United States General Accounting Office

GAO

Briefing Report to
Representative Vic Fazio,
House of Representatives

December 1985

HAZARDOUS WASTE

Status of Air Force's Installation Restoration Program

GAO/NSIAD-86-28BR

GAO

United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-213706

December 17, 1985

The Honorable Vic Fazio
House of Representatives

Dear Mr. Fazio:

On June 14, 1985, you asked us to follow up on the efforts the Air Force has taken to deal with groundwater contamination at McClellan Air Force Base since our November 29, 1983, report entitled Status of Air Force Efforts to Deal With Groundwater Contamination Problems at McClellan Air Force Base, GAO/NSIAD-84-37. You also asked us to examine the overall Air Force Installation Restoration Program (IRP) organizational structure in light of the problems with McClellan's IRP. On October 17, 1985, we briefed your staff on the preliminary results of our work, and have since updated the information presented in that briefing.

The Air Force IRP is an evolving program. As such, the Air Force is revising the program guidance based on its experience with the program and on its studies, which have pointed out that guidance is not clear on the roles and interrelationships of the program manager, the technical managers, and the installations.

The Air Force organizational structure for the IRP provides for divided program management between Engineering (Phases I, III, and IV) and Medical (Phase II) functions. An exception to this is McClellan which, based on its IRP experience, recently reorganized the management of its IRP under a new Directorate for Environmental Management, which consolidates both functions at McClellan.

The regulatory agencies recognize that McClellan is in the forefront of the IRP and, therefore, despite the many problems and delays that have occurred, are generally satisfied with the McClellan program and its progress.

We interviewed agency officials and reviewed the IRP related files and records of McClellan activities, the Air Force Occupational and Environmental Health Laboratory, the Air Force Engineering and

Services Center, the Air Force Logistics Command, and the regulatory agencies. Although the information we obtained on the Air Force organizational structure for the IRP was limited, we did observe instances where there may have been organizational problems. We also obtained information on the Air Force's efforts to correct some of these problems. We made our review between June and November 1985 in accordance with generally accepted government auditing standards.

The views of directly responsible officials were sought during the course of our work and were incorporated in this report where appropriate. In accordance with your wishes, we did not request the Department of Defense to review and comment officially on a draft of this report.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 10 days from the date of issuance. At that time, we will send copies to interested parties and make copies available to others upon request.

If you need further information, please call me on (202)275-4262.

Sincerely yours,

Harry R. Finley

Harry R. Finley
Senior Associate Director

Contents

ABBREVIATIONS

AFB	Air Force Base
AFESC	Air Force Engineering and Services Center
AFIRM	Air Force Installation Restoration Management Committee
AFLC	Air Force Logistics Command
AFRCE	Air Force Regional Civil Engineers
A&E	Architectural and Engineering
DOD	Department of Defense
DOE	Department of Energy
EPA	Environmental Protection Agency
GAO	General Accounting Office
IRP	Installation Restoration Program
MAJCOM	Major Command
OEHL	Occupational and Environmental Health Laboratory
PCB	Polychlorinated biphenyl
RAP	Remedial Action Plan
TCE	Trichloroethylene

STATUS OF AIR FORCE'S INSTALLATION RESTORATION PROGRAM

AIR FORCE IRP

In accordance with Department of Defense (DOD) policy, the Air Force Installation Restoration Program (IRP) was established to identify the location and contents of past toxic and hazardous waste disposal sites and to eliminate the hazards to public health in an environmentally responsible manner at Air Force bases. The Air Force has spent over $195 million for the IRP and plans to spend $710 million through fiscal year 1992. Initial Air Force IRP guidance was published in January 1982 and has been revised several times. The most recent guidance, published in July 1985, states that the numerous changes in the guidance are intended to transfer to all interested Air Force components the experience gained from managing the program and that the guidance will be periodically revised as the state-of-the-art continues to develop. The IRP consists of four phases.

Phase I

Phase I (Records Search) is intended to identify, on an installation basis, the potential for environmental contamination from past hazardous waste disposal practices. Phase I consists of a review of installation files on past missions, current operations, waste generation, past disposal practices, and interviews with key current and former installation employees. The Phase I study will result in one of the following:

--Termination of the IRP on the installation if no potential hazard is found.

--A Phase II to perform additional evaluation and sampling to confirm suspected contamination.

--A Phase IV remedial action to ameliorate contamination that presents an imminent threat to public health.

As of September 30, 1985, the Air Force had completed 162 Phase I studies and had 57 in process. Of the 57 in process, 55 were Air National Guard sites that are now to be included in the Air Force IRP. To date, only four completed Air Force Phase I studies did not recommend at least a Phase II effort.

Phase II

Phase II (Confirmation and Quantification) is intended to define and quantify the presence or absence of contamination that may have an adverse effect on public health or the

environment. Phase II consists of comprehensive environmental and ecological surveys, which include sampling and analysis to verify the presence of contamination and the magnitude and rate of contamination movement. Current Air Force guidance recognizes that a Phase II may require more than one study to adequately assess contaminant concentration and rate of movement. The concept was implemented in a February 1984 guidance change and was based on program experience.

The completion of Phase II efforts will result in one of the following at each investigated site.

--Termination of the IRP at a base if contamination is not confirmed or is determined to be insignificant.

--Long-term monitoring when contamination does not warrant remedial action at the time.

--A recommendation for Phase IV remedial actions when appropriate technology already exists, or a request for a Phase III effort to develop appropriate remedial technology.

As of September 30, 1985, the Air Force had completed Phase II efforts at 151 sites. Phase II studies were underway at 1,072 sites on 100 bases.

Phase III

Phase III (Technology Development) is intended to implement research and development on new toxic and hazardous waste cleanup methods. A Phase III requirement can be identified and instituted at any time during the IRP. Prior to the July 1985 guidance, Phase III was intended to assess various decontamination and containment technologies and to assess their cost/benefits. This evaluation of existing technologies is now to be addressed in Phase IV.

Phase IV

Phase IV (Remedial Actions) is intended to assess, select, and implement appropriate control measures that will comply with DOD and Air Force policy regarding former hazardous waste disposal sites. Phase IV will generally encompass individual sites or closely spaced groups of sites rather than all sites on an installation.

A January 1984 program guidance changed Phase IV to a two-staged approach. Previously, Phase IV entailed the design, construction, and operation of any necessary pollution abatement

facilities and the completion of remedial actions, which could include long-term monitoring. This is now designated Phase IV-B.

The new key element of Phase IV, Phase IV-A, entails the development of a Remedial Action Plan (RAP). The RAP is a detailed study listing available control technologies, an assessment of their effectiveness and cost/benefits, and selection of a preferred alternative which will become the basis for Phase IV-B. Air Force officials told us that creation of the IV-A process is consistent with the Environmental Protection Agency's (EPA) feasibility study procedure.

AIR FORCE IRP ORGANIZATIONAL STRUCTURE AND ROLES

The following is a brief description of the offices or activities involved in the IRP and the responsibilities of each, primarily as they relate to McClellan.

Headquarters

The Office of the Deputy for Environment, Safety, and Occupational Health in the Office of the Deputy Assistant Secretary of the Air Force for Installations, Environment, and Safety sets the overall policy for the Air Force IRP. Also, it has the final approval authority for any major project to correct any hazardous waste contamination at Air Force installations.

At Air Force headquarters, Washington, D.C., the Directorate of Engineering and Services, is the organization with overall management responsibility for the overall Air Force IRP. Its primary function is to implement Air Force IRP policy. The Air Force Surgeon General is responsible for Phase II studies as well as Phase III health effects research.

Air Force Installation Restoration Management Committee

The Air Force Installation Restoration Management (AFIRM) Committee was established in February 1985 to review and approve RAPs. The AFIRM Committee is chaired by a representative from the Directorate of Engineering and Services and consists of representatives from the major Air Force commands, the Surgeon General, and Judge Advocate staff. A contractor who is nationally recognized as an authority in hazardous waste disposal site restoration and representatives from the Air Force Regional Civil Engineers serve as technical consultants to this committee.

The AFIRM Committee serves as a focal point for the transfer of remedial action technologies and management techniques among Air Force organizations to assure a consistent

and cost-effective waste site cleanup approach. Its other functions include helping to establish priorities for Phase IV actions and IRP funding and reviewing or proposing IRP management guidance.

Major Commands

The Air Force Major Commands (MAJCOM) are the Air Force's IRP managers for bases in their command. Within a MAJCOM, the Directorate of Engineering and Services is responsible for managing Phases I and IV and the Surgeon General is responsible for managing Phase II. The Air Force Logistics Command (AFLC), Wright-Patterson Air Force Base, Ohio, is the IRP manager for McClellan. AFLC officials state that although they have program oversight responsibility and approval authority, they expect a base to manage its own IRP. Within AFLC's Directorate of Engineering and Services, the IRP comes under the Environmental Planning Division, which has a staff of eight personnel. Within the Office of the Surgeon General, the IRP comes under the Command Bioenvironmental Engineer, which has a staff of two.

Air Force Engineering and Services Center

The Air Force Engineering and Services Center (AFESC), Tyndall AFB, Florida, is a technical support organization of the Air Force Directorate of Engineering and Services. It provides support upon request of the major commands. According to an AFESC official, AFESC supported the MAJCOMs for most Phase I studies to date by providing on-call contractors.

AFESC is developing its Phase IV support capabilities. In July 1984, AFESC entered into a 10-year Interagency Agreement with the Department of Energy (DOE) for technical assistance on environmental matters. According to an AFESC official, AFESC entered into this agreement because of DOE's expertise in managing hazardous waste cleanup, and AFESC's success in using DOE. Also, AFESC wanted to avoid the significant staffing increases which would be needed to duplicate DOE's expertise. Under this agreement, DOE's Oak Ridge National Laboratory will establish eight regional, on-call contracts, which the major commands and installations can use for their Phase IV efforts. The contracts are primarily intended for the Phase IV-A work (development of a RAP) but can also be used for preparing Phase IV-B designs and quality control inspections during the construction phase.

An AFESC official stated that its primary Phase IV responsibility is to assist the installations in Phase IV-A and that the base is in the best position to manage Phase IV-B because:

--Phase IV-B entails architectural and engineering (A&E) design and construction of a proven technology defined in

Phase IV-A and is thus similar to any other base construction project.

--The base is in the best position to know and monitor local architect and engineering and construction firms.

This official further stated that AFESC's role is primarily to provide qualified contractors expeditiously through its DOE on-call contracts. The Base Civil Engineer is in the best position to manage the program because of the Engineer's first-hand knowledge of requirements and on-site monitoring capability.

According to the division chief, the Protection and Assessment Division has primary IRP responsibilities within AFESC. This division plans to increase its staff from five to eight. The planned increase must come from within existing AFESC personnel ceilings.

AFESC has not played a significant role in the on-going Phase IV efforts at McClellan. An AFESC on-call contract was used to expedite the initial Phase IV McClellan effort in the most contaminated area. However, because AFESC's on-call contract expired and the urgent need for McClellan to initiate Phase IV work, McClellan contracted for the remaining Phase IV work. Phase IV work is underway.

Occupational and Environmental Health Laboratory

The Air Force Occupational and Environmental Health Laboratory (OEHL), Brooks AFB, Texas, is under the command of the Air Force Systems Command. According to an OEHL official, OEHL is the Air Force technical manager for Phase II and will initiate work on a base when requested by a MAJCOM. OEHL has performed all Phase II studies to date through the use of on-call contracts, which have been awarded by the Air Force System Command's Aeronautical Systems Division at Wright-Patterson AFB, Ohio.

An OEHL official stated that OEHL looks to a base only to monitor the contractor's performance. In line with this philosophy, OEHL has played a significant role in the McClellan Phase II efforts.

The Technical Services Division has primary IRP responsibilities within OEHL. The OEHL commander stated that this division was recently increased to a staff of 16 and he plans further increases to 33 in order to handle the increasing IRP workload. He further stated that all increases must come from within existing OEHL personnel ceilings.

Air Force Regional Civil Engineers

The Air Force Regional Civil Engineers (AFRCE) are field organizations of the Directorate of Engineering and Services in Washington, D.C., and are located in Atlanta, Georgia; Dallas, Texas; and San Francisco, California. AFRCEs are intended to provide liaison between Headquarters, United States Air Force, AFESC, MAJCOMs, regional EPA offices; state and local regulatory agencies; and the individual Air Force bases.

According to an AFRCE official, one of the AFRCE's roles is to serve as an interface between Air Force program managers and the regulatory agencies. This includes seeing that

--base programs address known regulatory requirements and

--inconsistencies between regulatory requirements are identified and addressed.

The San Francisco AFRCE involvement at McClellan has been limited to attendance at two key meetings.

Base level

AFLC officials stated that, generally speaking, base level IRP responsibility is split between the Base Civil Engineer who is responsible for the base's role in Phases I and IV, and the Base Bioenvironmental Engineer, who is responsible for the base's role in Phase II. With the exception of Phase IV-B, where the base is assigned A&E design and construction responsibilities, Air Force guidance assigns the base the role of providing the contractor with on-site support and contractor monitoring during other Phase IV activities.

However, AFLC officials state that they expect their bases to manage their own programs, with AFLC maintaining program oversight responsibility and approval authority. AFLC wants its bases to establish a Technical Review Committee to provide a mechanism for involving the regulatory agencies in the base IRP. AFLC would like the Committee to contain a single representative each from EPA and the state who can speak for their respective agencies and a high level base representative.

McClellan Groundwater Contamination Task Force

The McClellan Groundwater Contamination Task Force was formed in August 1983 to oversee the cleanup of contaminated groundwater from past waste disposal practices at McClellan and to assure that proper and timely government actions are taken. The 13 members include representatives from the State Department of Health Services, the Regional Water Quality Control Board, the Air Resources Board, the Sacramento County Health

Department, the City of Sacramento, EPA, McClellan employee groups, the two local congressmen, two public members, and the McClellan Air Logistics Center Vice Commander.

In support of the Task Force, there is a Technical Review Committee, which is not the same as the Technical Review Committee envisioned by AFLC. The McClellan Technical Review Committee, which satisfies AFLC's requirement, consists of working level representatives of the Task Force membership offices. It works out the technical direction and requirements for the McClellan IRP for Task Force approval.

Directorate of Environmental Management

The Directorate of Environmental Management at McClellan is a new organization, officially established October 1, 1985, which brings together in one organization, at the Air Logistics Center level, responsibility for all environmental matters, including the IRP. According to its Director, the Directorate consolidated the Director of Engineering's and the Surgeon General's functions and staffing on environmental matters. Staffing as of October 31, 1985, was 33.

The Directorate of Environmental Management replaces the McClellan Installation Restoration Program Action Team. This team was established in July 1983 as a base level working group whose function was to plan and coordinate IRP actions among the responsible Air Force organizations.

Until recently, the Directorate of Environmental Management, according to an Environmental Management official, was an organization unique to McClellan. However, Vandenberg AFB, California, and Tinker AFB, Oklahoma, have recently formed groups for environmental matters. Although similar, they tend to differ in composition and responsibility.

Regulatory agencies

Federal, state, and local regulatory agencies play a role in the IRP. At McClellan:

--The State Department of Health Services has responsibility for inspecting and overseeing hazardous waste disposal sites and establishing state action levels for contaminants in California.

--The Central Valley Regional Water Quality Control Board has responsibility for ensuring that clean water standards are followed within its area in California.

--EPA has overall responsibility for ensuring that the state complies with the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act, and the Resource Conservation and Recovery Act.

At McClellan, EPA is an integral part of the Task Force. However, EPA Region IX officials stated that, in general, EPA has concentrated its activities on other military installations because of the high degree of state activity at McClellan.

FUNDING

AFLC and OEHL officials stated that through fiscal year 1983 IRP funding was provided from the MAJCOM operation and maintenance funds, not through specific IRP funding. As a result, they said that in the early years, IRP funding was a problem. The creation of the Defense Environmental Restoration Account for fiscal years 1984 and 1985 made specific funds available for the IRP. With this "fenced funding", they said funding was not a problem in these years.

As outlined on page 21 of this report, the IRP cost through fiscal year 1985 at McClellan is $16.7 million. The projected total cost of the program is $90 million through fiscal year 1992.

CONTRACTING

To expeditiously contract for McClellan IRP requirements, OEHL has used on-call contracts against which task orders are written to accomplish the work. Under this system, administrative restrictions or requirements with additional layers of review or approval apply to task orders that exceed $500,000. Task orders exceeding $500,000 require a contractor to prepare a small business subcontracting plan, which is also subject to additional layers of review. By not exceeding this amount, task orders can be "fast tracked."

AFESC and McClellan officials stated that contracting problems and delays have occurred in the McClellan IRP when the Tyndall base contracting office was not able to provide AFESC the required contracting support. This is a reason for McClellan having to contract for much of its own Phase IV effort. AFESC is only now preparing for Phase IV through its interagency agreement with DOE.

When off-base Phase II task orders have exceeded $500,000, OEHL has had to revise the proposed statements of work through staging to keep them within the "fast tracking" $500,000 limitation. Other than the above problems, which are discussed later, agreeing upon a statement of work has been the reason for most of the contracting delays.

AIR FORCE MANAGEMENT STUDIES

In response to concerns of various levels of command in the Air Force, the Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations, requested that a

study of the IRP be made during the period 1984-85. The headquarters Air Force Systems Command also made a study. The studies' recommendations are being reviewed and some are already in the process of being implemented.

Scientific Advisory Board Study

The first study, dated February 1985, was made by the USAF Scientific Advisory Board Ad Hoc Committee on Assessment of Air Force Hazardous Materials and Toxic Waste Management. The purpose of this study was to review and evaluate Air Force policies, programs, procedures, management structure, technical and scientific capabilities, methodologies, ongoing efforts, and progress and accomplishments in the entire area of hazardous waste management, not just IRP.

Management structure

The Board recommended that a high-level position within the Air Staff be created to act as the central Air Force manager for all aspects of hazardous material management, use, disposal, and associated environmental and health matters. It recommended that the incumbent have full authority and responsibility for

--developing goals and objectives, policy, and implementation strategies;

--advocating a pro-active Air Force role and commitment to achieving hazardous material, health, and environmental objectives;

--overseeing of hazardous material and waste operations and research and development within or sponsored by the Air Force;

--developing management and program plans;

--coordinating and focusing all Air Force capabilities as necessary, to accomplish policy, goals, and objectives;

--actively participating in national, state, and local policy development and rule making; and

--representing the Air Force's views and position to the public and to the federal, state, and local governments.

Waste reduction/elimination

The Board also recommended that the Air Force establish a multidisciplinary committee to recommend, identify, and assess the following for the central Air Force manager.

--Objectives for hazardous waste reduction, elimination, recycling, and reuse.

--Implementation plans and schedules.

--Potential costs and savings.

--Alternative methods/means for achieving waste reduction goals.

Other recommendations

Some other Board recommendations were to:

--develop a long-range hazardous waste management plan which addresses waste destruction and disposal techniques and evaluates the geographic location and transportation of wastes generated by the Air Force;

--expand and centralize existing safety, health, and environmental data bases;

--establish a single authority for research and development in hazardous waste and site restoration technology;

--establish a priority setting mechanism before proceeding to Phase IV remedial programs; and

--develop and implement contract documentation requirements which assure that contractor experience and knowledge gained under Air Force contracts are readily available for use by future Air Force contractors.

Air Force Systems Command Ad Hoc Review Panel Study

The Air Force Systems Command Ad Hoc Review Panel Study, dated July 1985, was made by the Aerospace Medical Division to review the OEHL's responsibilities and capabilities in Phase II, to advise of lessons learned at McClellan, and to recommend actions to further improve the program. Although the study focused on Phase II, it was necessary to examine the Phase II relationship to Phases I and IV.

In general, the study stated:

--The OEHL is doing a "fine" job overall.

--Present management concepts and contract strategies are excellent for the most part, sufficient for most bases, but vulnerable to isolated outbreaks such as the situation at McClellan.

--The biggest danger to the successful implementation of the IRP at any base is a breakdown in communications.

--There is room for improvement in both program management and program execution at all levels of the IRP--specifically, in the areas of program direction, MAJCOM and base acceptance of program responsibilities, manpower, contract monitoring, and contractor performance monitoring.

STATUS OF MCCLELLAN IRP

In August 1979, prior to initiation of an Air Force IRP, McClellan began investigating its own water supply because of groundwater contamination found in another area of Sacramento. Initial analyses disclosed contamination in two on-base drinking water production wells. Base and regulatory agency monitoring of both on- and off-base wells resulted in the closure of these two wells and three off-base wells.

To respond to this situation, McClellan initiated a study to (1) determine the current drinking water protection being provided, (2) evaluate past disposal practices, (3) identify contaminated areas, (4) determine local hydrogeology, and (5) identify the source and extent of contamination. The results of this study were published on April 30, 1981.

In January 1981, the Air Force implemented the IRP and AFESC awarded a contract to CH2M Hill for a Phase I study on McClellan. The Phase I study, issued in July 1981, identified 46 active and inactive waste disposal and storage sites on base. The Phase I study recommended a major groundwater monitoring program to pinpoint the source(s) and the extent of trichloroethylene (TCE) groundwater contamination both on- and off-base. In addition, the study disclosed a polychlorinated biphenyl (PCB) site in a small area that McClellan had recently purchased. McClellan cleaned up the PCB site in the summer of 1981--an action that was commended by California regulatory agencies.

In September 1981, OEHL awarded a contract to Engineering-Science, Inc., for a Phase II study on McClellan. The study was limited to on-base contamination by an Air Force Headquarters decision to defer all off-base work until DOD and EPA agreed on policies and procedures for accomplishing such work. Engineering-Science completed an interim report in August 1982 but, as discussed in our previous report (Status of Air Force Efforts to Deal with Groundwater Contamination Problems at McClellan Air Force Base, GAO/NSIAD-84-37, Nov. 29, 1983), issuance of a final report was delayed until July 1983 because of the lengthy Air Force review process.

The conclusions of this report and regulatory agencies' problems with it are fully discussed in our previous report. In general, Engineering-Science concluded:

--The large number of sites and their close proximity makes identification of a contamination plume for any individual site virtually impossible.

--Soil contamination in many sites is probably to a depth of 100 feet or more.

--Contamination has probably spread to cover a major portion of the base.

--Excavation of waste material would be prohibitively costly because of the extensive volumes involved.

--Treatment of the contaminated soil and groundwater is not feasible, primarily because of the low permeability of McClellan's soil.

--Contamination is generally limited to the upper aquifer.

--The upper aquifer is not connected with lower aquifers except by wells with gravel pack casings.

Engineering-Science also concluded that the upper aquifer could not be cleaned up and that future actions should concentrate on the prevention of further contaminant migration.

In general, regulatory agencies' problems with the Engineering-Science report were that Engineering-Science

--did not completely identify the magnitude of the contamination problem,

--may not have accurately determined the rate and direction of contaminant movement,

--may have used inadequate monitoring and sampling techniques, and

--did not recommend any cleanup measures and some of the recommended mitigation measures might not be effective.

In May 1984, OEHL awarded a contract to Radian Corporation which initiated an off-base Phase II study. To accomplish this overall effort, OEHL is using the multistage approach. Stage 2-1, which included digging groundwater reconnaissance borings, was completed in November 1984. Stage 2-2, which included constructing monitoring wells and conducting initial groundwater sampling, was contracted for in June 1985. Stages 2-3 and 2-4

were contracted for in September 1985. These stages include the constructing and sampling of additional monitoring wells, aquifer testing and modelling, establishing an on-base monitoring system, and assessing remedial action alternatives. Stages 2-3 and 2-4, which at this time are expected to complete the Phase II effort, have an estimated completion date of July 1987.

In July 1983, AFESC awarded a contract, which was called Phase III/IV, to CH2M Hill to do a site characterization, assess alternative remedial actions, and make a recommendation on the most cost-effective alternative for Area D (See map on page 28.), which is believed to be a major source of off-base contamination. This work also addressed deficiencies in the on-base Phase II study. AFLC program managers stated they used this approach rather than reopening the on-base Phase II study, because the AFLC Surgeon General lacked funds, while the Directorate of Engineering had funds and an available AFESC contractor to expeditiously do the work. It also permitted work to move into Phase IV without having the delays associated with a new contract.

This study, which was completed in February 1985, recommended a system to contain further spread of contamination through use of an impermeable ground cover and an extraction well system rather than other options, such as total excavation of old disposal pits.

Phase IV contracts covering the design and construction of the recommended water proof cover and contaminated water extraction system were awarded by McClellan. Construction of the cover has just begun. The first of six extraction wells has been completed and pump tests have begun.

In December 1984, McClellan awarded a Phase III/IV contract to McLaren Environmental Engineering to do a site characterization, assess alternative remedial actions, and recommend the most cost-effective alternative for Areas A, B, and C, and other on-base sites. (See map on page 28.) This work will also address deficiencies in the on-base Phase II study. AFLC program managers decided on this approach rather than reopening a Phase II study to make the McClellan program for these areas comparable to the earlier program in Area D. McClellan awarded this contract because, according to the Tyndall AFB contracting officer, AFESC no longer had an on-call contractor to do the work; therefore, McClellan could award the contract as easily as Tyndall and was in a better position to monitor the contractor.

Work under this contract is to be performed in an order of priority established by the Task Force, starting with Area C and continuing through Areas B and A and other sites. Currently, site characterization is underway in Area C and it is estimated that their work will be completed in April 1986.

PROBLEMS AND LESSONS LEARNED FROM MCCLELLAN IRP

According to Air Force officials, McClellan was one of four installations selected to start the Air Force IRP. Of the four, McClellan had the greatest contamination problem and was the only one with known off-base contamination. The program at McClellan has surfaced a number of problems which have led to changes in the Air Force IRP.

One problem concerned the Air Force's responsibility and authority for conducting off-base investigations and cleanups. This question was not resolved until August 1983 when a Memorandum of Understanding was agreed upon by DOD and EPA. Under the memorandum, DOD is responsible for all on-base programs and for off-base programs where off-base contamination is believed to have resulted solely from on-base disposal sites. EPA is responsible for off-base problems where there is a question whether off-base contamination resulted solely from a DOD disposal site.

The McClellan Phase II effort surfaced the potential need for staging Phase II studies. OEHL officials stated they initially believed it would be possible to identify contamination and to determine its magnitude and rate of movement in one effort. OEHL officials stated that the regulatory agencies' dissatisfaction with the results of the McClellan on-base Phase II study highlighted the difficulties of preparing an overall statement of work for a contract where extensive contamination exists at a site. Staging allows OEHL to better prepare discrete statements of work, based on prior efforts, to more adequately address contamination magnitude and rate of movement.

Confrontations with the regulatory agencies have surfaced the need for greater regulatory agency involvement in the IRP. Early program guidance merely required that EPA and state and local governments be advised of scheduled activities and final reports. In response to our April 12, 1985, report (Efforts To Clean Up DOD-Owned Inactive Hazardous Waste Disposal Sites, GAO/NSIAD-85-41), DOD revised its policy to call for increased and earlier involvement of the regulatory agencies in the IRP.

Early Air Force policy, which prevented the release of preliminary data and draft reports to regulatory agencies led to delays and confrontations with regulatory agencies. The initial confrontation occurred in January 1981 when the Regional Water Quality Control Board considered issuing a Cleanup and Abatement Order to get McCllelan to submit a plan to define the extent of groundwater contamination. In part, this resulted from delays in McClellan releasing its report and data on its pre-IRP groundwater investigation.

The report had been promised by September 30, 1980, but a final report was not released until April 30, 1981. However, a draft copy was released in February 1981 after legal action was threatened. The Regional Water Quality Control Board stated that although this report was an excellent compilation of data, it did not adequately discuss or interpret the data and additional information was still required.

In May 1983, the Board had to threaten legal action to obtain data from the on-base Phase II study. The report, which was scheduled for completion in October 1982, was delayed by Air Force review procedures until July 1983. Phase II raw data was provided to the Board on May 27, 1983, after legal action was threatened.

The regulatory agencies were generally dissatisfied with the Phase II study because it did not address all their concerns and questions.

Air Force actions to involve the regulatory agencies include forming a task force, which now provides both regulatory agency and public input to the McClellan IRP, and requiring other bases to form Technical Review Committees as a mechanism for regulatory agencies' participation. In addition, in June 1983, the Air Force revised its Phase II IRP guidance to provide a multistaged, incremental Phase II approach, which would include a series of decision points at which data could be shared with the regulatory agencies.

During the last year, a confrontation between the Air Force and the regulatory agencies over contracting delays between the off-base Phase II Stage 2-1 and 2-2 efforts has surfaced communication and guidance problems. A chronology and discussion of the events leading to the confrontation follow:

1984

Nov. 2 — A copy of the draft Stage 2-1 report, which includes the contractor's proposed work plan for Stage 2-2 (statement of work proposal), was delivered to the California Department of Health Services and the Central Valley Regional Water Quality Control Board for review.

Nov. 8 — A meeting was held with McClellan, contractor, and regulatory agencies' representatives to discuss the draft report and the statement of work proposal. The AFLC program manager said that the Air Force had been prepared to go to contracting under "fast tracking" with this statement of work proposal but regulatory agencies required that state officials approve the statement of work before it went to contracting.

Regulatory agency officials said that they only wanted additional time to review and comment on the draft report before the statement of work went to contracting.

The regulatory agencies had some concerns about the stage 2-1 conclusions, which would affect the follow-on work. Their concerns subsequently proved justified.

Nov. 20 - Dec. 11 — The regulatory agencies' comments were sent to McClellan.

Dec. 19 — McClellan sent the comments to AFLC, which received them during the holidays when the officer in charge of the IRP at AFLC/Surgeon General staff was on leave.

1985

Jan. 4 — The AFLC Surgeon General forwarded the regulatory agencies' comments to OEHL without elaboration.

Jan. 10 — OEHL received the comments.

Jan. 30 — OEHL notified AFLC that the proposed statement of work exceeded the $500,000 limitation for "fast tracking" and that they were reworking the proposal to bring it under the $500,000 limitation.

Feb. 14 — The AFLC Surgeon General questioned OEHL's delays in starting the next effort (stage 2-2). The Surgeon General cited the need to keep the momentum of the McClellan IRP going.

Feb. 28 — OEHL sent the draft statement of work to AFLC and McClellan.

Mar. 4 — McClellan received the draft statement of work and noted that many of the regulatory agencies' comments submitted during November and December, had not been addressed.

Mar. 7 — McClellan distributed the draft statement of work to Task Force members for comments. A regulatory agency representative noted that several key comments were not addressed.

Mar. 15 - Apr. 21 — McClellan received the regulatory agencies' comments which noted that their earlier comments had not been fully addressed. An Air Force communication problem was cited as the reason for

not addressing all of the regulatory agencies' comments. OEHL officials stated that they had expected "consolidated" comments from AFLC and McClellan. "Consolidated" meant that the AFLC and McClellan would address and resolve comments to the extent possible and only forward comments which the MAJCOM or base were unable to resolve.

OEHL officials told us that AFLC and McClellan officials did not "consolidate" the comments, but merely forwarded comments "consolidated with a staple".

AFLC and McClellan officials stated that they understood consolidation to mean forwarding comments in one package and that they lacked the technical expertise to address many of the comments. (Air Force guidance does not address consolidation requirements.)

OEHL officials told us that they, as technical manager for the IRP, assumed that they need only address and incorporate those comments which they felt technically appropriate into the draft statement of work. There was no AFLC or McClellan guidance that they must address (either incorporate or explain reasons for not incorporating) all agency comments.

Officials of a state regulatory agency stated that the Air Force should have realized that because the agencies are regulators, their "comments" are really "requirements," which must be addressed.

An OEHL official cited this as a lesson learned and plans to address all comments in the future. OEHL stated that this problem had never occurred previously.

Apr. 24 — McClellan resubmitted the comments to AFLC and requested a meeting between OEHL and the Task Force. The comments were not "consolidated" by OEHL definition.

Apr. 30 — AFLC submitted comments to OEHL and requested a meeting between OEHL and the Task Force.

May 8 — OEHL received the comments and officials, realizing they had a problem, called McClellan to arrange a meeting with regulatory agencies.

May 23 — A meeting was held between OEHL and regulatory agencies where the statement of work for stage

2-2 was revised. OEHL informed the regulatory agencies that it will take about 2 months to contract for the statement of work. OEHL and McClellan officials believed that it was a good and productive meeting.

June 6 — At a Task Force meeting, regulatory agency officials accused the Air Force, and in particular OEHL, of "arrogance" and issuing an "ultimatum" in presenting a tardy and inadequate work program at the May 23 meeting.

Air Force officials did not understand the basis for the charges. State regulatory agency officials cited the following as the basis for the "arrogance" charge.

--OEHL had still not addressed all their comments in the draft statement of work presented at the May 23 meeting.

--OEHL did not present an advance draft of the statement of work to be discussed at the May 23 meeting.

--OEHL expected the regulatory agencies to agree to a statement of work in one day, without being able to review it in advance.

Despite Air Force denials, both the Department of Health Services and California Regional Water Quality Control Board officials claimed the Air Force said that if a statement of work was not worked out at the May 23 meeting, then contracting requirements were such that they could not be contracted for in the current fiscal year cycle and further delays in the program would occur. As this would not allow them adequate time for review and comment, regulatory agency officials considered this a "take it or leave it" ultimatum.

Regulatory agency officials also cited some other frustrations which contributed to the charges:

--Groundwater contamination from McClellan has been known since late 1979 but in 1985 they still do not know the extent of the problem.

--The stage 2-1 effort included an inventory of all off-base private wells within approximately one mile of McClellan's boundary in the general direction of groundwater flow. The inventory disclosed more wells were contaminated than had been suspected. State regulatory agencies wanted the results of this effort in a computer usable format. Although the Air Force provided this information, it was in printed form. (This data required over 30 volumes.) An OEHL official claimed that development of this data into a computer usable format was not one of the items to

be produced under the contract and therefore could not be provided to the regulators.

--They had been unable to satisfactorily discuss with the contractor questions regarding conclusions in the stage 2-1 draft report. The California Regional Water Quality Control Board's interpretation of data differed from the contractor's and affected the conclusions. The regulators wished to fully discuss this with the contractor but at their only meeting, the contractor merely defended his position. (In the final stage 2-1 report, the contractor reversed himself and came to the same conclusion as the Board.) This problem recalled to the Board the past problems with the on-base Phase II study.

--OEHL had not addressed all their comments, which had been submitted as far back as December 1984.

--The whole follow-on stage 2-2 contracting effort was taking too long. They had been led to believe that 2-2 would start virtually right after completion of stage 2-1.

Since most of the problems dealt with Phase II and OEHL, we asked Air Force Headquarters and the state regulatory agency officials if the nature of Phase II efforts or OEHL was the problem. Both the Air Force and state regulatory agencies agreed that Phase II was the most difficult and sensitive phase of the IRP because Phase II confirmation of contamination and determination of its extent, is where DOD owns up to its contamination problem. It is also more sensitive because its technology entails as much art as science in defining the extent of contamination.

State regulatory agency officials also stated that OEHL has contributed to the problems. They believe that in contrast to McClellan where regulators and McClellan officials can frequently meet, discuss projects, and readily agree upon and make required changes, OEHL is remote and has tried to manage its projects without directly communicating with the regulatory agencies.

Despite these problems and delays, the regulatory agencies stated that, at the present time, they are basically satisfied with the McClellan program and with the progress of the cleanup effort.

OTHER ISSUES

In our prior report, we stated that McClellan needed to expand its testing of drinking water supplies to insure that the water meets state standards and that contaminants are not in

excess of state action levels. Since then, we found that McClellan performs annual testing instead of testing every third year. Testing includes analyses for all contaminants found during Phase II versus only the standards/action level requirements. According to a McClellan Bioenvironmental Division official, McClellan has purchased new equipment capable of testing for contaminants at the state action level requirements. State Department of Health Services, which monitors McClellan drinking water, is satisfied with the program.

Another issue we addressed was the Arcade Water District's February 1984 claim that its well was being contaminated by pollutants from McClellan's Camp Kohler. A Phase II study was made from October 1984 to May 1985 and its results do not indicate that Camp Kohler was responsible for contaminating the Arcade well. McClellan has forwarded the study and the claim to Air Force Headquarters for resolution.

OBSERVATIONS

The Air Force IRP is an evolving program. The Air Force is revising program guidance based on its experience with the program.

Air Force studies have pointed out that IRP guidance is not clear on the roles and interrelationships of the MAJCOM program manager, the technical managers, and the installations.

The Air Force organizational structure for the IRP provides for divided program management between Engineering (Phases I, III, and IV) and Medical (Phase II) functions. An exception to this is McClellan which, based on its IRP experience, recently consolidated these functions under a new Directorate for Environmental Management.

The regulatory agencies recognize that McClellan is in the forefront of the IRP and, therefore, despite the many problems and delays that have occurred, are generally satisfied with the McClellan program and its progress.

MCCLELLAN AIR FORCE BASE INSTALLATION RESTORATION PROGRAM COSTS[a]

FISCAL YEAR	DOLLARS IN THOUSANDS
1981	$ 530
1982	b
1983	388
1984	4,524
1985	11,211
1986	5,930
1987	15,640
1988	17,375
1989	18,355
1990	6,355
1991	6,355
1992	3,355
Total	$90,018

[a]Fiscal years 1981 through 1985 costs represent actual expenditures or obligated amounts where actual expenditure information was not available. Fiscal years 1986 through 1992 costs represent the latest cost estimates as of the time of our review.

[b]No fiscal year 1982 funds were used.

MCCLELLAN AIR FORCE BASE INSTALLATION RESTORATION PROGRAM COSTS - FISCAL YEARS 1981 THRU 1985

	Item/short title	Description	Awarded to	Awarded by[c]	Fiscal year funds	Obligated amount ($000)
1.	Phase I	Records search	CH2M Hill	AFESC	81	$ 49
2.	Presurveys, two	Contractors proposals for phase II	Weston	OEHL	81	6
			Engineering-Science	OEHL	81	3
3.	Phase II study (on base)	Confirmation	Engineering-Science	OEHL	81	472
4.	Private wells quarterly samples	Lab analysis of water samples	Radian Corporation	OEHL	83	8
					84	31
5.	Private wells quarterly samples	Gathering samples and lab analysis	Radian Corporation	OEHL	85	318
6.	Site 4 interim cover	Temporary cover to intercept rainwater in open sludge pit until final closure	American Environmental Corporation	Base	84	116
7.	Site 4 sludge sampling	Extract and analyze 12 sludge samples	Cal Analytical Lab	Base	84	5
8.	Site 4 cleanup	Contaminated liquids disposal	American Environmental	Base	83	183
		Sludge disposal	American Waste Container Service Incorporated	Base	84	8
9.	Site 4 cleanup	Sludge and soil disposal	G. W. Incorporated	Base	84	2,210
10.	Base production wells	Feasibility study to determine if contaminated wells could be salvaged by sealing off the upper contaminated soil stratas	Luhsoedd and Scalmanini	Base	83	55
11.	Area D site characterization	Conduct site characterization of area D, to include most cost-effective course of remedial action	CH2M Hill	AFESC	83	142
					84	492
12.	Phase II, Camp Kohler	Confirmation study for McClellan's AFB annex	Radian Corporation	OEHL	84	103
13.	Presurvey for off-base work	Contractor proposal for off-base phase II	Radian Corporation	OEHL	84	5

	Item/short title	Description	Awarded to	Awarded by[c]	Fiscal year funds	Obligated amount ($000)
14.	Phase II off base, stage 2-1	Survey off-base private wells and construct reconnaissance borings for Phase II effort	Radian Corporation Radian Corporation	OEHL	84	472
15.	Phase II off base, stage 2-2	Construct monitoring wells and monitoring wells and sample Phase I	Radian Corporation	OEHL	85	499
16.	Phase II off base, stage 2-3	Aquifer testing and evaluate and develop groundwater flow and establish an on-base well monitoring system	Radian Corporation	OEHL	85	478
17.	Phase II off base, stage 2-4	Construct monitoring wells and sample-phase II and provide remedial alternatives	Radian Corporation	OEHL	85	498
18.	On base monitoring	Resampling and analysis of base monitoring wells	Radian Corporation	OEHL	84	$ 104
19.	On base monitoring	Resampling of base production and monitoring wells	Radian Corporation	OEHL	85	392
20.	Filtration system well 18	To install a carbon filtration system on base production well in order to meet the state's action levels and reopen well	Calgon Carbon Corp.	Base	84 85	324 11
21.	Area D containment system	Architect-engineer design for area D cap	CH2M Hill	Base	84	141
22.	Area D cap construction	Construct impervious liner cap over area D	Sybion-Reid Company	Base	85	3,105
23.	Area D supervision	To supervise and inspect area D cap construction and update drawings to as-built	CH2M Hill	Base	85	61

	Item/short title	Description	Awarded to	Awarded by	Fiscal year funds	Obligated amount ($000)
24.	Rio linda water agreement	Provide drinking water to residential area adjacent to McClellan	Rio Linda Water Dist	Base	84 85	$ 311 281
25.	Areas A,B,C & other sites characterization	To do site characterization and develop remedial action plans for remaining McClellan AFB areas and sites, and to construct extraction well system for Area D	McLaren Environmental Engineering	Base	85	2,563
26.	Interim Connection	For sewer connection and service for pretreated industrial waste water from the base industrial waste treatment plant	Sacramento Regional County Sanitation District	Base	85	52
27.	Area D initial treatment system	To design and install a groundwater treatment system for area D extraction wells	Metcalf & Eddy, Inc.	Base	85	2,498
28.	DOE consultant	Technical assistance to evaluate proposed groundwater treatment system for area D	Department of Energy	Base	85	15
29.	City well 150	Reimburse City for loss of well	Sacramento City	Base	85	132
30.	Soil samples buildings 367 and 656 area	Take soil samples in given area for contamination analysis by McClellan AFB	Laver L. Roper and Associates, Inc.	Base	85	3
31.	Industrial waste lines	To remove and replace about 1,000 linear feet of the existing industrial and sanitary sewer lines	C.C. Young Construction Company, Inc.	Base	84	202
32.	Abandoned industrial waste lines	Remove and dispose abandoned industrial waste line	American Environmental Management Corp.	Base	85	4

	Item/short title	Description	Awarded to	Awarded by[C]	Fiscal year funds	Obligated amount ($000)
33.	Underground tanks	Disposal of 24 underground tanks containing hazardous substances. Tanks are either abandoned or no longer required	American Environmental Management Corp.	Base	85	120
34.	Area D analytical equipment	Equipment to monitor ambient air for cap and treatment system for area D	Perkin-Elmer Corporation	Base	85	62
	Total					$16,653

[C]AFESC and OEHL are IRP technical managers. Their actual contracting is done by the Tyndall Air Force Base contracting office in the case of AFESC and the Air Systems Division contracting office at Wright-Patterson Air Force Base in the case of OEHL.

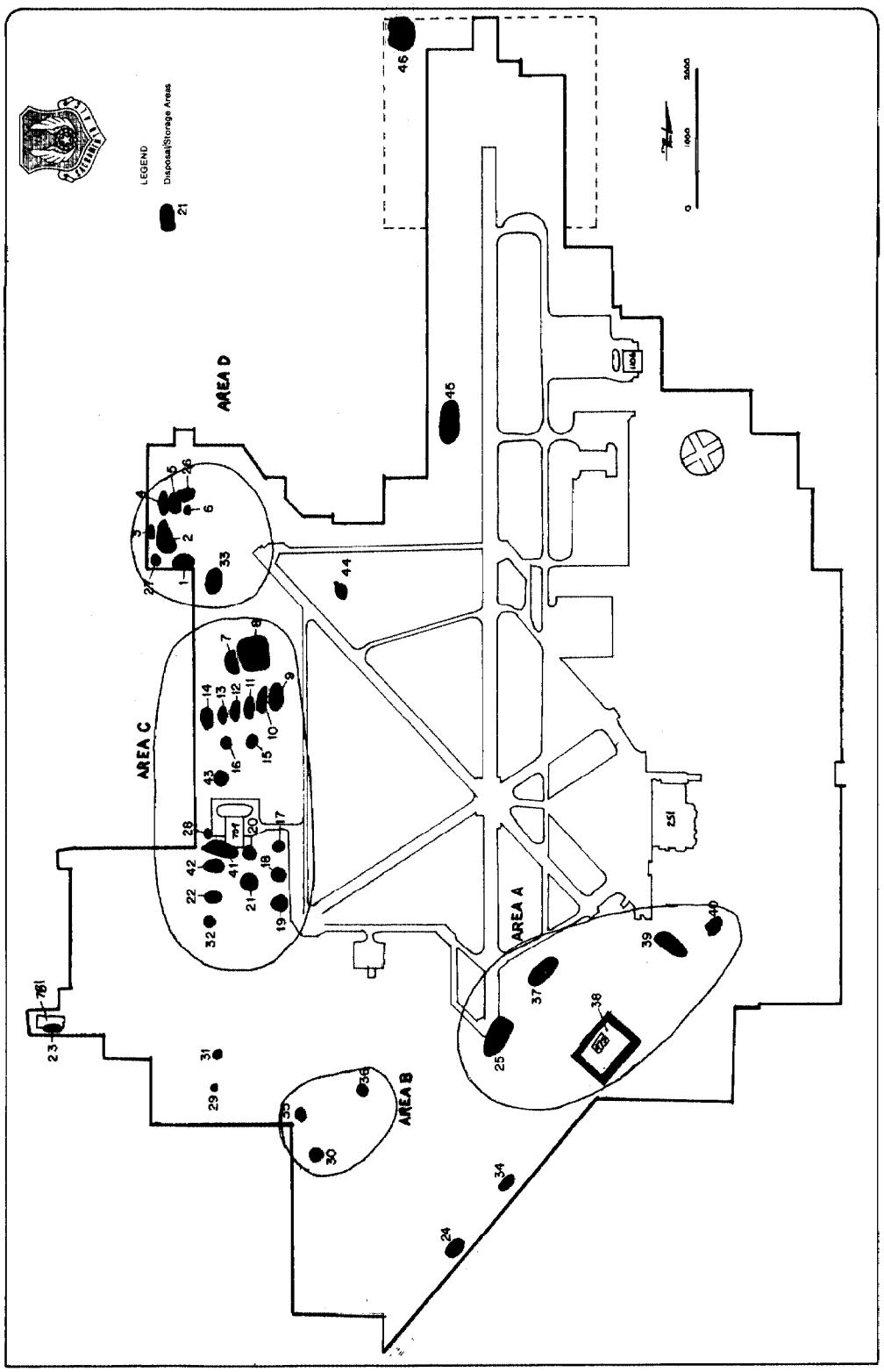
MCCLELLAN AIR FORCE BASE INSTALLATION RESTORATION PROGRAM
FISCAL YEARS 1986 THROUGH 1992 COST PROJECTIONS ($000)

	Item	FY86	FY87	FY88	FY89	FY90	FY91	FY92
(1)	Short-term treatment--follow on actions - Area D	$2,760	$2,760	$2,400				
(2)	Replacement carbon filters well 18	80	80	80	$ 80	$ 80	$ 80	$ 80
(3)	Unsaturated zone monitoring system Area D	250						
(4)	Prepare long-term treatment/disposal report - Area D	120						
(5)	Final treatment/disposal design - Area D	240						
(6)	Final treatment/disposal system - Area D (other areas as applicable)		4,000					
(7)	Remove underground tanks - basewide	120						
(8)	Perform soil sampling and analysis basewide	75	75	75	75	75	75	75
(9)	Area A monitoring/extraction well system	1,000						
(10)	Area C unsaturated monitoring system	500						
(11)	Area C cap design	210						
(12)	Area C initial ground water treatment system	500						
(13)	Industrial waste treatment plant sludge study	75						
	Subtotals	$5,930	$ 6,915	$ 2,555	$ 155	$ 155	$ 155	$ 155

MCCLELLAN AIR FORCE BASE INSTALLATION RESTORATION PROGRAM
FISCAL YEARS 1986 THROUGH 1992 COST PROJECTIONS ($000)

	Item	FY86	FY87	FY88	FY89	FY90	FY91	FY92
(14)	Area C initial follow on actions		$ 3,000	$ 2,400				
(15)	Inspection services for Area C cap construction		75					
(16)	Construct Area C cap		3,500					
(17)	All areas-follow on actions				$ 3,000	$3,000	$3,000	$3,000
(18)	Construct Area B extraction system		500					
(19)	Construct Area B unsaturated zone monitoring system		250					
(20)	Design and cleanup effort for contamination around building 666, plating shop		210					
(21)	Building 666 cleanup effort			3,500				
(22)	Area B initial groundwater treatment			500				
(23)	Area A extraction system		500					
(24)	Construct Area A-unsaturated zone monitoring system		250					
(25)	Area A initial groundwater treatment system			500				
(26)	Design Area A surface modification		90					
(27)	Construct Area A surface repair			1,500				
(28)	Design other areas surface improvements		150					
(29)	Construct other areas repairs			2,500				
(30)	Additional repair work unspecified			3,000	3,000	3,000	3,000	
(31)	Design and construct off base interception system (if needed)			720	12,000			
(32)	Off-base quarterly monitoring		200	200	200	200	200	200
	Subtotal		8,725	14,820	18,200	6,200	6,200	3,200
	Subtotal Previous Page	5,930	6,915	2,555	155	155	155	155
	Total	$5,930	$15,640	$17,375	$18,355	$6,355	$6,355	$3,355

Figure 1: Location of Disposal and Storage Sites at McClellan AFB, California



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