial Alternatives																														
FS Risk Assessment																														
FS Report																														
Treatability Study																														
No Further Action Recommended																														
REMEDIATION - REMOVAL ACTION:																														
REMEDIATION - OPERABLE UNIT:																														
Record of Decision																														
Remedial Design																														
Remedial Action (Construction)																														
Five-Year Review																														
REMEDIATION - BASEWIDE FINAL:																														
Record of Decision																														
Remedial Design																														
Remedial Action (Construction)																														
Operation & Maintenance																														

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

AREA C
LOCATION STATUS

	IDENTIFICATION NUMBER																												
	CS 22	CS 42	CS 69	17	18	19	20	21	28	32	41	54	55	56	57	60	61	62	63	64	65	66	68	I.7	P10	S11	S31	S32	S48
DISCOVERY & SCOPING:																													
Preliminary Assessment / Location File	●	●			●	●	●	●		●		●	●	●	●		●	●	●	●	●	●				●	●	●	
Site Inspection	●	●			●	●	●	●		●		●	●	●	●		●	●	●	●	●	●				●	●	●	
Interviews	●	●																				●							
No Further Action												●			●		●	●											
REMEDIAL INVESTIGATION*:																													
SAMPLING & ANALYSIS PLAN:																													
Soil Gas Investigation																													
Soil Sampling																													
Surface Water Sampling																													
Air Monitoring																													
RI DATA COLLECTION:																													
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Second Round Sampling																													
Third Round Sampling																													
Sampling Complete																													
Data Summary																													
RI REPORT:																													
Health Risk Assessment																													
RI Report																													
No Further Action Recommended																													
FEASIBILITY STUDY:																													
Identify & Screen Remedial Technologies																													
Develop & Screen Remedial Alternatives																													
FS Risk Assessment																													
FS Report																													
Treatability Study																													
No Further Action Recommended																													
REMEDIATION - REMOVAL ACTION:																													
REMEDIATION - OPERABLE UNIT:																													
Record of Decision																													
Remedial Design																													
Remedial Action (Construction)																													
Five-Year Review																													
REMEDIATION - BASEWIDE FINAL:																													
Record of Decision																													
Remedial Design																													
Remedial Action (Construction)																													
Operation & Maintenance																													

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

AREA D
LOCATION STATUS

	IDENTIFICATION NUMBER												
	CS A	CS S	CS T	CS 1	CS 2	CS 3	CS 4	CS 5	CS 6	CS 26	27	33	T11
DISCOVERY & SCOPING:													
Preliminary Assessment / Location File		●	●	●	●	●	●	●	●	●	●	●	
Site Inspection											●	●	
Interviews													●
No Further Action													
REMEDIAL INVESTIGATION*:													
SAMPLING & ANALYSIS PLAN:													
Soil Gas Investigation	●	●	●	●	●	●	●	●	●	●	●	●	
Soil Sampling													
Surface Water Sampling													
Air Monitoring													
RI DATA COLLECTION:													
First Round Sampling	●	●	●	●	●	●	●	●	●	●	●	●	
Second Round Sampling													
Third Round Sampling													
Sampling Complete													
Data Summary													
RI REPORT:													
Health Risk Assessment													
RI Report													
No Further Action Recommended													
FEASIBILITY STUDY:													
Identify & Screen Remedial Technologies													
Develop & Screen Remedial Alternatives													
FS Risk Assessment													
FS Report													
Treatability Study													
No Further Action Recommended													
REMEDIATION - REMOVAL ACTION:	●		●	●	●	●	●	●	●	●	●	●	
REMEDIATION - OPERABLE UNIT:													
Record of Decision													
Remedial Design													
Remedial Action (Construction)													
Five-Year Review													
REMEDIATION - BASEWIDE FINAL:													
Record of Decision													
Remedial Design													
Remedial Action (Construction)													
Operation & Maintenance													

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

AREA E LOCATION STATUS	IDENTIFICATION NUMBER																														
	45	S10	P7																												
DISCOVERY & SCOPING:																															
Preliminary Assessment / Location File																															
Site Inspection																															
Interviews																															
No Further Action																															
REMEDIAL INVESTIGATION*:																															
SAMPLING & ANALYSIS PLAN:																															
Soil Gas Investigation																															
Soil Sampling																															
Surface Water Sampling																															
Air Monitoring																															
RI DATA COLLECTION:																															
First Round Sampling																															
Second Round Sampling																															
Third Round Sampling																															
Sampling Complete																															
Data Summary																															
RI REPORT:																															
Health Risk Assessment																															
RI Report																															
No Further Action Recommended																															
FEASIBILITY STUDY:																															
Identify & Screen Remedial Technologies																															
Develop & Screen Remedial Alternatives																															
FS Risk Assessment																															
FS Report																															
Treatability Study																															
No Further Action Recommended																															
REMEDIATION - REMOVAL ACTION:																															
REMEDIATION - OPERABLE UNIT:																															
Record of Decision																															
Remedial Design																															
Remedial Action (Construction)																															
Five-Year Review																															
REMEDIATION - BASEWIDE FINAL:																															
Record of Decision																															
Remedial Design																															
Remedial Action (Construction)																															
Operation & Maintenance																															

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

AREA F
LOCATION STATUS

	IDENTIFICATION NUMBER
	B6
DISCOVERY & SCOPING:	
Preliminary Assessment / Location File	
Site Inspection	
Interviews	
No Further Action	
REMEDIAL INVESTIGATION*:	
SAMPLING & ANALYSIS PLAN:	
Soil Gas Investigation	
Soil Sampling	
Surface Water Sampling	
Air Monitoring	
RI DATA COLLECTION:	
First Round Sampling	
Second Round Sampling	
Third Round Sampling	
Sampling Complete	
Data Summary	
RI REPORT:	
Health Risk Assessment	
RI Report	
No Further Action Recommended	
FEASIBILITY STUDY:	
Identify & Screen Remedial Technologies	
Develop & Screen Remedial Alternatives	
FS Risk Assessment	
FS Report	
Treatability Study	
No Further Action Recommended	
REMEDIATION - REMOVAL ACTION:	
REMEDIATION - OPERABLE UNIT:	
Record of Decision	
Remedial Design	
Remedial Action (Construction)	
Five-Year Review	
REMEDIATION - BASEWIDE FINAL:	
Record of Decision	
Remedial Design	
Remedial Action (Construction)	
Operation & Maintenance	

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

AREA G LOCATION STATUS	IDENTIFICATION NUMBER																												
	L1	S42	S43	S44	T31	T32	T33	T44	T62																				
DISCOVERY & SCOPING:																													
Preliminary Assessment / Location File																													
Site Inspection																													
Interviews																													
No Further Action																													
REMEDIAL INVESTIGATION*:																													
SAMPLING & ANALYSIS PLAN:																													
Soil Gas Investigation																													
Soil Sampling																													
Surface Water Sampling																													
Air Monitoring																													
RI DATA COLLECTION:																													
First Round Sampling																													
Second Round Sampling																													
Third Round Sampling																													
Sampling Complete																													
Data Summary																													
RI REPORT:																													
Health Risk Assessment																													
RI Report																													
No Further Action Recommended																													
FEASIBILITY STUDY:																													
Identify & Screen Remedial Technologies																													
Develop & Screen Remedial Alternatives																													
FS Risk Assessment																													
FS Report																													
Treatability Study																													
No Further Action Recommended																													
REMEDIATION - REMOVAL ACTION:																													
REMEDIATION - OPERABLE UNIT:																													
Record of Decision																													
Remedial Design																													
Remedial Action (Construction)																													
Five-Year Review																													
REMEDIATION - BASEWIDE FINAL:																													
Record of Decision																													
Remedial Design																													
Remedial Action (Construction)																													
Operation & Maintenance																													

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

AREA H
LOCATION STATUS

	IDENTIFICATION NUMBER																														
	B7	P1	S8	S15	S39	S40	S45	S47																							
DISCOVERY & SCOPING:																															
Preliminary Assessment / Location File	●	●		●	●	●	●																								
Site Inspection	●	●		●	●	●	●																								
Interviews	●	●		●	●	●	●																								
No Further Action																															
REMEDIAL INVESTIGATION*:																															
SAMPLING & ANALYSIS PLAN:																															
Soil Gas Investigation																															
Soil Sampling																															
Surface Water Sampling																															
Air Monitoring																															
RI DATA COLLECTION:																															
First Round Sampling																															
Second Round Sampling																															
Third Round Sampling																															
Sampling Complete																															
Data Summary																															
RI REPORT:																															
Health Risk Assessment																															
RI Report																															
No Further Action Recommended																															
FEASIBILITY STUDY:																															
Identify & Screen Remedial Technologies																															
Develop & Screen Remedial Alternatives																															
FS Risk Assessment																															
FS Report																															
Treatability Study																															
No Further Action Recommended																															
REMEDIATION - REMOVAL ACTION:																															
REMEDIATION - OPERABLE UNIT:																															
Record of Decision																															
Remedial Design																															
Remedial Action (Construction)																															
Five-Year Review																															
REMEDIATION - BASEWIDE FINAL:																															
Record of Decision																															
Remedial Design																															
Remedial Action (Construction)																															
Operation & Maintenance																															

LEGEND: ● Completed Activity ▲ Activity Not Required ■ Continuing Activity * Some of these investigations apply to all sites & are not tracked on a site-by-site basis

Table A2-2. Status of Potential Release Locations and Sites. (continued)

RADIAN CORPORATION

APPENDIX B1

Response to Comments on the CCW

RADIAN CORPORATION

EPA Comment #2 January 1991: Section 2.1 CERCLA Process, page 2-3.

Comment: The CCW correctly describes an IRA as an action between a removal and remedial action however, the duration of the action itself is also an important criteria which determines the classification of an action. A removal action by statute is limited by a one year, two million dollar limit and EPA uses the definition to define the difference between removal and remedial actions.

An "IRA" is operable unit or interim action operable unit. An interim action operable unit is an early action taken under remedial authority to stabilize a site, prevent further degradation or achieve risk reduction. The interim action operable unit concept allows for early action or actions to be implemented in phases. The need for early action or phasing must be carefully balanced against the need to characterize a site an analyze alternative remedial approaches.

The operable unit approach conceptually allows for cleanup to be achieved quicker when viewed from a basewide perspective. However, as stated in the CCW, an IRA action by itself is not considered a cleanup action but is used to stabilize a situation. The use of the term IRA to provide a quicker cleanup is misleading and should be clarified.

Response: Text changes are presented on redline strikeout pages 2-3 and 2-4 to reflect information suggested in this comment and to use terms more consistent with the 1990 NCP. In addition, the Air Force authority for conducting removal actions is discussed.

- Screening and conducting detailed analyses of cleanup alternatives for the contaminated area; and

- Presenting the investigation results and the recommended cleanup remedy in a Remedial Investigation/Feasibility Study (RI/FS) report for agency and public review.

Detailed discussions about each of these steps and their relationships to one another are presented in Appendix A1, Section A1.2.

Clean up is the third phase of the CERCLA process in which the selected remedy for cleanup of a contaminated area is implemented. As shown in Figure 2-1, there are three steps in this phase involving the design and implementation of the chosen cleanup method as well as post-cleanup monitoring activities. Detailed discussions about each of these steps and their relationships to one another are presented in Appendix A1, Section A1.3.

In addition to remedial actions that would typically apply to an operable unit or a major subdivision thereof, removal actions and/or operable unit (OU) interim actions will address a limited area, volume, or zone of potentially contaminated media. Such actions would be implemented at sites where warranted. Removal actions and OU interim actions follow an abbreviated version of the remedial action process and are implemented anytime throughout the CERCLA process to stabilize a site, prevent further degradation, or achieve risk reduction. Removal actions and OU interim actions will be reevaluated as part of the Operable Unit Record of Decision (ROD). A detailed discussion of removal, OU interim actions, and remedial actions is presented in Appendix A1, Section A1.3.3.

U.S. Environmental Protection Agency policy, as presented in 40 CFR 300.415(b)(4)(ii)(B)(5) limits fund-financed removal actions to a one-year time limit and, $2 million limit. The McClellan AFB removal actions are not considered fund-financed removal actions or abatement actions ordered under 42 USC Sec. 9606 (CERCLA Sec.106). Instead, the Air Force removal actions are being conducted pursuant to the presidential authority delegated in CERCLA Section 104 and are financed under the Defense Environmental Restoration Program (DERP 10 USC Secs. 2701 et. seq.).

A key aspect of the CERCLA process is to communicate with the surrounding community and involve local citizens in the remedial and removal actions.

RADIAN CORPORATION

EPA Comment #3 January 1991: Section 3.2.1, Remedial Actions, page 3-15.

Comment: This section does not identify two of the key approaches for phased sample collection activities that are described in EPA data quality objectives guidance documents. The text explaining Phase I and Phase II RI activities should be clarified and expanded to include a discussion of (1) the development of a conceptual understanding (model) of the site based on the evaluation of previously collected data (including the soil gas surveys identified) and (2) the process of identifying the type, quality, and quantity of data that will be collected during phase II to support decisions regarding remedial response alternatives.

Response: Text changes are presented on redline strikeout pages 3-12, 3-15, and Tables 3-5 and 3-6 have been added.

investigation at each potential release location will be performed in phases. The scope of work for multi-phase investigations will be developed in RI SAPs prepared for each operable unit. Operable Unit B will be the first area subjected to phased investigations. Integral to the development of RI SAPs will be the selection of data quality objectives that specify the quality of the data required to support decisions during remedial response activities as provided in the U.S. EPA guidance document, *Data Quality Objectives for Remedial Response Activities*, (March, 1987). In a three-phase approach to conduct an RI for each site in an Operable Unit, separate objectives are required for each phase. The objectives for each subsequent RI phase will build upon the results of the previous RI phases. Because the level of detail and data quality needed will vary with the decision to be made with the data, data quality objectives will be established to meet the requirements of the decisions. The general objectives and uses of data for each phase are listed in Table 3-5. The five analytical levels and uses of the data for each level is presented in Table 3-6. Levels 1 through 3 will be used in the Phase 1 investigation; levels 4 and 5 will be used in subsequent phases. The first phase of the RI is a screening phase to determine if contaminants are present in soils, to locate the probable sources of contaminants and if present, to determine if contaminants have migrated to groundwater.

A soil gas investigation will be implemented first in the Phase I investigation to target areas for the collection of soil, soil gas, and groundwater samples during later Phase I activities. A detailed description of soil gas sampling and analysis methods will be documented in the respective RI SAPs for each OU.

Phase II investigations will be conducted after the Phase I effort is completed and represents the principal data collection phase of the RI. If the evaluation of the Phase I data indicates that contaminants are present, a complete characterization of the nature and extent of contamination will be conducted. The full site characterization will include data from past investigations, and will be performed in conformance with CERCLA guidance. The investigation will use an integrated approach, including characterization of contaminants in soil, surface water, groundwater, and soil vapor. This phase will implement a decision making protocol to assist in developing sampling and analysis efforts. Decisions made in the Phase II will be based on the adequacy of the data to determine health risk assessment and the need for remediation. During this phase, appropriate removal actions may also be initiated.

RADIAN
CORPORATION

EPA Comment #4 January 1991: Section 3.2.2, Expedited Response Actions (ERAs), page 3-17.

Comment: The comment number one Section 2.1, CERCLA Process, page 2-3 applies to this section.

Response: Text changes are presented on redline strikeout pages 3-18, 3-19, 3-20, and 3-21 as suggested.

TABLE 3-6. SUMMARY OF ANALYTICAL LEVELS

Analytical Level	Description	Data Uses
Level 1	Field screening or analyses using portable instruments. Results are often not compound specific and not quantitative, but results are available in real-time.	Health and safety monitoring. Site characterization.
Level 2	Field analyses using more sophisticated portable analytical instruments, generally in a mobil laboratory on site. Data generated are semi-quantitative to quantitative and may be compound specific.	Site characterization. Evaluation of alternatives. Engineering design.
Level 3	Analyses typically performed in an off-site laboratory. Analyses generally use CLP-type procedures, but do not include the same level of validation or documentation procedures required for CLP Level 4 analysis.	Site characterization. Evaluation of alternatives. Engineering design. Health risk assessment.
Level 4	All analyses are performed in an off-site CLP analytical laboratory following CLP protocols. Level 4 is characterized by rigorous QA/QC protocols and documentation. It is typically used for confirmation of lower level data, and to obtain highly documented data.	Health risk assessment. Evaluation of alternatives. Engineering design.
Level 5	Analyses are generally non-standard methods. All analyses are performed in an off-site laboratory which may or may not be a CLP laboratory. Method development or method modification may be required for specific constituents or detection limits.	Health risk assessment

CLP = Contract Laboratory Protocol
QA/QC = Quality Assurance/Quality Control

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EPA Comment #5 January 1991: Section 3.2.2, Expedited Response Actions, page 3-18.

Comment: The sentence which states that "ERAs can be used to support ongoing defense mission land use needs." must be in accordance with the NCP and applicable U.S. EPA guidance. The prioritization of a site for early action as an "ERA" for land use is not recognized by the NCP and should be deleted from the CCW. Enclosed, a U.S. EPA letter dated March 7, 1991 to Major General Pavich concerning Base Closure/Reutilization delineates options available for implementing actions.

Response: Text changes are presented on redline strikeout page 3-21 that clarify how base land use needs will be addressed during the McClellan AFB Remedial Response Program.

Concurrent with Phase I and Phase II activities, Phase III investigations will be conducted in the RI to allow evaluation of remedial alternatives in the Feasibility Study. If data from Phase II indicate that remediation is required at a site to meet health risk or environmental objectives, further data will be collected and become the basis for selection and design of cleanup alternatives. Sampling of soils, groundwater, and soil gas for treatability studies may also be conducted. Aquifer testing will be conducted to obtain groundwater data needed to evaluate and select remedial alternatives. None of these investigations have been identified to date for specific sites within any operable unit. However, a soil treatability study has been identified to assist in the development of treatment methods for contaminated soil that may be found during the RIs that may be applicable to soils in any OU.

Implementation of Remedial Alternatives

This activity results in the evaluation and selection of cleanup remedies. It follows and utilizes information provided by the identification and investigation efforts. The remedy selection activity would result in preparation of several IAG documents including:

- Remedial Investigations/Feasibility Study (RI/FS);
- Proposed Plan;
- Record of Decision (ROD); and
- Remedial Design/Remedial Action.

The remedy selection substrategies for an OU will include:

- Preparing combined RI/FS Reports for individual operable units;
- Selecting remedies for PRLs or groups of PRLs within operable units; and
- Providing active regulatory agency involvement during the remedy selection activity.

As shown in the IAG schedule, an RI/FS Report will be prepared for each of the OUs. The RI/FS Report and subsequent remedy selection activities will be completed for operable units in the order of their priority to ensure that operable units that pose the greatest threats to public health and welfare are evaluated first. The

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EPA Comment #6 January 1991: Appendix A1.

Comment: Terminology changes to the text based upon the aforementioned comments should also be incorporated in this section.

Response: Text has been revised as suggested.

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DHS Comment #1 March 22, 1991: Page 1-5, paragraph 2.

Comment: That paragraph states that 12 preliminary groundwater operable units (OUs) have been designated at McClellan AFB. Figure 1-2 indicates only 8 OUs.

Response: The text has been revised to indicate eight preliminary groundwater operable units on redline strikeout page 1-5.

enters McClellan AFB from the east, merges with several tributaries, and exits to the west.

The soil and groundwater contamination currently existing at McClellan AFB is primarily the result of chemical releases from:

- Land disposal facilities. Disposal occurred via burial of hazardous substances in unlined pits primarily along the western edge of the base. This practice has been discontinued, and wastes are now disposed of at an approved California Class I facility or discharged to the on-base Industrial Wastewater Treatment Plant (IWTP).

- Spills and discharges. In the course of various industrial activities, accidental discharges of hazardous substances onto the ground have occurred.

- Leaks. Leakage from sumps, underground storage tanks, the Industrial Wastewater Line (IWL), and disposal ponds have occurred.

To date, McClellan AFB has identified 170 waste sites and potential release locations (PRLs) that warrant investigation. Five sites and PRLs have been shown to require no further action; these sites and PRLs, identified in Appendix A2, occur within 8 preliminary groundwater operable units (OUs) that have been designated for the purpose of managing subsequent investigations and appropriate response actions. These OUs are shown in Figure 1-2. The Operable Unit designation has now replaced the earlier "Area" designation when referring to specific portions of the base.

A more detailed discussion of the environmental conditions of McClellan AFB, equivalent to a Conceptual Site Model for McClellan AFB, can be found in Sections 2.0 and 3.0 of the Preliminary Groundwater Operable Unit Remedial Investigation Sampling and Analysis Plan (Radian, 1989).

1.2 Parties to the Interagency Agreement

The parties to the IAG are the U.S. EPA, the Air Force, and the State of California. The terms of the IAG apply to and are binding upon all three parties.

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DHS Comment #4 March 22, 1991: Page A1-46, Paragraph 2,

Comment: That paragraph should indicate that the Soils Management Plan will be updated and submitted for agency review annually. The following modification to the second sentence should be made: "It is submitted annually for agency review..."

Response: The text change on redline strikeout page A1-49 has been revised as suggested.

actions and the normal CERCLA process for identifying, investigating, and remediating contamination is presented in Figure A1-12.

Removal actions involve the isolation or elimination of contamination or an exposure pathway in response to a threat to public health or the environment. Removal actions can be either time-critical or non-time critical actions, but in either case, the process of implementing the removal does not follow all the steps that are part of the normal RI/FS process. Time-critical removal actions are emergencies requiring immediate response. Non-time critical removal actions do not require the immediate response of time-critical removal actions, but are actions that should be performed on a timely basis. McClellan AFB has conducted several non-time-critical removal actions. Removal actions follow an abbreviated version of the RI/FS process and are implemented to achieve site stabilization, risk reduction and to prevent further degredation. A list of McClellan AFB removal actions which are already implemented is presented in Table 3-2.

Removal actions and OU actions can be either interim remedies or final remedies. An interim remedy is implemented to reduce short-term environmental or public health impacts and may not represent a long-term remedy. Removal actions that provide more permanent protection and emphasize alternative treatment technologies will generally be preferred. Operable unit interim and removal actions will be reassessed during the appropriate operable unit RI/FS evaluations, within ROD documentation, and during the final (basewide) RI/FS when any final remedial actions are selected. Appropriate deliverables will be prepared during the identification, investigation, and implementation phases of OU interim and removal actions.

A final removal action or OU action is part of the final (basewide) remedy. McClellan AFB has completed several Removal actions and OU interim actions that are considered part of the final remedy. Final remedies are so noted in Table A2-2.

Regulatory agencies and the public will be notified whenever removal action or OU interim actions are proposed. All removal actions and OU interim actions will be supported by appropriate documentation. An Action Memorandum will be transmitted to the agencies within 45 days following completion of a time-critical removal. For non-time critical removals, McClellan AFB will prepare an Engineering Evaluation/Cost Analysis and an Action Memorandum. This information will be transmitted to the agencies 45 days before the removal action begins. As actions are

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DHS Comment #5 March 22, 1991: Page A1-46, Last Bullet.

Comment: That bullet should clearly identify that the National Priorities List is "the list" in question. This comment also applies to the third and fifth bullets on page A1-46 (see page A1-48).

Response: Text changes on redline strikeout page A1-51 have been revised as suggested.

protects human health and the environment, further remedial actions will be considered.

Deliverables associated with post-remedial actions include:

- Compliance review reports;
- Five-Year Revisions; and
- Notices of taking the facility off the National Priorities List.

Taking a site off the list is appropriate for National Priority List (NPL) sites and would apply to the McClellan AFB facility. The McClellan AFB facility can be removed from the U.S. EPA National Priorities List when the final (basewide) remedy has been completed or if no further remedial actions are shown to be necessary. Procedures for taking a facility off the list include the following:

- Notice of intent to take a facility off the list in local publications and in the Federal Register (include a 30-day comment period); and

- Publication of the formal declaration of removal from the National Priorities List.

A1.4 Risk Assessment

The Risk Assessment process provides an evaluation of the potential threat to human health and the environment in the absence of any remedial action. It will provide a basis for determining whether or not a remedial action is necessary, the justification for performing remedial action, and also the reduction in risk to potential receptors if various proposed remedial actions are implemented.

During the Initial Screening and Development of Alternatives, remedial response objectives will be established based on the baseline risk assessment and the identification of ARARs. Remedial response objectives will be developed to specify contaminants and media of interest, exposure pathways, and remediation goals that permit a range of treatment and containment alternatives to be evaluated.

During the Detailed Analysis of Alternatives, a more detailed assessment of risk will be performed. This assessment will reevaluate indicator chemicals, identify potential exposure pathways, determine target concentrations at human exposure points,

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DHS Comment #6 March 22, 1991: Soils Management Program

Comment: The Soils Management Program (SMP) should be dated in order to identify which version of the SMP is being referenced.

Response: The cover page of the Soils Management Program has been revised as suggested.

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DHS Comment #7 March 22, 1991: Soils Management Program

Comment: The SMP report information should be specified and should include, but not be limited to: (1) the capacity of the soils holding area, (2) the percentage of the capacity that is in use, and (3) proposals for capacity expansion or reduction of soils in storage, if the capacity is being exceeded.

Response: (No text has been prepared as of the time this package was submitted. It is our understanding that the McClellan AFB EMR shall prepare specific responses to SMP issues.)

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DHS Comment #8 March 22, 1991: Soils Management Program

Comment: The Department will comment in detail in the SMP once possible changes, as specified in Section 3.3.4, are submitted for review.

Response: Comment noted.

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DHS Comment #2 March 22, 1991: Page 3-21, Section 3.3.1, Remedial Actions.

Comment: That section proposes to submit documents as separate items, as opposed to the previous recommendation of one comprehensive document. The Department has no objection to that proposal.

Response: Comment noted.

implemented more quickly. The OU interim remedial action would be selected in an interim Record of Decision.

McClellan AFB has recently (December 1990) completed a time-critical removal action. This action cleaned up mercury contamination outside the area between two buildings (251 and 250) in OU A.

Currently, one OU interim action, the OU B EE/CA is identified in the IAG schedule. This action consists of groundwater extraction, treatment, and discharge of treated waters. It is being implemented due to the current and potential future impacts that could result from the presence of contaminated groundwater in the vicinity of on-base and off-base public water supply wells. The activities and deadlines shown in the IAG schedule for this OU interim action include preparation of the EE/CA report and Action Memorandum.

The selected OU B EE/CA is considered to be protective of public health and the environment and will be consistent with any long-term remedies. When appropriate, the priorities for conducting removal actions and OU interim actions will be evaluated and incorporated into the priorities for remedial activities. For example, the OU B EE/CA has focused on minimizing the impacts from contaminated groundwater to on-base and off-base public drinking water supply wells. This selected remedy will be reassessed during the OU B RI/FS and possibly during the basewide RI/FS.

3.2.3 Other Response Actions

In addition to the remedial actions and removal actions, and OU interim actions, there are other activities that fall in the general category of remedial response actions. Various activities in this category are described below.

Treatability Studies

A technology assessment of soil treatability methods will be conducted during the Operable Unit B RI field sample collection effort to provide information that will be usable in all OUs. Other treatability studies that will be performed under the McClellan AFB program will document remedial technology developments that occur during the progress of the RI program to avoid unnecessary costs, duplication of other's treatability work, and delays in implementation. These studies will emphasize the use of

DHS Comment #3 March 22, 1991: Pages 3-22 and 3-23, Section 3.3.4, Changes Under Discussion.

Comment: The Department will address the identified possible program modifications following the submission of a formal proposal and request for modification by McClellan AFB.

Response: Comment noted.

technologies that are available or can be designed to operate in a modular or mobile fashion.

No Further Action Sites

A determination for No Further Action (NFA) can be made for a PRL after sufficient data is available to show that no public health or environmental impacts arise from the site conditions. The NFA recommendation is submitted for review and concurrence by the regulatory agencies. Target dates for the preparation and submittal of NFAs have not been identified in the IAG schedule.

CERCLA Soil and Debris Management Plan

The McClellan AFB Remedial Response Program will generate increasing volumes of contaminated soils and debris as the work progresses through characterization, expedited response actions (removals and interim remedial actions), and final remedial actions. Until soil and debris treatment options are addressed and treatment/disposal programs implemented, environmentally sound management is critical to the program. McClellan AFB is initiating a program to evaluate soils and debris management options and to track wastes from initial identification/ characterization through final disposal. This program will begin early in 1991.

3.2.4 Basewide and Scoping Activities

Basewide activities performed at McClellan AFB consist of a variety of field investigations and recurring annual activities. The field investigation efforts include PGOURI and the Groundwater Sampling and Analysis Program (GSAP). Both these activities have characterized the groundwater flow and extent of groundwater contamination beneath McClellan AFB and adjacent areas. The PGOURI results will be presented in the PGOURI Report. Subsequent focused groundwater investigations will be done as part of the Remedial Investigation effort conducted on individual operable units.

The Groundwater Sampling and Analysis Program will continue. The results of groundwater sampling and analysis will be presented in informational reports.

Annually recurring activities include scoping and management tasks. These tasks include preparation of the following:

- Comprehensive CERCLA Work Plan Updates; and
- Community Relations Plan (CRP) Updates.

The CRP includes plans for informational open houses about the current work being performed at McClellan AFB, public review and comment periods, task forces, and notifications. Each of these documents will be updated annually in accordance with CERCLA and NCP guidelines.

The McClellan AFB program contains several activities that provide a comprehensive review process to confirm the selection of response actions that will become the long-term cleanup remedies. One activity is the use of periodic reviews for both removal and remedial actions, the other activity is the preparation of a basewide Feasibility Study Report, Proposed Plan, and ROD.

A periodic review of future removal and remedial actions is required as long as hazardous substances, pollutants, or contaminants that may pose a threat to human health or the environment remain at the site. Five-year reviews will be scheduled and performed on the remedial actions completed at McClellan AFB and for new response actions as they are implemented. The five-year review period will begin upon the acceptance of an ROD for response actions performed under the IRP. Two-year review periods will be scheduled and performed on removal actions completed and for new removal actions as they are implemented. The two-year review period will begin upon acceptance of an Action Memorandum for removal actions.

A Basewide FS Report will be prepared followed by a Proposed Plan and ROD. The FS document will consider the accumulation of all previous Operable Unit FS results and reevaluate whether previously conducted removal actions and OU actions and remedies and consistent with the final Basewide remedy. The Proposed Plan will be submitted for public comment prior to the issuance of the ROD. The ROD will document the decision making process for selecting the final remedy for McClellan AFB.

3.3 Changes to the McClellan AFB Remedial Response Program

This section presents any changes that have been made since the last update to the IAG schedule of documents or to the submittal deadlines. This update is organized into three primary activities:

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APPENDIX B2

Response to Comments on the Soils Management Plan

RESPONSE TO REGULATORY AGENCIES' COMMENTS ON SOIL MANAGEMENT PLAN

Regional Water Quality Control Board

Comment #1:

RESPONSE: This statement is inclusive to not only analyze the present and past contents of the tanks, but any other contamination that may be present in the area. Historically speaking, greater than 90 plus percentage of the underground tanks removed have contained petroleum hydrocarbons, i.e., jet fuels, diesel fuels, gasolines, waste oils and standard solvents. For the small percentage of tanks that may contain other than petroleum solvents, such as plating solution wastes, appropriate metal analyses will be performed. If gasoline is present, we will also analyze for organic lead. It is our opinion that the stated EPA methods 8010, 8020, 8015 modified, and 418.1 provide us enough information to identify or characterize the UST contaminants. However, we have modified the plan to state that if past removals indicate that the underground tank in question contained other than petroleum based solvents, appropriate EPA analyses will be performed to characterize the contamination.

Comment #2:

RESPONSE: We concur. We have modified the plan for waste oils to include the addition of metals by EPA Method 6010 and PCBs by EPA Method 8080.

Comment #3:

RESPONSE: Noted. We have revised the Soils Management Plan to incorporate the change.

Comment #4:

RESPONSE: We concur that a total petroleum hydrocarbon concentration of less than 1,000 ppm is not the sole criterion for establishing when the soil can be placed back into the hole. We recognize that what is allowed to be put back into the hole will be negotiated with the local implementing authority (RWQCB).

Comment #5:

RESPONSE: Noted.

Comment #6:

RESPONSE: The 1,000 mg/kg total petroleum hydrocarbon (TPH) concentration guideline is a number used to assist us in the classification of soils as hazardous or non-hazardous. We recognize that the 1,000 mg/kg of TPH is not, and shall not be the sole criterion used in order to determine the need to pursue on-site or off-site treatment/disposal. We also recognize that these options will be formulated the most part by the specific contaminants detected and their respective concentrations. We have modified the plan to state as such.

Comment #7:

RESPONSE: The LDRs are not to be taken as cleanup level. No place within the Soils Management Plan are we advocating cleanup levels. We concur with you that cleanup levels are established on a site specific basis with regulatory coordination and approval. However, we have changed the wording in the second paragraph on page 5 for further clarification.

Comment #8:

RESPONSE: Concur, we have changed the flow chart.

RESPONSE TO REGULATORY AGENCIES' COMMENTS ON SOIL MANAGEMENT PLAN

Department of Health Services

Comment #6:

RESPONSE: We concur and will include revision date on all future Soil Management Plans.

Comment #7:

RESPONSE: The Soils Management Program (SMP) monthly report includes information agreed upon by all parties when the Soils Holding Area Operation Plan was coordinated.

Comment #8:

RESPONSE: Comment Noted.

McCLELLAN AFB

Directorate of Environmental Management

SOILS MANAGEMENT PROGRAM

20 June 1991

SOIL MANAGEMENT PLAN

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INTRODUCTION

McClellan Air Force Base was listed on the Environmental Protection Agency's (EPA) National Priorities List (NPL) on 22 July 1987. This NPL designation applies to the entire base and is not restricted to the specific sites currently under investigation. In addition, Comprehensive Environmental Response Compensation and Liability Act/Superfund Amendment and Reauthorization Act (CERCLA/SARA) requires McClellan to conduct its remedial investigation/feasibility studies and remedial action efforts in accordance with federal and state requirements. To ensure these requirements are met, an Interagency Agreement (IAG) was signed 21 July 1989 to establish the procedural framework between the Air Force, the State of California, and the EPA in conducting these efforts.

As a result of our past investigations, McClellan recognizes that areas of contaminated soil beyond those areas currently planned for investigation may exist within the confines of the base. As a result, McClellan has developed a Soil Management Program to proactively identify and prudently manage potentially contaminated soils. In this plan we make extensive use of the Land Disposal Restriction (LDR) values, obtained from 40 CFR 268 and Appendix I thereto, the Toxicity Characteristic Leaching Procedures (TCLP), to assist us in formulating site remediation and soil disposition. However, for future revisions of the Soils Management Program, we are contemplating using action levels from the proposed Resource Conservation and Recovery Act (RCRA) Corrective Action Rule to further assist us in evaluating soil contamination detected on base.

A prime motivation for the development of this plan was the recognition that CERCLA/SARA was not drafted to address many on-going activities at a large site as McClellan and its 2,952 acres. In addition, it was recognized that there is an absence of soil cleanup standards for many chemicals and that the interface of CERCLA and the RCRA complicates contaminated soil issues. As a result, the goal in developing this plan was to find a way of incorporating the substantive requirements of CERCLA/SARA and RCRA into the ongoing base activities i.e., construction projects, repairs, maintenance) and other environmental projects i.e., Underground Storage Tank (UST) Removals) that may involve potentially contaminated soils, while at the same time minimizing the impact to our day-to-day operations. As a general rule, for projects where soils are excavated; if there are no appreciable (over 50 ppm) OVA or HNu readings, no unusual soil discoloration, and no knowledge of any adjacent potential release locations, excavated soil will be placed beside the trenches from whence it came. When the project is completed, the soil will be placed back into the trench from whence it came. If there are appreciable OVA or HNu readings, or unusual soil discoloration, or records indicate the excavation project is on or adjacent to where contamination is confirmed or suspected (potential release location and study areas), then those excavated soils, after composite samples are collected, will either be placed on and covered by at least 6 mil plastic beside the trench from whence it came or transferred to the McClellan soils holding area. Soil

samples will be collected and analyzed using the TCLP and the acute aquatic 96-hour LC50 bioassay test. More specific guidance is provided under minor construction, repairs, emergency repairs and underground storage tank removal processes. The overall objective of this program is two-fold: 1) to ensure contaminated soil is identified early enough during ongoing base activities i.e., construction, repairs, maintenance efforts to preclude the off-base disposal of contaminated soils; and 2) to ensure that contaminated soil, once it is identified, is prudently managed in accordance with Federal and State requirements and in a way, to minimize the effect to our ongoing base operations.

This plan will also be implemented in a two-phased approach. In the Interim Period (first phase), this plan will require some temporary holding of contaminated soils if LDRs prohibit off-site disposal, if the cost effectiveness of on or off-site soil treatment can only be accomplished with certain volumes of contaminated soil, or until treatment/disposal options are formulated.

In October 1989, under the first phase of this plan, McClellan implemented the construction of a soils holding area which meets the substantive requirements of RCRA. In January 1990, an Operations and Maintenance Plan was developed for this soils holding area.

However, in the Long Term (second phase), particularly with the phase-in of the LDRs for CERCLA wastes and as Remedial Investigation/Feasibility Study (RI/FS) and proposed remedial actions for the base progress, there will be a need to develop on-site soil treatment capability. This plan is set up to ensure that as the objectives of this plan are implemented, both in the interim and long term, it will be accomplished in coordination with all interested parties so that all the applicable requirements are incorporated into this plan, both now and in the future.

REGULATORY AGENCY INTERFACE

It is recognized that the success of this Soil Management Program will require effective interface between all parties. Notifications of soil management actions (In Accordance With (IAW) Section 11.1 of IAG) will be included as part of our monthly IAG status report. This report will also include information regarding upcoming soil management sampling activities, as well as any soil management decision documents that were developed during the preceding month. This will keep the regulatory agencies informed of the activities occurring within this program, which will provide for an opportunity for regulatory comments and review, if necessary (IAW Section 11.1 of IAG).

SOIL MANAGEMENT PROGRAM INTERFACE WITH ONGOING RI/FS EFFORTS

It is recognized that the data and findings from the Soil Management Program is important to ongoing RI/FS studies at McClellan. To ensure this information is interfaced with this program, all data generated

within the Soil Management Program will be incorporated into the RI/FS efforts on a semi-annual basis. The contractor conducting the RI/FS activities in the operable unit area that this data was obtained, will evaluate this information to determine if it warrants a new site or Potential Release Location (PRL) designation or if it can be incorporated into an existing site or PRL. The status of this information will be summarized annually into the Comprehensive CERCLA Workplan (CCW) to ensure incorporation into the RI/FS process. In addition, the annual CCW will provide an opportunity for revisions to the Soil Management Plan, where necessary, to comply with new requirements.

SOIL MANAGEMENT PROGRAM

McClellan has been evaluating contamination on McClellan since October 1979. There have been numerous engineering studies performed indicating that the predominant types of contaminants found in the soil and groundwater have been those chemicals used in mission essential maintenance operations. For the most part, these have been identified to be Volatile Chlorinated Aliphatics, Volatile Aromatics, diesel and jet fuels. Numerous soil samples have been analyzed for EPA 8010, Volatile Chlorinated Aliphatics; EPA 8020, Volatile Aromatics; EPA 8270, Semi-Volatile Organics; EPA 8015, Non-Halogenated Volatile Organics; and Modified EPA 6010, TTLC/Metals. The results of previous sampling have provided McClellan with a basis for establishing a plan and rationale for assessing and prudently managing contaminated soils. In recognition of the intent of the IAG to integrate CERCLA and RCRA, this Soil Management Plan was designed as a screening methodology addressing both SARA/CERCLA and substantive RCRA requirements as they apply to contaminated soils.

This Soil Management Plan provides rationale in assessing soil contamination for appropriate soil disposition. While it is not McClellan's goal to permanently hold contaminated soil on-site, we must also attempt to meet the objective of CERCLA/SARA in conducting treatment on-site wherever possible. Recognizing that on-site treatment/disposal of soil may be needed to make on-site treatment options viable, some CERCLA contaminated soil may be held in the McClellan soils holding area. Soil held in the soils holding area will be managed as outlined in the soil holding area Operation and Maintenance Plan (Jan 90). The holding of CERCLA contaminated soil on-base will be in accordance with federal, state and local regulatory requirements (ref Section 19.1 of IAG). Regulatory agencies will be informed through the Soil Management Decision Document as to how each batch of CERCLA contaminated soil will be managed on a case-by-case basis. In this Soil Management Plan, wastes that are restricted under the LDR program outlined in 40 CFR, Part 268, are referred to as LDR waste. Restricted waste includes all F001, F002, F003, F004, and F005 spent solvent wastes, all listed dioxin wastes (i.e. F020, F021, F022, F023, F026, F027, and F028), all California listed waste and all first-third, second-third, and third-third wastes as defined in 40 CFR 268.10, 40 CFR 268.11, and 40 CFR 268.12 respectively. Determinations as to whether a hazardous waste listed in 40 CFR 268.10, 40 CFR 268.11, 40 CFR 268.12 and 40 CFR 268.13 exceeds the applicable treatment standards (LDRs) specified in 40 CFR 268.41 (Atch 5) and 40 CFR 268.43 (Atch 6), are made by taking a representative waste extract (TCLP) or the entire waste depending on whether the treatment standards are expressed as concentrations in waste extract or the waste. The results obtained from the analysis of the TCLP extract will be compared to the LDRs, referring to the values shown for the hazardous constituents listed in Table CCWE, 40 CFR 268.41 (Atch 5). The TCLP is utilized since it was designed to determine the mobility of both organic and inorganic contaminants that may be present in the soils. Acute aquatic 96-hour LC50 bioassays will also be performed on certain soil samples. This will be addressed in detail in subsequent sections.

This plan is not intended to mean that all soil that is excavated at McClellan will be sampled. Its intention is to provide controls such that if excavation is performed in known or potential areas of contamination, measures are taken to properly assess and manage the disposition of this soil. McClellan will continue to use its knowledge of potential release locations in reference to project sites, monitor with portable OVA or HNu analyzers, as well as visibly inspect soils to assist in making determinations of which soils need to be analyzed. This approach is consistent with the Lan Band requirements identified in 40 CFR 268.7, 40 CFR 261.24 and 40 CFR Part 261, Appendix II, which outlines the TC/TCLP requirements. With the exception of UST soils, all soils will routinely be analyzed using the TCLP outlined in 40 CFR Part 268, Appendix I. Generally, UST soils will be analyzed by the appropriate EPA methods necessary to assess the past and present contents of the tanks, as well as other contaminants that have been predominant on base. Historically speaking, greater than 90 percentage of the underground tanks removed have contained petroleum hydrocarbons such as jet fuels, diesel fuels, gasoline, waste oils, and stoddard solvent. If gasoline is present, samples will be analyzed for organic lead. If the initial results indicate the presence of other non-petroleum contaminants, additional samples will be collected using the 40 CFR 268, Appendix I (TCLP) and the 96-hour acute LC50 bioassay procedures. In some cases, we may analyze the additional samples by the 40 CFR 261, Appendix II (TC/TCLP) requirements. This will be elaborated on in the later UST section. For the small percentage of tanks that may contain other than petroleum solvent, such as plating solution wastes, metal analyses will be performed by the appropriate EPA methods.

In the past, the overwhelming majority of contaminated soils analyzed under the Soil Management Program contained SARA listed hazardous substances that were determined not to be hazardous by federal RCRA or state of California classification guidelines. However, cleanup of the contamination will be conducted under the ongoing CERCLA response action program and a combination of LDRs criteria and a risk evaluation methodology approach has been developed from which land use soil management decisions will be made.

The Soil Management Flow Diagram is identified in attachment 1. There are three main sections to the flow diagram. They are 1) Sampling Analyses (Atch 2); 2) Soil Disposition Criteria; and 3) Soil Management Decision Document (Atch 3). Also, there are several subsections to each main section and they are identified on the respective attachments. The preliminary risk evaluation, which is a subsection of the Soil Disposition Criteria main section, is separately addressed in attachment 4.

MINOR CONSTRUCTION, REPAIRS, EMERGENCY REPAIRS

Whenever possible, site location of minor construction and repair soils will be pre-sampled and analyzed using the TCLP. In cases where pre-sampling is not possible, the projects will be placed back into the

areas from where they were excavated, unless the soils indicate appreciable OVA or HNu (over 50 ppm) concentrations or unusual soil discoloration exists indicating possible soil contamination. From past experience with contamination projects at McClellan, whenever there were OVA or HNu readings that were consistently reading above 50 ppm, this was an indication of site contamination that needed to be further evaluated with sampling. If there are appreciable OVA or HNu readings, or unusual soil discoloration, or records indicate the excavation project is on or adjacent to a potential release location, then those excavated soils, after composite samples are collected, will either be placed on and covered by at least 6 mil plastic beside the trench from whence it came or transferred to McClellan's soil holding area. The excavated soils will be monitored for volatile organic vapor concentrations with either a portable HNu or OVA analyzer. In cases where there are elevated OVA or HNu readings, composite samples will be collected and analyzed using the TCLP outlined in 40 CFR, Part 268, Appendix I and also analyzed for acute aquatic 96-hour LC50 bioassay.

If records indicate that the project is on or adjacent to confirmed sites and suspected areas of contamination (potential release location and study areas), then the TCLP and bioassay analytical procedures will also be performed. Results obtained will be added to IRP documentation for further study in the RI/FS. In those areas where there are no appreciable HNu or OVA readings, no discolored soil and no records indicating the project is on or adjacent to potential release locations, excess soils from these projects may be used at selected locations on-base as fill material. Documentation of the reutilization of soils used as fill material will be included in the appropriate soil management decision documents. All data will be forwarded to McClellan IAG project manager for semi-annual inclusion into the RI/FS process.

UNDERGROUND STORAGE TANK (UST) REMOVALS

Removals of underground storage tanks fall under the jurisdiction of the Sacramento County Environmental Management Department. The cleanup at contaminated underground storage tank sites is under the jurisdiction of the Regional Water Quality Control Board, Central Valley Region, which is the Local Implementing Agency (LIA). During UST removals, soil in areas suspected of being contaminated will be monitored with an OVA or HNu. Composite samples will be collected at the direction of the LIA from those areas where appreciable OVA or HNu readings indicate volatile organics are present. Based on the past and present contents of the tanks, soil samples will be collected and analyzed using the appropriate EPA Methods necessary to validate contents. For tanks which contained petroleum products, composite soil samples will be collected and analyzed for contaminants using EPA Methods 8010, 8020, 8015 (modified) and Total Petroleum Hydrocarbons by Method 418.1. If gasolines were present, samples will be analyzed for Organic Lead using the State Department of Health Services' recommended method or an equivalent EPA method. If waste oils were present in the UST, then the soils samples will be

analyzed for Polychlorinated Biphenyls (PCBs) by EPA Method 8080 and Metals by EPA 6010. In some cases, the analytical methods prescribed in this plan may not be identical to the methods recommended by some of the regulators, however, the methods we prescribe are equivalent, and in some cases superior to those recommended by the regulators and will obtain the detection sensitivity necessary to evaluate the requested contaminants at the regulatory desired concentrations. If it has been determined by analytical results that the total petroleum hydrocarbons (TPH) found were less than 1000 mg/kg (ppm) and solely were as a result of leaking lines/storage tanks containing jet fuel, gasoline, kerosene, stoddard solvent or diesel fuels, and no other solvent contaminants are found, coordination with the LIA will determine ultimate cleanup and concurrence/nonconcurrence obtained to consolidate petroleum contaminated soil back into the same UST location. The ultimate decision as to whether the less than 1000 mg/kg total petroleum hydrocarbon scils can be placed back into the hole rests with the LIA and is dependent upon the cleanup goals for the site and on the concentration of other contaminants of concern such as the EPA Method 8020 compounds. In cases where benzene, xylene, ethylbenzene are found, these contaminants will be considered as constituents of the major petroleum blend found, i.e., gasoline. For examples, each of the chemicals mentioned can be found as constituents in gasoline, jet fuel and some kerosenes. If elevated levels of 40 CFR 268, Appendix I (TCLP) constituents such as, benzene, toluene, xylene or ethylbenzene are detected, whether or not they can be confirmed as indigenous or normal additives to a specific petroleum blend, we will collect additional samples and analyze them according to 40 CFR 261, Appendix II (TC/TCLP). It is our opinion, in some cases, we may need this additional information in order to comprehensively assess the site. However, if other solvent contaminants are found, i.e., 1,1,1-trichloroethane or tetrachloroethane, then additional samples will be collected and analyzed for 40 CFR 268, Appendix I (TCLP) analytes and acute aquatic 96-hour LC50 bioassay analyses. The TCLP results will be compared to the LDRs and a risk evaluation performed in order to determine soil use/disposition. This data and site will then be incorporated into the RI/FS as a new site. The 1000 mg/kg TPH is not and shall not be the sole criterion used to determine the need to pursue on-site or off-site treatment/disposal. These options will be formulated for the most part by the specific contaminants detected and their respective concentrations. In some cases, we may pursue delisting some of the soils. The total petroleum hydrocarbon (TPH) concentration of 1000 mg/kg is not a cleanup level, but is currently used as guidance by the California Department of Health Services (DHS) to classify UST soils as hazardous or non-hazardous (Leaking Underground Fuel Tank (LUFT) Manual, 1989). The 1000 mg/kg TPH value was based on ignitability characteristics of gasoline in sandy soil. DHS has recognized the complexity of the absorption of various hydrocarbon compounds in different soil types, as well as the different characteristics between old gasoline, new gasoline, and diesel fuels. DHS currently is researching this issue with the objective of reassessing this threshold value. In the meantime, the 1000 ppm will be used as guidance in evaluating soils at McClellan, while recognizing the limitations stated above may allow for reassessment of this in the future.

MAJOR CONSTRUCTION (MCP)

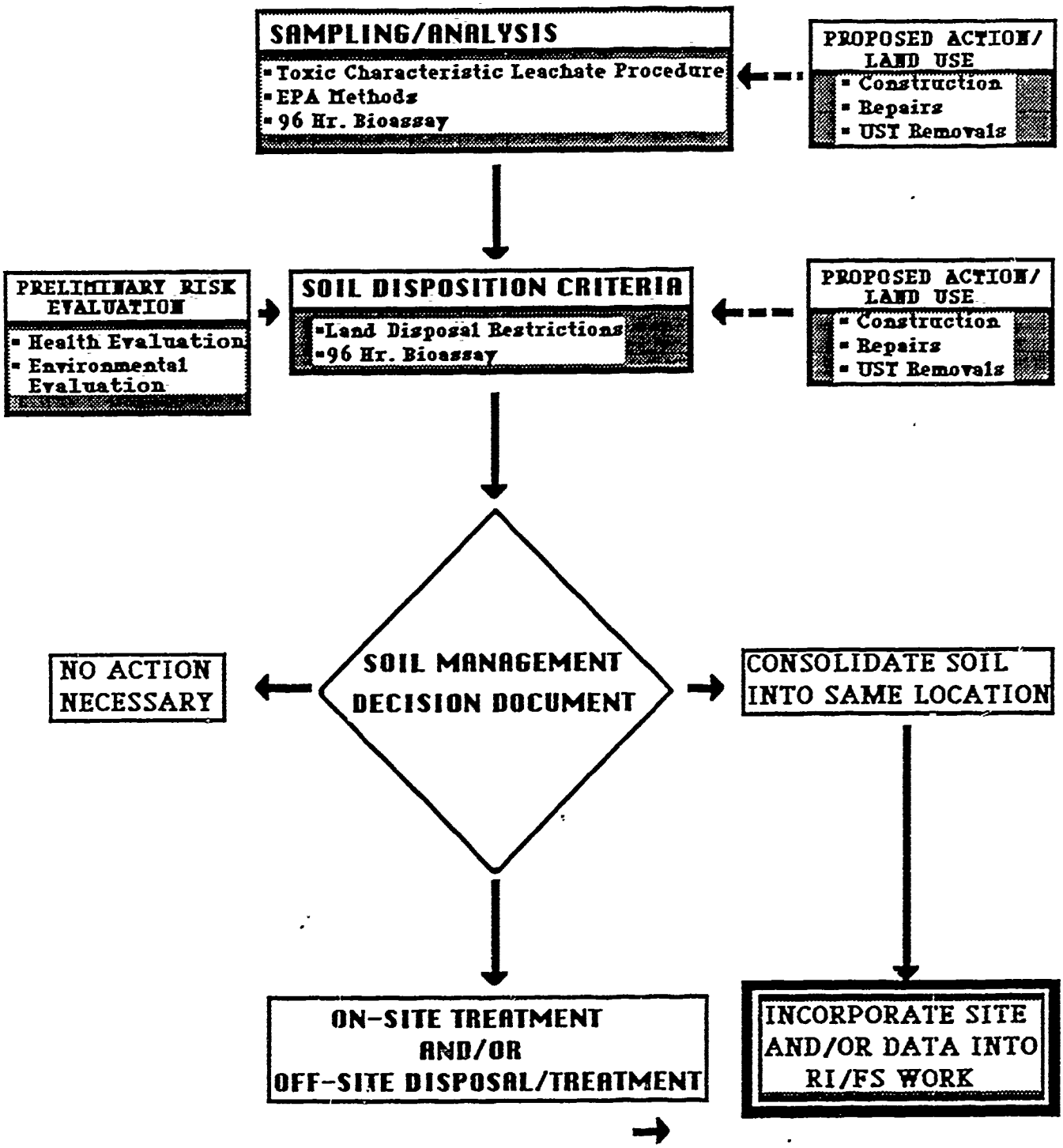
The Soil Management Plan is designed to pre-screen sites selected for major construction projects, i.e., Military Construction Projects (MCPs). These are projects funded by Congress that exceed $200K in construction cost. Once maps showing the proposed MCP siting are received, the Installation Restoration Program (IRP) data is evaluated to determine if there are any known IRP sites in the area. The number of core samples to be collected and the depths to which each bore hole will be drilled, is based upon the proposed facility drawings. Typically, between 8-15 bore hole samples are collected down to a depth of 15-20 feet. The number of samples taken is based on the size of the construction site and the variability of construction depths. If the MCP project is on or adjacent to an IRP site, then recommendations for resiting the proposed project, if possible, are made. If the proposed project cannot be resited, pre-sampling activities are initiated and core bore samples are collected and analyzed by the TCLP techniques and the results obtained compared to the LDRs. If the sample results exceed the LDRs and excavation is planned for construction, a more extensive partial site evaluation for possible remediation would be made only in those areas which samples indicated results that exceeded the LDRs. When those results are obtained and they indicate that contamination is localized and exceeds the LDRs, a risk evaluation will be performed and some response action to address the localized contamination would be proposed to the regulatory agencies. The LDRs are not to be taken as soil cleanup levels. They will only be used to assist us in determining disposal criteria. We recognize that site cleanup levels are site specific and will vary depending upon the types and concentrations of contaminants present and that site cleanup levels will only be determined by regulatory authority. Coordination with the regulatory agencies will occur to establish the applicable or relevant and appropriate requirements (ARARs) for remediation of the site (ref Section 7.6 of the IAG). A decision document will be formulated regardless of the final disposition of the soil. These decision documents will be forwarded to the regulatory agencies as part of our monthly IAG status reports. Anytime during construction that contamination is found, the same procedures previously stated will be followed.

PRELIMINARY RISK EVALUATION

The preliminary risk evaluation was developed to address all types of projects where soil digging and trenching may occur. This risk evaluation is for screening purposes only and is not meant to be a final risk quantification for the site. The risk evaluation was formulated using a combination of Industrial Hygiene Principles and State Drinking Water Water Action Levels and Site Recommended Cleanup Levels. The industrial hygiene principles of toxicology, exposure pathways, physio-chemical properties of contaminants and occupational threshold limit values were also used in developing the risk evaluation. Currently, there is no direct correlation between occupational exposure

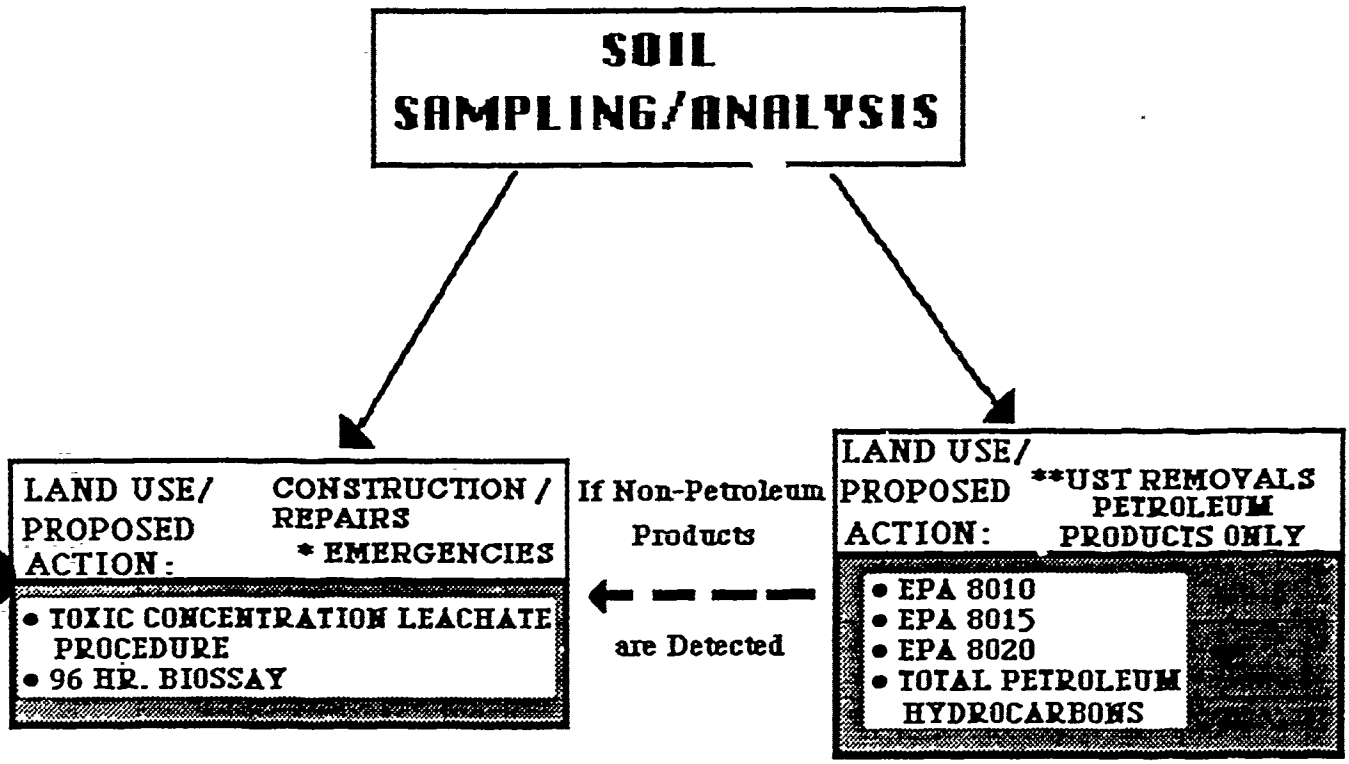
limits and environmental limits or standards. However, in the absence of environmental standards for contaminants found, some type of relationship between the two was established for screening purposes. The preliminary risk evaluation (Atch 8) has two major portions: 1) a health evaluation portion that is designed to assess the need for Personal Protective equipment (PPE) requirements, and 2) an environmental evaluation portion that is designed to assess impacts of various contaminants found in the environment. The risk evaluation, used in conjunction with the soils disposition criteria, will provide a mechanism to evaluate soil management alternatives.

McCLELLAN AFB
SOIL MANAGEMENT PROGRAM



ATTACHMENT 1

McCLELLAN AFB
SOIL MANAGEMENT PROGRAM

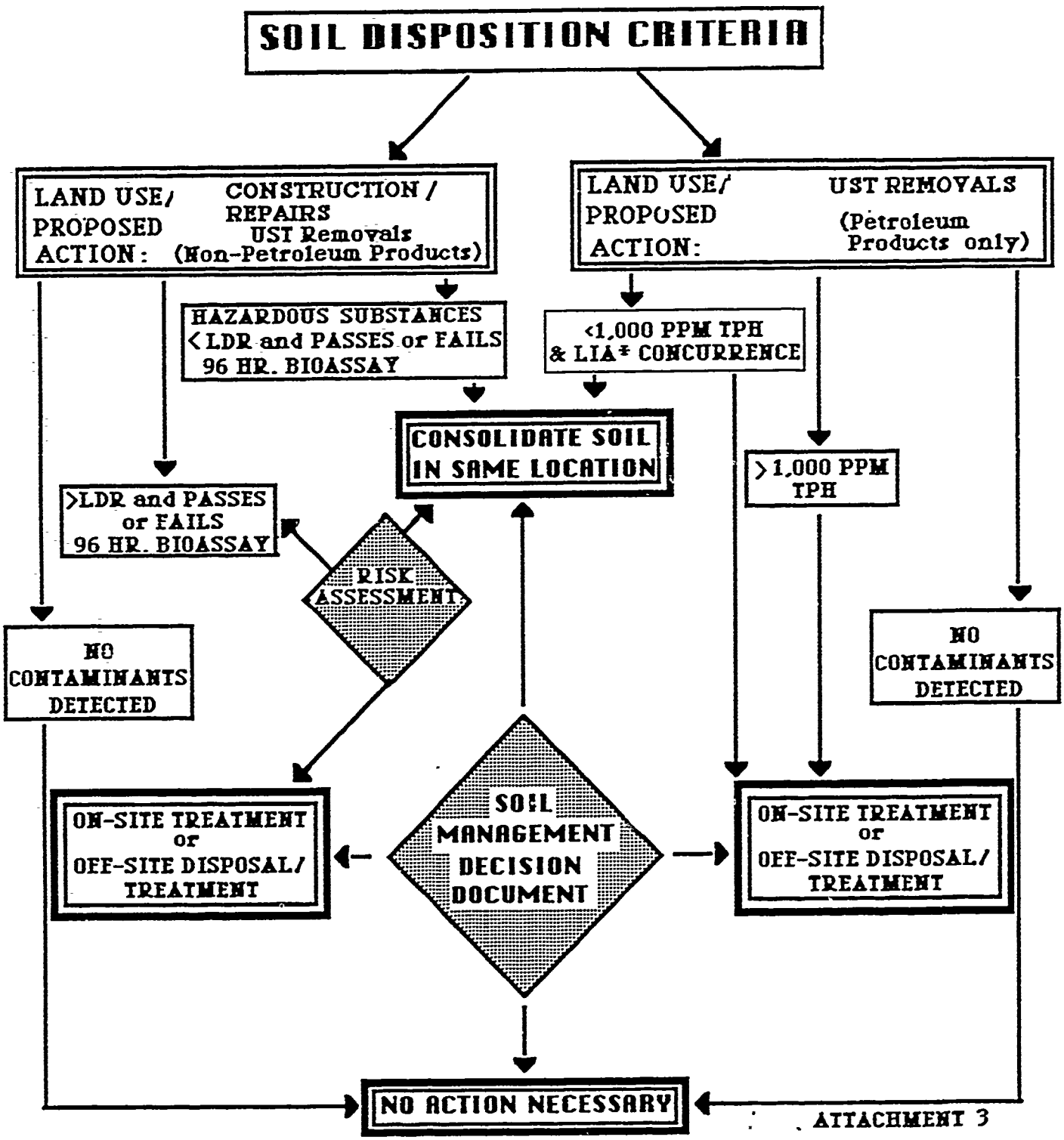


* Sampling Conducted During or After The Emergency, Whichever is Feasible

** UST Removals are Conducted In Accordance with the Local Implementation Agency (Sacramento County Environmental Management Department)

ATTACHMENT 2

McCLELLAN AFB
SOIL MANAGEMENT PROGRAM

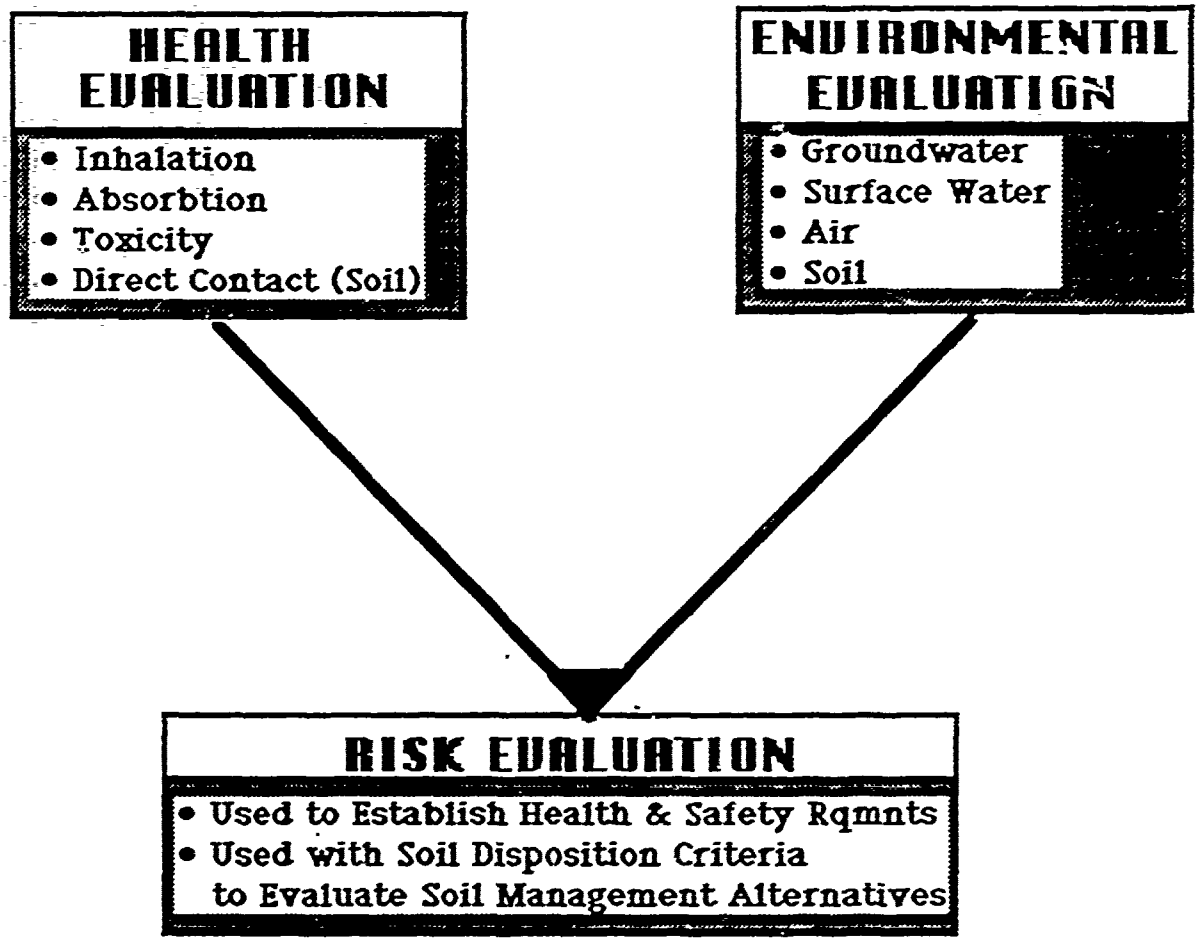


ATTACHMENT 3

* LIA: SACRAMENTO COUNTY ENVIRONMENTAL MANAGEMENT DEPARTMENT

McCLELLAN AFB
SOIL MANAGEMENT PROGRAM

PRELIMINARY RISK EVALUATION



ATTACHMENT 4

Table CCWE
Constituent Concentration in Waste Extract
40 CFR 268.41(a)

Constituents must be analyzed in the leachate produced by the Toxicity Characteristic Leaching Procedure (TCLP) found in 40 CFR 268 appendix I.

F001-- F005 spent solvents	Concentration (in mg/l)	
	Wastewater containing spent solvents	All other spent solvent wastes
Acetone	0.05	0.59
n-Butyl alcohol	5.00	5.00
Carbon disulfide	1.05	4.81
Carbon tetrachloride	0.05	0.96
Chlorobenzene	0.15	0.05
Cresols (and cresylic acid)	2.82	0.75
Cyclohexanone	0.125	0.75
1,2-Dichlorobenzene	0.65	0.125
Ethyl acetate	0.05	0.75
Ethylbenzene	0.05	0.053
Ethyl ether	0.05	0.75
Isobutanol	5.00	5.00
Methanol	0.25	0.75
Methylene chloride	0.20	0.96
Methylene chloride (from the pharmaceutical industry)	12.70	0.96
Methyl ethyl ketone	0.05	0.75
Methyl isobutyl ketone	0.05	0.33
Nitrobenzene	0.66	0.125
Pyridine	1.12	0.33
Tetrachlorcethylene	0.079	0.05
Toluene	1.12	0.33
1,1,2-Trichloro-1,2,2-Trifluoroethane	1.05	0.06
1,1,1-Trichloroethane	1.05	0.41
Trichloroethylene	0.062	0.091
Trichlorofluoromethane	0.05	0.96
Xylene	0.05	0.15

F006 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Cadmium	0.066
Chromium (Total)	5.20
Lead	0.51
Nickel	0.32
Silver	0.072

F007, F008, and F009 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Cadmium	0.066
Chromium (Total)	5.20
Lead	0.51
Nickel	0.32
Silver	0.072

F011 and F012 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Cadmium	0.066
Chromium (Total)	5.20
Lead	0.51
Nickel	0.32
Silver	0.072

F020-F023 and F026-F028 dioxin containing wastes	Concentration (in mg/l)
HxCDD-- All Hexachlorodibenzo-p-dioxins	<1 ppb
HxCDF-- All Hexachlorodibenzofurans	<1 ppb
PeCDD-- All Pentachlorodibenzo-p-dioxins	<1 ppb
PeCDF-- All Pentachlorodibenzofurans	<1 ppb
TCDD-- All Tetrachlorodibenzo-p-dioxins	<1 ppb
TCDF-- All Tetrachlorodibenzofurans	<1 ppb
2,4,5-Trichlorophenol	<0.05 ppm
2,4,6-Trichlorophenol	<0.05 ppm
2,3,4,6-Tetrachlorophenol	<0.10 ppm
Pentachlorophenol	<0.01 ppm

F024 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Chromium (Total)	Reserved
Nickel	Reserved

K001 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Lead	0.51

K022 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Chromium (Total)	5.2
Nickel	0.32

K028 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Chromium (Total)	Reserved
Nickel	Reserved

K046 nonwastewaters (Nonreactive Subcategory)	Concentration (in mg/l)
Lead	0.18

K048, K049, K050, K051 and K052 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Arsenic	0.004
Chromium (Total)	1.7
Nickel	0.048
Selenium	0.025

K061 nonwastewaters (Effective until 8/8/90 for the high zinc category -- 15% or greater total zinc)	Concentration (in mg/l)
Cadmium	0.14
Chromium (Total)	5.2
Lead	0.24
Nickel	0.32

K062 nonwastewaters	Concentration (in mg/l)
Chromium (Total)	0.094
Lead	0.37

K071 nonwastewaters	Concentration (in mg/l)
Mercury	0.025

K086 nonwastewaters (Solvent Washes Subcategory) (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Chromium (Total)	0.094
Lead	0.37

K087 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Lead	0.51

K101 and K102 nonwastewaters (Low Arsenic Subcategory - less than 1% Total Arsenic) (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Cadmium	0.066
Chromium (Total)	5.2
Lead	0.51
Nickel	0.32

K115 nonwastewaters	Concentration (in mg/l)
Nickel	0.32

P074 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Nickel	0.32

P099 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Silver	0.072

P104 nonwastewaters (see also Table CCW in sect. 268.43)	Concentration (in mg/l)
Silver	0.072

Table CCW
Constituent Concentration in Wastes
40 CFR 268.43

Constituents must be analyzed in waste before stabilization/solidification

F001, F002, F003, F004 and F005 wastewaters (Pharmaceutical Industry)	Concentration (in mg/l)
Methylene Chloride	0.044

F006 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Cyanides (Total)	590.0
Cyanides (Amenable)	30.0

F007, F008, and F009 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Cyanides (Total)	590 0
Cyanides (Amenable)	30.0

F007, F008, and F009 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10
Chromium (Total)	0.32
Lead	0.04
Nickel	0.44

F010 nonwastewaters	Concentration (in mg/kg)
Cyanides (Total)	1.5

F010 wastewaters	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10

F011 and F012 nonwastewaters (effective December 8, 1989; from July 8, 1989 until December 8, 1989, these waste are subject to the same treatment standards as F007, F008, and F009 nonwastewaters) (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Cyanides (Total)	110 0
Cyanides (Amenable)	9.1

F011 and F012 wastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/l)
Cyanides (Total)	1.9
Cyanides (Amenable)	0.10
Chromium (Total)	0.32
Lead	0.04
Nickel	0.44

F024 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
2-Chloro-1,3-butadiene	0.28
3 Chloropropene	0 28
1,1-Dichloroethane	0.014
1,2-Dichloroethane	0.014
1,2-Dichloropropane	0.014
cis-1,2-Dichloropropene	0.014
trans-1,3-Dichloropropene	0.014
Bis(2-ethylhexyl)phthalate	1 8
Hexachloroethane	1.8
Hexachlorodibenzo-furans	0 001
Hexachlorodibenzo-p-dioxins	0 001
Pentachlorodibenzo-furans	0 001
Pentachlorodibenzo-p-dioxins	0.001
Tetrachlorodibenzo-furans	0.001

F024 wastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/l)
2-Chloro-1,3 butadiene	0 28
3 Chloropropene	0.28
1,1-Dichloroethane	0 014
1,2-Dichloroethane	0 014
1,2-Dichloropropane	0 014
cis 1,3 Dichloropropene	0 014
trans-1,3-Dichloropropene	0.014
Bis(2-ethylhexyl)phthalate	0 036
Hexachloroethane	0 036
Hexachlorodibenzo-furans	0.001
Hexachlorodibenzo-p-dioxins	0 001
Pentachlorodibenzo-furans	0 001
Pentachlorodibenzo-p-dioxins	0.001
Tetrachlorodibenzo-furans	0.001
Chromium (Total)	0.35
Nickel	0.47

K001 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Naphthalene	8.0
Pentachlorophenol	37.0
Phenanthrene	8.0
Pyrene	7.3
Toluene	0.14
Xylenes	0.16

K001 wastewaters	Concentration (in mg/l)
Naphthalene	0.15
Pentachlorophenol	0 88
Phenanthrene	0.15
Pyrene	0.14
Toluene	0.14
Xylenes	0.16
Lead	0.037

K009 and K010 nonwastewaters	Concentration (in mg/kg)
Chloroform	6 0

K009 and K010 wastewaters	Concentration (in mg/l)
Chloroform	0.10

K011, K013, and K014 nonwastewaters	Concentration (in mg/kg)
Acetonitrile	1.8
Acrylonitrile	1.4
Acrylamide	23.0
Benzene	0 03
Cyanides (Total)	57.0

K015 wastewaters	Concentration (in mg/l)
Anthracene	1.0
Benzal chloride	0.28
Benzo (b and/or k) fluoranthene	0.29
Phenanthrene	0.27
Toluene	0.15
Chromium (total)	0.32
Nickel	0.44

K016 nonwastewaters	Concentration (in mg/kg)
Hexachlorobenzene	28 0
Hexachlorobutadiene	5.6
Hexachlorocyclopentadiene	5 6
Hexachloroethane	28 0
Tetrachloroethene	6.0

K016 wastewaters	Concentration (in mg/l)
Hexachlorobenzene	0.033
Hexachlorobutadiene	0.007
Hexachlorocyclopentadiene	0 007
Hexachloroethane	0 033
Tetrachloroethene	0.007

K018 nonwastewaters	Concentration (in mg/kg)
Chloroethane	6 0
1,1-Dichloroethane	6 0
1,2-Dichloroethane	6 0
Hexachlorobenzene	28 0
Hexachlorobutadiene	5 6
Hexachloroethane	28 0
Pentachloroethane	5 6
1,1,1-Trichloroethane	6.0

K018 wastewaters	Concentration (in mg/l)
Chloroethane	0 007
Chloromethane	0 007
1,1-Dichloroethane	0.007
1,2-Dichloroethane	0.007
Hexachlorobenzene	0.033
Hexachlorobutadiene	0.007
Pentachloroethane	0 007
1,1,1-Trichloroethane	0.007

K019 nonwastewaters	Concentration (in mg/kg)
Bis (2-chloroethyl) ether	5.6
Chlorobenzene	6.0
Chloroform	6.0
1,2-Dichloroethane	6 0
Hexachloroethane	28 0
Naphthalene	5 6
Phenanthrene	5.6
Tetrachloroethene	6 0
1,2,4-Trichlorobenzene	19.0
1,1,1-Trichloroethane	6 0

K019 wastewaters	Concentration (in mg/l)
Bis (2-chloroethyl) ether	0.007
Chlorobenzene	0.006
Chloroform	0 007
p-Dichloroethane	0 008
1,2-Dichloroethane	0 007
Fluorene	0.007
Hexachloroethane	0 033
Naphthalene	0 007
Phenanthrene	0.007
1,2,4,5-Tetrachlorobenzene	0.017
Tetrachoroethene	0.007
1,2,4-Tricholorbenzene	0 023
1,1,1-Trichloroethane	0.007

K020 nonwastewaters	Concentration (in mg/kg)
1,2-Dichloroethane	6.0
1,1,2,2-Tetrachloroethane	5 6
Tetrachloroethene	6.0

K020 wastewaters	Concentration (in mg/l)
1,2-Dichloroethane	0.007
1,1,2,2-Tetrachloroethane	0.007
Tetrachlorcethene	0.007

K022 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Acetophenone	19.0
Sum of Diphenylamine and Diphenylnitrosamine	13.0
Phenol	12.0
Toluene	0.034

K023 and K024 nonwastewaters	Concentration (in mg/kg)
Phthalic anhydride measured as phthalic acid	28.0

K023 and K024 wastewaters	Concentration (in mg/l)
Phthalic anhydride measured as phthalic acid	0.54

K028 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
1,1-Dichloroethane	6.0
trans-1,2-Dichloroethene	6 0
Hexachlorobutadiene	5.6
Hexachloroethane	28 0
Pentachloroethane	5 6
1,1,1,2-Tetrachloroethane	5.6
1,1,2,2-Tetrachloroethane	5 6
1,1,1-Trichloroethane	6.0
1,1,2-Trichloroethane	6.0
Tetrachloroethylene	6.0

K028 wastewaters	Concentration (in mg/l)
1,1-Dichloroethane	0.007
trans-1,2-Dichloroethene	0.033
Hexachlorobutadiene	.007
Hexachloroethane	C 033
Pentachloroethane	0 033
1,1,1,2-Tetrachloroethane	0 007
1,1,2,2-Tetrachloroethane	0.007
Tetrachloroethylene	0.007
1,1,1-Trichloroethane	0.007
1,1,2-Trichloroethane	0 007
Cadmium	6 4
Chromium (Total)	0 35
Lead	0 037
Nickel	0.47

K029 nonwastewaters	Concentration (in mg/kg)
Chloroform	6 0
1,2-Dichloroethane	6 0
1,1-Dichloroethylene	6.0
1,1,1-Trichloroethane	6.0
Vinyl chloride	6.0

K030 nonwastewaters	Concentration (in mg/kg)
Hexachlorobutadiene	5.6
Hexachloroethane	28.0
Hexachloropropene	19 0
Pentachlorobenzene	28.0
Pentachloroethane	5.6
1,2,4,5-Tetrachlorobenzene	14.0
Tetrachloroethene	6.0
1,2,4-Trichlorobenzene	19.0

K030 wastewaters	Concentration (in mg/l)
o-Dichlorobenzene	0.008
p-Dichlorobenzene	0.008
Hexachlorobutadiene	0 007
Hexachloroethane	0 033
Pentachloroethane	0.007
1,2,4,5-Tetrachlorobenzene	0.017
Tetrachloroethene	0.007
1,2,4-Trichlorobenzene	0.023

K036 wastewaters	Concentration (in mg/l)
Disulfoton	0.025

K037 nonwastewaters	Concentration (in mg/kg)
Disulfoton	0.1
Toluene	28.0

K037 wastewaters	Concentration (in mg/l)
Disulfoton	0 003
Toluene	0.028

K038 and K040 nonwastewaters	Concentration (in mg/kg)
Phorate	0.1

K038 and K040 wastewaters	Concentration (in mg/l)
Phorate	0.025

K043 nonwastewaters	Concentration (in mg/kg)
2,4-Dichorophenol	0 38
2,6-Dichorophenol	0.34
Pentachlorophenol	1.9
Tretrachloroethene	1.7
Tetrachlorophenols (Total)	0.68
2,4,5-Trichlorophenol	8.2
2,4,6-Trichlorophenol	7.6
Hexachlorodibenzo-p-dioxins	0 001
Hexachlorodibenzo-furans	0.001
Pentachlorodibenzo p dioxins	0 001
Pentachlorodibenzo-furans	0 001
Tetrachlorodibenzo p-dioxins	0 001
Tetrachlorodibenzo-furans	0.001

K043 wastewaters	Concentration (in mg/l)
2,4-Dichorophenol	0 049
2,6-Dichorophenol	0 013
Pentachlorophenol	0 22
Tretrachloroethene	0.006
Tetrachlorophenols (Total)	0.018
2,4,5-Trichlorophenol	0 016
2,4,6-Trichlorophenol	0 039
Hexachlorodibenzo-p-dioxins	0 001
Hexachlorodibenzo furans	0 001
Pentachlorodibenzo-p-dioxins	0 001
Pentachlorodibenzo-furans	0 001
Tetrachlorodibenzo p-dioxins	0.001
Tetrachlorodibenzo-furans	0.001

K048 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Benzene	9.5
Benzo(a)pyrene	0.84
Bis (2-ethylhexyl) phthalate	37.0
Chrysene	2.2
Di-n-butyl phthalate	4 2
Ethylbenzene	67.0
Naphthalene	Reserved
Phenanthrene	7.7
Phenol	2.7
Pyrene	2.0
Toluene	9.5
Xylenes	Reserved
Cyanides (Total)	1.8

K048 wastewaters	Concentration (in mg/l)
Benzene	0.011
Benzo(a)pyrene	0 047
Bis (2-ethylhexyl) phthalate	0 043
Chrysene	0 043
Di-n butyl phthalate	0 060
Ethylbenzene	0 011
Fluorene	0.050
Naphthalene	0.033
Phenanthrene	0 039
Phenol	0.047
Pyrene	0.045
Toluene	0.011
Xylenes	0.011
Chromium (Total)	0.20
Lead	0.037

K049 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Anthracene	6 2
Benzene	9.5
Benzo(a)pyrene	0 84
Bis (2-ethylhexyl) phthalate	37.0
Chrysene	2.2
Ethylbenzene	67.0
Naphthalene	Reserved
Phenanthrene	7.7
Phenol	2.7
Pyrene	2.0
Toluene	9.5
Xylenes	Reserved
Cyanides (Total)	1.8

K049 wastewaters	Concentration (in mg/l)
Anthracene	0.039
Benzene	0 011
Benzo(a)pyrene	0 047
Bis (2-ethylhexyl) phthalate	0.043
Carbon disulfide	0 011
Chrysene	0 043
2,4-Dimethylphenol	0 033
Ethylbenzene	0 011
Naphthalene	0 033
Phenanthrene	0 039
Phenol	0 047
Pyrene	0 045
Toluene	0.011
Xylenes	0.011
Chromium (Total)	0 20
Lead	0 037

K050 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Benzo(a)pyrene	0 84
Phenol	2.7
Cyanides (Total)	1.8

K050 wastewaters	Concentration (in mg/l)
Benzo(a)pyrene	0 047
Phenol	0 047
Chromium (Total)	0 20
Lead	0.037

NOTE: "Wastewater" means a waste containing less than 1% filterable solids and less than 1% T.O.C.

Table CCW
Constituent Concentration in Wastes
40 CFR 268.43
(Continued)

Constituents must be analyzed in waste before stabilization

K051 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Anthracene	6.2
Benzene	9 5
Benzo(a)anthracene	1.4
Benzo(a)pyrene	0 84
Bis (2-ethylhexyl) phthalate	37.0
Chrysene	2.2
Di-n-butyl phthalate	4 2
Ethylbenzene	67.0
Naphthalene	Reserved
Phenanthrene	7.7
Phenol	2.7
Pyrene	2 0
Toluene	9.5
Xylenes	Reserved
Cyanides (Total)	1.8

K051 wastewaters	Concentration (in mg/l)
Acenaphthene	0 050
Anthracene	0 039
Benzene	0 011
Benzo (a) anthracene	0.043
Benzo(a)pyrene	0.047
Bis (2-ethylhexyl) phthalate	0.043
Chrysene	0 043
Di-n-butyl phthalate	0.060
Ethylbenzene	0.011
Flourene	0 050
Naphthalene	0.033
Phenanthrene	0 039
Phenol	0 047
Pyrene	0.045
Toluene	0 011
Xylenes	0 011
Chromium (Total)	0.20
Lead	0 037

K052 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Benzene	9 5
Benzo(a)pyrene	0 84
o Cresol	2.2
p Cresol	0.90
Ethylbenzene	67 0
Naphthalene	Reserved
Phenanthrene	7.7
Phenol	2 7
Toluene	9.5
Xylenes	Reserved
Cyanides (Total)	1.8

K052 wastewaters	Concentration (in mg/l)
Benzene	0 011
Benzo(a)pyrene	0 047
o-Cresol	0 011
p Cresol	0 011
2,4-Dimethylphenol	0 033
Ethylbenzene	0 011
Naphthalene	0 033
Phenanthrene	0 039
Phenol	0 047
Toluene	0 011
Xylenes	0.011
Chromium (Total)	0 20
Lead	0 037

K062 wastewaters	Concentration (in mg/l)
Chromium (Total)	0.32
Lead	0 04
Nickel	0 44

K071 wastewaters	Concentration (in mg/l)
Mercury	0.030

K086 nonwastewaters- Solvent Washes Subcategory (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Acetone	0.37
bis (2-ethylhexyl) phthalate	0.49
n-Butyl alcohol	0.37
Cyclohexanone	0 49
1,2-Dichlorobenzene	0 49
Ethyl acetate	0 37
Ethyl benzene	0 031
Methanol	0.37
Methylene chloride	0 037
Methyl ethyl ketone	0.37
Methyl isobutyl ketone	0.37
Naphthalene	0 49
Nitrobenzene	0 49
Toluene	0.031
1,1,1-Tricholorethane	0.044
Trichloroethylene	0 031
Xylenes	0.015

K086 wastewaters- Solvent Washes Subcategory	Concentration (in mg/l)
Acetone	0 015
bis (2-ethylhexyl) phthalate	0.044
n-Butyl alcohol	0 031
Cyclohexanone	0 022
1,2-Dichlorobenzene	0 044
Ethyl acetate	0 031
Ethyl benzene	0.015
Methanol	0 031
Methylene chloride	0.031
Methyl ethyl ketone	0 031
Methyl isobutyl ketone	0 031
Naphthalene	0 044
Nitrobenzene	0 044
Toluene	0 029
1,1,1-Tricholorethane	0 031
Trichloroethylene	0.029
Xylenes	0 015
Chromium (Total)	0 32
Lead	0.037

K087 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Acenaphthalene	3.4
Benzene	0 071
Chrysene	3 4
Fluoranthene	3.4
Indeno (1,2,3-cd) pyrene	3.4
Naphthalene	3 4
Phenanthrene	3.4
Toluene	0 65
Xylenes	0.070

K087 wastewaters	Concentration (in mg/l)
Acenaphthalene	0 028
Benzene	0.014
Chrysene	0 028
Fluoranthene	0 028
Indeno (1,2,3 cd) pyrene	0 028
Naphthalene	0 028
Phenanthrene	0.028
Toluene	0 008
Xylenes	0.014
Lead	0.037

K093 and K094 nonwastewaters	Concentration (in mg/kg)
Phthalic acid	28 0

K093 and K094 wastewaters	Concentration (in mg/l)
Phthalic acid	0.54

K095 nonwastewaters	Concentration (in mg/kg)
1,1,1,2-Tetrachloroethane	5.6
1,1,2,2-Tetrachloroethane	5.6
Tetrachloroethene	6 0
1,1,2-Trichloroethane	6 0
Trichloroethylene	5 6
Hexachloroethane	28.0
Pentachloroethane	5 6

K096 nonwastewaters	Concentration (in mg/kg)
1,3-Dichlorobenzene	5.6
Pentachloroethane	5 6
1,1,1,2-Tetrachloroethane	5 6
1,1,2,2-Tetrachloroethane	5.6
Tetrachloroethylene	6.0
1,2,4-Trichlorobenzene	19 0
Trichloroethylene	5.6
1,1,2-Trichloroethane	6.0

K099 nonwastewaters	Concentration (in mg/kg)
2,4,-Dichlorophenoxyacetic acid	1 0
Hexachlorodibenzo-p-dioxins	0 001
Hexachlorodibenzofurans	0.001
Pentachlorodibenzo-p-dioxins	0 001
Pentachlorodibenzofurans	0 001
Tetrachlorodibenzo p dioxins	0.001
Tetrachlorodibenzofurans	0.001

K099 wastewaters	Concentration (in mg/l)
2,4,-Dichlorophenoxyacetic acid	1 0
Hexachlorodibenzo-p-dioxins	0 001
Hexachlorodibenzofurans	0 001
Pentachlorodibenzo-p dioxins	0 001
Pentachlorodibenzofurans	0 001
Tetrachlorodibenzo-p-dioxins	0 001
Tetrachlorodibenzofurans	0.001

K101 nonwastewaters (Low Arsenic Subcategory-less than 1% total arsenic) (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Ortho Nitroaniline	14.0

K101 wastewaters	Concentration (in mg/l)
Ortho-Nitroaniline	0 27
Arsenic	2 0
Cadmium	0 24
Lead	0.11
Mercury	0.027

K102 nonwastewaters (Low Arsenic Subcategory-less than 1% total arsenic) (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Ortho-Nitrophenol	13 0

K102 wastewaters	Concentration (in mg/l)
Ortho-Nitroaniline	0 028
Arsenic	2.0
Cadmium	0 24
Lead	0.11
Mercury	0 027

K103 nonwastewaters	Concentration (in mg/kg)
Aniline	5.6
Benzene	6.0
2,4-Dinitrophenol	5.6
Nitrobenzene	5.6
Phenol	5.6

K103 wastewaters	Concentration (in mg/l)
Aniline	4.5
Benzene	0.15
2,4-Dinitrophenol	0.61
Nitrobenzene	0.073
Phenol	1.4

K104 nonwastewaters	Concentration (in mg/kg)
Aniline	5.6
Benzene	6.0
2,4-Dinitrophenol	5.6
Nitrobenzene	5.6
Phenol	5.6
Cyanides (Total)	1.8

K104 wastewaters	Concentration (in mg/l)
Aniline	4.5
Benzene	0.15
2,4-Dinitrophenol	0.61
Nitrobenzene	0.073
Phenol	1.4
Cyanides (Total)	2.7

K115 wastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/l)
Nickel	047

P013 nonwastewaters	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P013 wastewaters	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10

P021 nonwastewaters	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P021 wastewaters	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10

P029 nonwastewaters	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P029 wastewaters	Concentration (in mg/l)
Cyanide (Total)	
Cyanide (Amenable)	0.10

P030 nonwastewaters	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P030 wastewaters	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10

P039 nonwastewaters	Concentration (in mg/kg)
Disulfoton	0.1

P039 wastewaters	Concentration (in mg/l)
Disulfoton	0.025

P063 nonwastewaters	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P063 wastewaters	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10

P071 nonwastewaters	Concentration (in mg/kg)
Methyl parathion	0.025

P071 wastewaters	Concentration (in mg/l)
Methyl parathion	0.025

P074 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P074 wastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10
Nickel	0.44

P089 nonwastewaters	Concentration (in mg/kg)
Parathion	0.1

P089 wastewaters	Concentration (in mg/l)
Parathion	0.025

P094 nonwastewaters	Concentration (in mg/kg)
Phorate	0.1

P094 wastewaters	Concentration (in mg/l)
Phorate	0.025

P097 nonwastewaters	Concentration (in mg/kg)
Famphur	0.1

P097 wastewaters	Concentration (in mg/l)
Famphur	0.025

P098 nonwastewaters	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P098 wastewaters	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10

P099 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P099 wastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10

P104 nonwastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P104 wastewaters (see also Table CCWE in sect. 268.41)	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10

P106 nonwastewaters	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P106 wastewaters	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10

P121 nonwastewaters	Concentration (in mg/kg)
Cyanide (Total)	110.0
Cyanide (Amenable)	9.1

P121 wastewaters	Concentration (in mg/l)
Cyanide (Total)	1.9
Cyanide (Amenable)	0.10

NOTE: "Wastewater" means a waste containing less than 1% filterable solids and less than 1% T.O.C.

Table CCW
Constituent Concentration in Wastes
40 CFR 268.43
(Continued)

Constituents must be analyzed in waste before stabilization

U028 nonwastewaters	Concentration (in mg/kg)
Bis-(2-ethythexyl) phthalate	28.0

U028 wastewaters	Concentration (in mg/l)
Bis-(2-ethythexyl) phthalate	0.54

U069 nonwastewaters	Concentration (in mg/kg)
Di-n-butyl phthalate	28 0

U069 wastewaters	Concentration (in mg/l)
Di-n-butyl phthalate	0.54

U088 nonwastewaters	Concentration (in mg/kg)
Diethyl phthalate	28 0

U088 wastewaters	Concentration (in mg/l)
Diethyl phthalate	0 54

U102 nonwastewaters	Concentration (in mg/kg)
Dimethyl phthalate	28 0

U102 wastewaters	Concentration (in mg/l)
Dimethyl phthalate	0.54

U107 nonwastewaters	Concentration (in mg/kg)
Di-n-octyl phthalate	28 0

U107 wastewaters	Concentration (in mg/l)
Di n-octyl phthalata	0.54

U190 nonwastewaters	Concentration (in mg/kg)
Phthalic anhydride (reported as Phthalic acid)	28.0

U190 wastewaters	Concentration (in mg/l)
Phthalic anhydride (reported as Phthalic acid)	0.54

U235 nonwastewaters	Concentration (in mg/kg)
tris-(2,3-Dibromopropyl) phosphate	0.1

U235 wastewaters	Concentration (in mg/l)
tris-(2,3-Dibromopropyl) phosphate	0.025

NOTE: "Wastewater" means a waste containing less than 1% filterable solids and less than 1% T.O.C.

Appendix III to part 268 - List of Halogenated Organic Compounds Regulated Under Sec. 268.32

[Appendix III added by 52 FR 25787, July 8, 1987]

Appendix III is a list of HOCs that must be considered when determining if the waste falls under the California list HOC restrictions. The concentrations of these HOCs in the waste must be added together to determine if the 1,000 mg/l restriction is exceeded

In determining the concentration of HOCs in a hazardous waste for purposes of the Sec. 268.32 land disposal prohibition, EPA has defined the HOCs that must be included in the calculation as any compounds having a carbon-halogen bond which are listed in this Appendix (see Sec. 268.2). Appendix III to Part 268 consists of the following compounds:

Volatiles
Bromodichloromethane
Bromomethane
Carbon Tetrachloride
Chlorobenzene
2-Chloro-1,3-butadiene
Chlorodibromomethane
Chloroethane
2-Chloroethyl vinyl ether
Chloroform
Chloromethane
3-Chloropropene
1,2-Dibromo-3-chloropropane
1,2-Dibromomethane
Dibromomethane
Trans-1,4-Dichloro-2-butene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethylene
Trans-1,2-Dichloroethene
1,2-Dichloropropane
Trans-1,3-Dichloropropene
cis-1,3-Dichloropropene
Iodomethane
Methylene chloride
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Tribromomethane
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Trichloromonofluoromethane
1,2,3-Trichloropropane
Vinyl chloride

Semivolatiles
Bis(2-chloroethoxy)ethane
Bis(2-chloroethyl)ether
Bis(2-chloroisopropyl)ether
p-Chloroaniline
Chlorobenzilate
p-Chloro-m-cresol
2-Chloronaphthalene
2-Chlorophenol
3-Chloropropionitrile
m-Dichlorobenzene
o-Dichlorobenzene
p-dichlorobenzene
3,3'-Dichlorobenzidine

2,4-Dichlorophenol
2,6-Dichlorophenol
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexachloroprophene
Hexachloropropene
4,4'-Methylenebis(2-chloroaniline)
Pentachlorobenzene
Pentachloroethane
Pentachloronitrobenzene
Pentachlorophenol
Pronamide
1,2,4,5-Tetrachlorobenzene
2,3,4,6-Tetrachlorophenol
1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
Tris(2,3-dibromopropyl)phosphate

Organochlorine Pesticides
Aldrin
alpha-BHC
beta-BHC
delta-BHC
gamma-BHC
Chlordane
DDD
DDE
DDT
Dieldrin
Endosulfan I
Endosulfan II
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide
Isodrin
Kepone
Methoxyclor
Toxaphene

Phenoxyacetic Acid Herbicides
2,4-Dichlorophenoxyacetic acid
Silvex
2,4,5-T

PCBs
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
PCBs not otherwise specified

Dioxins and Furans
Hexachlorodibenzo-p-dioxins
Hexachlorodibenzofuran
Pentachlorodibenzo-p-dioxins
Pentachlorodibenzofuran
Tetrachlorodibenzo-p-dioxins
Tetrachlorodibenzofuran
2,3,7,8-Tetrachlorodibenzo-p-dioxin

PRELIMINARY RISK EVALUATION

I. Contaminant: _____

Contaminant TLV: _____

Contaminant Action Level: _____

II. Concentration in Soil: _____ppm

(1) <100ppb (5) 100ppb-1ppm (10) >1ppm

III. Route of Exposure (Health)

TOTAL a) Inhale (5) Yes_____ (0) No_____

1) Contaminant concentration:

>1/1000 of TLV Total_____ (2) Yes___ (0) No___

2) Contaminant concentration:

>1/100 of AL Total_____ (2) Yes___ (0) No___

3) Toxicity: LC_{50}_____ 8 Hours, Rat

(10) Extreme____ <10ppm (5) High____ 10-100ppm (2) Moderate____ 100-1000ppm

(1) Slight_____ 1000-10,000ppm (0) Non Hazardous_____ >10,000ppm

TLV_____

(15) Extreme_____ 0-1ppm (10) High_____ 1-10ppm (5) Moderate_____ 10-100ppm

(2) Slight_____ 100-1000ppm (0) Non Hazardous_____ >1000ppm

4) Vapor Pressure: _____mm (10) High___ >75mm (5) Medium___ 25-75mm (0) Low___ <25mm

TOTAL b) Absorb: (5) Yes_____ (0) No_____

Contaminant concentration:

>1/500 of TLV total_____ (2) Yes___ (0) No___

3) Toxicity: LD_{50}_____ 8 Hours, Rat

(10)	(5)	(2)
Extreme_____ 0-1mg	High_____ 1-50mg	Moderate_____ 50-500mg

(1)	(0)
Slight_____ 500-5000mg	Non Hazardous_____ >5000mg

4) Vapor Pressure: _____mm

(0)	(5)	(10)
High___ >75mm	Medium___ 25-75mm	Low___ <25mm

c) Carcinogenic Effect:

____ True human carcinogenics (25)

____ Probable human carcinogenic with limited human study (20)

____ Probable human carcinogenic with inadequate human study (15)

____ Possible human carcinogenic with limited evidence in animals (10)

____ Not classified inadequate study on animals (5)

____ No evidence of carcinogenicity in humans (0)

TOTAL HEALTH RISK:

Soil Concentration____+ Inhalation____+ Absorb ____+ Carcinogenic ____ = _____

TOTAL HEALTH RISK RANGES:

High: 78 - 111

Medium: 30 - 77

Low: 1 - 29

IV. Route of Exposure (Environmental)

1) Groundwater

a) Environmental significant

If greater than States Recommended Soil Clean-up Level (RSCL) levels at 1-15 ft, contaminate is

	(15)	(0)
significant	Yes_____	No_____

b) Effect of groundwater

If greater than 10 x RSCL at 15 ft, possible effect on

	(15)	(0)
groundwater	Yes_____	No_____

2) Surface water

a) Solubility in water:

(0)	(2)
Insoluble_____	Slightly soluble_____
(5)	(10)
Soluble_____	Very soluble_____

b) Observable signs of contamination

(10)	(0)
Yes_____	No_____

Remarks:

c) Concentration: _____ppb

	(10)	(0)
Action level 1/500 of TLV_____	Yes_____	No_____

3) Air:

	(10)	(5)	(0)
Vapor Pressure: _____mm	High___ >75mm	Moderate___ 25-75mm	Low___ <25mm

TOTAL ENVIRONMENTAL RISK:

Soil Concentration____+ Groundwater_____+ Surface water_____+ Air_____ = _____

TOTAL ENVIRONMENTAL RISK RANGES:

High:	45 - 95	Immediate removal of soil
Medium:	20 - 44	Soil removal depends on population & project
Low:	2 - 19	Soil can be put back into hole

SAMPLE PLAN

FOR

SOIL SAMPLING

Compliance Division (EMC)
Directorate of Environmental Management
McClellan AFB CA 95652-5990

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I. OBJECTIVE OF SAMPLING EFFORT

As a result of our past investigations, McClellan recognized that areas of contaminated soil beyond those areas currently planned for investigation may exist within the confines of the base. As a result, McClellan has developed a Soil Management Program to proactively identify and prudently manage potentially contaminated soils. In recognition of the intent of the IAG to integrate CERCLA and RCRA this plan was designed as a screening methodology addressing both SARA/CERCLA and substantive RCRA requirements as they apply to contaminated soils.

The overall objective of this sampling plan is two-fold: 1) to ensure contaminated soil is identified early enough during ongoing base activities (i.e., construction, repairs, maintenance efforts to preclude the off-base disposal of contaminated soils; and 2) to ensure that contaminated soil, once it is identified, is prudently managed in accordance with Federal and State requirements and in a way to minimize the effect to our ongoing base operations.

It is recognized that the data and findings from the Soil Sampling Plan are important to ongoing RI/FS studies at McClellan. To ensure this information is interfaced with this program, all data generated will be incorporated into the RI/FS efforts on a semi-annual basis. The contractor conducting the RI/FS activities in the Operable Unit area that this data was obtained, will evaluate this information to determine if it warrants a new site or Potential Release Location (PRL) designation or if it can be incorporated into an existing site or PRL. The status of this information will be summarized annually into the Comprehensive CERCLA Workplan (CCW) to ensure incorporation into the RI/FS process.

II. SITE BACKGROUND

A. Location and History

1. McClellan AFB is located approximately seven miles northeast of downtown Sacramento, California, as shown in Figure II-1. The main base facility includes 2,952 contiguous acres, which are bounded by the City of Sacramento to the west and southwest, the unincorporated areas of Rio Linda/Elverta to the northwest, and North Highlands to the east.

2. McClellan AFB was established in 1936 when the US Congress authorized the construction of a new air repair depot and supply base for the War Department (predecessor to the Department of Defense). Initially named the Sacramento Air Depot, the facility was dedicated in 1939. In the early 1950s, McClellan AFB changed from a bomber depot to a jet fighter maintenance depot. McClellan AFB currently operates as an Air Force Logistics Command Base, employing approximately 18,000 military and civilian personnel with the primary mission of management, maintenance, and repair of aircraft, electronics, and communication equipment.

3. Units existing within the Air Logistics Command Center include: the 2852nd Air Base Group, which is responsible for all support and housekeeping functions at McClellan AFB; the 2951st Combat Logistics Support Squadron, which provides mobile supply and maintenance support to USAF forces worldwide; Detachment 5, 3025th Management Engineering Squadron, which provides manpower authorization and management engineering support; and the USAF Clinic, which provides McClellan AFB with medical services.

4. Tenant units at McClellan AFB include: Air Force Systems Command; Air Training Command; Tactical Air Command; Air Force Communications Command; Military Airlift Command; the Fourth Air Force Reserve; the Coast Guard Air Station Sacramento, Detachment 1905, 17th District, Air Force Office of Special Investigations; Canadian Forces Liaison Detachment; Royal Air Force Liaison Office; Air Force Commissary Complex Service; American Red Cross Field Office, General Accounting Office; and Defense Logistics Agency activities.

5. In fulfilling its past and current mission to defend the United States through the operation and maintenance of aircraft, McClellan AFB has been engaged in a wide variety of operations that involve the use, storage, and disposal of hazardous materials including: industrial solvents, caustic cleaners, electroplating chemicals, heavy metals, polychlorinated biphenyls (PCBs), low-level radioactive wastes, and a variety of fuel oils and lubricants.

B. Physical Setting

1. Groundwater beneath McClellan AFB occurs under confined and unconfined conditions. Hazardous substances have percolated into the aquifer underlying the facility at various locations on base. In 1979, groundwater testing by McClellan AFB, state, and local agencies

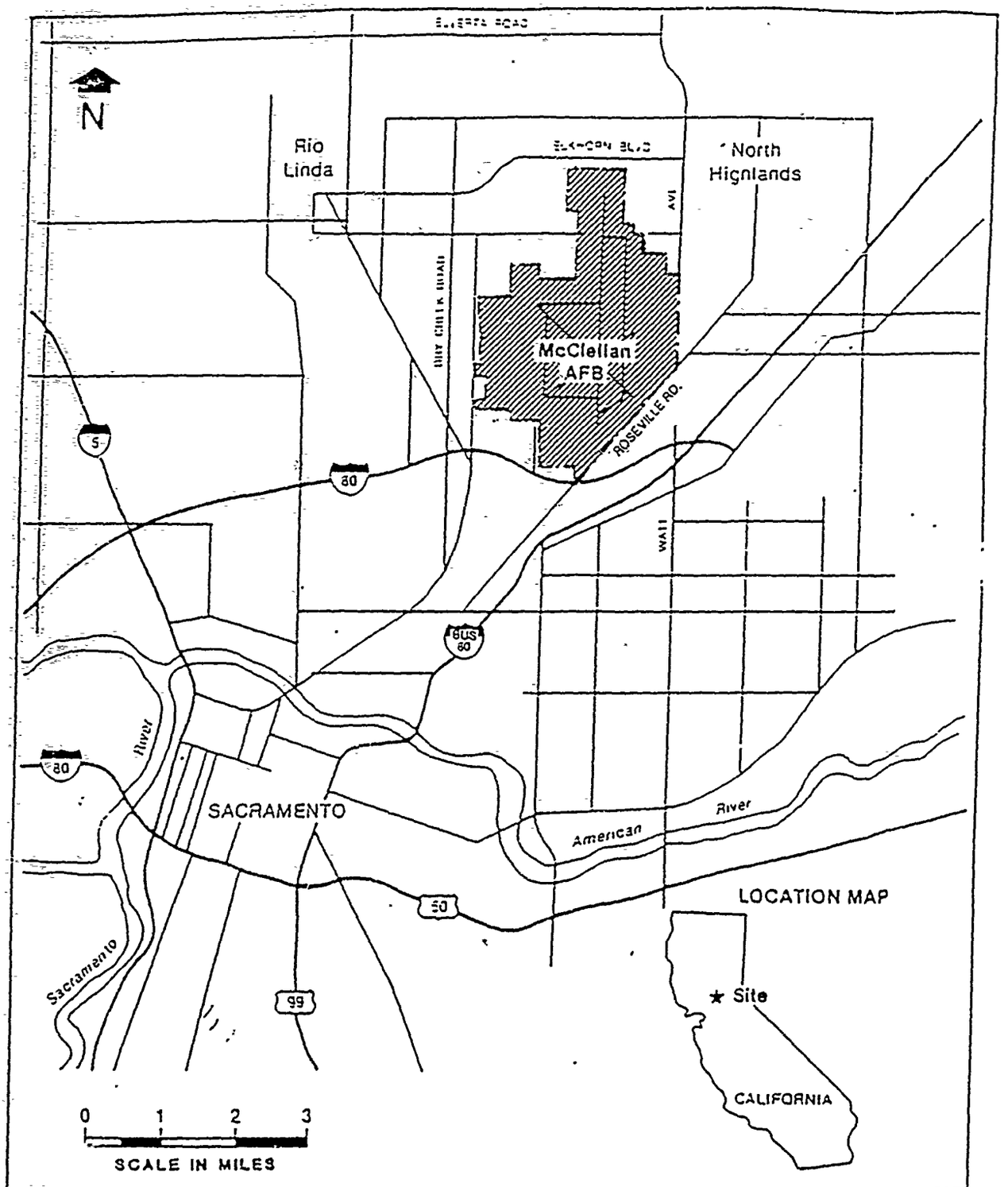


Figure 2-1 Location of McClellan AFB.

identified the presence of volatile organic compounds (VOCs) in on-base and off-base wells which led to the closure of two McClellan AFB wells and three off-base wells. Groundwater and soil samples collected on and in the vicinity of McClellan AFB have shown the presence of a variety of contaminants, principally VOCs and metals.

2. The watershed in the vicinity of McClellan AFB had historically moved in westerly or southwesterly direction toward the Sacramento and American Rivers, until 1955 when the natural direction of this flow showed significant change moving away from the rivers toward a cone of depression caused by public and industrial extraction. Surface water drainage on and around McClellan AFB includes Magpie, Second, Dry, and Arcade creeks. The primary recipient of on-base drainage is Magpie Creek, which enters McClellan AFB from the east, merges with several tributaries, and exits to the west.

3. The soil and groundwater contamination which currently exists at McClellan AFB are primarily the result of chemical releases from:

a. Land disposal facilities. Disposal occurred via burial of hazardous substances in unlined pits primarily along the western edge of the base. This practice has been discontinued, and wastes are now disposed of at an approved California Class I facility or discharged to the on-base Industrial Wastewater Treatment Plant (IWTP).

b. Spills and discharges. In the course of various industrial activities, accidental discharges of hazardous substances onto the ground have occurred.

c. Leaks. Leakage from sumps, underground storage tanks, the Industrial Wastewater Line, and disposal ponds have occurred.

4. To date, McClellan AFB has identified 170 waste sites and potential release locations (PRLs) that warrant investigation. These sites and PRLs, identified in Table II-1, occur within 12 preliminary groundwater operable units (OUs), for the purpose of managing subsequent investigations and appropriate response actions that have been designated. These OUs are shown in Figure II-2.

5. A more detailed discussion of the environmental conditions of McClellan AFB, equivalent to a Conceptual Site Model for McClellan AFB, can be found in Sections 2.0 and 3.0 of the Preliminary Groundwater Operable Unit Remedial Investigation Sampling and Analysis Plan (Radian, 1989).

C. Contaminant Sources

1. Area A

Area A encompasses approximately 200 acres located in the southeast portion of McClellan AFB in an area of heavy industrial activity involving trichloroethene (TCE) usage. Area A contains 54 sites that are potential sources of hazardous substances to the soils and groundwater;

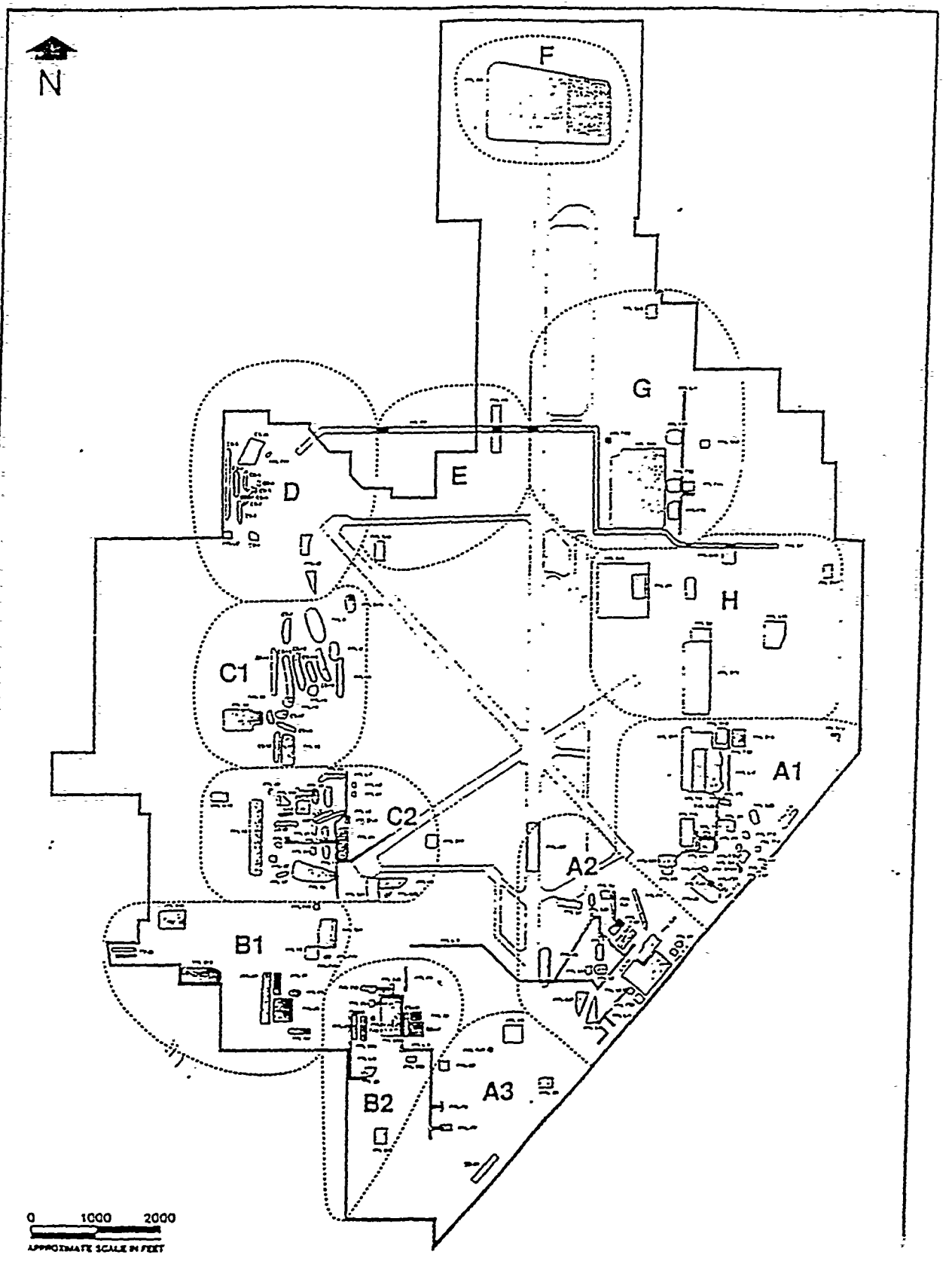


Figure II-2 Approximate Boundaries of Confirmed Sites, Potential Release Locations, and Groundwater Operable Units.

5 Area sites have been studied. Materials disposed of at the sites included refuse and refuse ash, 1,2-dichloroethane (1,2-DCA), cresylic acid, skimming pond sludges, and industrial wastewater sludge. Groundwater samples collected from monitoring wells in the vicinity of Area A have contained a variety of volatile organic compounds (VOCs) including:

* TCE
* 1,1-Dichloroethene (1,1-DEC)
* 1,2-DCA
* Acetone
* Toluene
* Carbon tetrachloride
* 1,1,1-Trichloroethane (1,1,1-TCA)
* Chloroform
* Methylene chloride
* Benzene
* Ethyl benzene
* Trichlorofluoromethane (TCF)

Contaminants reported in soil samples collected from sites in Area A include:

* Acetone
* Benzene
* Chloroform
* Ethyl benzene
* TCE
* 1,1,1-TCA
* Total xylenes
* Bis(2-ethylhexyl)phthalate
* Di-n-butylphthalate

Three base production wells located in Area A (BW-1, BW-2, and BW-12) have been closed because elevated concentrations of TCE have been reported.

2. Area B

Area B encompasses approximately 68 acres in the southwest portion of McClellan AFB, and includes 16 sites that are potential sources of hazardous substances to the soils and groundwater; 5 Area B sites have been studied. Area B has historically been an area of varied use, including: storage buildings, a chemical laboratory, a woodshop and instrument repair facilities, a paint facility, and a plating shop. Materials handled at various locations within the area include: TCE, diethyl ether, low-level radioactive wastewater, and waste chemicals generated during plating activities. In Area B, TCE has been found in Base Production Well 18, which currently operates with an activated carbon filtering system. City Well 150 located south of the area was closed because of TCE contamination. Volatile organic compounds reported in groundwater collected from Area B are:

* 1,1-DCE
* TCE
* Trans-1,2-dichloroethene (trans-1,2-DCE)
* Methyl Ethyl Ketone (MEK)
* Carbon disulfide
* Dichlorobenzene
* Chloroform
* Methylene chloride

Contaminants reported in soil samples collected from sites in Area B include:

* Chlorinated VOCs
* Ketones
* Phthalates
* Heavy metals (barium, chromium, arsenic, lead and copper)

3. Area C

Area C encompasses approximately 260 acres in the west-central portion of McClellan AFB. Forty sites in Area C are potential sources of hazardous substances to the soils and groundwater; all of these sites have been studied. Currently, Area C includes a Civil Engineering materials storage yard, the Industrial Waste Treatment Plant (IWTP), the Groundwater Treatment Plant (GWTP), an aircraft maintenance hangar, and a fire training area. These sites include refuse sludge pits, chemical waste pits, burn pits, waste oil and solvent storage ponds (used from the 1940s to 1971), surface storage areas, settling ponds, waste water ponds, and unlined drainage ditches. The area was used from the 1940s to 1972 for waste disposal into excavated trenches, which were sometimes burned, and were subsequently covered with fill material. These wastes were from a variety of sources, and included ash, burned debris, and general refuse. A wide variety of VOCs have been detected in groundwater samples collected from this area. The VOCs that have occurred in Area C wells at concentrations above Department of Health Services (DHS) action levels include:

* TCE
* 1,2-DCA
* 1,1-DCE
* Tetrachloroethylene (PCE)
* Trans-1,2-DCE
* Toluene
* Benzene

A variety of VOCs, base neutral and acid extractable (BNA) compounds, and metals have been detected in soil samples collected from this area including:

* Chlorinated VOCs
* Ketones
* Benzene, toluene, xylenes
* Phthalates
* Heavy metals (zinc, barium, arsenic, copper, antimony, lead, and vanadium)

Table II-1 SITES AND POTENTIAL RELEASE LOCATIONS, McCLELLAN AFB

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Cover	Phase I Rating Score	HRS Score
Operable Unit A1							
PRL 39	LANDFILL	S OF BLDG 351	100,000	NONE DETECTED	YES	60	0.52
PRL 40	INDUSTRIAL WASTEWATER SLUDGE	NE OF SANITARY WTP	21,000	SOLVENTS	YES	66	27.90
PRL L-2	INDUSTRIAL WASTEWATER LINE	AREA A1	--	PRIORITY POLLUTANTS			
PRL B-3	LANDFILL	UNDER BLDG 251	UNKNOWN	SOLVENTS, PETROLEUM PRODUCTS			
PRL B-4	SLUDGE DRYING BED	S OF BLDG 344	2,500	SOLVENTS, METALS			
PRL B-5	LANDFILL	S OF BLDG 375	12,500	SOLVENTS, PETROLEUM PRODUCTS			
PRL P-3	OIL PIT	S OF BLDG 251	6,272	SOLVENTS, PETROLEUM PRODUCTS			
PRL P-4	SUMP	E OF BLDG 351	3,360	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-1	PLATING SHOP	IN BLDG 343	12,000	SOLVENTS, METALS, CYANIDE			
PRL S-6	IWTP #1	E OF BLDG 346	4,200	SOLVENTS, METALS			
PRL S-14	PAINT SHOP/SPRAY BOOTH	BLDG 22	8,400	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-16	SOLVENTS/PAINT SPRAY BOOTHS	BLDG 250	250,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-17	REPAIR SHOP/SPRAY BOOTHS	BLDG 251	27,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-18	REPAIR SHOP/CLEANING SHOP	BLDG 252	27,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-19	ENTOMOLOGY STORAGE AREA	NE OF SANITARY WTP	3,600	PESTICIDES			
PRL S-20	PHOTO LAB	BLDG 336	14,000	SOLVENTS, METALS			
PRL S-21	DEGREASER/SPRAY BOOTHS	IN BLDG 351	20,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-22	REPAIR SHOP/SPRAY BOOTHS	IN BLDG 355	10,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-23	PLATING SHOP	IN BLDG 358	14,000	SOLVENTS, METALS, CYANIDE			
PRL S-24	DEPAINT WASHRACK	AT BLDG 375	25,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL T-10	SOLVENT TANK	BLDG 362	56,000	SOLVENTS			
PRL T-12	WASTE OIL/SOLVENT TANK	BLDG 342	2,400	SOLVENTS			
PRL T-17	TANK FARM	S OF BLDG 350	2,800	SOLVENTS, PETROLEUM PRODUCTS			
PRL T-18	TANK FARM	E OF BLDG 343	5,400	SOLVENTS, PETROLEUM PRODUCTS			
PRL T-19	TANK FARM	E OF BLDG 344	5,400	SOLVENTS, PETROLEUM PRODUCTS			
PRL T-21	UNDERGROUND SOLVENT TANK	W OF BLDG 342	10,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL T-30	UNDERGROUND SOLVENT TANK	S OF BLDG 252	3,600	SOLVENTS			
PRL T-36	500 GALLON STODDARD SOLVENT TANK	NEAR BLDG 329	6,700	SOLVENTS			
PRL T-37	STODDARD SOLVENT TANK	S OF BLDG 360	6,700	SOLVENTS			

(Continued)

Table III-1 (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Cover	Phase I Rating Score	HRS Score
Operable Unit A1 (Continued)							
PRL T-47	OIL/WATER SEPARATOR	E OF BLDG 346A	6,700	PETROLEUM PRODUCTS			
PRL T-59	UNDERGROUND STORAGE TANK	NEAR BLDG 340	2,500	PETROLEUM PRODUCTS			
Operable Unit A2							
CS 38	UNDERGROUND TANKS/SLUDGE LANDFILL	BLDG 475	240,000	SOLVENTS, PRIORITY POLLUTANTS, METALS	YES	65	37.20
PRL 25	LANDFILL	S END OF N/S RUNWAY	110,000	NONE DETECTED	PARTIAL	37	0.52
PRL 37	LANDFILL	ADJ. TO TAXIWAY 7165	125,000	SOLVENTS, OIL/GREASE	PARTIAL	--	16.74
PRL L-3	INDUSTRIAL WASTEWATER LINE	AREA A2	UNKNOWN	PRIORITY POLLUTANTS			
UPRL L-4	INDUSTRIAL WASTEWATER LINE	AREA A2	UNKNOWN	PRIORITY POLLUTANTS			
PRL B-2	SPOIL PIT/BORROW PIT	UNDER N/S RUNWAY	UNKNOWN	UNKNOWN			
PRL P-5	OPEN DITCH	N OF BLDG 475	2,200	SOLVENTS, OTHER			
PRL P-6	OPEN DITCH	N OF BLDG 475	2,200	SOLVENTS, OTHER			
PRL S-2	CHEMICAL WAREHOUSE	IN BLDG 447	9,400	SOLVENTS			
PRL S-3	ACID STORAGE WAREHOUSE	W OF BLDG 447	5,600	ACIDS			
PRL S-4	TREATMENT PLANT/SLUDGE BEDS	N OF BLDG 431	13,000	SOLVENTS, METALS, PETROLEUM PRODUCTS			
PRL S-7	IWTP #3	NE OF BLDG 475	8,100	SOLVENTS, METALS			
PRL S-25	TRANSFORMER SHOP	BLDG 440	27,000	PCBS, SOLVENTS, PETROLEUM PRODUCTS			
PRL S-26	MAINTENANCE SHOP/SPRAY BOOTHS	BLDG 473	38,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-27	SOLVENT RECOVERY STILLS	BLDG 478	7,200	SOLVENTS			
PRL S-36	OIL DRUM STORAGE	N OF BLDG 410	27,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-37	OIL DRUM STORAGE	N OF BLDG 410	27,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-38	DRUM STORAGE	N OF BLDG 431	15,000	SOLVENTS			
PRL T-15	TANK FARM	N OF BLDG 447	25,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL T-16	TANK FARM	N OF BLDG 475	6,700	SOLVENTS, PETROLEUM PRODUCTS			
PRL T-20	TANK FARM	W OF BLDG 475	20,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL T-57	IWL DRAIN AT BDLG 431	W OF BLDG 431	75,000	PRIORITY POLLUTANTS			

(Continued)

Table II-1 (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Cover	Phase I Rating Score	HRS Score
Operable Unit A3							
CS 24	LANDFILL	E OF BLDG 621	41,000	PRIORITY POLLUTANTS	PARTIAL	37	37.20
PRL 34	WASTE SOLVENT STORAGE TANKS	E OF BLDG 640	100	PRIORITY POLLUTANTS	NO	38	29.77
PRL P-8	ACID AND CYANIDE PIT	S END OF N/S RUNWAY	38,000	ACID, METALS			
PRL S-9	ASBESTOS STORAGE	E OF BLDG 642	10,000	ASBESTOS			
PRL T-6	UNDERGROUND SOLVENT TANK	BLDG 640	3,100	SOLVENTS			
PRL T-7	SOLVENT PIT/WASTE THINNER TANK	BLDG 640	14,000	SOLVENTS			
PRL T-61	UNDERGROUND STORAGE TANK	BLDG 614	1,000	GASOLINE			
Operable Unit B1							
CS 23	LANDFILL	BLDG 781	24,000	PRIORITY POLLUTANTS	PARTIAL	35	46.51
PRL 29	LANDFILL	NE OF BLDG 700	120,000	NONE DETECTED	NO	42	0.50
PRL 31	INCINERATOR ASH BURIAL PIT	NEAR BLDG 680	53,000	ARSENIC	NO	41	11.92
PRL B-1	LANDFILL	E OF BLDG 700	109,200	UNKNOWN			
PRL B-9	LANDFILL	E OF BLDG 700	UNKNOWN	UNKNOWN			
PRL P-2	WASTE POND	S OF BLDG 687	18,816	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-13	OPEN STORAGE	BLDGS 709,727,729	120,000	SOLVENTS			
PRL S-33	HAZARDOUS MATERIALS STORAGE	BLDG 786	84,000	SOLVENTS, OTHER			
PRL S-41	HAY K DRAINAGE	S OF BLDG 711	125,000	SOLVENTS, PETROLEUM PRODUCTS, LEAD			
PRL T-8	FUEL TANK	BLDG 756	16,000	PETROLEUM PRODUCTS, SOLVENTS			
PRL T-45	OIL/WATER SEPARATOR	N OF BLDG 74	3,600	PETROLEUM PRODUCTS			
PRL T-46	OIL/WATER SEPARATOR	S OF BLDG 764	6,700	PETROLEUM PRODUCTS			
PRL T-48	OIL/WATER SEPARATOR	S OF BLDG 765	6,700	PETROLEUM PRODUCTS			
Operable Unit B2							
CS 47	ABANDONED PLATING SHOP	BLDG 666	44,000	SOLVENTS, METALS	YES	--	27.9
CS 48	ABANDONED IWTP	IWTP #4	2,500	SOLVENTS, METALS, OIL/GREASE	YES	--	33.4
PRL 30	RADIO/CHEM LAB/LANDFILL	E OF BLDG 620	39,000	SOLVENTS, METALS	PARTIAL	--	--
PRL 35	SCRAP METAL BURIAL PIT	BLDG 652	35,000	NONE DETECTED	PARTIAL	--	0.5
PRL 36	OPEN STORAGE AREA	N OF BLDG 666	30,000	SOLVENTS, CYANIDE	PARTIAL	--	27.9

(Continued)

Table II-1 (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Cover	Phase I Rating Score	HRS Score
Operable Unit B2 (Continued)							
PRL L-5	INDUSTRIAL WASTEWATER LINE	AREA B2	UNKNOWN	PRIORITY POLLUTANTS			
PRL L-6	INDUSTRIAL WASTEWATER LINE	AREA B2	UNKNOWN	PRIORITY POLLUTANTS			
PRL P-9	OPEN DRAINAGE DITCH	N OF BLDG 660	1,700	SOLVENTS, METALS			
PRL S-5	IWTP	N OF BLDG 652	7,100	SOLVENTS, METALS			
PRL S-12	PCB STORAGE	BLDG 624	20,000	PCBs			
PRL S-28	OIL/PAINT STORAGE	N OF BLDG 600	5,000	OIL/GREASE			
PRL S-29	PCB STORAGE	IN BLDG 655	190,000	PCBs			
PRL S-30	DEPAINT WASHRACK	BLDG 658	15,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-34	DEGREASER/PAINT SPRAY BOOTH	BLDG 652	35,000	SOLVENTS, OTHER			
PRL S-35	SOLVENT SPRAY BOOTH	BLDG 654	25,000	SOLVENTS, OTHER			
PRL T-60	UNDERGROUND STORAGE TANK	NW BLDG 656	2,500	PETROLEUM PRODUCTS			
Operable Unit C1							
CS 7	SLUDGE/OIL PIT	E OF BLDG 701	35,000	PRIORITY POLLUTANTS, OIL/GREASE, PCB	NO	67	22.58
CS 10	LANDFILL	W OF BLDG 774	32,000	PRIORITY POLLUTANTS, PCB	NO	63	22.58
CS 11	LANDFILL	W OF BLDG 774	32,000	PRIORITY POLLUTANTS	NO	63	22.58
CS 12	LANDFILL	SW OF BLDG 774	55,000	PRIORITY POLLUTANTS	NO	63	22.58
CS 13	LANDFILL	W OF BLDG 774	54,000	PRIORITY POLLUTANTS	NO	63	37.54
CS 14	LANDFILL	S OF BLDG 701	54,000	PRIORITY POLLUTANTS	NO	63	22.58
CS 43	LANDFILL	NW OF BLDG 704	20,000	PRIORITY POLLUTANTS	NO	49	22.58
CS 52	BURN PIT	NW OF BLDG 704	20,000	PRIORITY POLLUTANTS	YES	--	20.84
CS 67	LANDFILL	NW OF BLDG 702	40,000	PRIORITY POLLUTANTS, PETROLEUM PRODUCTS	YES	--	19.98
PRL 8	SLUDGE/REFUSE LANDFILL	NW OF BLDG 774	59,000	SOLVENTS, PRIORITY POLLUTANTS	NO	66	22.57
PRL 9	LANDFILL	W OF BLDG 774	40,000	PRIORITY POLLUTANTS	NO	63	6.70
PRL 15	SODIUM VALVE TRENCH	SW OF BLDG 774	30	NONE DETECTED	NO	44	0
PRL 16	SODIUM VALVE TRENCH	S OF BLDG 701	30	NONE DETECTED	NO	44	0
PRL 49	LANDFILL	NE OF BLDG 704	45,000	NONE DETECTED	NO	--	0
PRL 50	SETTLING POND	NW OF BLDG 704	11,000	NONE DETECTED	YES	--	0
PRL 51	HOLDING POND	NW OF IWTP	180,000	NONE DETECTED	YES	--	0

(Continued

Table II-1 (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Cover	Phase I Rating Score	HRS Score
Operable Unit C1 (Continued)							
PRL 53	SETTLING POND	NW OF BLDG 704	96,000	SOLVENTS	YES	--	0
PRL S-46	UNKNOWN	N OF BLDG 774	UNKNOWN	VOLATILE ORGANIC COMPOUNDS			
Operable Unit C2							
CS 22	BURN PIT/LANDFILL	S OF IWTP AERA. BSN	40,000	PRIORITY POLLUTANTS, PCB, OIL/GREASE	NO	66	48.37
CS 42	OIL STORAGE/LANDFILL	IWTP AERATION BASIN	11,000	PRIORITY POLLUTANTS, OIL/GREASE, PCB	YES	--	48.37
CS 69	BURN PIT	SE OF BLDG 704	UNKNOWN	PRIORITY POLLUTANTS	NO	--	22.58
PRL 17	LANDFILL	SE OF BLDG 704	40,000	SOLVENTS	NO	65	0
PRL 18	LANDFILL	SE OF BLDG 704	40,000	NONE DETECTED	NO	65	0
PRL 19	LANDFILL	SE OF BLDG 704	40,000	NONE DETECTED	NO	65	0
PRL 20	SLUDGE/OIL PIT	SE OF BLDG 704	50,000	SOLVENTS	NO	64	0
PRL 21	SLUDGE/OIL PIT	SE OF BLDG 704	50,000	SOLVENTS	NO	64	0
PRL 28	SLUDGE PIT	W OF IWTP	3,000	PRIORITY POLLUTANTS	YES	50	4.34
PRL 32	RADIO/HAZ WASTE STORAGE	S OF IWTP	160	PRIORITY POLLUTANTS	PARTIAL	51	4.49
PRL 41	LANDFILL	BLDG 704	106,000	PRIORITY POLLUTANTS	PARTIAL	49	21.70
PRL 54	STORAGE AREA	S OF BLDG 704	6,300	NONE DETECTED	NO	--	0
PRL 55	ACID STORAGE AREA/LANDFILL	S OF BLDG 704	900	SOLVENTS	YES	--	0
PRL 56	STORAGE AREA	S OF BLDG 704	100,000	NONE DETECTED	NO	--	0
PRL 57	LANDFILL	S OF BLDG 704	25,000	NONE DETECTED	NO	--	0
PRL 60	HOLDING POND	S OF IWTP	80,000	NONE DETECTED	YES	--	0
PRL 61	CHEMICAL WASTE PIT	E OF BLDG 722	500	NONE DETECTED	YES	--	0
PRL 62	CHEMICAL WASTE PIT	E OF BLDG 722	500	NONE DETECTED	YES	--	0
PRL 63	UNLINED DITCH	SE OF BLDG 704	20,000	NONE DETECTED	PARTIAL	--	0
PRL 64	UNLINED DITCH	SE OF BLDG 704	20,000	NONE DETECTED	PARTIAL	--	0
PRL 65	LANDFILL	E OF BLDG 692	400,000	NONE DETECTED	YES	--	0
PRL 66	DITCHES AND POND	W OF BLDG 721	UNKNOWN	NONE DETECTED	PARTIAL	--	0
PRL 68	SLUDGE PONDS	W OF SITE 42	13,000	PRIORITY POLLUTANTS	YES	--	22.32
PRL L-7	INDUSTRIAL WASTEWATER LINE	AREA C2	UNKNOWN	PRIORITY POLLUTANTS			
PRL P-10	MAGPIE CREEK	N OF BLDG 783	UNKNOWN	VOLATILE ORGANIC COMPOUNDS			

(Continued)

Table II-1 (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Cover	Phase 1 Rating Score	HRS Score
Operable Unit C2 (Continued)							
PRL S-11	BCE/PCE STORAGE	BLDG 636	47,000	PCB, SOLVENTS, PETROLEUM PRODUCTS			
PRL S-31	AIRCRAFT PAINT HANGAR	BLDG 692	47,000	PAINTS, SOLVENTS, PETROLEUM PRODUCTS			
PRL S-32	PAINT STORAGE AREA	BLDG 694	10,080	PAINTS, SOLVENTS, PETROLEUM PRODUCTS			
PRL S-48	UNKNOWN	W OF BLDG 720	UNKNOWN	VOLATILE ORGANIC COMPOUNDS			
Operable Unit D							
CS A	SLUDGE DISPOSAL PIT	NW CORNER OF BASE	UNKNOWN	SOLVENTS, PRIORITY POLLUTANTS, METALS	NO	--	--
CS S	FUEL/SOLVENT/OILBURN PIT	NW CORNER OF BASE	9,200	SOLVENTS, PRIORITY POLLUTANTS, PETROLEUM PRODUCTS	YES	--	--
CS T	FUEL/SOLVENT SLUDGE PIT	NW CORNER OF BASE	8,400	SOLVENTS, PRIORITY POLLUTANTS, METALS, PETROLEUM PRODUCTS	YES	--	--
CS 1	LANDFILL	NW CORNER OF BASE	10,500	PRIORITY POLLUTANTS	YES	61	--
CS 2	SLUDGE/OIL PIT	NW CORNER OF BASE	20,000	PRIORITY POLLUTANTS	YES	71	--
CS 3	SLUDGE/OIL PIT	NW CORNER OF BASE	50,700	PRIORITY POLLUTANTS	YES	71	--
CS 4	SLUDGE/OIL PIT	NW CORNER OF BASE	15,000	PRIORITY POLLUTANTS	YES	72	--
CS 5	SLUDGE/OIL PIT	NW CORNER OF BASE	15,600	PRIORITY POLLUTANTS	YES	71	--
CS 6	OIL BURN PIT	NW CORNER OF BASE	7,500	SOLVENTS, METALS	PARTIAL	71	--
CS 26	SLUDGE/OIL BURN PIT	NW CORNER OF BASE	40,000	SOLVENTS, METALS	YES	71	--
PRL 27	SODIUM VALVE TRENCH	BLDG 1085	100	NONE DETECTED	PARTIAL	--	--
PRL 33	IWTP SLUDGE LANDFARM	NW CORNER OF BASE	2,000,000	SOLVENTS	YES	--	--
PRL T-11	UNDERGROUND STORAGE TANK	BLDG 1093	1,000	SOLVENTS			
Operable Unit D,E,G,H							
PRL P-7	OPEN DITCH	NE TO AREA D	5,000 LINEAR	PETROLEUM PRODUCTS, SOLVENTS			
Operable Unit E							
PRL 45	PAINT WASTE LANDFILL	N END OF BASE	150,000	NONE DETECTED	NO	42	0.50
PRL S-10	STORAGE AREA	NW OF BLDG 1086	63,000	SOLVENTS, RADIATION			

(Continued)

Table II-1 (Continued)

ID	Description	Location	Size (sq ft)	Identified/Potential Contaminants	Cover	Phase I Rating Score	HRS Score
Operable Unit F							
PRL B-6	WASTE AREA	N OF N/S RUNWAY	627,200	UNKNOWN			
Operable Unit G							
PRL I-1	INDUSTRIAL WASTEWATER LINE	AREA G	UNKNOWN	PRIORITY POLLUTANTS			
PRL S-42	HOBBY SHOP/M&R WASHRACK	N OF BLDG 1439	8,100	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-43	AIRCRAFT WASHRACK	NE CORNER OF MAT V	49,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-44	AIRCRAFT MAINTENANCE AREA	S OF BLDG 1071/MAT U	275,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL T-31	UNDERGROUND STORAGE TANK	NEAR BLDG 1028	12,500	SOLVENTS			
PRL T-32	UNDERGROUND STORAGE TANK	NEAR BLDG 1023	12,500	SOLVENTS			
PRL T-33	UNDERGROUND STORAGE TANK	NEAR BLDG 1021	12,500	SOLVENTS			
PRL T-44	STODDARD SOLVENT TANK	NW OF BLDG 1048	10,000	SOLVENTS			
PRL T-62	UNDERGROUND STORAGE TANK	NE OF BLDG 1075	UNKNOWN	VOLATILE ORGANIC COMPOUNDS			
Operable Unit H							
PRL B-7	SPOIL AREA	N OF BLDG 243	627,200	UNKNOWN			
PRL P-1	DRAINAGE DITCH/PONDS	W OF BLDG 878	56,448	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-8	ELECTROPLATING SHOP	IN BLDG 243G	35,000	SOLVENTS, METALS, CYANIDE			
PRL S-15	DEGREASER/SPRAY BOOTHS	BLDG 243	290,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-39	NEW MUSEUM SITE	DUDLEY BLVD/PALM ST	94,000	SOLVENTS			
PRL S-40	TROOP ISSUE SITE	NW OF BLDG 910	19,000	UNKNOWN			
PRL S-45	AIRCRAFT MAINTENANCE AREA	W OF BLDG 878	615,000	SOLVENTS, PETROLEUM PRODUCTS			
PRL S-47	UNKNOWN	NE OF BLDG 943	UNKNOWN	VOLATILE ORGANIC COMPOUNDS			

CS = Confirmed Site.
PRL = Potential Release Location.
HRS = Hazard Ranking System.
IWL = Industrial Wastewater Line.
IWTP = Industrial Wastewater Treatment Plant.

A remediation measure consisting of expansion of the groundwater extraction and treatment system in Area C began operation in August 1988.

4. Area D

Area D encompasses approximately 140 acres in the northwest corner of McClellan AFB. Twelve sites in this area are potential sources of hazardous substances to the soils and groundwater; all of these sites have been studied. These include waste burn and debris pits, fuel and sludge disposal pits, a wastewater sludge disposal and burn pit, a skimmed oil burn area, a sodium valve disposal pit, and an industrial wastewater sludge landfarm. Samples from a number of groundwater monitoring wells in this area have shown high concentrations of VOCs, primarily 1,1-DCE, 1,1,1-TCA, and TCE. The degree of contamination in soils in Area D varies from no contamination to high levels, primarily VOCs. Two remediation measures have been implemented in Area D: A clay cap was constructed over former sludge/oil disposal sites, and a groundwater extraction and treatment system was installed and has been in since early 1987.

5. Other Areas

In addition to the sites in Areas A, B, C, and D, historical record searches have identified another 32 sites located on base that may be potential sources of contamination; 26 of these sites have not been studied.

III. MAPS

A. McClellan AFB Base, 1 September 1989

B. McClellan AFB Well Locations, 13 March 1990, Plate 1

C. McClellan AFB Well Locations, 13 March 1990, Plate 2

D. McClellan AFB Well Locations, 13 March 1990, Plate 3

E. McClellan AFB Well Locations, 13 March 1990, Plate 4

F. McClellan AFB Well Locations, 13 March 1990, Plate 5

G. McClellan AFB Well Locations, 13 March 1990, Plate 6

H. McClellan AFB Well Locations, 13 March 1990, Plate 7

IV. RATIONAL FOR SAMPLE LOCATIONS AND NUMBERS OF SAMPLES

A. This plan was designed as a screening methodology addressing both SARA/CERCLA and substantive RCRA requirements as they apply to contaminated soils. The overall objective of this program is two-fold: 1) to ensure contaminated soil is identified early enough during ongoing base activities to preclude the off-base disposal of contaminated soil; and 2) to ensure that contaminated soil, once it is identified, is prudently managed in accordance with Federal and State requirements and in a way, to minimize the effect to our ongoing base operations. This plan is not intended to mean that all soil that is excavated at McClellan will be sampled. The Soil Management Program is conducted in three general areas:

1. Major Construction (MCP): Major Construction Projects always require soil sampling and should be initiated at the 50% submittal phase. A request will be made by DEPX to EMC to conduct soil sampling for all MCP projects.

2. Minor Construction, Repairs, Emergency Repairs: A prescreening is performed with an OVA or HNu meter before sampling is performed. As a general rule, if there are no appreciable (over 50 ppm) OVA or HNu readings, no unusual soil discoloration, and no knowledge of any adjacent potential release locations, no soil will be sampled.

3. Underground Storage Tank (UST) Removals: A prescreening is performed with an OVA or HNu meter before sampling is performed. As a general rule, it there are no appreciable (over 50 ppm) OVA or HNu readings, no unusual soil discoloration, and no knowledge of any adjacent potential release locations, no soil will be sampled.

B. We use a variety of sampling methodologies to obtain the number and types of samples in the Soil Management Plan. It is best described as being similar to a combination of both authoritative (selective sampling) and representative (primarily stratified random) type sampling. Most of the time there is an absence of analytical data necessary to calculate the number of samples which must be collected. As a general guide, the minimum number of samples to be taken in each category is given below:

1. Major Construction Projects: 6-14 core holes, with three samples from each hole (1 ft, 7 ft, and 15 ft below surface).

2. Minor Construction, Repairs, Emergency Repairs: 2-4 core holes, with three samples from each hole (1 ft, 7 ft, and 15 ft below surface).

3. Underground Storage Tank (UST) Removals: 2-3 samples for each UST (determined by local implementing agency).

C. Upon receipt of sample results, calculations can be performed as outlined in SW-846 to further assess whether a sufficient number of samples were taken.

D. The primary objective of a sampling plan is to collect samples that will allow sufficiently accurate and precise measurements of the chemical properties of the material. High accuracy and high precision are required of one or more of the chemical contaminants that are present at a concentration that is close to the applicable regulatory threshold (LDRs). Whenever values are close to the regulatory limit, calculation of the 80% Confidence Interval (CI) can be performed and use made of the upper limit of the 80% CI to compare against the appropriate regulatory threshold. This method is described in SW-846 to achieve relia.. estimates of the chemical properties of a material.

GENERAL PROCEDURES FOR CALCULATION OF
1. SUFFICIENT # OF SAMPLES
2. 80% CONFIDENCE INTERVAL (CI)
(Stratified Random Sampling)

Steps

1. Calculations are performed for $\bar{x}$ (sample mean) and s^2 (sample variance) for each chemical contaminant of concern by using Equations 2b and 3b from Table 1. Refer to Step 1 of hypothetical example.

2. Calculate the appropriate number of samples (n_1) to be collected from the soil through use of Equation 8, Table 1 and Table 2. Calculate individual values for each chemical contaminant of concern. The appropriate number of samples to be taken from the soil is the greatest number of samples which has been calculated for the individual contaminants.

3. Calculate s (the standard deviation) and $s_{\bar{x}}$ (standard error) for each set of analytical data using Equations 4 and 5 from Table 1.

4. If $\bar{x}$ for a chemical contaminant is equal to or greater than the applicable LDR and is believed to be an accurate estimate of the amount of contaminant present in the soil at a regulatory significant concentration no additional sampling is required. Otherwise, additional samples will need to be collected. In the case of a set of analytical data that does not exhibit obvious abnormality and for which $\bar{x}$ is greater than s^2, perform the following calculations with non-transformed data. Otherwise, consider transforming the data by the square root transformation (if $\bar{x}$ is about equal to s^2) or the arcsine transformation (if $\bar{x}$ is less than s^2) and performing all subsequent calculations with transformed data. Square root and arcsine transformations are defined by Equations 10 and 11 in Table 1.

5. Determine the Confidence Interval (CI) for each chemical contaminant of concern by Equation 6, Table 1, and Table 2. If the upper limit of the CI is less than the applicable LDR, the chemical contaminant is not considered to be present in the soil at a hazardous concentration.

Table VI-1 BASIC STATISTICAL TERMINOLOGY APPLICABLE TO SAMPLING PLANS FOR SOLID WASTES

Terminology	Symbol	Mathematical equation	(Equation)
• Variable (e.g., barium or endrin)	X	---	
• Individual measurement of variable	X_i	---	
• Mean of all possible measurements of variable (population mean)	μ	$\mu = \frac{\sum_{i=1}^{N} X_i}{N}$, with N = number of possible measurements	(1)
• Mean of measurements generated by sample (sample mean)	$\bar{x}$	Simple random sampling and systematic random sampling: $\bar{x} = \frac{\sum_{i=1}^{n} X_i}{n}$, with n = number of sample measurements	(2a)
		Stratified random sampling: $\bar{x} = \sum_{k=1}^{r} W_k \bar{x}_k$, with $\bar{x}_k$ = stratum mean and W_k = fraction of population represented by Stratum k (number of strata [k] ranges from 1 to r)	(2b)
• Variance of sample	s^2	Simple random sampling and systematic random sampling: $s^2 = \frac{\sum_{i=1}^{n} X_i^2 - (\sum_{i=1}^{n} X_i)^2/n}{n-1}$	(3a)
		Stratified random sampling: $s^2 = \sum_{k=1}^{r} W_k s_k^2$, with s_k^2 = stratum variance and W_k = fraction of population represented by Stratum k (number of strata [k] ranges from 1 to r)	(3b)
• Standard deviation of sample	s	$s = \sqrt{s^2}$	(4)
• Standard error (also standard error of mean and standard deviation of mean) of sample	$s_{\bar{x}}$	$s_{\bar{x}} = \frac{s}{\sqrt{n}}$	(5)
• Confidence interval for μ[2]	CI	$CI = \bar{x} \pm t_{.20}\, s_{\bar{x}}$, with $t_{.20}$ obtained from Table 2 in this section for appropriate degrees of freedom	(6)
• Regulatory threshold[1]	RT	Defined by EPA (e.g., 100 ppm for barium in elutriate of EP toxicity test)	(7)
• Appropriate number of samples to collect from a solid waste (financial constraints not considered)	n	$n = \frac{t_{.20}^2 s^2}{\Delta^2}$, with $\Delta = RT - \bar{x}$	(8)

Table IV-1 (Continued)

Terminology	Symbol	Mathematical equation	(Equation)
• Degrees of freedom	df	$df = n - 1$	(9)
• Square root transformation	---	$\sqrt{X_i + 1/2}$	(10)
• Arcsin transformation	---	$\text{Arcsin}\sqrt{p}$; if necessary, refer to any text on basic statistics; measurements must be converted to percentages (p)	(11)

[a]The upper limit of the CI for μ is compared to the applicable regulatory threshold (RT) to determine if a solid waste contains the variable (chemical constituent) of concern at a hazardous level. The contaminant of concern is not considered to be present in the waste at a hazardous level if the upper limit of the CI is less than the applicable RT. Otherwise, the opposite conclusion is reached.

TABLE IV-2. TABULATED VALUES OF STUDENT'S "t" FOR EVALUATING SOLID WASTES

Degrees of Freedom (n-1)[a]	Tabulated "t" Value[b]
1	3.078
2	1.886
3	1.638
4	1.533
5	1.476
6	1.440
7	1.415
8	1.397
9	1.383
10	1.372
11	1.363
12	1.356
13	1.350
14	1.345
15	1.341
16	1.337
17	1.333
18	1.330
19	1.328
20	1.325
21	1.323
22	1.321
23	1.319
24	1.318
25	1.316
26	1.315
27	1.314
28	1.313
29	1.311
30	1.310
40	1.303
60	1.296
120	1.289
∞	1.282

[a] Degrees of freedom (df) are equal to the number of samples (n) collected from a solid waste less one.

[b] Tabulated "t" values are for a two-tailed confidence interval and a probability of 0.20 (the same values are applicable to a one-tailed confidence interval and a probability of 0.10).

Hypothetical Example
(For Calculation)

1. Sufficient # of Samples
2. 80% Confidence Interval (CI)

Toluene is analyzed in 9 soil samples at 3 stratified levels. The LDR for Toluene is 0.33 mg/l.

1 ft	7 ft	15 ft
#1 - 0 mg/l	#4 - 0.29 mg/l	#7 - 0.28 mg/l
#2 - 0.27 mg/l	#5 - 0.33 mg/l	#8 - 0.33 mg/l
#3 - 0.15 mg/l	#6 - 0.25 mg/l	#9 - 0.30 mg/l

Step 1. $\boxed{\bar{x} = \sum_{k}^{r} W_k \bar{x}_k}$ (Eq 2b)

$k = 1$

$\bar{x}_k$ = stratum mean

W_k = fraction of population represented by stratum k (number of strata [k] ranges from 1 to r).

$$\bar{x} = \frac{(1)\ (.14)}{3} + \frac{(1)\ (.29)}{3} + \frac{(1)\ (.3033)}{3}$$

$$\bar{x} = 0.0467 + 0.096 + 0.1011 = \boxed{0.2445}$$

$$\boxed{s^2 = \sum_{k}^{r} W_k s_k^2}$$ (Eq 3b)

$k = 1$

s_k^2 = stratum variance

W_k = fraction of population represented by stratum k (number of strata [k] ranges from 1 to r)

It is first necessary to calculate s^2 for each strata using formula:

$$s^2 = \frac{\sum_{i=1}^{n} x_i^2 - n(\sum x_i)^2 / n}{n-1}$$ (Eq 3a)

Calculation for 1st strata

		X^2
#1 -	0 mg/l	0
#2 -	0.27 mg/l	0.0729
#3 -	0.15 mg/l	0.0225
(add above)	0.42 $= \Sigma X_i$	(add above) 0.0954 $= \Sigma X_i^2$

$$0.1764 = (\Sigma X_i)^2$$

$$\frac{(\Sigma X_i)^2}{n} = 0.0588$$

Using Equation 3a

$$\text{1st strata } s^2 = \frac{0.0954 - 0.0588}{2} = \boxed{0.0183}$$

Calculation for 2nd strata

		X^2
#4	0.29 mg/l	0.0841
#5 -	0.33 mg/l	0.1089
#6 -	0.25 mg/l	0.0625
(add above)	0.87 $= \Sigma X_i$	(add above) 0.2555 $= \Sigma X_i^2$

$$0.7569 = (\Sigma X_i)^2$$

$$\frac{(\Sigma X_i)^2}{n} = 0.2523$$

Using Equation 3a

$$\text{2nd strata } s^2 = \frac{0.2555 - 0.2523}{2} = \boxed{0.0016}$$

Step 3.

$$s = \sqrt{s^2} = \sqrt{0.0089} = 0.0943 \qquad \text{(Eq 4)}$$

$$s_{\bar{x}} = s/\sqrt{n} = \frac{0.0943}{\sqrt{9}} = \frac{0.0943}{3} = 0.0314 \qquad \text{(Eq 5)}$$

The value of $\bar{x}$ 0.2445 is less than the LDR of 0.33 mg/l.

$\bar{X}$ is greater than s^2 (0.0089)

The study is continued with the following calculation performed with nontransformed data.

CI (Confidence Interval) $= \bar{x} \pm t \cdot 20 s_{\bar{x}}$ (Eq 6)

$= 0.2445 \pm (1.397)\ (0.0314)$

$= 0.2445 \pm 0.0439$

t.20 obtained from Table 2 $= \boxed{0.2889}$

Upper limit of the CI (0.2889) is less than the applicable LDR of 0.33 mg/l. Therefore, it is concluded that Toluene is not present in the soil at a concentration above the LDR.

Calculation for 3rd strata

			X^2
	#7 - 0.28 mg/l		0.0784
	#8 - 0.33 mg/l		0.1089
	#9 - 0.30 mg/l		0.09
(add above)	0.91 $= \sum X_i$	(add above)	0.2773 $= \sum X_i^2$

$$0.8281 = (\sum X_i)^2$$

$$\frac{(\sum X_i)^2}{n} = 0.2760$$

Using Equation 3a

$$\text{3rd strata } s^2 = \frac{0.2773 - 0.2760}{2} = \boxed{0.0007}$$

Back to Equation 3b for stratified random sampling

$$s^2 = \frac{(1)\ (0.0183)}{3} + \frac{(1)\ (0.0016)}{3} + \frac{(1)\ (0.007)}{3} = \boxed{0.0089}$$

Step 2.

Based on calculation of $\bar{X}$ and s^2, as well as knowledge that the LDR for Toluene 0.33 mg/l

Appropriate number of samples to collect = $n_1 = \frac{t^2 \cdot 20 s^2}{\Delta^2}$

$$n_1 = \frac{(1.397)^2(0.0089)}{0.0855^2} = 2.3794 \text{ or } \boxed{3 \text{ samples}}$$

Δ = LDR - $\bar{X}$

Student's "t" - Table 2

NOTE: Since the calculation indicated 3 samples were required and 9 samples were collectd, no additional samples are warranted.

V. REQUEST FOR ANALYSIS

A. Previous engineering studies performed at McClellan AFB since Oct 1979 indicate that the predominant types of contaminants found in the soil and groundwater have been identified for the most part as volatile chlorinated aliphatics, volatile aromatics, diesel and jet fuels. Numerous soil samples have been analyzed for EPA 8010, volatile chlorinated aliphatics; EPA 8020, volatile aromatics; EPA 8270, semi-volatile organics; EPA 8015, non-halogenated volatile organics; and modified EPA 6010 TTLC/metals. The TCLP is utilized since it was designed to determine the mobility of both organic and inorganic contaminants that may be present in the soils. Acute aquatic 96 hour LC bioassays will also be performed on certain soil samples to provide a preliminary risk evaluation for screening purposes. McClellan will continue to use its knowledge of potential release locations in reference to project site, monitor with portable OVA or HNu analyzers, as well as visibly inspect soils o assist in making determinations of which soils need to be analyzed. All soils analyzed, with the exception of Underground Storage Tank (UST) soils, will be analyzed using the Toxic Characteristic Leaching Procedures (TCLP) outlined in 40 CFR, Part 268, Appendix I. UST soils will be analyzed by the appropriate EPA methods to quantify petroleum hydrocarbons, as well as other contaminant solvents that historically have been found to be predominant on base. If the results from these UST analyses indicate the presence of other non-petroleum contaminants, then additional UST samples will be collected and analyzed using the TCLP and 96 hour acute bioassay procedures.

B. A flow diagram for each of the three general areas where soil analyses is performed is provided in Section VI, Figures VI-2, VI- 6, and VI-8. These diagrams define the type analyses to be requested. The analytical methodology applicable (analyses are only requested for those items of known concern) to each category of soil are identified below:

UNDERGROUND STORAGE TANKS

Initial ←
- EPA 8010 - Halogenated volatile organics
- EPA 8020 - Aromatic volatile organics
- EPA 8015 - Non-halogenated volatile organic, modified PD-680, gasoline, diesel, motor oil
- EPA 418.1 - Total recoverable petroleum hydrocarbons

When Required ← Perform analyses listed for type soils as outlined below

MINOR CONSTRUCTION, REPAIRS, EMERGENCY REPAIR
MAJOR CONSTRUCTION (MCP)

Acute Aquatic - 96 hr, LC_{50} Bioassay
TCLP
EPA 9045 - pH
% Solids - (if soil is moist)
EPA 6010 - Metals, to include EPA 7060, arsenic; EPA 7470, mercury; EPA 7740, selenium
EPA 610 - Polynuclear aromatic hydrocarbons
EPA 8015 - Non-halogenated volatile organics, to include n-butyl alcohol, CS , ethyl ether, isobutanol, methanol, cyclohexanone, ethyl acetate, nitrobenzene, pyridine, acetone, MEK, MIBK, and Freon 113
EPA 604 - Phenols
EPA 8280 - The analysis of polychlorinated dibenzo-P dioxins and polychlorinated dibenzofurans
EPA 601 - Halogenated volatile organics
EPA 602 - Aromatic volatile organics
EPA 9010 - Total and amendable cyanide
EPA 9030 - Sulfides

Zero Head-space

EPA 601 - Halogenated volatile organics
EPA 602 - Aromatic volatile organics
EPA 8015 - Non-halogenated volatile organics to include: n-butyl alcohol, CS , ethyl ether, isobutanol, methanol, cyclohexanone, ethyl acetate, nitrobenzene, pyridine, acetone, MEK, MIBK, and Freon 113.

An analysis request form is shown in Figure V-1. This sheet outlines, preservation/special handling techniques, analytical holding time(s) and number of containers per analysis. The samples to be analyzed are listed individually as well as samples for QA/QC. The analytical laboratory will follow the QA/QC protocols defined in the "Quality Assurance Project Plan" by Radian Corporation, August 89 on Calibration, Section 7.0, pages 1-5; Data Validation, Section 9.0, pages 1-9; Internal QC Checks, Section 10, pages 1-24 and Preventative Maintenance, Section 12.0, pages 1-5. The laboratory will also follow Region IV guidelines in data reporting requirements. Figures V-2 thru V-8 identify the analytes by EPA Method and give the required detection limits. Detection limits are required to be below the LDR's and Local Implementing Agency (LIA) cleanup levels. Table VI-1 summarizes the minimum number of samples to be collected.

* PD-680
Gasoline
Diesel
Motor Oil

** To include: EPA 7060, Arsenic
EPA 7470, Mercury
EPA 7740, Selenium

**** To Include: N-Butyl Alcohol, Acetone, Carbon Disulfide, Ethyl Ether, Cyclohexanone, Isobutanol, Ethyl Acetate, Methanol, MEK, MIBK, Freon 113, Nitrobenzene, Pyridine

ANALYSIS REQUEST FOR SOILS

SPECIFIC ANALYTICAL PARAMETERS	UST SOILS							TCLP									ZERO HEADSPACE		
								Ext Fluid A or B							Ext Fluid DI - H2O				
		Mod*						**	***	**** Mod								**** Mod	
	EPA 418.1	EPA 8015	EPA 8010	EPA 8020	Bio-Assay	% Solids	EPA 9040	EPA 6010	EPA 601	EPA 8015	EPA 602	EPA 604	EPA 610	EPA 8280	EPA 9010	EPA 9030	EPA 8010	EPA 8015	EPA 8020
PRESERVATION/ SPECIAL HANDLING	← Chill to 4° C →																		
ANALYTICAL HOLDING TIME(s)	7 Days	14 Days	14 Days	14 Days	ASAP	7 Days	ASAP	28 Days	14 Days	14 Days	14 Days	7 Days until Ext 40 D after			14 Days	7 Days	14 Days	14 Days	14 Days
# OF CONTAINERS PER ANALYSIS (BRASS TUBES, MIN SIZE 2½" X 6")	←		1	→	←1→	←					1								→

Samp #	Schedule (Date)	Dry Soil	Moist Soil

TABLE V-1 SAMPLE COLLECTION PER TYPE SITE

SAMPLE LOCATION	MINIMUM # SAMPLES	# OF CONTAINERS/ SAMPLES	ANALYSIS
Major Construction (MCP)			
Soil Samples	18-42	18-42	Per Figure VI-2
Duplicate Samples	2	2	Per Figure VI-2
Minor Construction, etc			
Soil Samples	6-12	6-12	Per Figure VI-6
Duplicate Samples	1	1	Per Figure VI-6
Underground Storage Tanks (UST)			
Soil Samples	2-3	2-3	Per Figure VI-8
Duplicate Samples	1	1	Per Figure VI-8

FIGURE V-2

UNDERGROUND STORAGE TANKS (UST)

EPA METHOD 8015
Non-halogentated Volatile Organics
(Modified for UST)

Compound	Detection Limit Mg/Kg (PPM)
PD-680	
Gasoline	5
Diesel	10
Motor Oil Range	50

EPA METHOD 8020
Aromatic Volatile Organics
For UST

Compound	Detection Limit, Ug/Kg (PPB)
Benzene	1
Chlorobenzene	1
1,2-Dichlorobenzene	1
1,3-Dichlorobenzene	1
1,4-Dichlorobenzene	1
Ethyl Benzene	1
Toluene	1
Xylenes (Dimethyl benzenes)	1

EPA METHOD 418.1
Total Recoverable Petroleum
Hydrocarbons For UST

Compound	Detection Limit Mg/Kg (PPM)
Total Recoverable Hydrocarbon	4

FIGURE V-3

UNDERGROUND STORAGE TANKS (UST)

EPA METHOD 8010
Halogenated Volatile Organics
For UST

Compound	Detection Limit Ug/Kg (PPM)
Bromodichloromethane	1
Bromoform	1
Bromomethane	1
Carbon Tetrachloride	1
Chlorobenzene	1
Chloroethane	1
Chloroform	1
Chloromethane	1
Dibromochloromethane	1
Dibromomethane	1
1,2-Dichlorobenzene	1
1,3-Dichlorobenzene	1
1,4-Dichlorobenzene	1
1,1-Dichloroethane	1
1,2-Dichloroethane	1
1,1-Dichloroethylene (Vinylidene chloride)	1
Trans-1,2-Dichloroethylene	1
Dichloromethane	1
1,2-Dichloropropane	1
Cis-1,3-Dichloropropylene	1
Trans-1,3-Dichloropropylene	1
1,1,2,2-Tetrachloroethane	1
1,1,1,2-Tetrachloroethane	1
Tetrachloroethylene	1
1,1,1-Trichloroethane	1
1,1,2-Trichloroethane	1
Trichloroethylene	1
Vinyl chloride	1
Dichlorodifluoromethane	1
Trichlorofluoromethane	1

FIGURE V-3

TCLP FOR SOILS

EPA Method 6010
Arsenic, EPA Method 7060
Mercury, EPA 7470
Selenium, EPA Method 7740

Compound	Detection Limit, Mg/L (PPM)
Silver	0.01
Arsenic	0.004
Barium	0.02
Beryllium	0.01
Cadmium	0.02
Cobalt	0.02
Chromium	0.02
Copper	0.01
Mercury	0.001
Molybdenum	0.02
Nickel	0.1
Lead	0.05
Antimony	0.05
Selenium	0.003
Thallium	0.1
Vanadium	0.01
Zinc	0.01

FIGURE V-4

TCLP FOR SOILS

EPA Method 601
Halogenated Volatile Organics

Comp No	Compound	Detection Limit Ug/L (PPB)
V1	Bromodichloroemethane	0.5
V2	Bromoform	0.5
V3	Bromomethane	0.5
V4	Carbon Tetrachloride	0.5
V5	Chlorobenzene	0.5
V6	Chloroethane	0.5
V7	Chloroform	0.5
V8	Chloromethane	0.5
V9	Dibromochloromethane	0.5
V10	Dibromomethane	0.5
V11	1,2-Dichlorobenzene	0.5
V12	1,3-Dichlorobenzene	0.5
V13	1,4-Dichlorobenzene	0.5
V14	1,1-Dichloroethane	0.5
V15	1,2-Dichloroethane	0.5
V16	1,1-Dichloroethylene (Vinylidene Chloride)	0.5
V17	Trans-1,2-Dichloroethylene	0.5
V18	Dichloromethane	0.5
V19	1,2-Dichloropropane	0.5
V20	Cis-1,3-Dichloropropylene	0.5
V21	Trans-1,3-Dichloropropylene	0.5
V22	1,1,2,2-Tetrachloroethane	0.5
V23	1,1,1,2-Tetrachloroethane	0.5
V24	Tetrachloroethylene	0.5
V25	1,1,1-Trichloroethane	0.5
V26	1,1,2-Trichloroethane	0.5
V27	Trichloroethylene	0.5
V28	Vinyl Chloride	0.5
V29	Dichlorodifluoromethane	0.5
V30	Trichlorofluoromethane	0.5

TCLP FOR SOILS

EPA Method 602
Aromatic Volatile Organics

Comp No	Compound	Detection Limit Ug/L (PPB)
V1	Benzene	0.5
V2	Chlorobenzene	0.5
V3	1,2-Dichlorobenzene	0.5
V4	1,3-Dichlorobenzene	0.5
V5	1,4-Dichlorobenzene	0.5
V6	Ethyl Benzene	0.5
V7	Toluene	0.5
V8	Xylenes (Dimethyl Benzenes)	0.5

EPA Method 8015
Non-halogenated Volatile Organics

Compound	Detection Limit Ug/L (PPB)
N-Butyl Alcohol	20
Carbon Disulfide	1,000
Cyclohexanone	100
Ethyl Acetate	20
Ethyl Ether	10
Isobutanol	20
Methanol	750
Nitrobenzene	20
Pyridine	330
Acetone	8
Methyl Ethyl Ketone (MEK)	4
Methyl Isobutyl Ketone (MIBK)	8
Freon 113	20

FIGURE V-6

TCLP FOR SOILS

EPA Method 604
Phenols

Cas No	Compound	Detection Limit Ug/L (PPB)
108-95-2	Phenol	9
95-57-8	2-Chlorophenol	17
	3-Chlorophenol	17
120-83-2	2,4-Dichlorophenol	9
	2,5-Dichlorophenol	9
	2,6-Dichlorophenol	9
95-95-4	2,4,5-Trichlorophenol	17
88-06-2	2,4,6-Trichlorophenol	17
	2,3,4,5-Tetrachlorophenol	34
	2,3,5,6-Tetrachlorophenol	51
87-86-5	Pentachlorophenol	51
	Cresol	17
	4,6-Dinitro-o-cresol	17
59-50-7	4-Chloro-3-methylphenol	17
105-67-9	2,4-Dimethylphenol	9
88-75-5	2-Nitrophenol	17
100-02-7	4-Nitrophenol	17
51-28-5	2,4-Dinitrophenol	51
	2-sec-Butyl-4,6-dinitrophenol	51
	2-Cyclohexyl-4,6-dinitrophenol	51
534-52-1	2-Methyl-4,6-dinitrophenol	17
	2,3,4,6 Tetrachlorophenol	2

FIGURE V-7

TCLP FOR SOILS

EPA Method 610
Polynuclear Aromatic Hydrocarbons

Cas No	Compound	Detection Limit Ug/L (PPB)
Dilution Factor: 2.0		
83-32-9	Acenaphthene	5.0
208-96-8	Acenaphthylene	5.0
120-12-7	Anthracene	5.0
56-55-3	Benzo(a)athracene	5.0
50-32-8	Benzo(a)pyrene	10.0
205-99-2	*Benzo(b)fluoranthene and/or Benzo(k)fluoranthene	5.0
191-24-2	Benzo(g,h,i)perylene	10.0
218-01-9	Chrysene	5.0
53-70-3	Dibenzo(a,h)anthracene	10.0
	Dibenz(a,j)acridine	5.0
206-44-0	Fluoranthene	5.0
86-73-7	Fluorene	10.0
193-39-5	Indeno(1,2,2-cd)pyrene	5.0
	3-Methylcholanthrene	5.0
91-20-3	Naphthalene	5.0
85-01-8	Phenanthrene	0.14
129-00-0	Pyrene	0.14
	Dibenzo(a,i)pyrene	0.6
	Benzo(j)fluoranthene	NA
	Dibenz(a,h)acridine	NA
	7H-Dibenzoo(c,g)carbazole	NA
	Dibenzo(a,e)pyrene	NA
	Dibenzo(a,h)pyrene	NA

FIGURE V-8

TCLP FOR SOILS

EPA Method 9010
Cyanide

Compound	Detection Limit Mg/Kg (PPM)
Total Cyanide	0.10

EPA Method 9030
Sulfide

Compound	Detection Limit Mg/Kg (PPM)
Total Sulfide	0.04

FIGURE V-9

TCLP FOR SOILS

EPA Method 8280
Dioxin and Furan

Compound	Detection Limit (Ug/Kg (PPB)
Tetrachlorodibenzodioxins (TCDDS)	1
Pentachlorodibenzodioxins (PeCDDS)	1
Hexachlorodibenzodioxins (HxCDDS)	1
Heptachlorodibenzodioxin (HpCDDS)	1
Octachlorodibenzodioxin (OCDD)	1
Tetrachlorodibenzofurans (TCDFS)	1
Pentachlorodibenzofurans (PeCDFS)	1
Hexachlordibenzofurans (HxCDFS)	1
Heptachlorodibenzofurans (HpCDFS)	1
Octachlorodibenzofuran (OCDF)	1

VI. METHODS AND PROCEDURES

A. Sample Collection Techniques

1. MCP Projects. A request is made to EMC by DEPX to conduct soil sampling which is required for MCP projects. Sampling should be initiated at the 50% submittal phase. EMC is responsible for obtaining the base digging permit which must be coordinated with all organizations listed on the Base Civil Engineering Work Clearance Request (Figure VI-1). A digging permit, CE Form 103, is required for digging more than a few inches. If the project is located off base, a digging permit from the appropriate county, state, underground utilities, etc must also be obtained. A flow chart for Soil Sampling for Major Construction (MCP) is attached (Figure VI-2). Proceed as follows:

a. A Preliminary Site Investigation should be initiated prior to soil sampling and include a description of vegetation, location of nearby streams, soil appearance, past and present land use, etc.

b. Determine number and location of samples to be taken as explained under Part IV.

c. Make sure proper digging permits have been obtained.

d. If the holes to be dug are deep, a contractor must be utilized. Check to see if a contract is in place for this type of work. If no contract exists, a Statement of Work (SOW) must be prepared. A SOW shall include boring sites, depths, type of sampling container, handling and storage of samples, the urgency with which the project must be completed (i.e. routine or rush), decontamination procedure to be used on brass tubes and equipment. State that the contractor is to follow QA/QC procedures outlined in the Quality Assurance Project Plan by Radian Corp, Aug 89.

e. Write up an AF Form 9 for funds and proceed through proper channels (AC and PMK).

f. Once the SOW is written and a contract in in place, an appointment for core boring/soil sampling should be made over the phone with the contractor.

g. Core boring and soil sampling sites should be marked or staked by OPR if core boring/soil sampling is to be done by a contractor.

h. The contractor will provide the Drill Rig (Figure VI-3) using the Hollow Stem Auger (HSA) drilling method (Figure VI-4); taking samples with a split spoon sampler (Figures VI-5a, 5b). The HSA drilling method employs a hollow helical steel drill tool that is rotated to advance the boring and lift formation materials and cuttings to the surface. The hollow opening allows the insertion of split spoon sampler. The contractor is to use 2-1/2" x 6" brass sampling tubes. Prior to drilling, the drill string (casing, auger, bit, etc) shall be cleaned by a high pressure, hot water wash (>180°F and >200 psi). Proceed as follows:

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

DATE RECEIVED

1. Clearance is requested to proceed with work at _____

on Work Order/Job No. _____, Contract No. _____, involving excavation or utility disturbance per attached sketch. The area involved ☐ Has ☐ Has not been staked or clearly marked.

TYPE OF FACILITY/WORK INVOLVED

A. PAVEMENTS	B. DRAINAGE SYSTEMS	C. RAILROAD TRACKS	D. FIRE DETECTION AND PROTECTION SYSTEMS	E. UTILITY ☐ OVERHEAD ☐ UNDERGROUND
F. COMM. ☐ OVERHEAD ☐ UNDERGROUND	G. AIRCRAFT OR VEHICULAR TRAFFIC FLOW	H. SECURITY	I. OTHER (Specify)	

3. INSTRUCTIONS: The BCE work clearance request is used for any work (contract or in house) that may disrupt aircraft or vehicular traffic flow, base utility services, protection provided by fire and intrusion alarm system, or routine activities of the installation. This form is used to coordinate the required work with key base activities and keep customer inconvenience to a minimum. It is also used to identify potentially hazardous work conditions in an attempt to prevent accidents. The work clearance request is processed just prior to the start of work. If delays are encountered and the conditions at the job site change (or may have changed) this work clearance request must be reprocessed.

4. DATE CLEARANCE REQUIRED

5. DATE CLEARANCE TERMINATED IAW 2852 CES Reg 88-8; _____

6. REQUESTING OFFICIAL (Signature)

7. PHONE NO.

8. ORGANIZATION

CLEARANCE REVIEW

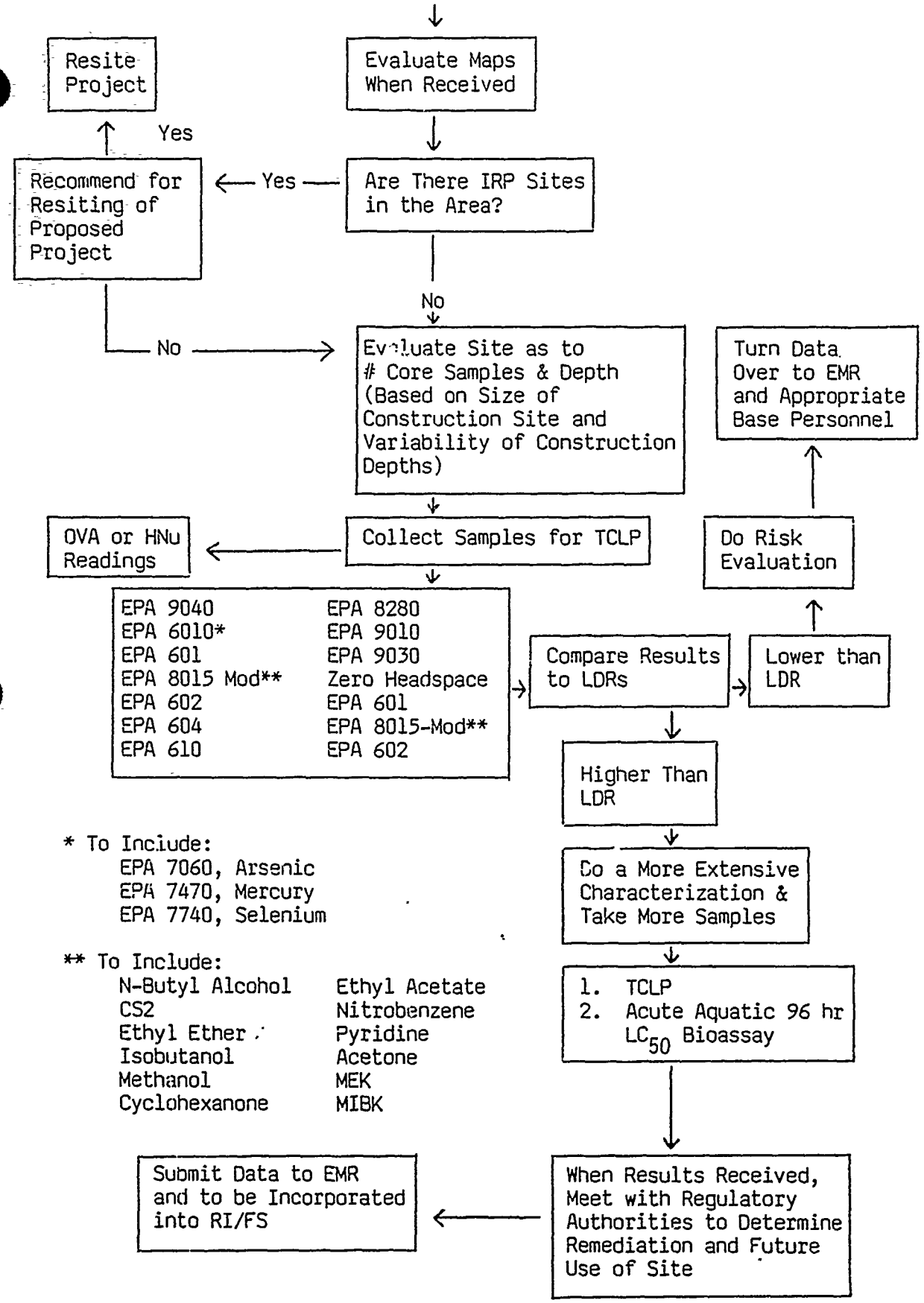
9. ORGANIZATION	SYMBOL	REMARKS	NAME & INITIALS
BASE CIVIL ENGINEERING			
Cathodic Protection	DEEE		
Site Planning	DEEX		
Fire Department	DEFT		
Industrial Waste	DEMBP		
Natural Gas	DEMBP		
Sanitary Waste	DEMBP		
Steam Distribution	DEMBP		
Water Distribution	DEMBP		
Data Links-EMCS Cable	DEMDE		
Electrical Distribution	DEMEE		
Storm Drains/Pavements	DEMG		
POL Distribution	DEMMF		
Compressed Air	DEMMR		
Environmental Management	EM		
Safety	SEO		
Security Police	SP		
Base Operations	OT		
Communications	2049 EG		
Utility Plans	XRX		
Commercial Utility-Pactel		LAM SCCX	

REQUESTED CLEARANCE ☐ APPROVED ☐ DISAPPROVED

DATE	SIGNATURE OF APPROVING OFFICER (Chief of Operations or Chief of Engineering

FIGURE VI-2

SOIL SAMPLING FOR MAJOR CONSTRUCTION (MCP)

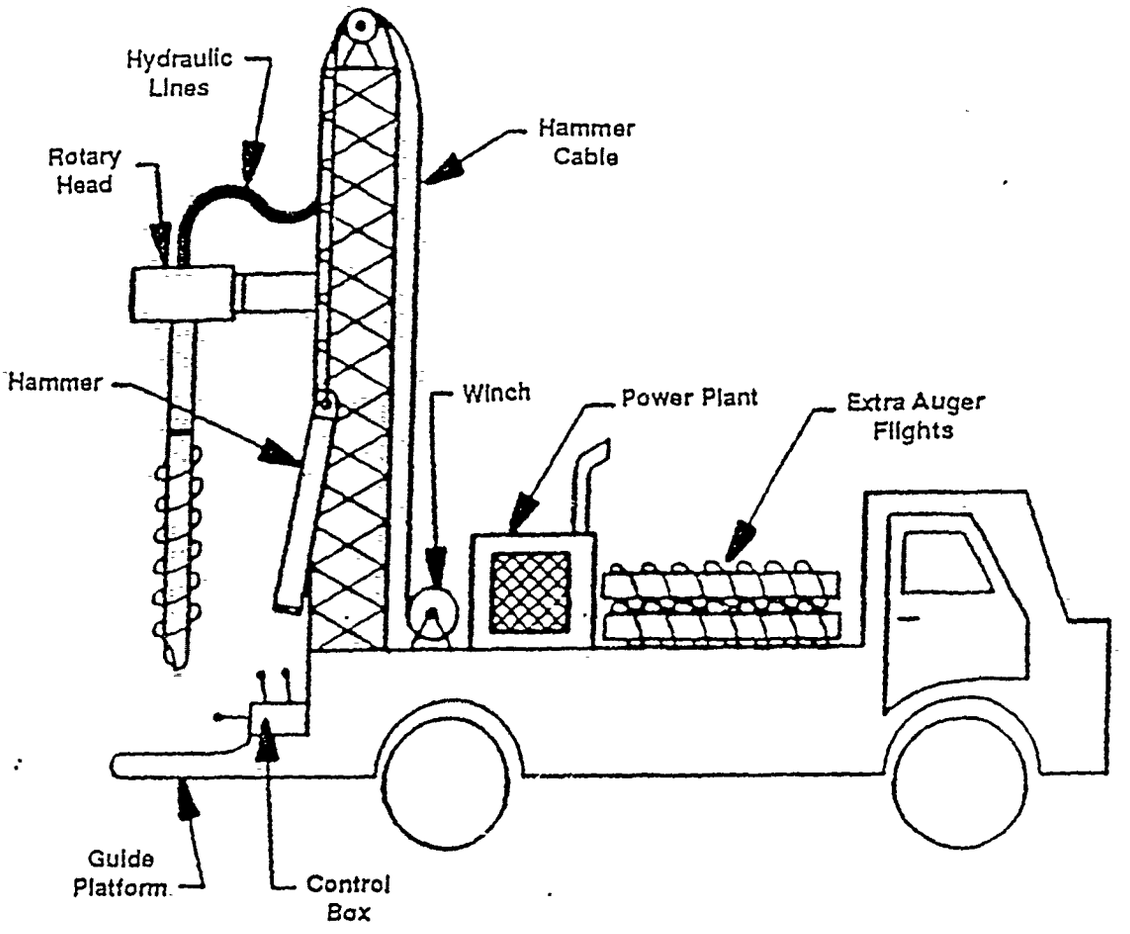


* To Include:
- EPA 7060, Arsenic
- EPA 7470, Mercury
- EPA 7740, Selenium

** To Include:

N-Butyl Alcohol	Ethyl Acetate
CS2	Nitrobenzene
Ethyl Ether	Pyridine
Isobutanol	Acetone
Methanol	MEK
Cyclohexanone	MIBK

FIGURE VI-3



Typical Hollow-Stem Auger Rig.

Hollow Stem Auger

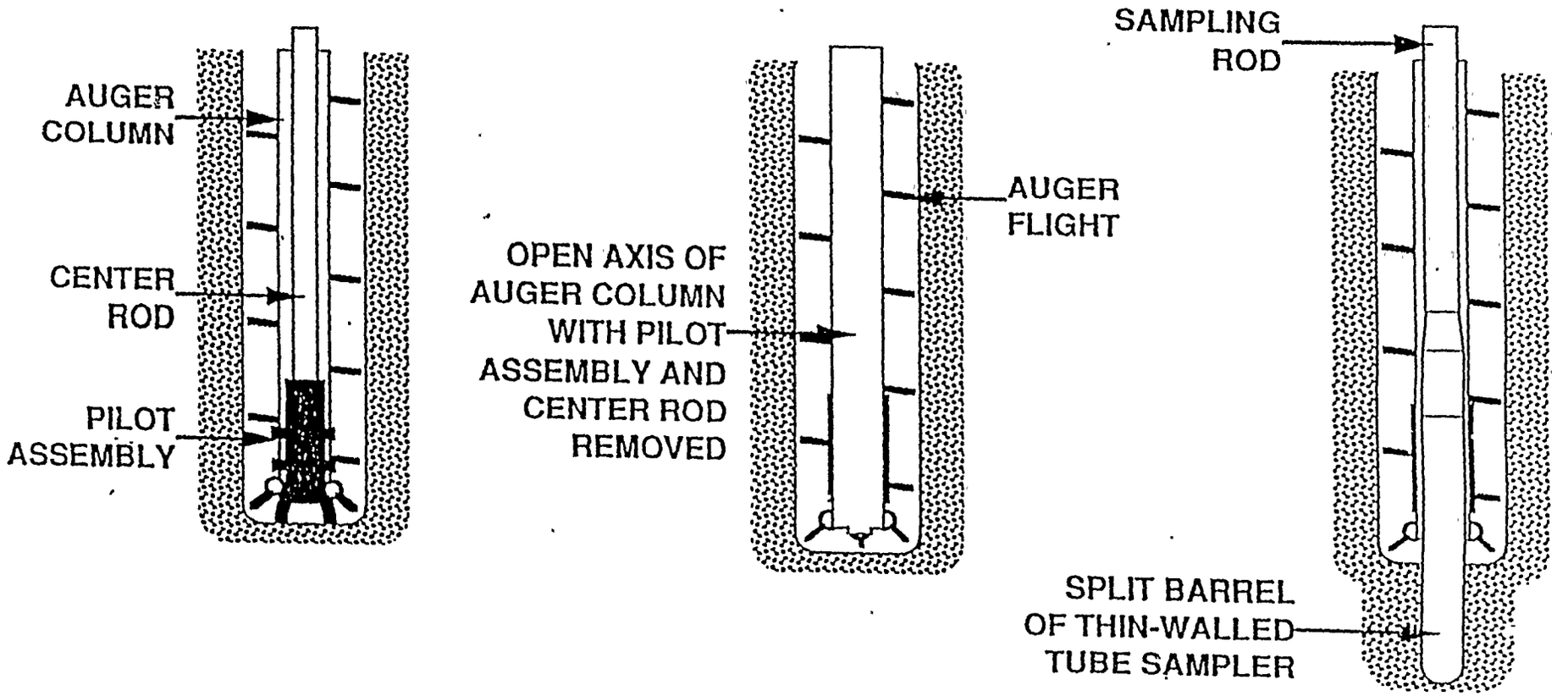


FIGURE VI-4

FIGURE VI-5a

Samplers

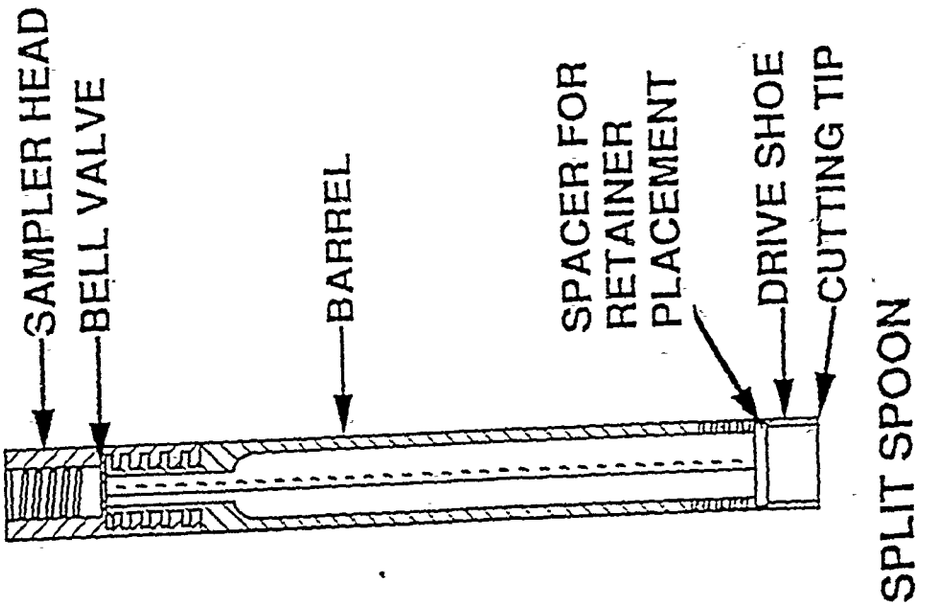
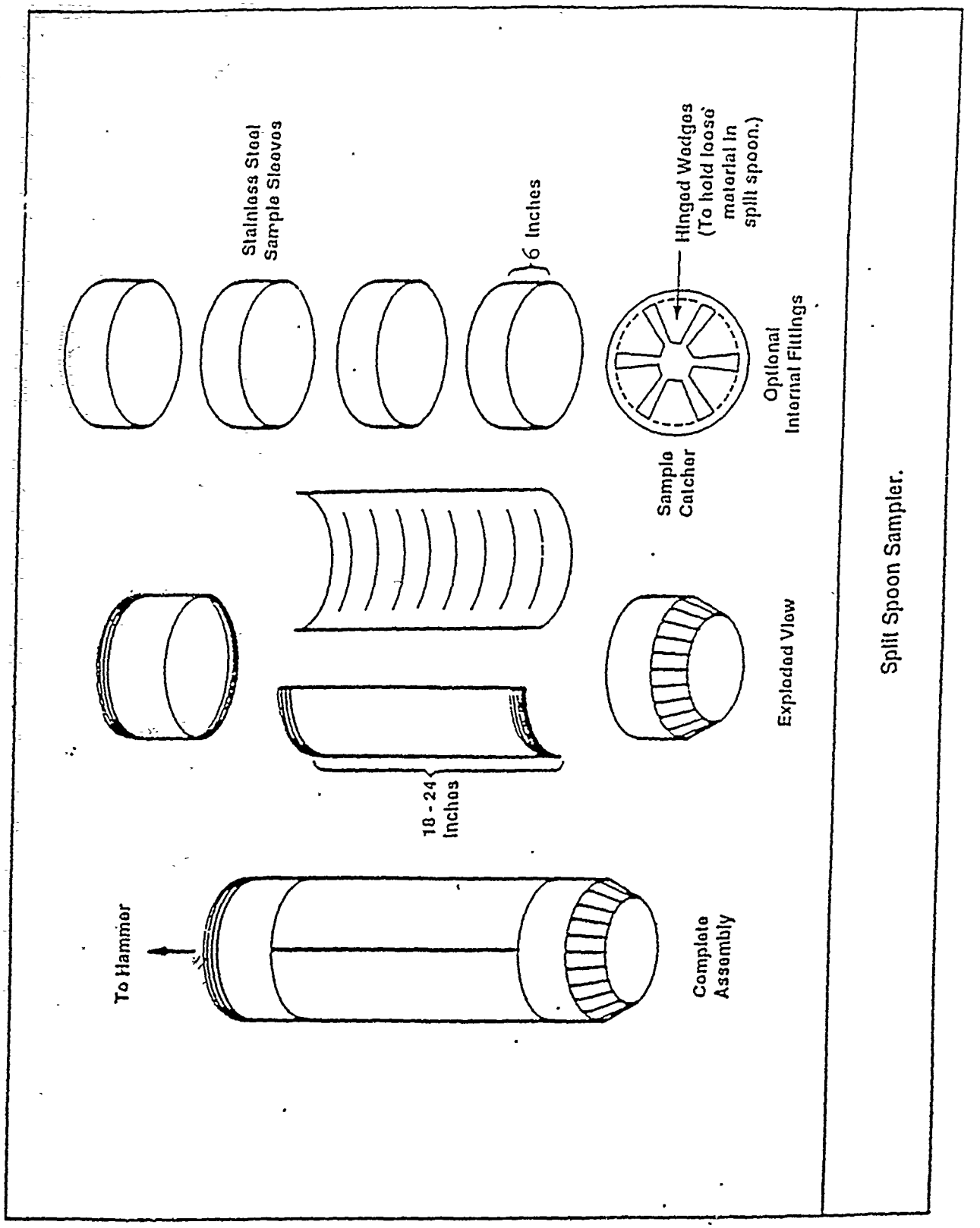


FIGURE VI-5b


Split Spoon Sampler.
Exploded View
Optional Internal Fittings
Hinged Wedges (To hold loose material in split spoon.)
6 Inches
Stainless Steel Sample Sleeves
Sample Catcher
18 - 24 Inches
To Hammer
Complete Assembly

(1) Initiate chain of custody and field log (AF Form 1447).

(2) Using the drill rig as shown in Figure VI-3, a hole (typically 8 or 10 inches in diameter) will be bored to the required sampling depth. At the desired depth, the drill tip of the bit (and drive shaft) will be removed from the hole. A downhole hammer (or a drill stem with an external hammer) fitted with a split spoon sampler will be lowered inside the auger stem to the sampling depth. The sampler will be driven into the soil approximately 18 inches and then removed, with the soil sample retained in the split spoon.

(3) A split spoon sampler (Figure VI-5b) with brass liners (2-1/2" x 6") will be used to obtain samples at intervals for chemical analysis, visual observation and soil vapor screening. This type of sampler allows for the collection of relatively undisturbed samples and minimizes losses of volatile and semivolatile species.

(4) After the sampler is removed from the hole, liners are separated, and removed from the holder. The split spoon takes three tubes. The middle tube is selected for analysis and both ends are covered with aluminum foil and capped with polyethylene caps. The tubes are then sealed with duct tape. Label tubes with waterproof pen with the following information:

(a) Location

(b) Depth

(c) EM #

(d) Date and time

(e) Name

Place samples in a cooler (containing blue ice) and maintain at 4°C.

(5) Take one of the end brass tubes to perform soil vapor testing with an OVA or HNu analyzer. This is done by filling a brass tube (with one end capped) with approximately 1" of soil. Cap the second end, shake the sample; remove the cap and take a reading with the meter. These meters are calibrated daily before use and at end of day (directions follow). If the readings are low (<50 ppm) the excess soil can be placed in area of soil cuttings. If the soil is positive, then those excavated soils will either be placed on and covered by at least 6 mil plastic beside the trench from whence it came or be transferred to the McClellan Soil Holding Area. On MCP projects, the soil vapor testing is done as a check on analytical results, proper disposal of soil cuttings and safety of personnel.

(6) Precision of soil samples to be analyzed will be assessed from co-located samples because the compositing process required to obtain uniform samples would result in loss of the volatile organic compounds. The co-located samples will otherwise be handled and analyzed

in the same manner. Each project will have a minimum of two duplicate samples analyzed for all parameters tested. These will be taken from two different levels of the same hole. One of the end brass tubes from the split spoon sampler can be used as the duplicate co-located sample. The duplicate sample will be assigned a control number so that it cannot be identified (blind duplicate) as a duplicate sample by lab personnel performing the analysis.

(7) After each sample is collected, the split spoon and tip will be decontaminated by:

(a) Washing in detergent and potable water solution using a brush.

(b) Rinsing with potable water.

(c) Rinsing with deionized water.

Clean tubes will then be loaded into the sampler for the next sample. After completion of the boring, the sampler will be decontaminated by steam cleaning. The rinse water will be collected and dumped at the wash rack waste collection area located at the south end of Bldg 685.

(8) The brass liners will be prepared prior to use by the following four-step process:

(a) Washing in a solution of detergent and potable water.

(b) Rinsing with potable water.

(c) Rinsing with deionized water.

(d) Baking at 106° C for a minimum of 8 hours.

(9) The hollow stem auger flights and split spoon sampler will be steam cleaned between borings.

(10) Complete chain of custody. Complete field log (AF Form 1447) in waterproof ink which should include the following information:

(a) Time contractor arrived on site

(b) Time contractor left site

(c) Weather, temperature

(d) Location of samples

(e) HNu or OVA readings of each sample

(f) Date and time of samples

(g) Field data and observations, any problems

Entry errors or changes will be crossed out with a single line, dated, and initialed by the person making the correction. Entries made by individuals other than the person to whom the logbook was assigned will be dated and signed by the individual making the entry.

(11) Samples will be transported in ice chests containing blue ice and stored in the refrigerator located in the south room of Bldg 646 along with the chain of custody. If sample results are urgent, the samples will be taken to the contract laboratory the same day as sampled. If not, the samples are to be taken to the laboratory by the third day.

(12) The EMC sample log located in Bldg 250 HH is completed with the following information:

(a) EM #

(b) Date collected

(c) Date shipped

(d) Name of laboratory

(e) Analysis requested

(f) Purchase order #

(g) Type container

(h) Sample type

(i) Location of sample

(j) OPR

(k) Remarks

(l) Date results are received from laboratory

(13) Samples can be transported to the contract laboratory Monday thru Friday between 8:00 A.M. and 5:00 P.M. A completed analysis request form and a chain of custody form should accompany the samples. A photocopy of both forms should be made upon release of the samples at the designated analytical laboratory. These copies will be maintained in the project file along with the field log (AF Form 1447) information.

(14) Upon receipt of analytical results, a project folder shall be completed on soil testing and site characterization for each project including as follows:

(a) Preliminary site investigation

(b) Focus site investigation

(c) Preliminary risk assessment

(d) Status of soil

(e) Description of sampling

(f) Summary of lab results

(g) Soil Management Decision Document

(h) Field log (AF Form 1447)

A letter on soil testing and site characterization shall be sent to DE for all MCP projects.

(15) The completed project folders are to be turned over to EMC.

2. Minor Construction, Repairs, Emergency Repairs: A work request is received from Civil Engineering which is reviewed by each division in EM. If soil sampling is to be performed in a potential release area, a digging permit (CE Form 103) must be initiated. If no soil sampling is to be performed, EMC will coordinate and sign off on the digging permit initiated by other areas. A flow chart for soil sampling for minor construction, repairs, emergency repairs is attached (Figure VI-6). EMC will proceed as follows:

a. Perform research on previous soil sampling. Site characterization may have already been determined by previous soil sampling. EMC's sample log book may be used to locate such prior work. Engineering Technical Reports, such as Preliminary Pathways Assessment Work Plan by Radian, provide past land and chemical uses at various sites. If previous soil sampling results cannot be found, then proceed to paragraph b.

b. EMR coordination will provide the latest information on all potential release areas on base.

c. Soil sampling must be initiated if the project site is in a potential release area.

d. Determine number and location of samples to be taken as explained under Part IV.

e. Make sure proper digging permits have been obtained, if necessary.

f. If the holes are to be dug deep, a contractor must be utilized. If a contractor is needed, follow the procedure as outlined above under MCP Projects. Most holes are not deep and are done using a hand auger (Figure VI-7). Sampling as follows:

(1) Initiate chain of custody and field log (AF Form 1447). A hand auger is used to drill a hole to the desired depth; samples are usually collected at the 1-3 ft level.

(2) Before use and between samples, decontaminate hand auger by:

(a) Washing in detergent and potable water solution using a brush.

(b) Rinsing with potable water.

(c) Rinsing with deionized water.

(3) Bring auger up and scoop as much soil as is possible into the decontaminated brass tube (have one end covered with aluminum foil and polyethylene cap). Use a decontaminated shovel to fill completely. Cap end with aluminum foil and polethylene cap and handle as outlined above for MCP Projects.

(4) Soil vapors are also measured as outlined above for MCP Projects.

(5) Precision of soil samples will be assessed from co-located samples because the compositing process required to obtain uniform samples would result in loss of the volatile organic compounds. Each project will have a minimum of one duplicate sample analyzed for all parameters tested.

(6) If soil contamination is detected during excavation (i.e., discolored soil, odor or worker's discomfort, etc), soil samples will be taken as soon as possible to determine the degree of contamination.

(7) Complete process as outlined above under MCP Projects.

(8) Upon receipt of analytical results, a project folder shall be completed on soil testing and site characterization for each project including as follows:

(a) Preliminary site investigation

(b) Focus site investigation

(c) Status of Soil

(d) Description of sampling

(e) Summary of lab results

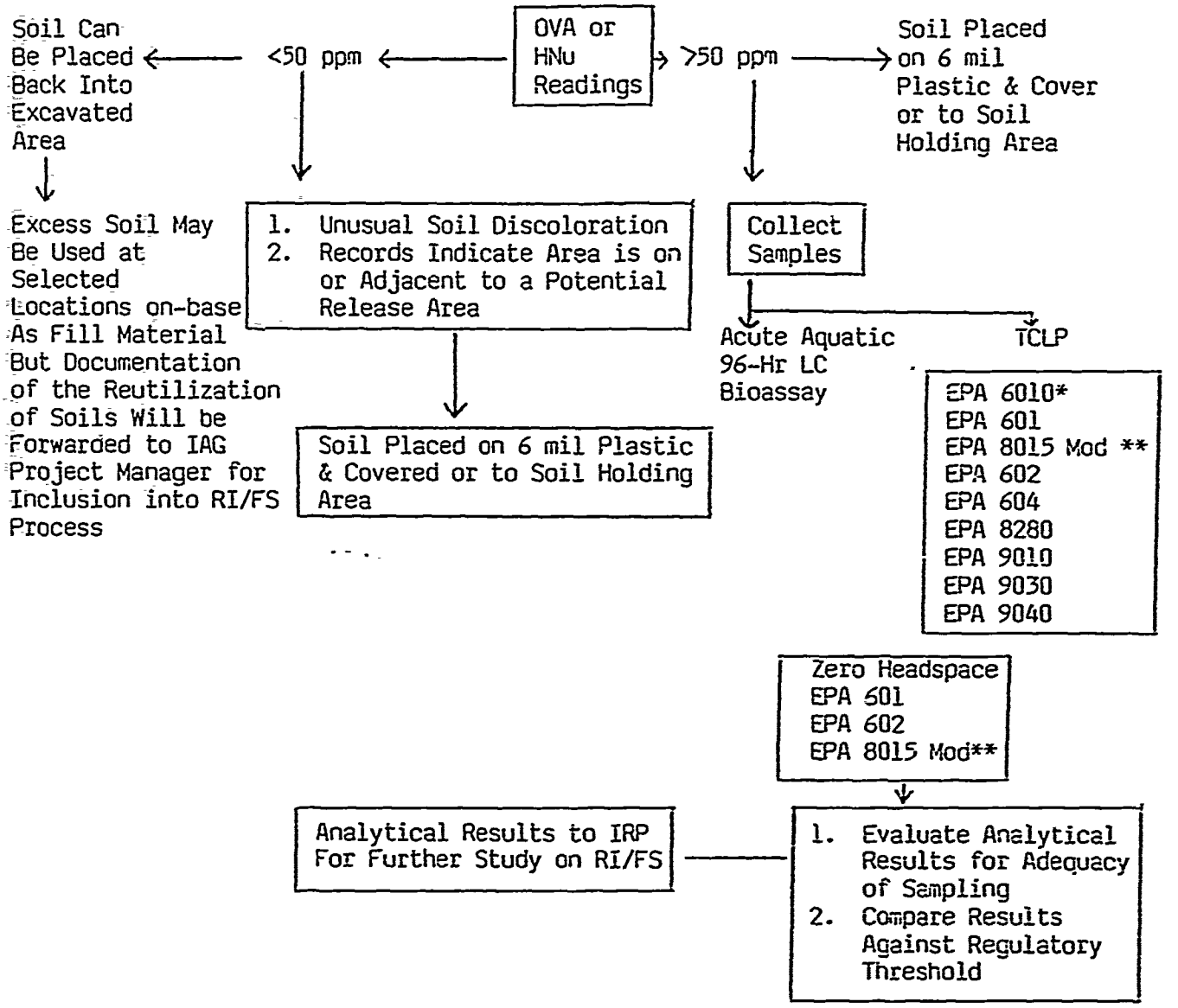
(f) Soil Management Decision Document

(g) Field log (AF Form 1447)

(9) The completed project folders are to be turned over to EMR.

FIGURE VI-6

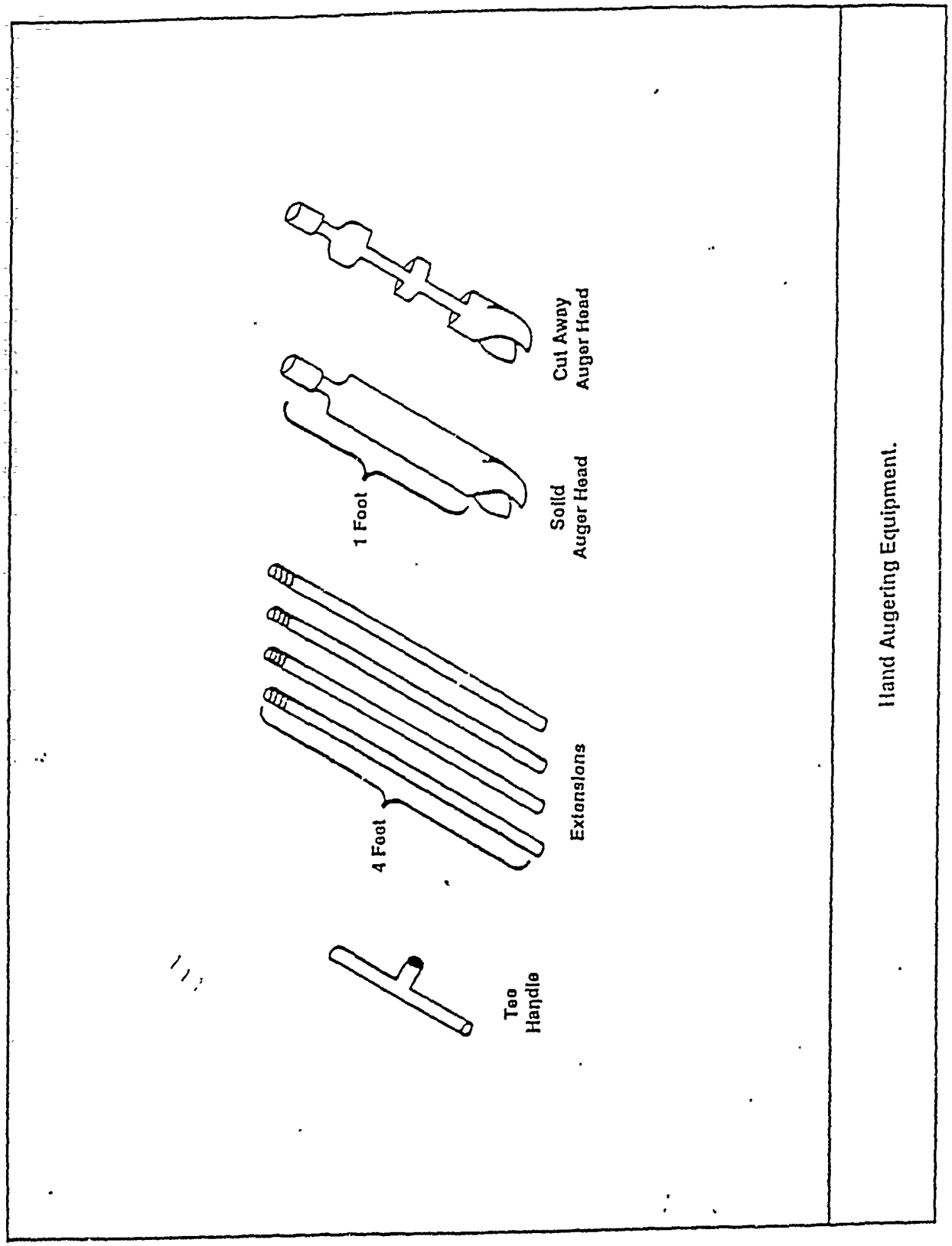
SOIL SAMPLILNG FOR MINOR CONSTRUCTION, REPAIRS, EMERGENCY REPAIRS



* To Include:
EPA 7060, Arsenic
EPA 7471, Mercury
EPA 7740, Selenium

** To Include:
N-Butyl Alcohol
CS2
Ethyl Ether
Isobutanol
Methanol
Cyclohexanone
Ethyl Acetate
Nitrobenzene
Pyridine
Acetone
MEK
MIBK

FIGURE VI-7



Hand Augering Equipment.

3. Underground Storage Tanks (UST): A request is made to EMC by EMR for soil sampling to be performed. EMR will already have the required digging permit. A flow chart for sampling for underground storage tanks (USTs) is attached (Figure VI-8). Practical guidance on USTs can be received from the latest LUFT Field Manual (Leaking Underground Fuel Tank Field Manual) on Site Assessment, Cleanup, and Underground Storage Tank Closure. This manual follows the approach of the California Site Mitigation Decision Tree Document (DHS, 1986). EMC will proceed as follows:

a. EMR will have made an appointment with the Local Implementing Agency (LIA), which in our case is the Sacramento County Environmental Management Department, to come out immediately after the tank and contaminated soil have been removed.

b. Under LIA direction, soil in areas suspected of being contaminated, will be monitored with an OVA or HNu. Samples will be collected at the direction of the LIA from those areas where appreciable OVA or HNu readings indicate volatile organics are present.

c. Initiate chain of custody and field log.

d. Sampling is accomplished by the backhoe scooping the bottom soil in the area of concern and bring it to the top where the sampler scoops off the top few inches of soil and then pounds the decontaminated brass tube into the soil with a wooden mallet. No headspace should be present in the cylinder once the sample is collected. Both ends of the brass tube are then covered with aluminum foil and capped with polyethylene caps. The tubes are then sealed with duct tape. Label tubes with waterproof pen with the following infromation:

(1) Location

(2) Depth

(3) EM #

(4) Date and time

(5) Name

Place samples in a cooler (containing blue ice) and maintain at 4°C.

e. Perform soil vapor testing on a co-located sample with an OVA or HNu analyzer. This is done by filling a decontaminated brass tube (one end caped with aluminum foil and polyethylene cap) with approximately 1" of soil. Cap the second end, shake the sample; remove the cap and take a reading with the meter.

f. Precision of soil samples to be analyzed will be assessed from co-located samples because the compositing process required to obtain uniform samples would result in loss of the volatile organic

FIGURE VI-8

SOIL SAMPLING FOR UNDERGROUND STORAGE TANKS

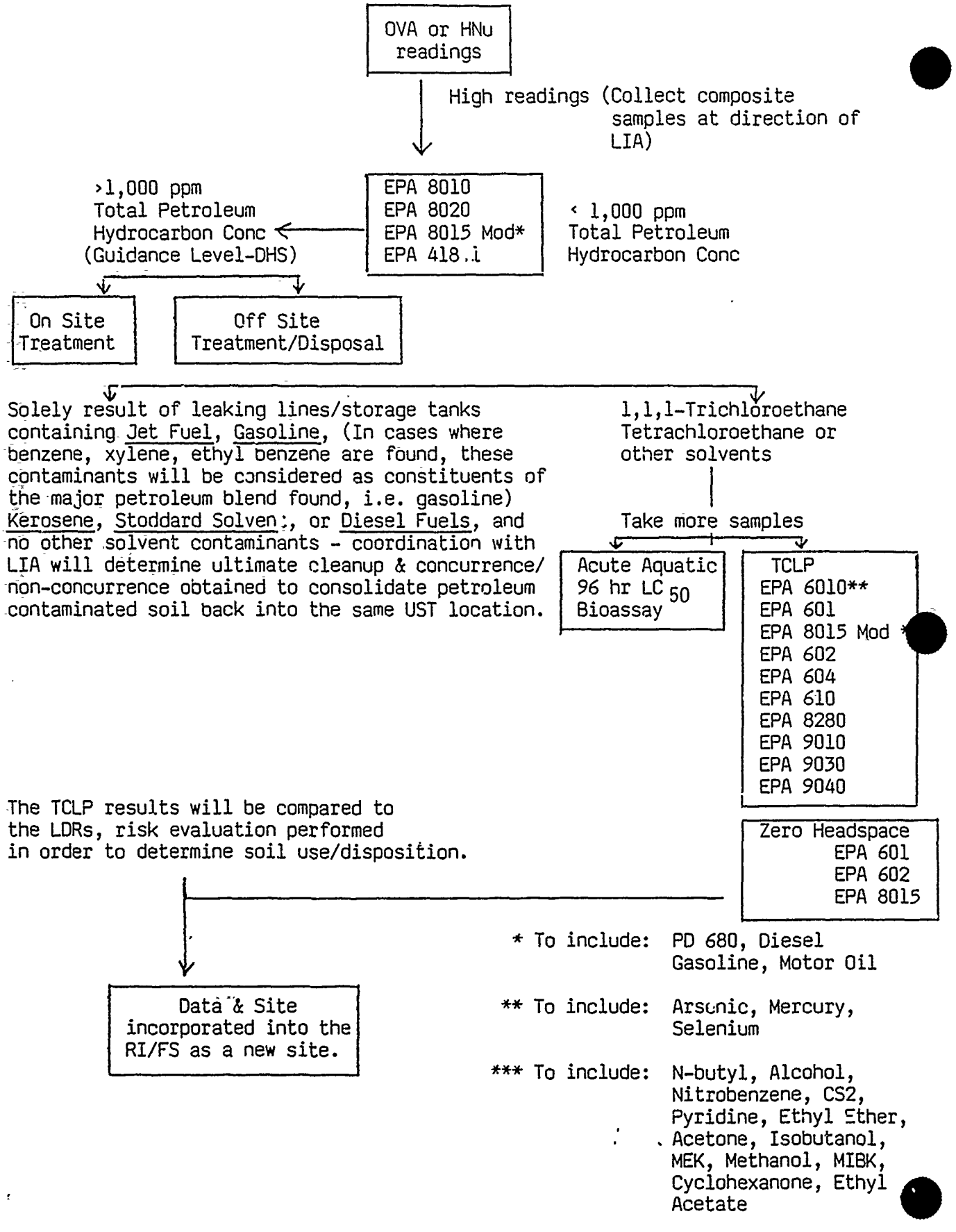


TABLE VI-1
HOLDING TIMES FOR SOIL SAMPLES

TEST		MAXIMUM HOLDING TIME
EPA 418.1	Total Recoverable Petroleum Hyrocarbons	7 days
EPA 8010	Halogenated Volatile Organics	14 days
EPA 8015 (UST)	Nonhalogenated Volatile Organics, Modified PD-680, Gasoline, Diesel, Motor Oil	14 days
EPA 8020	Aromatic Volatile Organics	14 days
EPA 8015 (TCLP)	Nonhalogenated Volatile Organics, to include n-Butyl alcohol, CS_2, Ethyl Ether, Isobutanol, Methanol, Cyclohexanone, Ethyl Acetate, Nitrobenzene, Pyridine, Acetone, MEK, MIBK, and Freon 113	14 days
EPA 6010	Metals, to include EPA 7060, Arsenic; EPA 7470, Mercury; EPA 7740, Selenium	28 days
EPA 610	Polynuclear Aromatic Hydrocarbons	7 days until ext, 40 days after ext
EPA 604	Phenols	7 days until ext 40 days after ext
EPA 8280	The analysis of Polychlorinated Dibenzo-P Dioxins and Polychlorinated Dibenzofurans	7 days until ext 40 days after ext
EPA 601	Halogenated Volatile Organics	14 days
EPA 602	Aromatic Volatile Organics	14 days
EPA 9010	Total and Amendable Cyanide	14 days
EPA 9030	Sulfides	7 days
EPA 9040	pH	ASAP
% Solids		7 days
Bio-Assay		ASAP

compounds. The co-located samples will otherwise be handled and analyzed in the same manner. Each project will have a minimum of one duplicate sample analyzed for all parameters tested. The duplicate sample will be assigned a control number so that it cannot be identified (blind duplicate) as a duplicate sample by lab personnel performing the analysis.

g. The brass liners will be prepared prior to use by the following four-step process:

(1) Washing in a solution of detergent and potable water.

(2) Rinsing with potable water.

(3) Rinsing with deionized water.

(4) Baking at 106°C for a minimum of 8 hours.

h. Complete chain of custody. Complete field log (AF Form 1447) in waterproof ink which should include the following information;

(1) Time contractor arrived on site

(2) Time contractor left site

(3) Weather, temperature

(4) Location of samples

(5) HNu or OVA readings of each sample

(6) Date and time sampled

(7) Field data and observations, any problems

Entry errors or changes will be crossed out with a single line, dated, and initialed by the person making the correction. Entries made by individuals other than the person to whom the logbook was assigned will be dated and signed by the individual making the entry.

i. Samples will be transported in ice chests containing blue ice and stored in the refrigerator located in the south room of Bldg 646, along with the chain of custody. If sample results are urgent, the samples will be taken to the contract laboratory the same day as sampled. If not, the samples are to be taken to the laboratory by the third day.

j. The EMC sample log located in Bldg 250 HH is completed with the following information:

(1) EM #

(2) Date Collected

(3) Date shipped

(4) Name of laboratory

(5) Analysis requested

(6) Purchase order #

(7) Type container

(8) Sample type

(9) Location of sample

(10) OPR

(11) Remarks

(12) Date results are received from laboratory

k. Samples can be transported to the contract laboratory Monday thru Friday between 8:00 A.M. and 5:00 P.M. A completed analysis request form and a chain of custody form should accompany the samples. A photocopy of both forms should be made upon release of the samples at the designated analytical laboratory. These copies will be maintained in the project file along with the field log (AF Form 1447) information.

B. Disposal of Contaminated Materials

1. Contaminated Soil. If there are appreciable OVA or HNu readings, or unusual soil discoloration or records indicate the excavation project is on or adjacent to a potential release location, then those excavated soils, after samples are collected, will either be placed on and covered by at least 6 mil plastic beside the trench from whence it came or may be stored in the contaminated soil holding area north of Bldg 704. Contaminated soil should be kept on and covered with plastic, in order to protect contaminants from leaching into soil and to protect from wind.

2. Clean Soil. May be stored in the clean soil holding area northwest of Bldg 1090.

3. Rinse Water. The rinse water will be collected and dumped at the wash rack waste collection area located at the south end of Bldg 685.

C. Equipment Decontamination. General requirements for decontamination are identified in 29 CFR Section 1910.120(k).

1. Brass Sampling Tubes

a. Wash in a solution of detergent and potable water using a brush.

b. Rinse with potable water.

c. Rinse with deionized water.

d. Bake at 106°C for a minimum of 8 hours.

2. Hand auger

a. Wash in a solution of detergent and potable water using a brush.

b. Rinse with potable water.

c. Rinse with deionized water.

3. Drill String (casing, auger, bit, split spoon sampler, etc). Clean by a high pressure, hot water wash (>180°F and >200 psi).

*NOTE: Decontamination of field equipment suspected of being contaminated will occur in the vehicle wash pad located north, behind Bldg 685. The clean up of field equipment known not to be contaminated will occur on the gravel lot adjacent to the staging area.

D. Labeling and Packaging. Both ends of the brass sampling tube are covered with aluminum foil and capped with polyethylene caps. The tubes are then sealed with duct tape. Label tubes with waterproof pen with the following information:

1. Location

2. Depth

3. EM #

4. Date and time

5. Name

Place samples in a cooler containing blue ice and maintain at 4 C.

E. Calibration of Field Instruments. HNu and OVA instruments are calibrated daily before use and at the end of each working day. Calibration is done more frequently when considered necessary.

1. HNU Calibration Procedure (PI 101 with 10.2 eV lamp)

a. Connect the probe cable plug to the 12 pin keyed socket on the readout assembly panel. Carefully match the alignment slot in the plug to the key in the connector. Screw down the probe connector until a distinct snap and lock is felt. Make sure the red INTERLOCK SWITCH is depressed by the ring on the connector.

b. Battery Check: Turn the FUNCTION SWITCH to BATT. The needle should be in the green region (check the battery as needed).

c. Leave the FUNCTION SWITCH to 0-20 range and wait for 5 minutes.

d. Zero Set: Turn the FUNCTION SWITCH to STANDBY and set the zero-point with the zero set control.

e. Connect the probe and calibration standard gas. The cylinder should have a regulator adapter (CALIBRATION GASES SHOULD NOT BE USED BELOW 300 PSI).

f. Set the FUNCTION SWITCH to the range position of the standard, i.e., set the FUNCTION SWITCH to 0-200 range for Isobutylene with 25 ppm.

g. Open the calibration gas. Unlock and adjust with the SPAN CONTROL SETTING knob as required to read the ppm concentration of the standard. Lock the SPAN CONTROL setting.

h. Shut off the calibration gas.

i. Check the zero setting again. If it is off zero, then repeat 4 through 9 above.

j. Now the HNu is ready for sampling.

Source of calibration gases:

Isobutylene (25 ppm) w/air: Tegal Scientific
PO Box 5905
Concord CA 94524

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ W A R N I N G ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

** Do not look at the light source from closer than 6 inches with unprotected eyes. Observe only briefly if necessary. Continued exposure to ultraviolet energy can be harmful to eyesight.

** The instrument measures gases in the vicinity of the operator and a high reading when measuring any volatile organics should be cause for immediate action for safety.

** Extreme care must be taken in the handling of gas cylinders. Contents are under high pressure.

** Turn the FUNCTION SWITCH on the control panel to the OFF position before disassembly. Otherwise, high voltage of 2200 V DC will be present.
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

2. OVA Calibration Procedure

a. Connect the Probe/Readout Assembly to the side pack assembly by attaching the sample line and electronic jack to the sidepack. Connect a short tubular sampler to the probe handle.

b. When using the OVA in the Survey Mode, ensure that the SAMPLE INJECT VALVE remains in the full "out" position.

c. Check the battery condition by moving the INSTR SWITCH to the BATT position. The meter needle should move to a point beyond the white line, indicating the battery has more than 4 hours of operating life before recharging is necessary.

d. Move INSTR SWITCH to ON and allow 5 minutes to warm-up.

e. Turn the PUMP SWITCH on.

f. Use the CALIBRATE ADJUST knob to set the meter needle to the level desired for activating the Audible Alarm.

g. Turn the VOLUME knob fully clockwise.

h. Using the ALARM LEVEL ADJUST knob located behind the Probe/Readout Assembly, turn the knob until the audible alarm is activated.

i. Move the CALIBRATE SWITCH to X1 and adjust the meter reading to 0.4 using the CALIBRATE ADJUST knob.

j. Open the H TANK VALVE and H SUPPLY TANK VALVE 1 or 2 turns. H TANK should nave at least 300 psi of hydrogen. Hydrogen should be supplied between 8-12 psi. Wait 1 minute for hydrogen to purge the system.

k. Depress the Igniter Button until the hydrogen flame lights. The meter needle will travel upscale and begin to read "Total Organic Vapors." Do not depress igniter for more than 6 seconds. If flame does not ignite, wait one minute and try again.

l. Before calibration of the instrument, allow a minimum of 15 minutes for warm-up and stabilization.

m. Set the GAS SELECT control to 300.

n. Set the CALIBRATE ADJUST knob so that the meter reads 0.4.

o. Set the CALIBRATE SWITCH to X1 and introduce zero air calibration gas (<1 ppm). Adjust with R31 located behind the sidepack assembly so that the meter reading corresponds to the calibration gas concentration.

p. Set the CALIBRATE SWITCH to X10 and introduce Methane calibration gas (100 ppm). Adjust R32 so that the meter reading corresponds to the calibration gas concentration. Set the CALIBRATE SWITCH to X100. If the needle is not on "1" then adjust with R33.

q. Shut off the calibration gas.

r. Shut Down Procedure

(1). Close H TANK VALVE.

(2). Close H SUPPLY VALVE.

(3). Move INSTR Switch to OFF.

(4). Wait 5 seconds and move PUMP SWITCH to OFF. The instrument is now shut off.

Source of Calibration gases: Liquid Air Corporation
California Plaza, Suite 350
2121 N California Blvd
Walnut Creek CA 94596

Methane (100 ppm) w/air
Zero Air (<1 ppm) of Hydrocarbons

3. Fuel Refilling of OVA

Note: Use 4.5 grade hydrogen stored at Bldg 646.

a. Shut down the instrument and the charger completely. Refilling should be done in a ventilated area. THERE SHOULD BE NO POTENTIAL IGNITERS OR FLAME IN THE AREA.

b. Make sure that the FILL/BLEED Valve on the end of the HYDROGEN FILL HOSE is in the OFF position. Connect the HYDROGEN FILL HOSE to the hydrogen bottle and the instrument.

c. Open the hydrogen supply bottle valve slightly. Turn the FILL/BLEED Valve to bleed slightly and then to OFF position.

d. Open the H REFILL VALVE and the H TANK VALVE on the instrument panel and place on the instrument panel and place the FILL/BLEED Valve on the filling hose assembly in the FILL position. The pressure in the instrument tank will be indicated on the H TANK PRESSURE Indicator.

e. After the instrument fuel tank is filled, close the REFILL VALVE on the panel, the FILL/BLEED Valve on the filling hose assembly, and the hydrogen supply bottle valve.

f. Purge the trapped hydrogen in the filling hose, turn the FILL/BLEED Valve on the filling hose assembly to the BLEED position and then to OFF position. Turn the FILL/BLEED Valve to FILL position and then to OFF position.

g. Repeat Step 6 above a few times.

h. Close the H TANK VALVE.

i. Disconnect the filling hose.

F. Sample Shipment. Samples are transported to the laboratory in an ice chest containing blue ice. They can be transported Monday thru Friday between 8:00 A.M. and 5:00 P.M. A completed analysis request form and a chain of custody form should accompany the samples. A photocopy of both forms should be made upon release of the samples at the designated analytical laboratory. These copies will be maintained in the project file along with the field log information.

G. Sample Documentation

1. Field Logbooks. A field logbook (AF Form 1447) is assigned to each individual project where all pertinent factual information is recorded from beginning of sampling to end of project. Logbooks are to be dated, legible, and inclusive documentation of investigation activities. The logbooks are to contain only facts and observations. Language is to be objective, factual, and free of personal opinions or other terminology which might prove inappropriate. Entries made are dated and signed by the individual who is making the entry. The log, which is completed in waterproof ink, should include the following information:

a. Time contractor arrived on site

b. Time contractor left site

c. Weather, temperature

d. Location of samples

e. HNu or OVA readings of each sample

f. Date and time sampled

g. Field data and observations, any problems

Entry errors or changes will be crossed out with a single line, dated, and initialed by the person making the correction.

2. Requests for Analyses and Chain of Custody Record. The collection of each sample will be documented on requests for analysis sheets. Chain of custody sheets will be initiated at the time of

sampling. Both of these forms are to accompany the samples to the laboratory where photocopies are made upon release of the samples. The copies will be maintained in the project file.

H. Quality Control Samples. The sampling activities during these evaluations will be supported by preparing and analyzing several sets of quality control (QC) samples:

1. Field replicates

2. Laboratory QC samples

All field QC samples will be submitted in the same manner as the other field samples, with no distinguising labeling or markings. The QC samples will be collected to match all of the parameters of the regular samples. The laboratory QC is to be performed as outlined in "Quality Assurance Project Plan," Aug 89 prepared by Radian Corporation.

a. MCP Projects. Precision of soil samples to be analyzed will be assessed from co-located samples because the compositing process required to obtain uniform samples would result in loss of the volatile organic compounds. The co-located samples will otherwise be handled and analyzed in the same manner. Each project will have a minimum of two duplicate samples analyzed for all parameters tested. These will be taken from two different levels of the same hole. One of the end brass tubes from the split spoon sampler can be used as the duplicate co-located sample. The duplicate sample will be assigned a control number so that it can not be identified (blind duplicate) as a duplicate sample by lab personnel performing the analysis.

b. Minor Construction, Repairs, Emergency Repairs. Co-located samples will be taken and analyzed for all parameters tested. Each project will have a minimum of one duplicate sample analyzed.

c. Underground Storage Tanks (UST): Each project will have a minimum of one duplicate sample analyzed for all prarmeters tested.

VII. SITE SAFETY PLAN

A. Emergency Telephone Numbers

1. Local Services: In the event that an emergency happens while doing sampling or working in any possible contaminated area, the base has the capability to respond to all incidents. These services are not limited to base employees. The phone numbers are as follows:

Fire (on base phone)	117
Fire (Wherry Housing)	643-6660
Fire (Capehart Housing)	643-6660
Ambulance (on base)	5-115
Police	112
Command Post	3-2751
Program Manager (Chief, EMC)	3-2517
Health & Safety Project Mgr (EMC)	3-2517

2. If a spill incident occurs, the Base Fire Department (117) should be notified immediately. This activates the base spill response into action with the proper individuals responding. The Environmental Planning Division (EMX) has the responsibility (per SM-ALC, MCAFB Reg 19-2) of notifying the following off-base agencies if the contamination is of reportable quantity or if the contamination threatens human life or waterways:

National Response Center	1-800-424-8802
California Emergency Service	1-800-852-7560
Regional Water Quality Control Board (RWQCB)	885-7872
County Health	386-6168

B. General Information

1. McClellan AFB is listed on the National Priority List (NPL). We have a history of contamination which primarily includes solvents, petroleum and metals. Through past surveys, we have identified most of the areas on base which are sites of past disposal actions. The employee is most likely to come in contact with these chemicals during excavation, while repairing pipeline, underground electrical, and general road maintenance. The actual concentrations at the site will most likely vary considerably, as well as the risk of exposure of workers to potentially hazardous chemicals. It is for this reason that this Health and Safety Plan was developed.

2. All McClellan AFB personnel must follow procedures as are set forth in this document. Further, any contractors that might be employed for the successful completion of any contract covered under this Request for Proposal (RFP) must develop their own health and safety procedures;

they may be modeled after these procedures but shall in no case be less than those as adopted by McClellan AFB. The contractor's health and safety procedures must be reviewed and approved by EMC, prior to initiation of any field work.

3. It is clearly impossible to anticipate all specific safety and health hazards beforehand; therefore, working personnnel must exercise common sense and good judgement in their approach to a given situation. The Health and Safety training described in Appendix A of this document has been designed to assist in preparing workers to recognize hazards and minimize potentially adverse situations. This plan incorporates appropriate rules, guidelines and recommended work practices contained in previously published material and referenced in 29 CFR 1910.120, Appendix C. All project personnel shall follow the safety and health procedures set forth in the subsequent sections.

C. Organization and Responsibilities

1. The Project Manager. The Project Manager is specifically responsible for all aspects of the daily operation of the project and for its successful completion.

2. The Site Health and Safety Officer. Responsibilities of the Site Health and Safety Officer (SHSO) are delegated to the Industrial Hygienist (Occupational Health Specialist). He shall report directly to the Project Manager or his designee. The SHSO shall immediately inform the Project Manager of any health and/or safety conditions which may adversely affect the project. The SHSO is also accountable for health and safety during any visit(s) to the project or for subcontractor personnel. The SHSO is specifically given the authority for the following actions:

a. Require specific health and safety precautions prior to site entry or contractor personnel by McClellan employees.

b. Require any worker, including contractor personnel, to obtain immediate medical attention when indicated.

c. Deny access to the site or to any portion thereof, when imminent health and safety risk exists.

d. Order the immediate evacuation of workers, including contractor personnel, from any area of the site when, in his professional judgement, conditions warrant such action.

3. Emergency Actions: If any emergency involving actual or suspected personnel injury occurs, the SHSO shall take the following steps:

a. Remove the exposed or injured person(s) from the immediate point of danger.

b. Render first aid, if necessary. Decontaminate the victim's outer clothing after critical first aid has been given.

c. Obtain paramedic services or ambulance services. Transport the victim to the local hospital for medical care. This procedure shall be followed even if there is no visible injury.

d. Other personnel shall be evacuated to a safe distance until it is determined that it is safe for work to resume. If there is any doubt regarding the condition of the area, further appropriate advice shall be sought.

e. At the earliest practical time, the SHSO shall contact the Project Manager and provide details of the incident and any steps that have been taken to prevent its recurrence.

f. In the event that there is a possibility that an environmental impact or off-site migration of a toxic substance is likely, then immediate notification should be made to the Base Fire Department (117). This activates the base spill response into action with the proper individuals responding. The Environmental Planning Division (EMX) has the responsibility (per SM-ALC, MCAFB Reg 19-2) of notifying the following off-base agencies if the contamination is of reportable quantity or if the contamination threatens human life or waterways.

* National Emergency Response Center
* CA State Office of Emergency Services
* Local Police Department or Sheriff's Department

* NOTE: For telephone numbers, see Section VII.

g. A written report of the incident shall be prepared by the SHSO and the Project Manager within twenty-four (24) hours following the incident and forwarded to EM.

D. Medical Screening Procedures

1. The purposes of the medical screening program are as follows:

a. To assess the health status of personnel prior to work and to determine their fitness for the anticipated duties.

b. To monitor personnel for the evidence of post project adverse health affects.

2. All employees who will be working at any given remedial action site must undergo a medical evaluation before participating in field work.

3. A Physician's Statement qualifying the employee's physical ability to work will be available on-site in the possession of the Project Manager for review by the contracting officer's representative or the appropriate regulatory agency as may be required.

E. Personal Protective Apparel and Equipment

1. The suggested item specifications and description in this section are included primarily for information purposes only. As stated earlier in this document, the generic nature of the Health and Safety Plan is such that site specific, job specific, and contaminant specific personal protective clothing cannot be presented at this time. However, it should be clearly understood that the appropriate Level of Protection (A-D) will be utilized by all employees while working. Appropriate Levels of Protection, vendors and actual items will be determined by the SHSO and continuously evaluated throughout the course of the project. For most work done on this facility, the worker will wear level D protection, the SHSO will be responsible for upgrading the protection level. The recommended PPE for each level is as follows:

LEVEL A: Recommended

** Pressure-demand, full facepiece SCBA or pressure-demand supplied air respirator with escape SCBA.
** Fully-encapsulating, chemical resistant suit
** Inner chemical-resistant gloves.
** Chemical-resistant safety boots/shoes.
** Two-way radio communications.

LEVEL A: Optional

** Cooling unit
** Coveralls
** Long cotton underwear
** Hard hat
** Disposable gloves and boot covers

LEVEL B: Recommended

** Pressure-demand, full facepiece SCBA or pressure-demand supplied-air respirator with escape SCBA.
** Chemical-resistant clothing (overalls and long sleeved jacket; hooded one or two piece chemical splash suit; disposable chemical-resistant one-piece suit).
** Inner and outer chemical resistant gloves
** Chemical resistant safety boots/shoes
** Hard hat
** Two-way radio communications

LEVEL B: Optional

** Coveralls
** Disposable boot covers
** Face shield
** Long cotton underwear

LEVEL C: Recommended

** Full-facepiece, air-purifying, canister equipped respirator.
** Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one or two peice chemical splash suit; disposable chemical resistant one-piece suit).
** Inner and outer chemical resistant gloves
** Chemical-resistant safety boots/shoes
** Hard hat
** Two-way radio communications

LEVEL C: Optional

** Coveralls
** Disposable boot covers
** Face shield
** Escape mask
** Long cotton underwear

LEVEL D: Recommended

** Coveralls
** Safety boots/shoes
** Safety glasses or chemical splash goggles
** Hard hat

LEVEL D: Optional

** Gloves
** Escape mask
** Face shield

2. Personal Protection. The SHSO shall insure that ample supplies including, but not limited to, the following items will be available for worker's personal use during any on-site work activity.

a. Gloves

* Inner: latex, vinyl, and when needed, nitrile will be used.
* Outer: Chemically protective, neoprene, butyl rubber, nitrile gloves.

b. Protective Clothing

* Tyvek coveralls (all sizes)
* Polylaminated Saranex coveralls
* Butyl rubber aprons
* PVC chemically resistant splash suits

c. Footwear

** Chemical protective butyl rubber boots fitted with steel shanks and steel toe protectors.
** Safety shoes worn with protective PVC overboots.

d. Eye protection

* Safety glasses with side shields
* Single unit plastic "specs" with shields
* Goggles
* Face shield (attached to hard hat)

e. Hard hat

f. Hearing Protectors

* Ear plugs
* Acoustic ear muffs

g. Respiratory Protection

* Half-mask air purifying respirator equipped with NIOSH/MSHA approved cartridges for protection against organic vapors, mists, pesticides, dusts, and fumes, as conditions dictate. All particulate cartridges shall conform to the current ANSI Standard for HEPA filters.

* Full-face mask respirators equipped with air-purifying cartridges as described above.

* Self-Contained Breathing Apparatus (SCBA) conforming to the current ANSI Standard with an ample supply of auxiliary air bottles filled with Grade-D breathing air.

* Supplied air system(s) supplying Class-C, Grade-D air under positive pressure. Air delivery shall not exceed limits as established in 29 CFR, 1920.134.

* Five minute escape masks

3. Other Miscellaneous Protective Equipment. If unanticipated conditions are encountered which require additional personal protection, the SHSO shall ensure that appropriate additional personal protective apparel and equipment is available and in use prior to continuing field activities under such conditions.

4. Disposal of Contaminated Clothing

a. After daily field work has been completed, outer disposable protective clothing shall be removed and placed in] .ervious bags. The bagged waste will then be handled as hazardous w and disposed of accordingly as part of the site remedial work waste stream.

b. When laundering is necessary, clothing shall be washed by laundries which accept contaminated clothing. All boots will be decontaminated each day and left on-site until the conclusion of the project field work.

5. Safety Equipment. Minimally, the SHSO shall have the following items immediately available on-site:

** One (1) or more 30 pound ABC fire extinguisher(s)
** Foam generating fire extinguisher(s)
** First aid kit
** A supply of clean, potable water
** A portable eye wash unit conforming to OSHA standards
** Soap or waterless hand cleaner and towels
** Medical oxygen for resuscitation purposes

6. Apparel Decontamination Facilities. The SHSO shall establish a safety apparel decontamination station at the work site. As a minimum, soap, rinse water, towels, wash pans, and brushes for scrubbing boots, bib overalls, and other gear as is needed shall be available. All wastes generated during the decontamination process will be contained and properly disposed. Appendix C provides a generic decontamination layout intended to provide an overview of the basic zones and stations that shall be established on the personal decontamination of protective clothing and equipment prior to leaving a hazardous waste site.

7. Personnel Decontamination and Personal Hygiene

a. Personnel shall be provided with clean and sanitary change room(s) equipped with storage facilities for street clothing and adequately removed from potential sources of contamination. Contaminated individuals should shower at the end of the work shift. These facilities, when provided, will be in compliance with OSHA standards as stipulated in 29 CFR 1910.141.

b. A rest area in which workers may take rest breaks and non-breaks shall be made available for workers in an area that is free of potential sources of contamination.

8. Air Monitoring Equipment

a. There are no direct reading instruments available that would be suitable for the quantification of all airborne contaminants that might be encountered at all hazardous waste cleanup sites. Therefore, specific detection instrumentation and sampling strategies will be selected for contaminants as they are presented in the pre-work plan prior to the implementation of site mitigation activities.

b. However, since almost every hazardous waste site potentially would involve chemicals existent in vapor, gaseous or particulate states, all instrumentation and sampling equipment required for environmental and personal monitoring will be provided by the SHSO. Refer to Appendix B for a list of direct reading instrumentation and other sampling equipment that will be made available during the work phases of a project.

c. Personal air monitoring will be performed to document worker's 8 hour Time Weighted Average (TWA) exposure to specific volatile organic vapors and inorganic gases. The personnel to be monitored and the number of samples to be collected will be determined by the SHSO after evaluating site conditions and work activities.

d. The SHSO shall ensure that all necessary monitoring equipment is available prior to the start of sitc work. The SHSO shall also ensure that monitoring instruments are used only by persons who have had prior experience with their use, care, calibration, and operation; and who are knowledgeable about their operational limitations.

F. Field Personnel Health and Safety Training

1. General Health and Safety Training. In order to derive the greatest benefit from staff hours devoted to training as required under 29 CFR, 1910.120(e), Industrial Hygienists, Occupational Health Specialists, and other professionals experienced in the health anc safety aspects of hazardous waste management shall provide initial, refresher, and/or review training to the staff as outlined in Appendix A. The following basic areas of worker safety technique will be discussed:

a. Health and Safety Training. All personnel (except clerical staff) should have completed a 40 hour Health and Safety Training Course within the past year. Refer to Appendix A for an outline of course content. Documentation for employee attendance should be available upon request.

b. Site Specific Health and Safety Training and Hazardous Substances in the Field.

Before begining work at each location, employees will be required to attend a site indoctrination health and safety training session. At the minimum, each member shall receive the following training as described by 29 CFR 1910.120(e):

** Indoctrination about potential site safety hazards present on-site and those routes of exposure to be particularly cautious.

** Special work practices required for the specific site.

** Engineering controls and special equipment present on-site.

** Overview of personal protective equipment required for remedial activities on-site.

** Medical surveillance requirements on-site.

** Physiological and behavioral signs of acute toxicity that must be recognized as early as possible.

** Decontamination procedures to be practiced.

** In the case of sampling, review sampling techniques that will be employed on the site during the project and special protective equipment that must be utilized during sampling (if any).

c. Respiratory Protection: The following aspects of respiratory protective equipment will be discussed:

* Selection
* Donning
* Fit
* Qualitative fit testing
* Use
* Maintenance during usages

d. Use of safety Apparel and Equipment. The following areas of personal protection will be discussed:

* Personal protective equipment use
* Limitations of clothing and equipment
* Personal hygiene and habits
* Decontamination procedures (clothing, equipment, etc)
* Disposal of contaminated clothing

e. Emergency Procedures and Services: Refer to Section VII of this document for telephone numbers and individual contacts.

G. Site Operations

1. General Safety

Site operations shall be conducted in a safe manner consistent with the procedures contained in the Soil Management Plan. The number of personnel working on site shall be restricted to a minimum and will represent only those needed to perform the required work.

2. Control of Possible Contamination During Remedial Activities and Sampling. The project Manager shall review and approve all procedures governing work activities at the site. These procedures shall be used to ensure that neither property nor unsuspecting persons are contaminated by any aspect of project activities. Procedures and/or procedural changes should address the following items as appropriate.

a. Prevention of surface contamination by subsurface material and vice versa.

b. Minimization of dust generation resulting from the operation of graders and other heavy construction equipment. It should be noted that water spraying of overburden surfaces will be available whenever needed.

c. Minimization of worker exposure(s) to particulate dust. Personnel shall work upwind of any operating graders or other heavy equipment to reduce worker exposure to respirable fractions.

APPENDIX A

Hazardous Waste Worker Training
General Course Outline

I. Introduction

A. Orientation and introduction

B. Course objectives

II. Regulations

A. Federal legislation

1. Superfund requirements (SARA, Title II)

2. OSHA Standard (29 CFR, Parts 1910.120, 29 CFR, 1910 and 1926, CFR 300.150 and applicable OSHA Act laws and regulations)

B. Other Agency Requirements

1. Mine Safety and Health Administration (MSHA)

2. American National Standards Institute (ANSI)

III. Environmental Incidents/History

IV. Medical Considerations

A. Routes of entry

1. Respiration

2. Skin absorption

3. Ingestion

B. Overview of toxicology

1. General considerations

2. Exposure limits

3. Material safety data sheets

V. Chemical and Physical Considerations

A. Chemical properties of matter

B. Physical properties

C. Noise

VI. Respiratory Protection

A. General considerations

1. Limitations of respiratory protective devices

2. Types and description

B. Air-Purifying Devices

1. Particulate filters (HEPA)

2. Canisters for gases and vapors

3. Combination canisters

C. Supplied-Air Systems

1. Confined space requirements

2. Airlines and compressors

3. Air quality requirements

D. Self-Contained Breathing Apparatus (SCBA)

E. Respirator Selection

F. Respirator Fit Testing

1. Semi-quanitative fit test

2. Qualitative fit test

3. Quantitative fit test

G. Care and maintenance of respirators

VII. Protective Clothing

A. Protective materials

B. Permeation factors

C. Suiting-up and removing protective clothing

VIII. Levels of personal protection

A. Protection objectives

B. Levels (A-D) described

IX. Site Entry Considerations

X. Work Zones

XI. Decontamination Zones (Zones A-D)

XII. Health and Safety Plans

XIII. Field Monitoring and Instrumentation

A. Explosimeters

B. Direct-reading instrumentation

1. Colorimetric tubes

2. Carbon monoxide detectors

3. Hydrogen sulfide detectors

4. Oxygen level indicators

C. Photoionization meters

D. Portable gas chromatographs

XIV. Engineering Controls

NOTES:

1. Personal training manuals will be provided for each student in attendance.

2. Lectures will be supplemented with demonstrations and active student participation.

3. Instruction time: 40 hours.

APPENDIX B

Industrial hygiene and environmental monitoring equipment shall be provided by the Site Health and Safety Officer (SHSO) for the purpose of monitoring employee's exposure to chemical contaminants and physical conditions that on-site personnel might potentialy be exposed to. All equipment shall be maintained in good working order and shall be periodically calibrated to ensure operational accuracy.

Protocols for testing specific contaminants shall meet requirements as cited in 29 CFR, 1910.120; and all equipment shall be operated as directed by the manufacturer(s). All calculations performed to evaluate worker's exposure on an 8 hour time weigh ɔ average shall be prescribed in 29 CFR, 1910.120. All measurements shall be referenced to current permissible exposure levels (PELs) as cited in the following:

- 29 CFR 1910.10, subpart 2
- CA Administrative Code, Title 8
- ACGIH, Recommended Threshold Limit Values, 1987-88

Minimally, the following instrumentation and/or analytical equipment shall be provided on site:

- oxygen level indicator
- carbon monoxide (CO) indicator
- hydrogen sulfide (H2S) meter
- combustible gas meter (%LEL) and (ppm)
- direct reading colorimetric tube indicators
  - -- Draiger hand pump
  - -- various specific gas colorimetric tubes
- photoionization detection meter (HNU photoionizer) for the detection of volatile organic vapors
  - --10.7 eV UV lamp source
  - --optional strip chart recorder for hard copy recording
- personal passive monitoring badges
- personal portable air sampling pumps
  - --field calibration equipment
  - --appropriate sampling train(s)
- portable hand-held noise meter (dba weighted, slow response and peak hold capability)
- portable personal noise dosimeters
- heat stress monitor (WBGT)
- hazardous categorization field kit (Haz-Cat)

APPENDIX C

The Decontamination Layout presented in this appendix is intended to be generic in order to provide an overview of the basic zones and stations that shall be established for the personal decontamination of protective clothing and equipment prior to leaving a hazardous waste site. It is to be emphasized that specific plans for Decontamination Stations will vary depending upon the level(s) of protection (i.e., Levels A-D) that are employed. Accordingly, the basic layout will be either enhanced and/or simplified as indicated by EMC.

A. Exit Zones

1. Exclusion Zone (within the contaminated area)

a. Segregated equipment drop

b. Outer garment, boots and glove wash

c. Outer garment removal

2. Contamination Reduction Zone

a. Outer garment removal

b. Air tank change (and return to exclusion area) or respiratory protective equipment removal (to exit the site)

c. Inner protective clothing removal

3. Support Zone (behind the contamination control line)

a. Field wash (wash basins, shower, etc)

b. Toilet facilities

c. Redress area

d. Rest facilities

e. Equipment supply/resupply

B. Decontamination Equipment

1. Exclusion Zone

a. Various size containers

b. Plastic liners

c. Plastic drip cloths

d. Decon solution and/or detergent water

e. Wastewater collection facility

2. Decontamination Reduction Zone

   a. Auxiliary air tanks

   b. Boot covers, gloves, tape

   c. 30-50 gal containers with water/decon solution

   d. Bench or stool

   e. Soap, towels

   f. Plastic sheeting

3. Support Area

   a. All other support equipment as needed