UNITED STATES NAVY
NAVAL FACILITIES ENGINEERING COMMAND
SOUTHWEST DIVISION
COMPREHENSIVE LONG TERM ENVIRONMENTAL ACTION NAVY (CLEAN)

IMPLEMENTATION PLAN
CTO #0018

WORK PLAN FOR A REMEDIAL
INVESTIGATION/FEASIBILITY STUDY AT THE
MARINE CORPS AIR STATION, EL TORO
SANTA ANA, CALIFORNIA

PREPARED FOR
UNITED STATES NAVY
SOUTHWEST DIVISION
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1.0 INTRODUCTION

On 27 November 89 the Department of the Navy, Naval Facilities Engineering Command, Southwest Division (Navy), issued Contract Task Order (CTO) #0018 to the Jacobs Engineering Group Inc. This Implementation Plan (IP) responds to the CTO requirement. This IP for the MCAS El Toro RI/FS Work Plan and supplemental plans has been prepared by the Jacobs Team in response to the SOW for CTO #0018 under the Comprehensive Long-term Environmental Action Navy (CLEAN) program, Contract N68711-89-D-9296.

This IP outlines the work to be performed under each task in the Scope of Work (SOW) dated 16 November 89 for CTO #0018. This IP describes the tasks necessary to develop a Work Plan for the conduct of a Remedial Investigation/Feasibility Study (RI/FS) at the Marine Corps Air Station (MCAS) El Toro, Santa Ana, California (Figure 1). The RI/FS Work Plan is an important document to allow the Navy to review the scope and commit funds to the RI/FS effort and for the PjM to plan and execute the project. In addition, it allows for state and other regulatory agencies to comment on the scope and methodologies proposed. In addition to the RI/FS Work Plan the SOW requires the preparation of Sampling and Analysis Plan (SAP), site specific Health and Safety Plan, Site Management Plan, review and update of the Administrative Record, and revision of a Community Relations Plan (CRP).

In May 1988, the Naval Energy and Environmental Support Activity (NEESA) released their Initial Assessment Study (IAS) of the Marine Corps Air Station, El Toro, California. The purpose of the IAS was to identify and assess sites posing a potential threat to human health or the environment due to contamination from past operations involving the use, handling, or disposal of hazardous materials. Based on information from various records, aerial photographs, and personnel interviews, a total of 17 potentially contaminated sites were identified in the IAS. The sites are:

Site 1 Explosive Ordinance Disposal Range - Two 100-foot diameter pits used for the disposal of sulfur trioxide cholorosulfonic acid (FS smoke).

Site 2 Magazine Road Landfill - Approximately 1,000,000 cubic yards of wastes including oils, solvents, paint residue, transformers, household refuse, municipal solid waste, and others.

Site 3 Original Landfill - Approximately 163,500 to 243,000 cubic yards of waste material, similar to that at Site 2, that was burned prior to burial to reduce volume.

Site 4 Ferrocene Spill - Approximately five gallons of ferrocene in a hydrocarbon carrier was spilled during an overflow incident.

Site 5 Perimeter Road Landfill - Approximately 50,000 to 60,000 cubic yards of waste material, similar to that at Site 2 with the exception of transformers.

Site 6 Drop Tank Drainage Area, No. 1 - An estimated 1,400 gallons of JP-5 and 300 gallons of lubricating oils were released here due to drop tank rinsing and leakage.

Site 7 Drop Tank Drainage Area, No. 2- An estimated 23,460 gallons of JP-5 were released here due to drop tank rinsing, dust control, and a spill.

Site 8 DPDO Storage Yard - Several gallons of transformer oil was spilled here and subsequently excavated for off-site disposal.

Site 9 Crash Crew Pit, No. 1 - Approximately 8,170 gallons of AVGAS, 4,080 gallons of JP-5, and 120 gallons of crankcase oil have been released to the soil during crash crew training activities.

Site 10 Petroleum Disposal Area - Approximately 52,000 gallons of petroleum wastes were sprayed over an area of approximately 960,000 square feet.

Site 11 Transformer Storage Area - A 30 by 30 foot concrete pad used for transformer storage where approximately 60 gallons of transformer oil leaked and flowed onto the soil.

Site 12 Sludge Drying Beds - Approximately 880 cubic yards of secondary wastewater treatment plant sludge was spread in this area for dewatering.

Site 13 Oil Change Area - Approximately one quarter acre site where approximately 7,000 gallons of waste crankcase oil was disposed of. The soil was later scraped into a pile for disposal.

Site 14 Battery Acid Disposal Area - Approximately 210 gallons of battery acids, oily wastes, and paint wastes were released to the soil.

Site 15 Suspended Fuel Tanks - Approximately 500 gallons of diesel fuel is reported to have been spilled on the soil in this area.

Site 16 Crash Crew Pit, No. 2 - Two pits used during training exercises in which approximately 27,400 gallons of JP-5, AVGAS, hydraulic fluid, and crankcase oil have been released to the soil.

Site 17 Communication Station Landfill - The discharge point for a 1,000-gallon vacuum truck. Wastes were largely cooking grease but waste oils and fuel were also reported to have been disposed of at this site.

The IAS concluded that 9 of the identified sites warranted confirmation studies. These included Sites 1, 2, 3, 5, 9, 11, 14, 16, and 17. In addition, Site 4 was recommended for remedial measures.

Subsequent to the completion of the IAS and following negotiations with federal, state, and local agencies, it was determined that two additional sites should be investigated. These sites are:

Site 18 Perimeter Investigation -- was added to evaluate whether trichloroethene (TCE) contamination observed in three off-station agricultural wells was a result of past waste disposal practices at the station.

Site 19 ACER Site -- the site of an early 1986 failure of an aboveground, 20,000-gallon-capacity fuel bladder that reportedly released an estimated 15,000 gallons of fuel onto the ground.

It is the intention of Jacobs, as required in the CTO, to reconsider each of these 19 sites (Figure 1-1) during the evaluations conducted during the execution of the IP.

1.1 Objective

The objective of this IP is to present the technical approach, cost estimate, and schedule for the development of the RI/FS Work Plan, SAP, site specific Health and Safety Plan, revised CRP, site management plan, and an updated administrative record.

Possible phases in the RI/FS may include data acquisition and review, site orientation, a field investigation program, risk assessment, evaluation of the feasibility of the remedial actions, and the preparation of a draft Record of Decision (ROD). The Work Plan will be prepared in strict accordance with CERCLA/SARA requirements, the latest EPA and Navy Installation Restoration (IR) guidelines, and applicable or relevant and appropriate State and local regulatory agency guidance.

The purpose of performing these specified tasks is to acquire sufficient information so that risks to human health and the environment from the contaminated sites at the MCAS El Toro can be estimated and remedial strategies evaluated. This approach is based on initial review of background documents, a site visit and discussions with the Navy Remedial Project Manager (RPM), Mr. Larry Nuzum.

1.2 Project Organization

Jacobs has identified Mr. Edward Rogan as the Project Manager for this CTO. Additional project support and lead technical personnel are identified in Section 4.0, Cost Estimate.

2.0 TECHNICAL APPROACH

In accordance with the SOW outlined in CTO #0018 Jacobs will prepare the RI/FS Work Plan, a SAP, a site specific health and safety plan, a site management plan, an updated administrative record, and revise the CRP. Each task is described in detail below.

2.1 Task 1 - Background Review

The purpose of the background review is to summarize the current situation, identify data deficiencies, and facilitate the development of the RI/FS work plan. Readily available background information on the MCAS El Toro will be compiled and reviewed during this phase. The Navy RPM has already provided Jacobs with several site-specific documents. Conversations with the RPM indicate that the documents received constitute the majority of the information available through the Navy on the site. Approximately one four-drawer file cabinet, one two-drawer file cabinet, and 6 linear feet of shelved documents remain to be reviewed at the MCAS El Toro offices. Other sources of information are anticipated to include the files of the Regional Water Quality Control Board (RWQCB), Santa Ana District, the EPA, and the U. S. Geological Survey. Work will be conducted in accordance with the latest EPA, state of California, RWQCB, Navy Installation Restoration Program regulations and guidance. To facilitate the background review and the future development of base maps for the site, the Navy will be responsible for providing Jacobs with reproducible copies of site topographic maps and available construction drawings collected as part of this background review exercise.

Specific attention will be focused on data relating to the varieties and quantities of hazardous wastes disposed of at the site to aid in further characterization of the nature and extent of contamination. The results of previous sampling events will be summarized in terms of physical and chemical characteristics, such as the contaminants identified and their respective concentrations. Compiled information will include demographic and land use information as well as geology, hydrology, hydrogeology, meteorology, toxicology and ecology. Data deficiencies will be identified and the Work Plan focused to fill critical data needs. If sites are identified which appear to pose an imminent threat to human health or the environment these sites will be evaluated for potential removal actions described under Section 2.2.3.

Each of the 17 disposal sites identified in the Initial Assessment Study and the two subsequently identified sites will be evaluated to assess whether it merits further study through the RI/FS. In consultation with the RPM and installation personnel, a determination will be made regarding which sites to include under the succeeding investigations.

As a deliverable to this task Jacobs will prepare a Summary Report which describes the work undertaken to date at the MCAS El Toro with respect to the RI/FS and IR program. As has been directed in the CTO #018 Project Scope, this report will include a list of specific sites which are proposed to be investigated under the RI/FS and their rationale for their inclusion or exclusion. A draft of this report will be delivered to the RPM 30 calendar days following approval of the IP. It is anticipated that the format of the summary report would be suitable for insertion as a section in the RI/FS Work Plan. Five copies of the Draft Summary Report will be submitted. The Final Summary Report will be delivered 14 days following receipt of government comments. Five copies of the Final Summary Report will be provided to the RPM.

2.2 Task 2 - RI/FS Work Plan

The RI/FS Work Plan will describe the procedures and programs necessary to further characterize the nature and extent of contamination present at the sites identified at the MCAS El Toro. The Work Plan will address the specific sites currently identified at the MCAS El Toro, as they are currently understood. The observational method of investigation (discussed in Appendix C) may be proposed in the Work Plan to allow for the need to phase the investigations and potentially break out operable units. The Work Plan will incorporate and expand on the work outlined in the Site Inspection Plan of Action, prepared by James M. Montgomery Consulting Engineers, dated August 1988. It will also describe the procedures necessary to develop, screen and evaluate potential remedial action alternatives. The Work Plan will identify the staff and the approximate level of effort required to perform the activities described. It will inform the Navy of potential conflicts, unrealistic schedule demands and issues of concern to the affected communities. The Work Plan will include descriptions of the assumptions made for each site so that the Navy will be able to identify the rationale behind the proposed investigation and study approach.

Initial efforts associated with the RI/FS Work Plan will involve continued data acquisition and review as well as site orientation of investigation team. It is intended that this RI/FS Work Plan will complement the concurrent off station investigations Work Plan.

Concurrent with the development of the RI/FS Work Plan, and integral to ensuring that it is appropriately focused, the following seven tasks will be completed and the results documented within the RI/FS Work Plan.

2.2.1 Monitor Well Inventory

The existing on site monitoring wells and supply wells will be assessed to evaluate their status, condition and usability. Assessment for usability will be made through a review of well logs and completion details. A site visit will confirm the well location and accessibility in the field. Criteria for usability will be developed with the concurrence of the Navy RPM and are expected to include documentation of acceptable well drilling and installation techniques, construction with suitable materials, suitable screen length, annular seal, surface seal and protection. It is anticipated that some wells may be determined as suitable for non-critical data such as water levels while others will be suitable for more critical parameters such as hazardous constituent sampling.

2.2.2 Preliminary Baseline Risk Assessment

Jacobs will prepare a Preliminary Baseline Risk Assessment (RA) for the hazardous waste sites located at MCAS El Toro. This RA will provide a preliminary evaluation of the potential adverse effects or risks to human health and the environment from these sites in the absence of remedial or removal actions. The RA will also include a comparison of the chemical and location-specific ARARs (Applicable or Relevant and Appropriate Requirements) to site-specific contaminant concentrations in the media (i.e. air, water, soil, etc.). The latest EPA risk assessment guidance documents will be used during RA preparation. The level of effort required to conduct the RA is highly dependant on the complexity of the specific sites.

The RA will primarily consist of the following components: 1) a review of background documentation (such as the Initial Assessment Study and Confirmation Studies), 2) the identification and prioritization of risk areas, operable units and contaminants of concern (i.e., hazard identification), 3) an environmental fate and transport analysis, 4) an exposure assessment which constitutes the identification of complete exposure pathways and the determination of what levels of exposure an individual may encounter, 5) a toxicity assessment which constitutes the determination of what contaminant intake levels could produce an adverse effect, 6) a preliminary ARARs analysis, 7) a risk characterization which estimates the likelihood that an adverse effect would occur, 8) an environmental effects assessment which constitutes the determination of potential adverse effects to flora and fauna that have occurred or may occur as a result of exposure to site contaminants, and 9) the levels of uncertainty associated with the above components. The RA will also include a conclusion/ recommendation section which will summarize the RA findings, discuss uncertainties in the data and analysis, and identify data needs and environmental modelling requirements for a more comprehensive baseline risk assessment.

The preparation of the Final RA will be a task within the RI and will be completed by the end of the RI. An ARARs analysis will be included as an appendix to the FS.

2.2.3 Removal Action Evaluation

The need for removal actions on the site will be evaluated. The criteria for assessing if a removal action is necessary or appropriate depends upon whether there is a threat to public health or the environment. Specific factors which would be taken into consideration include: actual or potential exposure of humans or the environment to hazardous substances, actual or potential contamination of drinking water supplies, hazardous substances, pollutants or contaminants in drums or other bulk containers which pose a threat of release, high levels of hazardous substances in soils at or near the surface that may migrate. Removal actions are typically restricted to an expenditure of $2,000,000 over a time frame of one year. Removal actions which will be considered include site security measures, drainage control, covering or capping contaminated smudges or soils, treatment to retard migration, excavation, removal of drums or other bulk containers, and provision of an alternate water supply.

2.2.4 Preliminary ARARs Analysis

A preliminary list of state, federal and local ARARs will be compiled. The list will focus on chemical specific and location specific ARARs. Response to or addressing action specific ARARs is typically waived by the agencies until later in the RI/FS process. A formal assessment as to whether the rule or regulation is applicable under the law or relevant and appropriate will be made by the Technical Review Committee (TRC). The final ARARs analysis will be conducted under the RI/FS and will be included as an appendix to the RI/FS report.

2.2.5 Community Relations Plan

The RI/FS Work Plan will include, as a task, technical support of the implementation of the CRP described in Section 2.5. The implementation of the CRP will include as a minimum the preparation of information sheets and/or attendance at public meetings.

2.2.6 Evaluate Potential Remedial Actions

Background information will be evaluated and a conceptual understanding of the site will be developed. Potential remedial action objectives will be identified for each contaminated medium and a preliminary range of remedial actions developed. This will consist of a general classification of potential remedial actions based on the expected routes of exposure and identified receptors. Although this is not meant to replace the more detailed identification and screening of remedial action alternatives that will be evaluated during the RI/FS it will help to focus the data gathering efforts so they support likely remedial actions. The preliminary list of remedial actions will include the SARA mandate to address treatment which significantly reduces the toxicity, mobility and volume of waste; containment with little or no treatment; and, of course, the no action alternative.

The Work Plan will describe the methodologies to evaluate and compare the remedial action technologies under consideration. The remedial actions developed will be subject to screening during the RI/FS based on effectiveness, implementability and cost.

2.2.7 Treatability Evaluation

Based on the identification of potentially applicable remedial technologies, an evaluation as to whether treatability studies should be conducted under the RI/FS will be made, if possible. The decision process for determining if a treatability evaluation is necessary consists of the following steps: determining data needs, reviewing existing data to determine if they are sufficient to evaluate the alternatives and proposing treatability testing if available information is not sufficient.

2.2.8 Deliverables

Three versions of the RI/FS Work Plan will be provided for Task 2: a Preliminary Draft, Draft and Final. The RI/FS Work Plan will include a description of the procedures and programs necessary to characterize the nature and extent of contamination at the sites. It will contain the proposed methodology to develop, screen and evaluate remedial action alternatives. The results of the preliminary baseline risk assessment will be included within the Work Plan. It will also contain an executive summary as well as a summary listing of monitoring and analytical requirements by site. As part of the Work Plan the preparation of the Draft Record of Decision document will be specified as late FS tasks. The Preliminary Draft RI/FS Work Plan will be delivered within 90 days of IP approval. Three copies will be provided to the RPM and 3 copies to the MCAS El Toro. The Draft RI/FS Work Plan will be delivered within 21 days of receipt of Navy and MCAS El Toro comments, assuming the comments do not require extensive Work Plan revisions. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. The Final Work Plan will be delivered within 21 days of RPM comments and direction to finalize the report, assuming the comments do not require extensive Work Plan revisions. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. In addition to the copies required above, an unbound, camera-ready copy of the Draft and the Final deliverables will be provided to the MCAS El Toro.

2.3 Task 3 - Sampling and Analysis Plan

Jacobs will prepare the documents necessary to complete a SAP in accordance with federal, state and local guidance. The SAP consists of two parts: the Quality Assurance Project Plan (QAPP) and the Field Sampling Plan (FSP). These documents will be submitted as separate deliverables, consistent with the Preliminary Draft, Draft, and Final versions discussed above.

2.3.1 Quality Assurance Project Plan (QAPP)

Data quality objectives (DQOs) will be addressed early in the QAPP process. The required data quality level for the investigation will be assessed and verified with the RPM. Once DQOs are established, a Navy approved, CLP laboratory will be identified for sample analysis. The QAPP will describe the policy, organization and functional activities necessary to achieve the DQOs. It will describe the procedures which will be used to document and report precision, accuracy, representativeness, completeness and comparability of environmental measurements. As much as practical, Jacobs' previously prepared standard operating procedures will be utilized in the QAPP. SOPs which are presently available are listed on Table 1. Based on EPA guidance the QAPP will have each of the required 16 elements. The regional EPA office will be contacted to determine if certain portions of the QAPP documentation, if any, have been standardized for this region.

Depending on the agreed upon DQOs the QAPP may require additional items such as use of a close support lab, use of a non-CLP lab, and use of non-standard analytical or sampling procedures. It is intended that the QAPP will be general enough to use in off station investigations.

The Preliminary Draft QAPP will be delivered within 90 days from approval of the IP. Three copies will be provided to the RPM and 3 copies to the MCAS El Toro. The Draft QAPP incorporating government comments will be delivered within 21 days from receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. The Final QAPP will be delivered within 21 days from receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. In addition to the copies required above, an unbound, camera-ready copy of the Draft and Final deliverables will be provided to the MCAS El Toro.

2.3.2 Field Sampling Plan (FSP)

The Field Sampling Plan will address the objectives of the sampling effort, the rationale for the sample locations, number of samples, and analytical parameters. Site maps depicting the sample locations will be included. The FSP will describe the sample collection techniques, disposal of contaminated materials, equipment decontamination, sample containers, sample preservation, sample shipment, sample documentation, and quality assurance/quality control. Specifics regarding sample blanks, duplicates, splits and spikes will be described. Where data needs overlap with the QAPP they will not be reiterated but rather referenced as being contained in the QAPP. The QAPP and FSP, when used together, will be complete enough so that qualified hazardous waste samplers, unfamiliar with the site, could conduct the sampling effort.

The Preliminary Draft FSP will be delivered within 90 days from approval of the IP. Three copies will be provided to the RPM and 3 copies to the MCAS El Toro. The Draft FSP incorporating government comments will be delivered within 21 days from

receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. The Final FSP will be delivered within 21 days from receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. In addition to the copies required above, an unbound, camera-ready copy of the Draft and Final deliverables will be provided to the MCAS El Toro.

TABLE 1
Standard Operating Procedures For
The Navy CLEAN Contract

SOP NUMBER	TITLE
1.0	ADMINISTRATION
2.0	HEALTH AND SAFETY TRAINING
3.0	REPORTING AND RECORDKEEPING
4.0	MEDICAL PROGRAM
5.0	SITE SAFETY PLAN
6.0	GENERAL HEALTH AND SAFETY PRACTICES
7.0	SURVEY AND RECONNAISSANCE
8.0	LEVELS OF PROTECTION
9.0	WORK ZONES
10.0	PERSONNEL DECONTAMINATION
11.0	FIELD LOGBOOK/PHOTOGRAPHS
12.0	FIELD MEASUREMENT OF TEMPERATURE
13.0	FIELD MEASUREMENT OF pH
14.0	FIELD MEASUREMENT OF SPECIFIC CONDUCTANCE
15.0	FIELD MEASUREMENT OF ORGANIC VAPORS
16.0	FIELD MEASUREMENT OF RADIATION
17.0	FIELD MEASUREMENT OF SAMPLE LOCATIONS
18.0	SAMPLING PLAN
19.0	SOLIDS
20.0	SOILS
21.0	SMUDGES AND SEDIMENTS
22.0	BULK MATERIALS
23.0	SURFACE WATERS
24.0	CONTAINERIZED LIQUIDS
25.0	GROUNDWATER
26.0	FIELD DECONTAMINATION PROCEDURES FOR EQUIPMENT USED IN GROUND WATER DATA COLLECTION
27.0	FIELD FILTRATION OF GROUNDWATER SAMPLES FOR DISSOLVED METALS ANALYSIS
28.0	SAMPLE PRESERVATION AND ANALYSES METHODS
29.0	CLP SAMPLE CONTAINER REQUIREMENTS
30.0	SAMPLE DOCUMENTATION
31.0	SAMPLE PACKAGING AND SHIPMENT
32.0	FIELD CLASSIFICATION AND DESCRIPTION OF SOILS
33.0	IN-SITE HYDRAULIC CONDUCTIVITY DETERMINATION
34.0	INSTALLATION/SERVICING OF TENSIOMETERS AND MEASUREMENT OF SOIL WATER POTENTIAL
35.0	SOIL WATER SAMPLER INSTALLATION AND USE

TABLE 1 (Continued)
Standard Operating Procedures For
The Navy CLEAN Contract (continued)

SOP NUMBER	TITLE
36.0	MONITOR WELL INSTALLATION
37.0	WELL DEVELOPMENT
38.0	FIELD MEASUREMENT OF STATIC WATER LEVELS AND TOTAL DEPTH IN GROUND WATER MONITORING WELLS
39.0	FIELD MEASUREMENT OF IMMISCIBLE COMPONENTS IN GROUNDWATER MONITORING WELLS
40.0	AQUIFER PUMPING TESTS
41.0	SLUG TESTING
42.0	PACKER TESTING
43.0	GEOPHYSICAL TECHNIQUES
44.0	SOIL GAS SAMPLING
45.0	HEADSPACE ANALYSIS FOR VOLATILE ORGANICS IN SOILS: FIELD METHOD

2.4 Task 4 - Site-Specific Health and Safety Plan

A site Health and Safety Plan will be prepared which establishes policies and procedures to protect workers and the public from potential hazards posed by each site. The purpose of the plan is to provide information about the site being investigated, evaluate the hazards present, establish personal protective measures for personnel assigned to the operation and to outline emergency action procedures. The plan is prepared by the Project Manager (PjM) or by the Site Safety Officer (SSO) and is submitted to the Jacobs CLEAN Health and Safety Manager for approval.

The following documents will be used as guidance in preparing the Health and Safety Plan:

- EPA Standard Operating Safety Guidelines, completed November 1984
- NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, completed October 1985
- Technical Method for Investigating Sites Containing Hazardous Substances, prepared by the EPA in 1981 as part of the National Contingency Plan
- Applicable Occupational Safety and Health Agency (OSHA) regulations
- Recommendations from the National Institute of Occupational Safety and Health (NIOSH), the American Conference of Governmental Industrial Hygienists (ACGIH), the Practices for Respiratory Protection by the American National Standards Institute (ANSI Z88.2).

The Health and Safety Plan will also conform to:

- FAR Clause 52.236.13, Accident Prevention
- Applicable CAL/OSHA Regulations
- U.S. Department of Labor OSHA Standards for General Industry (29 CFR 1910.120), Interim Final Rule; and (29 CFR 1926) Construction Industry standards

The Preliminary Draft Health and Safety Plan will be delivered within 90 days from approval of the IP. Three copies will be provided to the RPM and 3 copies to the MCAS El Toro. The Draft Health and Safety Plan incorporating government comments will be delivered within 21 days from receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. The Final Health and Safety Plan will be delivered within 21 days from receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. In addition to the copies required above, an unbound, camera-ready copy of the Draft and Final deliverables will be provided to the MCAS El Toro.

2.5 Task 5 - Revise/Incorporate a Community Relations Plan (CRP)

Jacobs will revise the CRP presently being prepared by others under a separate contract. It will describe how the community will be kept informed of project planning

and field activities, and how and when the community would be involved in project decisions during the RI/FS phase. This CRP will be revised in close consultation with, and with guidance from, MCAS El Toro personnel or their designees and will include the RI/FS schedule developed under CTO #018. In addition to EPA, state and local regulatory agency, and Navy guidance, the following guidance documents will be followed:

- o "Community Relations in Superfund, A Handbook," Interim Version, U.S. Environmental Protection Agency, June 1988.

- o "Installation Restoration Public Affairs Plan," Department of Navy, Office of Information, 26 January 1989.

The CRP will include a schedule of Technical Review Committee (TRC) members and of key project milestones requiring TRC meetings.

The Preliminary Draft CRP will be delivered within 90 days from receipt of the existing CRP from the government. Three copies will be provided to the RPM and 3 copies to the MCAS El Toro. The Draft CRP incorporating government comments will be delivered within 21 days from receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. The Final CRP will be delivered within 21 days from receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies the MCAS El Toro. In addition to the copies required above, an unbound, camera-ready copy of the Draft and Final deliverables will be provided to the MCAS El Toro.

2.6 Task 6 - Site Management Plan

The Site Management Plan (a project overview) will present the schedule, interrelationships and integration of the RI/FS tasks specified under this CTO. It will be prepared under the assumption that the site will be included on the NPL in the near future. The purpose of the site management plan is to organize the approach to the RI/FS to maximize the usefulness of the data that is generated. It is also intended to bring together the major elements of the RI/FS investigation to provide an overview of the overall program for upper management and others. As there are multiple tasks which are to be performed simultaneously, particular attention will be focused to avoid duplication of effort. A presentation of a cost and time effective approach for achieving IR program goals will be provided, possibly including a discussion of operable units. The Site Management Plan will be used as a tool to help work progress according to priorities and objectives established for the completion of the RI/FS. Review of Preliminary Draft and Draft reports by the Navy and regulatory agencies will be highlighted on Gantt charts. Activities that are on a critical path to the completion of the RI/FS effort will be clearly depicted on the Gantt charts.

The Preliminary Draft Site Management Plan will be delivered within ~~120~~ 60 Days from approval of the IP. The plan will include an executive summary section. Three copies will be provided to the RPM and 3 copies to the MCAS El Toro. The Draft Site Management Plan incorporating government comments will be delivered within 21 days from receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies to the MCAS El Toro. The Final Site Management Plan will be delivered within 21 days from receipt of comments assuming major revisions are not required. Five copies will be provided to the RPM and 15 copies to the MCAS El Toro. In addition to the copies required above, an unbound, camera-

ready copy of the Draft and Final deliverables will be provided to the MCAS El Toro.

2.7 Task 7 - Review and Update the Administrative Record

Documents, maps and photographs pertinent to the IRP at the site will be compiled. The RPM has already provided Jacobs with some of the key reports developed for the site. An up-to-date copy of the Administrative Record will be kept at a local library, to be specified by MCAS El Toro. Files available at the MCAS El Toro, EPA and the Santa Ana RWQCB will also be reviewed. Reports, data and correspondence which relate to the actions taken or contemplated at the site will be copied during the execution of the IP for inclusion in the site files. Within 90 days a relatively complete file will be established for review by the RPM. Although the SOW requests the compilation of an Administrative Record, based on discussions with the RPM an Administrative File is expected.

The purpose of the Administrative Record is to provide a compilation of documents that were considered or relied upon to select the response actions. The contents of the record should be able to demonstrate the rationality of the response decision. It must include documentation of public participation and be adequate for judicial review. The record should include information in support of the decision, information in opposition to the decision and justification for all statements in the ROD including facts, analysis of facts, policy and legal analysis, comments, response to comments, decision documents, QA/QC'd documents, chain of custody forms, data summary sheets, and an index.

The Administrative File (as opposed to the AR) is an ongoing collection of documents that the RPM anticipates will eventually constitute the Administrative Record. The index to the file will be on a computerized data base management format that is reviewed and approved by the RPM. While selecting the software to use Jacobs will include an evaluation of the Paradox system as this is the system that the Navy currently employs. Relevant documents compiled, screened and approved by the RPM will be numbered and placed in the Administrative File. New documents will be added to the file as they are generated. The cost of this task was estimated based on the amount of documents received to date and the report that approximately one four-drawer file cabinet, one two-drawer file cabinet, and 6 linear feet of shelved documents remain to be reviewed at the MCAS El Toro offices.

2.8 Task 9 - Meetings, Progress Reports

Jacobs personnel will attend meetings as needed to keep Southwest Division personnel, the MCAS El Toro personnel and regulatory agency personnel informed as to the status of the project. For cost estimating purposes, it is assumed that one meeting per month will be required. Jacobs will provide minutes of meetings attended within seven days of meeting occurrence. Jacobs personnel will also attend meetings of the Technical Review Committee and provide minutes of the meetings to the RPM and the MCAS El Toro. Following approval of the IP a kick off meeting will be scheduled to clarify project implementation. Internal meetings of the Jacobs team are anticipated to include coordination and scheduling meetings and "brainstorming" sessions to develop innovative solutions to site and project problems. Some monthly meetings are expected to coincide with planned deliverables. This will allow for an informal presentation of the material being delivered.

Two copies of monthly progress reports will be provided to the RPM and the MCAS El

Toro for the duration of this CTO as outlined in the CLEAN contract.

3.0 SCHEDULE

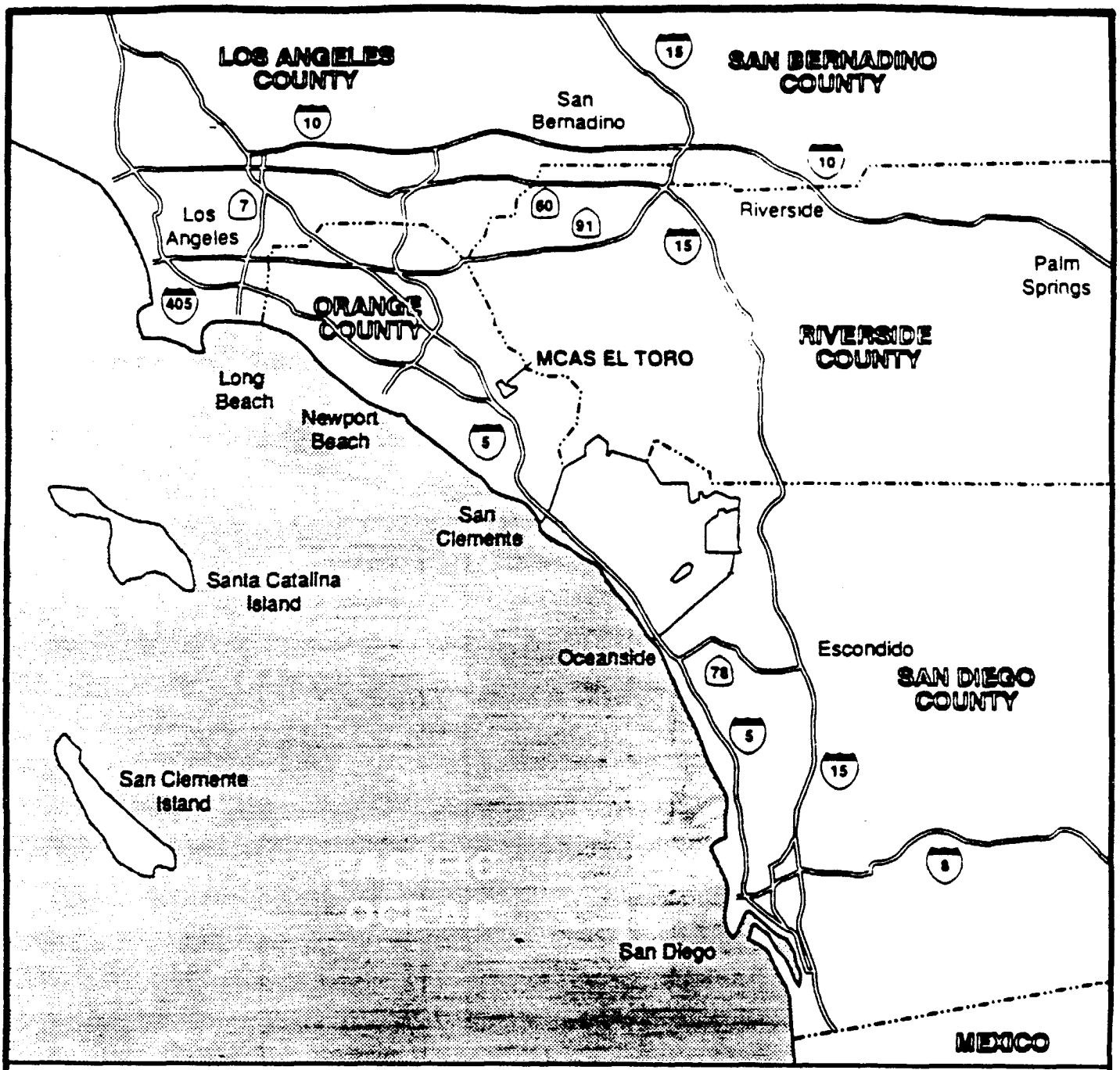
Appendix A identifies each of the activities necessary to complete the CTO. The schedule shows the start and finish dates with applicable logical ties. Using the IP approval date as a starting point, the schedule calls for the delivery of all plans/reports in accordance with the requirements specified in the CTO. Navy review times were developed based upon the anticipated length and complexity of the deliverable and discussions with the RPM. In general, 30 days will be allowed for Navy and state/TRC reviews. This schedule may be adjusted subject to the reviewers schedules/availability. The schedule calls for delivery of Draft and Final reports within 21 days from receipt of comments. If comments require extensive revisions, additional time will be required for Jacobs to respond.

4.0 COST

The cost estimate is provided in Appendix B. It identifies lead technical personnel and functional code personnel by functional code category, contract rate category, hours and amount required to complete CTO #0018. Additionally, anticipated travel costs are identified in Exhibit 1 and other direct costs are provided in exhibit 2.

The Navy's interim funding budget, before the Performance Aware Fee, provided in CTO #0018 is $128,572. The Jacobs estimated cost, before the Performance Award Fee is $166,620 which is 30% over the Navy's authorized budget. The Jacobs budget was created by developing the detailed activities and the associated budget necessary to accomplish each activity. A summary of this cost estimate is provided in Appendix B, Schedule A1. The schedule and associated budget for each activity provides a high level of detail for review by the Navy.

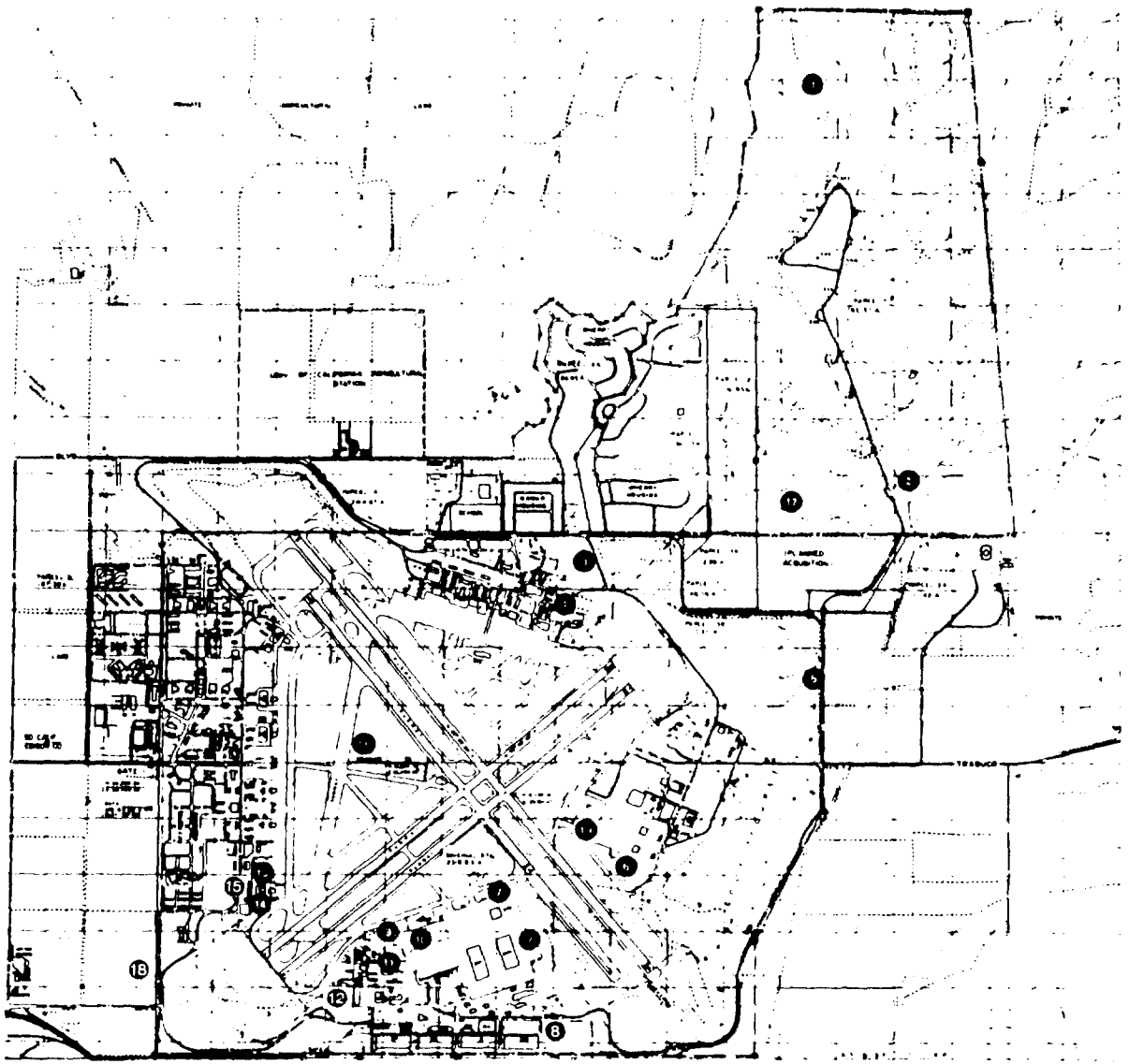
FIGURE(S)



Source: U.S. Navy. MCAS Tustin Master Plan, Existing Conditions Report. April 1988.

INSTALLATION RESTORATION PROGRAM
MARINE CORPS AIR STATIONS
TUSTIN AND EL TORO, CALIFORNIA

FIGURE 1
VICINITY MAP



SITE NO.	DESCRIPTION
1	EXPLOSIVE ORDNANCE DISPOSAL (EOD) RANGE
2	MAGAZINE ROAD LANDFILL
3	ORIGINAL LANDFILL
5	PERIMETER ROAD LANDFILL
6	DROP TANK DRAINAGE AREA NO. 1
7	DROP TANK DRAINAGE AREA NO. 2 (NORTH AREA ONLY)
9	CRASH CREW PIT NO. 1
10	PETROLEUM DISPOSAL AREA
11	TRANSFER STORAGE AREA
13	OIL CHANGE AREA
14	BATTERY ACID DISPOSAL AREA
16	CRASH CREW PIT NO. 2
17	COMMUNICATION STATION LANDFILL
4	FERROCENE SPILL AREA ⚠
19	ACER SITE ⚠
8	*DPDO Storage Yard* *
12	*Sludge Drying Beds* *
15	*Suspended Fuel Tanks* *
18	*Perimeter Investigation* *

⚠ REVISED 5/89
* **Revised 1/90**

INSTALLATION RESTORATION PROGRAM
MARINE CORPS AIR STATIONS
TUSTIN AND EL TORO, CALIFORNIA

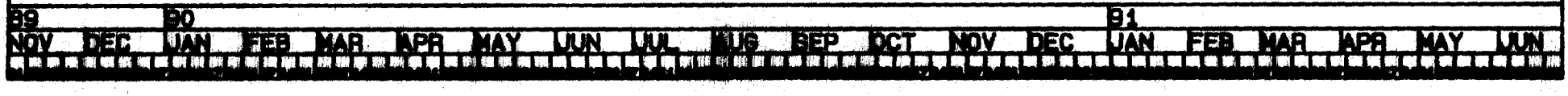
LEGEND
● SITE NUMBER AND LOCATION

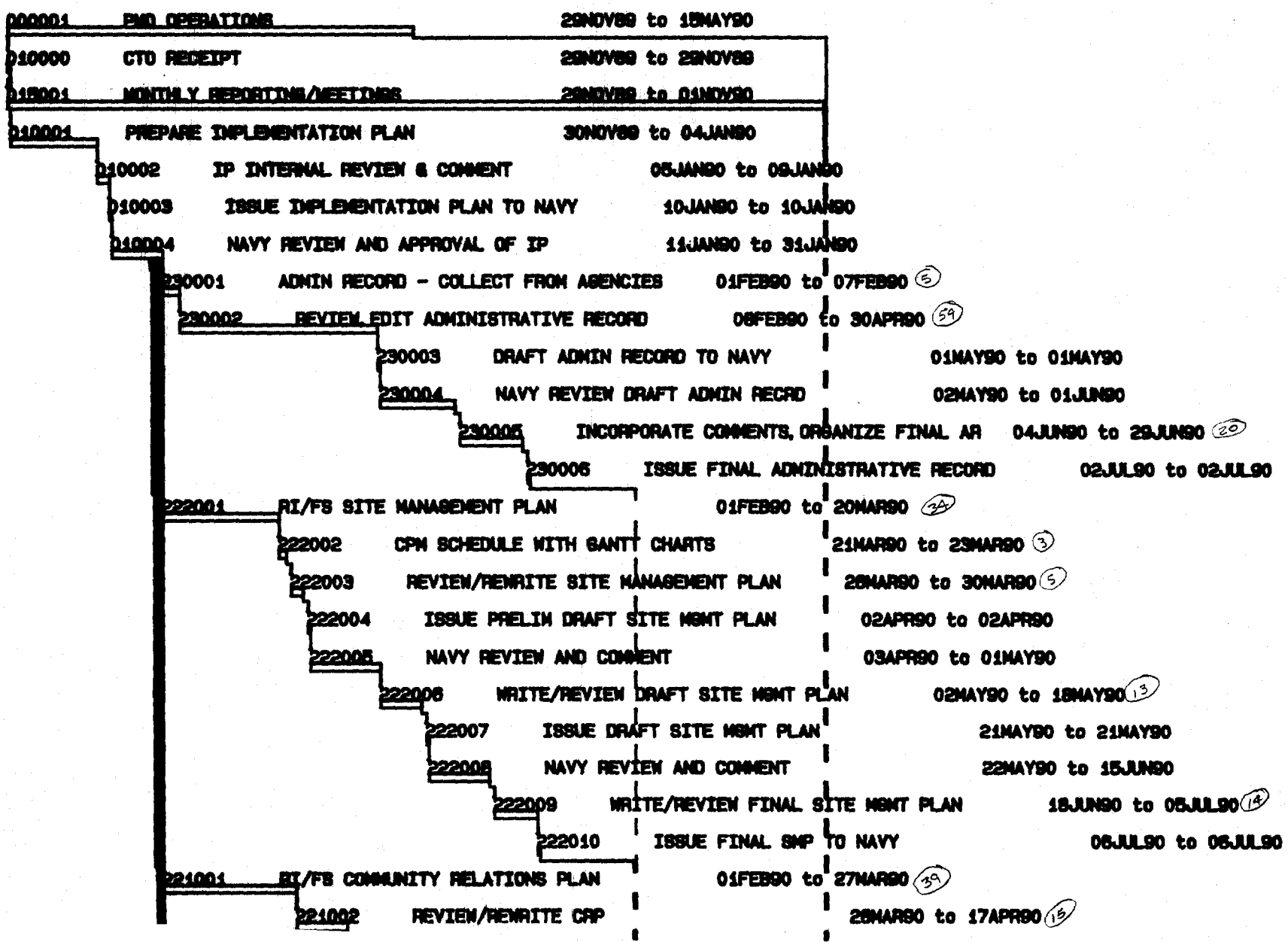
SCALE IN FEET
0 2000 4000

FIGURE 1-1
VERIFICATION STEP STUDY SITES
MCAS EL TORO, CALIFORNIA

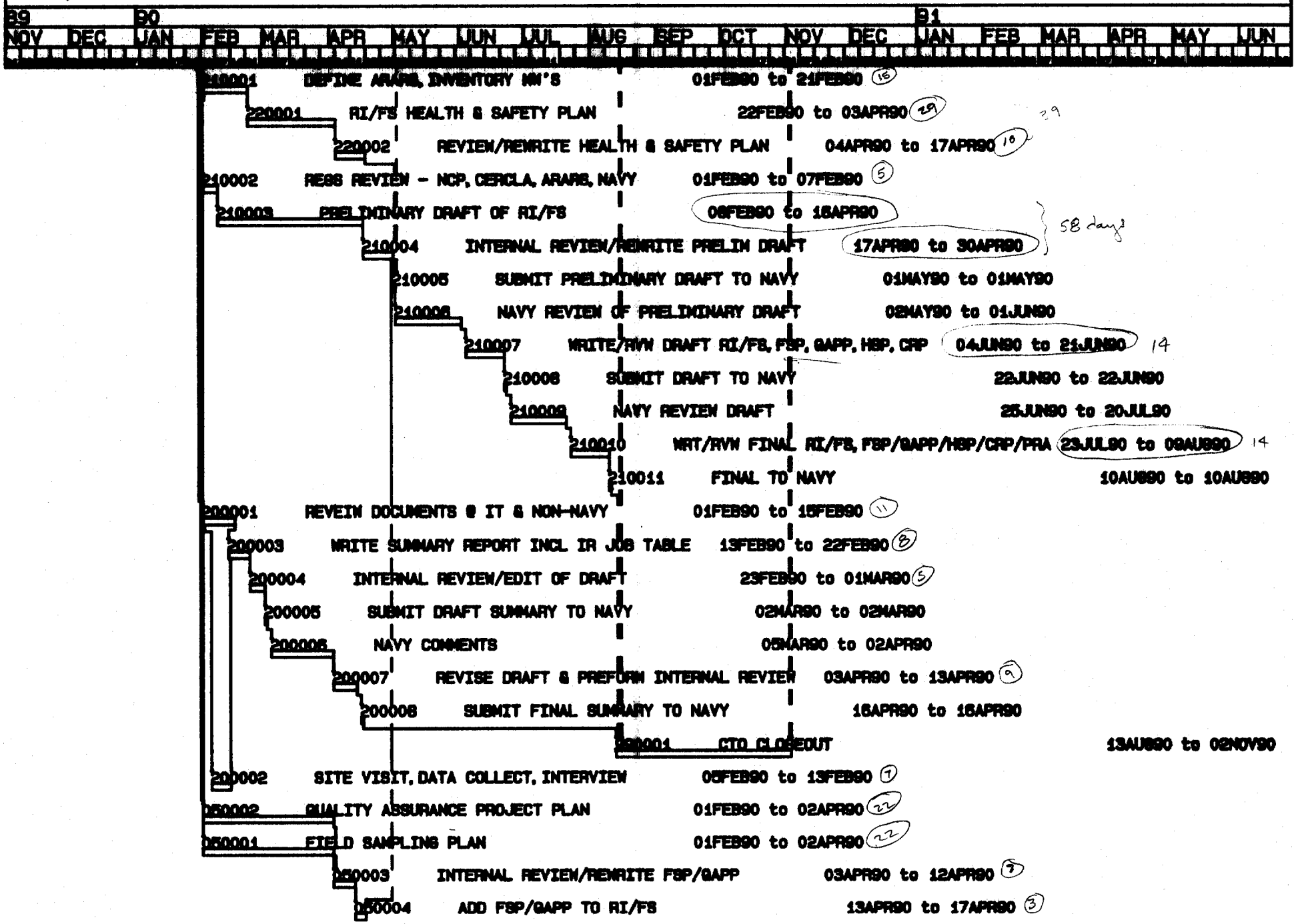
APPENDIX A

RI/FS WORK PLAN - MCAS EL TORO , CA





RI/FS WORK PLAN - MCAS EL TORO , CA



PORT: ACTES ACTIVITY LISTING by ACTIVITY NUMBER REPORT DATE:10JAN90

PI CTO018 RI/FS WORK PLAN - MCAS EL TORO ,CA TIME NOW:01NOV89

ACTIVITY	REM DUR	ORIG DUR	DESCRIPTION	CODE 1	CODE 2	EARLY START	EARLY FINISH	LATE START	LATE FINISH	TOTAL FLOAT
100001	120	120	PMO OPERATIONS	000		29NOV89	15MAY90	21MAY90	02NOV90	123
010000	1	1	CTO RECEIPT	010		29NOV89	29NOV89	29NOV89	29NOV89	0
010001	26	26	PREPARE IMPLEMENTATION PLAN	010		30NOV89	04JAN90	30NOV89	04JAN90	0
010002	3	3	IP INTERNAL REVIEW & COMMENT	010		05JAN90	09JAN90	05JAN90	09JAN90	0
010003	1	1	ISSUE IMPLEMENTATION PLAN TO NAVY	010		10JAN90	10JAN90	10JAN90	10JAN90	0
010004	15	15	NAVY REVIEW AND APPROVAL OF IP	010		11JAN90	31JAN90	11JAN90	31JAN90	0
015001	242	242	MONTHLY REPORTING/MEETINGS	015		29NOV89	01NOV90	30NOV89	02NOV90	1
050001	43	43	FIELD SAMPLING PLAN	050		01FEB90	02APR90	14FEB90	13APR90	9
050002	43	43	QUALITY ASSURANCE PROJECT PLAN	050		01FEB90	02APR90	14FEB90	13APR90	9
050003	8	8	INTERNAL REVIEW/REWRITE FSP/QAPP	050		03APR90	12APR90	16APR90	25APR90	9
050004	3	3	ADD FSP/QAPP TO RI/FS	050		13APR90	17APR90	26APR90	30APR90	9
200001	11	11	REVEIW DOCUMENTS @ IT & NON-NAVY	200		01FEB90	15FEB90	30MAY90	13JUN90	84
200002	7	7	SITE VISIT,DATA COLLECT,INTERVIEW	200		05FEB90	13FEB90	07JUN90	15JUN90	88
200003	8	8	WRITE SUMMARY REPORT INCL IR JOB TABLE	200		13FEB90	22FEB90	11JUN90	20JUN90	84
200004	5	5	INTERNAL REVIEW/EDIT OF DRAFT	200		23FEB90	01MAR90	21JUN90	27JUN90	84
	1	1	SUBMIT DRAFT SUMMARY TO NAVY	200		02MAR90	02MAR90	28JUN90	28JUN90	84
	21	21	NAVY COMMENTS	200		05MAR90	02APR90	29JUN90	27JUL90	84
200007	9	9	REVISE DRAFT & PREFORM INTERNAL REVIEW	200		03APR90	13APR90	30JUL90	09AUG90	84
200008	1	1	SUBMIT FINAL SUMMARY TO NAVY	200		16APR90	16APR90	10AUG90	10AUG90	84
210001	15	15	DEFINE ARARS,INVENTORY MW'S	210		01FEB90	21FEB90	01FEB90	21FEB90	0
210002	5	5	REGS REVIEW - NCP,CERCLA,ARARS,NAVY	210		01FEB90	07FEB90	01FEB90	07FEB90	0
210003	48	48	PRELIMINARY DRAFT OF RI/FS	210		08FEB90	16APR90	08FEB90	16APR90	0
210004	10	10	INTERNAL REVIEW/REWRITE PRELIM DRAFT	210		17APR90	30APR90	17APR90	30APR90	0
210005	1	1	SUBMIT PRELIMINARY DRAFT TO NAVY	210		01MAY90	01MAY90	01MAY90	01MAY90	0
210006	23	23	NAVY REVIEW OF PRELIMINARY DRAFT	210		02MAY90	01JUN90	02MAY90	01JUN90	0
210007	14	14	WRITE/RVW DRAFT RI/FS,FSP,QAPP,HSP,CRP	210		04JUN90	21JUN90	04JUN90	21JUN90	0
210008	1	1	SUBMIT DRAFT TO NAVY	210		22JUN90	22JUN90	22JUN90	22JUN90	0
210009	20	20	NAVY REVIEW DRAFT	210		25JUN90	20JUL90	25JUN90	20JUL90	0
210010	14	14	WRT/RVW FINAL RI/FS,FSP/QAPP/HSP/CRP/PRA	210		23JUL90	09AUG90	23JUL90	09AUG90	0
210011	1	1	FINAL TO NAVY	210		10AUG90	10AUG90	10AUG90	10AUG90	0
220001	29	29	RI/FS HEALTH & SAFETY PLAN	220		22FEB90	03APR90	07MAR90	16APR90	9
220002	10	10	REVIEW/REWRITE HEALTH & SAFETY PLAN	220		04APR90	17APR90	17APR90	30APR90	9
	39	39	RI/FS COMMUNITY RELATIONS PLAN	221		01FEB90	27MAR90	14FEB90	09APR90	9
	15	15	REVIEW/REWRITE CRP	221		28MAR90	17APR90	10APR90	30APR90	9

ACTIVITY	REM DUR	ORIG DUR	DESCRIPTION	CODE 1	CODE 2	EARLY START	EARLY FINISH	LATE START	LATE FINISH	TOTAL FLOAT
222001	34	34	RI/FS SITE MANAGEMENT PLAN	222		01FEB90	20MAR90	08MAR90	24APR90	25
222002	3	3	CPM SCHEDULE WITH GANTT CHARTS	222		21MAR90	23MAR90	25APR90	27APR90	25
222003	5	5	REVIEW/REWRITE SITE MANAGEMENT PLAN	222		26MAR90	30MAR90	30APR90	04MAY90	25
222004	1	1	ISSUE PRELIM DRAFT SITE MGMT PLAN	222		02APR90	02APR90	07MAY90	07MAY90	25
222005	21	21	NAVY REVIEW AND COMMENT	222		03APR90	01MAY90	08MAY90	05JUN90	25
222006	13	13	WRITE/REVIEW DRAFT SITE MGMT PLAN	222		02MAY90	18MAY90	06JUN90	22JUN90	25
222007	1	1	ISSUE DRAFT SITE MGMT PLAN	222		21MAY90	21MAY90	25JUN90	25JUN90	25
222008	19	19	NAVY REVIEW AND COMMENT	222		22MAY90	15JUN90	26JUN90	20JUL90	25
222009	14	14	WRITE/REVIEW FINAL SITE MGMT PLAN	222		18JUN90	05JUL90	23JUL90	09AUG90	25
222010	1	1	ISSUE FINAL SMP TO NAVY	222		06JUL90	06JUL90	10AUG90	10AUG90	25
230001	5	5	ADMIN RECORD - COLLECT FROM AGENCIES	230		01FEB90	07FEB90	14MAR90	20MAR90	29
230002	58	58	REVIEW,EDIT ADMINISTRATIVE RECORD	230		08FEB90	30APR90	21MAR90	08JUN90	29
230003	1	1	DRAFT ADMIN RECORD TO NAVY	230		01MAY90	01MAY90	11JUN90	11JUN90	29
230004	23	23	NAVY REVIEW DRAFT ADMIN RECRD	230		02MAY90	01JUN90	12JUN90	12JUL90	29
	20	20	INCORPORATE COMMENTS,ORGANIZE FINAL AR	230		04JUN90	29JUN90	13JUL90	09AUG90	29
230006	1	1	ISSUE FINAL ADMINISTRATIVE RECORD	230		02JUL90	02JUL90	10AUG90	10AUG90	29
990001	60	60	CTO CLOSEOUT	990		13AUG90	02NOV90	13AUG90	02NOV90	0

REPORT: ACTRELS PREDECESSOR and SUCCESSOR REPORT REPORT DATE:10JAN90

CTO018 RI/FS WORK PLAN - MCAS EL TORO ,CA TIME NOW:01NOV89

PRECEEDING ACTIVITY	TYPE	LAG	DESCRIPTION		ACTIVITY	DESCRIPTION		SUCCEEDING ACTIVITY	TYPE	LAG	DESCRIPTION
0000	SS	0	CTO RECEIPT	=>	000001	PMO OPERATIONS	=>	990001	FF	0	CTO CLOSEOUT
START*				=>	010000	CTO RECEIPT	=>	000001	SS	0	PMO OPERATIONS
								010001	FS	0	PREPARE IMPLEMENTATION
								015001	SS	0	MONTHLY REPORTING/MEETI
0000	FS	0	CTO RECEIPT	=>	010001	PREPARE IMPLEMENTATION PLAN	=>	010002	FS	0	IP INTERNAL REVIEW & CO
010001	FS	0	PREPARE IMPLEMENTATION	=>	010002	IP INTERNAL REVIEW & COMMENT	=>	010003	FS	0	ISSUE IMPLEMENTATION PL
0002	FS	0	IP INTERNAL REVIEW & CO	=>	010003	ISSUE IMPLEMENTATION PLAN TO N	=>	010004	FS	0	NAVY REVIEW AND APPROVA
0003	FS	0	ISSUE IMPLEMENTATION PL	=>	010004	NAVY REVIEW AND APPROVAL OF IP	=>	050001	FS	0	FIELD SAMPLING PLAN
								050002	FS	0	QUALITY ASSURANCE PROJE
								200001	FS	0	REVEIW DOCUMENTS @ IT &
								210001	FS	0	DEFINE ARARS,INVENTORY
								221001	FS	0	RI/FS COMMUNITY RELATIO
								222001	FS	0	RI/FS SITE MANAGEMENT P
								230001	FS	0	ADMIN RECORD - COLLECT
	SS	0	CTO RECEIPT	=>	015001	MONTHLY REPORTING/MEETINGS	=>	990001	FF	0	CTO CLOSEOUT
10004	FS	0	NAVY REVIEW AND APPROVA	=>	050001	FIELD SAMPLING PLAN	=>	050003	FS	0	INTERNAL REVIEW/REWRITE
010004	FS	0	NAVY REVIEW AND APPROVA	=>	050002	QUALITY ASSURANCE PROJECT PLAN	=>	050003	FS	0	INTERNAL REVIEW/REWRITE
0001	FS	0	FIELD SAMPLING PLAN	=>	050003	INTERNAL REVIEW/REWRITE FSP/QA	=>	050004	FS	0	ADD FSP/QAPP TO RI/FS
0002	FS	0	QUALITY ASSURANCE PROJE								
0003	FS	0	INTERNAL REVIEW/REWRITE	=>	050004	ADD FSP/QAPP TO RI/FS	=>	210004	FF	0	INTERNAL REVIEW/REWRITE
010004	FS	0	NAVY REVIEW AND APPROVA	=>	200001	REVEIW DOCUMENTS @ IT & NON-NA	=>	200002	SS	2	SITE VISIT,DATA COLLECT
								200003	FS	-3	WRITE SUMMARY REPORT IN
200001	SS	2	REVEIW DOCUMENTS @ IT &	=>	200002	SITE VISIT,DATA COLLECT,INTERV	=>	200003	FS	-5	WRITE SUMMARY REPORT IN
0001	FS	-3	REVEIW DOCUMENTS @ IT &	=>	200003	WRITE SUMMARY REPORT INCL IR J	=>	200004	FS	0	INTERNAL REVIEW/EDIT OF
0002	FS	-5	SITE VISIT,DATA COLLECT								
0003	FS	0	WRITE SUMMARY REPORT IN	=>	200004	INTERNAL REVIEW/EDIT OF DRAFT	=>	200005	FS	0	SUBMIT DRAFT SUMMARY TO
200004	FS	0	INTERNAL REVIEW/EDIT OF	=>	200005	SUBMIT DRAFT SUMMARY TO NAVY	=>	200006	FS	0	NAVY COMMENTS
0005	FS	0	SUBMIT DRAFT SUMMARY TO	=>	200006	NAVY COMMENTS	=>	200007	FS	0	REVISE DRAFT & PREFORM
2	FS	0	NAVY COMMENTS	=>	200007	REVISE DRAFT & PREFORM INTERNA	=>	200008	FS	0	SUBMIT FINAL SUMMARY TO

PORT: ACTRELS PREDECESSOR and SUCCESSOR REPORT REPORT DATE:10JAN90

P. CTO018 RI/FS WORK PLAN - MCAS EL TORO ,CA TIME NOW:01NOV89

PRECEEDING ACTIVITY	TYPE	LAG	DESCRIPTION		ACTIVITY	DESCRIPTION		SUCCEEDING ACTIVITY	TYPE	LAG	DESCRIPTION
200007	FS	0	REVISE DRAFT & PREFORM	=>	200008	SUBMIT FINAL SUMMARY TO NAVY	=>	990001	FS	0	CTO CLOSEOUT
10004	FS	0	NAVY REVIEW AND APPROVA	=>	210001	DEFINE ARARS,INVENTORY MW'S	=>	210002	SS	0	REGS REVIEW - NCP,CERCL
								220001	FS	0	RI/FS HEALTH & SAFETY P
10001	SS	0	DEFINE ARARS,INVENTORY	=>	210002	REGS REVIEW - NCP,CERCLA,ARARS	=>	210003	FS	0	PRELIMINARY DRAFT OF RI
210002	FS	0	REGS REVIEW - NCP,CERCL	=>	210003	PRELIMINARY DRAFT OF RI/FS	=>	210004	FS	0	INTERNAL REVIEW/REWRITE
10003	FS	0	PRELIMINARY DRAFT OF RI	=>	210004	INTERNAL REVIEW/REWRITE PRELIM	=>	210005	FS	0	SUBMIT PRELIMINARY DRAF
10004	FF	0	ADD FSP/QAPP TO RI/FS								
10004	FS	0	INTERNAL REVIEW/REWRITE	=>	210005	SUBMIT PRELIMINARY DRAFT TO NA	=>	210006	FS	0	NAVY REVIEW OF PRELIMIN
20002	FS	0	REVIEW/REWRITE HEALTH &								
221002	FS	0	REVIEW/REWRITE CRP								
10005	FS	0	SUBMIT PRELIMINARY DRAF	=>	210006	NAVY REVIEW OF PRELIMINARY DRA	=>	210007	FS	0	WRITE/RVW DRAFT RI/FS,F
210006	FS	0	NAVY REVIEW OF PRELIMIN	=>	210007	WRITE/RVW DRAFT RI/FS,FSP,QAPP	=>	210008	FS	0	SUBMIT DRAFT TO NAVY
	FS	0	WRITE/RVW DRAFT RI/FS,F	=>	210008	SUBMIT DRAFT TO NAVY	=>	210009	FS	0	NAVY REVIEW DRAFT
10008	FS	0	SUBMIT DRAFT TO NAVY	=>	210009	NAVY REVIEW DRAFT	=>	210010	FS	0	WRT/RVW FINAL RI/FS,FSP
210009	FS	0	NAVY REVIEW DRAFT	=>	210010	WRT/RVW FINAL RI/FS,FSP/QAPP/H	=>	210011	FS	0	FINAL TO NAVY
10010	FS	0	WRT/RVW FINAL RI/FS,FSP	=>	210011	FINAL TO NAVY	=>	990001	FS	0	CTO CLOSEOUT
210001	FS	0	DEFINE ARARS,INVENTORY	=>	220001	RI/FS HEALTH & SAFETY PLAN	=>	220002	FS	0	REVIEW/REWRITE HEALTH &
20001	FS	0	RI/FS HEALTH & SAFETY P	=>	220002	REVIEW/REWRITE HEALTH & SAFETY	=>	210005	FS	0	SUBMIT PRELIMINARY DRAF
10004	FS	0	NAVY REVIEW AND APPROVA	=>	221001	RI/FS COMMUNITY RELATIONS PLAN	=>	221002	FS	0	REVIEW/REWRITE CRP
221001	FS	0	RI/FS COMMUNITY RELATIO	=>	221002	REVIEW/REWRITE CRP	=>	210005	FS	0	SUBMIT PRELIMINARY DRAF
10004	FS	0	NAVY REVIEW AND APPROVA	=>	222001	RI/FS SITE MANAGEMENT PLAN	=>	222002	FS	0	CPM SCHEDULE WITH GANTT
222001	FS	0	RI/FS SITE MANAGEMENT P	=>	222002	CPM SCHEDULE WITH GANTT CHARTS	=>	222003	FS	0	REVIEW/REWRITE SITE MAN
22002	FS	0	CPM SCHEDULE WITH GANTT	=>	222003	REVIEW/REWRITE SITE MANAGEMENT	=>	222004	FS	0	ISSUE PRELIM DRAFT SITE
22003	FS	0	REVIEW/REWRITE SITE MAN	=>	222004	ISSUE PRELIM DRAFT SITE MGMT P	=>	222005	FS	0	NAVY REVIEW AND COMMENT
22	FS	0	ISSUE PRELIM DRAFT SITE	=>	222005	NAVY REVIEW AND COMMENT	=>	222006	FS	0	WRITE/REVIEW DRAFT SITE

PORT: ACTRELS PREDECESSOR and SUCCESSOR REPORT REPORT DATE:10JAN90

P CTO018 RI/FS WORK PLAN - MCAS EL TORO ,CA TIME NOW:01NOV89

ECEEDING ACTIVITY	TYPE	LAG	DESCRIPTION	ACTIVITY	DESCRIPTION	SUCCEEDING ACTIVITY	TYPE	LAG	DESCRIPTION
2005	FS	0	NAVY REVIEW AND COMMENT =>	222006	WRITE/REVIEW DRAFT SITE MGMT P	=> 222007	FS	0	ISSUE DRAFT SITE MGMT P
222006	FS	0	WRITE/REVIEW DRAFT SITE =>	222007	ISSUE DRAFT SITE MGMT PLAN	=> 222008	FS	0	NAVY REVIEW AND COMMENT
2007	FS	0	ISSUE DRAFT SITE MGMT P =>	222008	NAVY REVIEW AND COMMENT	=> 222009	FS	0	WRITE/REVIEW FINAL SITE
22008	FS	0	NAVY REVIEW AND COMMENT =>	222009	WRITE/REVIEW FINAL SITE MGMT P	=> 222010	FS	0	ISSUE FINAL SMP TO NAVY
22009	FS	0	WRITE/REVIEW FINAL SITE =>	222010	ISSUE FINAL SMP TO NAVY	=> 990001	FS	0	CTO CLOSEOUT
0004	FS	0	NAVY REVIEW AND APPROVA =>	230001	ADMIN RECORD - COLLECT FROM AG	=> 230002	FS	0	REVIEW,EDIT ADMINISTRAT
230001	FS	0	ADMIN RECORD - COLLECT =>	230002	REVIEW,EDIT ADMINISTRATIVE REC	=> 230003	FS	0	DRAFT ADMIN RECORD TO N
0002	FS	0	REVIEW,EDIT ADMINISTRAT =>	230003	DRAFT ADMIN RECORD TO NAVY	=> 230004	FS	0	NAVY REVIEW DRAFT ADMIN
230003	FS	0	DRAFT ADMIN RECORD TO N =>	230004	NAVY REVIEW DRAFT ADMIN RECRD	=> 230005	FS	0	INCORPORATE COMMENTS,OR
30004	FS	0	NAVY REVIEW DRAFT ADMIN =>	230005	INCORPORATE COMMENTS,ORGANIZE	=> 230006	FS	0	ISSUE FINAL ADMINISTRAT
	FS	0	INCORPORATE COMMENTS,OR =>	230006	ISSUE FINAL ADMINISTRATIVE REC	=> 990001	FS	0	CTO CLOSEOUT
200008	FS	0	SUBMIT FINAL SUMMARY TO =>	990001	CTO CLOSEOUT	=> *FINISH*			
990001	FF	0	PMO OPERATIONS						
15001	FF	0	MONTHLY REPORTING/MEETI						
210011	FS	0	FINAL TO NAVY						
222010	FS	0	ISSUE FINAL SMP TO NAVY						
30006	FS	0	ISSUE FINAL ADMINISTRAT						

A ITY ENTIFIER	ACTIVITY DESCRIPTION	ORIG DUR	REM DUR	- WORKING - START	- - FINISH	- TREND BASELINE - START	FINISH	VARN.	IMPOSED DATE	- - RESOURCE - - - - TYPE	MH	DOLLARS
000-001	PMO OPERATIONS	120		29NOV89	15MAY90	EMPTY	EMPTY	19704		PM	3	269
										PC	8	544
010-000	CTO RECEIPT	1		29NOV89	29NOV89	EMPTY	EMPTY	19823	Start 29NOV89		0	0
010-001	PREPARE IMPLEMENTATION PLAN	26		30NOV89	04JAN90	EMPTY	EMPTY	19797		IP	60	3136
										PG	40	2980
										IN	5	137
										P4	20	1666
										SP	16	732
										P3	12	706
										EE	12	463
010-002	IP INTERNAL REVIEW & COMMENT	3		05JAN90	09JAN90	EMPTY	EMPTY	19794		P4	4	333
010-003	ISSUE IMPLEMENTATION PLAN TO NAVY	1		10JAN90	10JAN90	EMPTY	EMPTY	19793			0	0
010-004	NAVY REVIEW AND APPROVAL OF IP	15		11JAN90	31JAN90	EMPTY	EMPTY	19778			0	0
015-001	MONTHLY REPORTING/MEETINGS	242		29NOV89	01NOV90	EMPTY	EMPTY	19582		P4	69	5746
										P3	60	3532
										IN	18	493
										OI	36	1575
										SP	30	1373
										AC	12	368
										OD	.0000	4166
										RI	.0000	6682
										C3	.0000	4442
										QI	.0000	270
050-001	FIELD SAMPLING PLAN	43		01FEB90	02APR90	EMPTY	EMPTY	19735		IB	51	4631
										IP	203	10611
										IN	76	2083
050-002	QUALITY ASSURANCE PROJECT PLAN	43		01FEB90	02APR90	EMPTY	EMPTY	19735		IB	5	454
										IP	93	4861
										IN	21	576
050-003	INTERNAL REVIEW/REWRITE FSP/QAPP	8		03APR90	12APR90	EMPTY	EMPTY	19727		IB	8	726
										IP	45	2352
										IN	16	439
										PJ	21	1355
										QA	21	1253
050-004	ADD FSP/QAPP TO RI/FS	3		13APR90	17APR90	EMPTY	EMPTY	19724			0	0
200-001	REVEIW DOCUMENTS @ IT & NON-NAVY	11		01FEB90	15FEB90	EMPTY	EMPTY	19767		IB	6	545
										IP	46	2404
										RI	.0000	50

notes Milestone D Denotes Deliverables A Denotes Navy/Agency Action Required

IL TY ER	ACTIVITY DESCRIPTION	ORIG DUR	REM DUR	- WORKING - - START	FINISH	- TREND BASELINE - START	FINISH	VARN.	IMPOSED DATE	- - RESOURCE - - - - TYPE	MH	DOLLARS
200-002	SITE VISIT,DATA COLLECT,INTERVIEW	7	05FEB90	13FEB90	EMPTY	EMPTY	19769			IP	45	2352
200-003	WRITE SUMMARY REPORT INCL IR JOB TABLE	8	13FEB90	22FEB90	EMPTY	EMPTY	19762			IB	8	726
										IP	40	2091
										IN	10	274
200-004	INTERNAL REVIEW/EDIT OF DRAFT	5	23FEB90	01MAR90	EMPTY	EMPTY	19757			IB	2	182
										IP	6	314
										IN	2	55
										PJ	8	516
200-005	SUBMIT DRAFT SUMMARY TO NAVY	1	02MAR90	02MAR90	EMPTY	EMPTY	19756				0	0
200-006	NAVY COMMENTS	21	05MAR90	02APR90	EMPTY	EMPTY	19735				0	0
200-007	REVISE DRAFT & PREFORM INTERNAL REVIEW	9	03APR90	13APR90	EMPTY	EMPTY	19726			IB	1	91
										IP	4	209
										IN	1	27
200-008	SUBMIT FINAL SUMMARY TO NAVY	1	16APR90	16APR90	EMPTY	EMPTY	19725				0	0
210-001	DEFINE ARARS,INVENTORY MW'S	15	01FEB90	21FEB90	EMPTY	EMPTY	19763			EE	75	2896
										P4	4	333
										P3	19	1119
210-002	REGS REVIEW - NCP,CERCLA,ARARS,NAVY	5	01FEB90	07FEB90	EMPTY	EMPTY	19773			P4	2	167
										P3	6	353
003	PRELIMINARY DRAFT OF RI/FS	48	08FEB90	16APR90	EMPTY	EMPTY	19725			P4	9	749
										P3	174	10244
										T1	9	252
										IY	37	1078
										WP	30	638
										EE	215	8301
210-004	INTERNAL REVIEW/REWRITE PRELIM DRAFT	10	17APR90	30APR90	EMPTY	EMPTY	19715			P3	10	589
										T1	1	28
										EE	62	2394
										IO	96	5234
210-005	SUBMIT PRELIMINARY DRAFT TO NAVY	1	01MAY90	01MAY90	EMPTY	EMPTY	19714				0	0
210-006	NAVY REVIEW OF PRELIMINARY DRAFT	23	02MAY90	01JUN90	EMPTY	EMPTY	19691				0	0
210-007	WRITE/RVW DRAFT RI/FS,FSP,QAPP,HSP,CRP	14	04JUN90	21JUN90	EMPTY	EMPTY	19677			P3	10	589
										T1	1	28
										IY	2	58
										IO	96	5234
										EE	62	2394
										WP	10	213

notes Milestone D Denotes Deliverables A Denotes Navy/Agency Action Required

ACTIVITY NUMBER	ACTIVITY DESCRIPTION	ORIG DUR	REM DUR	WORKING START	WORKING FINISH	TREND BASELINE START	TREND BASELINE FINISH	TREND BASELINE VARN.	IMPOSED DATE	RESOURCE TYPE	RESOURCE MH	RESOURCE DOLLARS
210-008	SUBMIT DRAFT TO NAVY	1		22JUN90	22JUN90	EMPTY	EMPTY	19676			0	0
210-009	NAVY REVIEW DRAFT	20		25JUN90	20JUL90	EMPTY	EMPTY	19656			0	0
210-010	WRT/RVW FINAL RI/FS,FSP/QAPP/HSP/CRP/PRA	14		23JUL90	09AUG90	EMPTY	EMPTY	19642		P3	3	177
										IY	1	29
										IO	27	1472
										EE	46	1776
										WP	8	170
210-011	FINAL TO NAVY	1		10AUG90	10AUG90	EMPTY	EMPTY	19641			0	0
220-001	RI/FS HEALTH & SAFETY PLAN	29		22FEB90	03APR90	EMPTY	EMPTY	19734		IB	11	999
										IJ	55	3528
										IN	17	466
										IO	14	763
220-002	REVIEW/REWRITE HEALTH & SAFETY PLAN	10		04APR90	17APR90	EMPTY	EMPTY	19724		IB	3	272
										IJ	11	706
										IN	6	164
										PJ	3	194
										EE	17	656
221-001	RI/FS COMMUNITY RELATIONS PLAN	39		01FEB90	27MAR90	EMPTY	EMPTY	19739		IB	4	363
										IP	8	418
										IN	3	82
										SS	.0000	1500
										IK	3	198
-002	REVIEW/REWRITE CRP	15		28MAR90	17APR90	EMPTY	EMPTY	19724		IB	2	182
										IP	4	209
										IN	1	27
										PJ	1	65
										EE	2	77
222-001	RI/FS SITE MANAGEMENT PLAN	34		01FEB90	20MAR90	EMPTY	EMPTY	19744		P4	3	250
										P3	19	1119
										T1	6	168
222-002	CPM SCHEDULE WITH GANTT CHARTS	3		21MAR90	23MAR90	EMPTY	EMPTY	19741		P4	13	1083
										P3	58	3415
										T1	5	140
										SP	38	1740
222-003	REVIEW/REWRITE SITE MANAGEMENT PLAN	5		26MAR90	30MAR90	EMPTY	EMPTY	19736		P4	3	250
										P3	13	765
										T1	3	84
										SP	13	595
										PJ	2	129
										EE	13	502

M Denotes Milestone D Denotes Deliverables A Denotes Navy/Agency Action Required

ACTIVITY IDENTIFIER	ACTIVITY DESCRIPTION	ORIG DUR	REM DUR	WORKING START	WORKING FINISH	TREND BASELINE START	TREND BASELINE FINISH	TREND BASELINE VARN.	IMPOSED DATE	RESOURCE TYPE	RESOURCE MH	RESOURCE DOLLARS
222-004	ISSUE PRELIM DRAFT SITE MGMT PLAN	1		02APR90	02APR90	EMPTY	EMPTY	19735			0	0
222-005	NAVY REVIEW AND COMMENT	21		03APR90	01MAY90	EMPTY	EMPTY	19714			0	0
222-006	WRITE/REVIEW DRAFT SITE MGMT PLAN	13		02MAY90	18MAY90	EMPTY	EMPTY	19701		P4	3	250
										P3	13	765
										T1	3	84
										SP	13	595
										EE	3	116
222-007	ISSUE DRAFT SITE MGMT PLAN	1		21MAY90	21MAY90	EMPTY	EMPTY	19700			0	0
222-008	NAVY REVIEW AND COMMENT	19		22MAY90	15JUN90	EMPTY	EMPTY	19681			0	0
222-009	WRITE/REVIEW FINAL SITE MGMT PLAN	14		18JUN90	05JUL90	EMPTY	EMPTY	19667		P4	3	250
										P3	13	765
										T1	3	84
										EE	3	116
										SP	13	595
222-010	ISSUE FINAL SMP TO NAVY	1		06JUL90	06JUL90	EMPTY	EMPTY	19666			0	0
230-001	ADMIN RECORD - COLLECT FROM AGENCIES	5		01FEB90	07FEB90	EMPTY	EMPTY	19773		P4	8	666
										P3	24	1413
										QI	.0000	531
002	REVIEW,EDIT ADMINISTRATIVE RECORD	58		08FEB90	30APR90	EMPTY	EMPTY	19715		P4	10	833
										P3	80	4710
										T1	20	560
										PJ	2	129
										EE	6	232
230-003	DRAFT ADMIN RECORD TO NAVY	1		01MAY90	01MAY90	EMPTY	EMPTY	19714			0	0
230-004	NAVY REVIEW DRAFT ADMIN RECRD	23		02MAY90	01JUN90	EMPTY	EMPTY	19691			0	0
230-005	INCORPORATE COMMENTS,ORGANIZE FINAL AR	20		04JUN90	29JUN90	EMPTY	EMPTY	19671		P4	8	666
										P3	55	3238
										T1	56	1567
										PJ	1	65
										EE	4	154
230-006	ISSUE FINAL ADMINISTRATIVE RECORD	1		02JUL90	02JUL90	EMPTY	EMPTY	19670			0	0
990-001	CTO CLOSEOUT	60		13AUG90	02NOV90	EMPTY	EMPTY	19581		PM	2	179
										PC	2	136
										SP	4	183
										CA	2	110
										IB	3	272
										IN	2	55
										OI	2	88

notes Milestone D Denotes Deliverables A Denotes Navy/Agency Action Required

LEGEND FOR WORK PACKAGE SCHEDULE

RESOURCE TYPE	DESCRIPTION
AC	ACCOUNTING
C3	CH OTHER DIRECT COST
CA	CONTRACT ADMINISTRATION
EE	ENVIRONMENTAL ENGINEERING
IB	IT - MANAGER OF PROJECTS
IJ	IT - SAFETY
IK	IT - CONTRACT ADMINISTRATION
IN	IT - WORD PROCESSOR
IO	IT - SPEC WRITER
IP	IT - GEOLOGIST
IY	IT - PROJECT DRAFTING
OD	OTHER DIRECT COSTS
0I	IT - ACCOUNTING
P3	CH PROFESSIONAL LEVEL 3
P4	CH PROFESSIONAL LEVEL 4
PC	PROJECT CONTROLS
PG	IT - PROJECT MANAGER
PJ	PROJECT MANAGER
PM	PROGRAM MANAGER
QA	QUALITY ASSURANCE
QI	IT - TRAVEL
RI	IT - ODC'S
SP	COST/SCHEDULING/PLANNING
SS	SPECIALTY SUBCONTRACTOR
T1	CH TECHNICIAN LEVEL 1
WP	WORD PROCESSOR

Record#	RESCODE	RESDESC	UNIT	UNITCOST	THRESHOLD	RE
1	AC	ACCOUNTING	MANHOURS	30.6310		
48	AI	IT - CIVIL ENGINEERING	MANHOURS	60.8900		
49	BI	IT - CIVIL DESIGN	MANHOURS	47.0000		
2	BS	BUSINESS SYSTEMS - MIS	MANHOURS	26.0270		
3	CA	CONTRACT ADMINISTRATION	MANHOURS	55.1170		
4	CE	CIVIL ENGINEERING	MANHOURS	42.3330		
5	CH	CHEMIST	MANHOURS	32.4100		
50	CI	IT - CIVIL DRAFTING	MANHOURS	29.1300		
6	CM	CH2 M HILL	MANHOURS	90.8700		
7	DC	DOCUMENT CONTROL	MANHOURS	20.4510		
51	DI	IT - STRUCTURAL ENGINEERING	MANHOURS	60.8900		
8	EE	ENVIRONMENTAL ENGINEERING	MANHOURS	38.6090		
52	EI	IT - STRUCTURAL DESIGN	MANHOURS	47.0000		
53	FI	IT - STURCTURAL DRAFTING	MANHOURS	29.1300		
68	GE	GEOLOGIST	MANHOURS	33.6020		
9	GH	GEOTECHNICAL/HYDROLOGY	MANHOURS	60.6740		
54	GI	IT - ELECTRICAL ENGINEERING	MANHOURS	65.6600		
55	HI	IT - ELECTRICAL DESIGN	MANHOURS	57.8000		
10	HS	HEALTH & SAFETY	MANHOURS	51.7970		
69	HY	HYDROLOGIST	MANHOURS	35.2890		
21	IA	IT - MGR OF ENGR OPERATIONS	MANHOURS	99.1700		
22	IB	IT - MANAGER OF PROJECTS	MANHOURS	90.8100		
24	IC	IT - SCHEDULING/PLANNING	MANHOURS	65.4000		
25	ID	IT - ESTIMATING	MANHOURS	64.1400		
26	IE	IT - COST ENGINEERING	MANHOURS	69.0900		
27	IF	IT - COST ANALYST	MANHOURS	54.5200		
28	IG	IT - PURCHASING	MANHOURS	50.3800		
29	IH	IT - EXPEDITING	MANHOURS	50.3800		
30	II	IT - DOCUMENT CONTROL	MANHOURS	42.4200		
31	IJ	IT - SAFETY	MANHOURS	64.1400		
32	IK	IT - CONTRACT ADMINISTRATION	MANHOURS	66.0000		
33	IL	IT - PUBLIC INFORMATION	MANHOURS	48.4700		
34	IM	IT - PROJECT SERV SECRETARY	MANHOURS	27.4052		
35	IN	IT - WORD PROCESSOR	MANHOURS	27.4100		
36	IO	IT - SPEC WRITER	MANHOURS	54.5200		
37	IP	IT - GEOLOGIST	MANHOURS	52.2700		
38	IQ	IT - HYDROLOGIST	MANHOURS	52.2700		
39	IR	IT - GEO-HYDROLOGIST	MANHOURS	52.2700		
40	IS	IT - HYDROGEOLOGIST	MANHOURS	52.2700		
41	IT	IT - CHEMIST	MANHOURS	52.2700		
42	IU	IT - BIOLOGIST	MANHOURS	52.2700		
43	IV	IT - CHEMICAL ENGINEER	MANHOURS	52.2700		
44	IW	IT - PROJECT ENGINEERING	MANHOURS	52.2700		
45	IX	IT - PROJECT DESIGN	MANHOURS	52.2700		
46	IY	IT - PROJECT DRAFTING	MANHOURS	29.1300		
47	IZ	IT - PROCESS ENGINEERING	MANHOURS	52.2700		
56	JI	IT - CAD DRAFTING	MANHOURS	24.9700		
57	KI	IT - MECHANICAL ENGINEERING	MANHOURS	67.0700		
58	LI	IT - MECHANICAL DESIGN	MANHOURS	53.5004		
59	MI	IT - MECHANICAL DRAFTING	MANHOURS	29.0600		
60	NI	IT - GRAPHICS	MANHOURS	26.2800		
19	OD	OTHER DIRECT COSTS	DOLLARS	1.0000		
61	OI	IT - ACCOUNTING	MANHOURS	43.7500		
11	PC	PROJECT CONTROLS	MANHOURS	68.0480		
23	PG	IT - PROJECT MANAGER	MANHOURS	74.5100		
62	PI	IT - BUSINESS SYSTEMS ANALYST	MANHOURS	37.1800		
12	PJ	PROJECT MANAGER	MANHOURS	64.5080		
13	PM	PROGRAM MANAGER	MANHOURS	89.6540		

14	QA	QUALITY ASSURANCE	MANHOURS	59.6660
63	QI	IT - TRAVEL	DOLLARS	1.0000
20	RE	RELOCATION	DOLLARS	1.0000
64	RI	IT - ODC'S	DOLLARS	1.0000
15	SA	SUBCONTRACT ADMINISTRATION	MANHOURS	42.2230
16	SC	SECRETERIAL/CLERICAL	MANHOURS	22.7990
65	SI	IT - NON-LAB SUBCONTRACTS	DOLLARS	1.0000
17	SP	COST/SCHEDULING/PLANNIING	MANHOURS	45.7810
72	SS	SPECIALTY SUBCONTRACTS	DOLLARS	1.0000
66	TI	IT - LAB SUBCONTRACTS	DOLLARS	1.0000
70	TP	IT - TECH PLAN/QUALITY CONTROL	MANHOURS	92.3700
18	TV	TRAVEL	DOLLARS	1.0000
67	TW	TECHNICAL WRITER	MANHOURS	28.6703
71	WP	WORD PROCESSOR	MANHOURS	21.2764

APPENDIX B

SCHEDULE A

SUMMARY OF COSTS BY TASK

CTO# 0018 RI/FS WORK PLAN - MCAS EL TORO ,CA

ACTIVITY NUMBER	TASK NAME	TASK MANHOURS	TASK DOLLARS	
000	PMO OPERATIONS	11	$ 895	
010	IMPLEMENTATION PLAN	169	$ 12,139	11,267
015	MONTHLY REPORTING,MEETINGS	225	$ 34,992	~6,400
050	SAMPLING AND ANALYSIS PLAN	560	$ 35,241	
200	RECORD REVIEW	179	$ 11,793	
210	RI/FS WORK PLAN	1,015	$ 54,155	
220	RI/FS HEALTH & SAFETY PLAN	137	$ 9,288	
221	RI/FS COMMUNITY RELATIONS PLAN	53	$ 3,598	
222	RI/FS SITE MANAGEMENT PLAN	259	$ 16,229	
230	RI/FS ADMINISTRATIVE RECORD	274	$ 17,680	
990	CTO CLOSE OUT	17	$ 1,172	
	TOTALS	2,899	$ 197,183	

NAVY CLEAN PROJECT
JACOBS ENGINEERING GROUP INC.
CONTRACT NO. N68711-89-D-9296
CONTRACT TASK ORDER: 0018
RI/FS WORK PLAN - MCAS EL TORO ,CA

SCHEDULE B
JACOBS ENGINEERING COSTS
-->TOTAL COSTS<--

PMO	CONTRACT RATE CATEGORY	RES CODE	FUNCTIONAL CATEGORY	TOTAL HOURS	RATE	TOTAL COST
	PROGRAM MANAGER	PM	PMO	5	48.8810	244
	CONTRACTS ADMIN MANAGER	CA	PMO	2	30.0510	60
	PROJECT CONTROLS MANAGER	PC	PMO	10	37.1010	371
	SUBTOTAL PMO			17	$	675
LEAD TECHNICAL						
	PROJECT MANAGER	PJ		38	35.1700	1,336
	ACCOUNTING	AC	ACCOUNTING	12	16.7030	200
	ENVIRONMENTAL ENGINEER	EE	ENVIRONMENTAL ENGINEER	520	21.0500	10,946
	QUALITY ASSURANCE MANAGER	QA	QUALITY ASSURANCE MANAGER	21	32.5325	683
	SCHEDULING/PLANNING	SP	SCHEDULING/PLANNING	127	24.9625	3,170
	WORD PROCESSOR	WP	WORD PROCESSOR	48	11.6000	557
	SUBTOTAL CTO			766	$	16,892
	TOTAL JEG LABOR			783	$	17,567
	JEG FRINGE BENEFITS 27				$	4,747
	JEG G & A 44				$	9,907
	SPECIALTY SUBCONTRACTOR (EXHIBIT 1-SCH B)				$	1,500
	ODC COST (EXHIBIT 2-SCH B)				$	4,166
	TRAVEL COST (EXHIBIT 3-SCH B) NON FEE BEARING				$	0
	TOTAL JEG COST CONTRACT TASK ORDER: 0018			783	$	37,886
	SUMMARY OF TOTAL COSTS:					
	TOTAL JEG COST (SCHEDULE B)			783	$	37,886
	TOTAL IT COST (SCHEDULE C)			1,256	$	82,141
	TOTAL CH2MHILL COST (SCHEDULE D)			835	$	59,306
	AWARD FEE			N/A	$	17,853
	TOTAL COSTS: RI/FS WORK PLAN - MCAS EL TORO ,CA			2,874	$	197,187

JACOBS ENGINEERING GROUP, INC.
EXHIBIT 1 TO SCHEDULE B
SPECIALTY SUB-CONTRACTORS
CTO# 0018 RI/FS WORK PLAN - MCAS EL TORO ,CA

GRISBY GRAVES COMM. RELATIONS	$ 1,500
TOTAL COST	$ 1,500

JACOBS ENGINEERING GROUP, INC.
EXHIBIT 2 TO SCHEDULE B
OTHER DIRECT COSTS
CTO# 0018 RI/FS WORK PLAN - MCAS EL TORO ,CA

REPRODUCTION	783 HOURS	@ $	1.96/hour	$ 1,535
MAINFRAME COMPUTER	783 HOURS	@ $	0.99/hour	$ 775
TELEPHONE / COMMUNICATIONS	783 HOURS	@ $	1.18/hour	$ 924
POSTAGE / FREIGHT	783 HOURS	@ $	1.19/hour	$ 932
TOTAL ODC'S				$ 4,166

JACOBS ENGINEERING GROUP, INC.
EXHIBIT 3 TO SCHEDULE B
TRAVEL EXPENSES
CTO# 0018 RI/FS WORK PLAN - MCAS EL TORO ,CA

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0 TRIP(S) FROM: TO:
0 PERSON(S) DATE: DURATION:
ID#: 010001 PURPOSE:

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0 AIRFARE	@	$ 0/Each	$	0
0 DAYS CAR RENTAL	@	$ 0/Day	$	0
0 DAYS HOTEL	@	$ 0/Day	$	0
0 DAYS PER DIEM	@	$ 0/Day	$	0
0 MILES	@	$ 0.00/Mile	$	0
TOTAL TRIP			$	0

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0 TRIP(S) FROM: TO:
0 PERSON(S) DATE: DURATION:
ID#: 210004 PURPOSE:

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0 AIRFARE	@	$ 0/Each	$	0
0 DAYS CAR RENTAL	@	$ 0/Day	$	0
0 DAYS HOTEL	@	$ 0/Day	$	0
0 DAYS PER DIEM	@	$ 0/Day	$	0
0 MILES	@	$ 0.00/Mile	$	0
TOTAL TRIP			$	0

TOTAL TRAVEL COSTS FOR JACOBS ENGINEERING GROUP, INC. $ 0
CTO# 0018 RI/FS WORK PLAN - MCAS EL TORO ,CA

NAVY CLEAN PROJECT
JACOBS ENGINEERING GROUP INC.
CONTRACT NO. N68711-89-D-9296
CONTRACT TASK ORDER: 0018
RI/FS WORK PLAN - MCAS EL TORO ,CA

SCHEDULE C
-->INTERNATIONAL TECHNOLOGY CORP.<--

PMO	CONTRACT RATE CATEGORY	RES CODE	FUNCTIONAL CATEGORY	TOTAL HOURS	RATE	TOTAL COST
	MANAGER OF TECH PLANNING/ QC	TP	PMO	0	35.0600	0
	SUBTOTAL PMO			0	$	0
LEAD TECHNICAL						
	MANAGER OF PROJECTS	IB		104	34.6600	3,605
	SAFETY	IJ	SAFETY	66	24.4800	1,616
	CONTRACT ADMINISTRATION	IK	CONTRACT ADMINISTRATION	3	25.1900	76
	WORD PROCESSOR	IN	WORD PROCESSOR	178	10.4600	1,862
	SPEC WRITER	IO	SPEC WRITER	233	20.8100	4,849
	GEOLOGIST	IP	GEOLOGIST	554	19.9500	11,052
	PROJECT DRAFTING	IY	PROJECT DRAFTING	40	11.1200	445
	ACCOUNTING	OI	ACCOUNTING	38	16.7000	635
	PROJECT MANAGER	PG	PROJECT MANAGER	40	28.4400	1,138
	SUBTOTAL CTO			1,256	$	25,278
	TOTAL IT CORP. LABOR			1,256	$	25,278
	PMO OVERHEAD @ 112%				$	0
	CTO OVERHEAD @ 130%				$	32,861
	SUBTOTAL IT LABOR/OVERHEAD			1,256	$	58,139
	SPECIALTY SUBCONTRACTOR (EXHIBIT 1-SCH C)				$	0
	ODC COST (EXHIBIT 2-SCH C)				$	6,682
	TRAVEL COST (EXHIBIT 3-SCH C) NON FEE BEARING				$	801
	SUBTOTAL DIRECT COSTS				$	65,622
	G & A @ 12.95%				$	8,498
	SUBTOTAL IT DIRECT/G&A COST				$	74,120
	AWARD FEE (10%)				$	7,332
	FCCOM(OH) @ .02233				$	564
	FCCOM(G&A) @ .0019				$	125
	TOTAL COSTS:					
	RI/FS WORK PLAN - MCAS EL TORO ,CA				$	82,141

INTERNATIONAL TECHNOLOGY CORP.
EXHIBIT 2 TO SCHEDULE C
OTHER DIRECT COSTS
CTO# 0018 RI/FS WORK PLAN - MCAS EL TORO ,CA

REPRODUCTION	1,256 HOURS	@	$ 1.96/hour	$ 2,462
MAINFRAME COMPUTER	1,256 HOURS	@	$ 0.99/hour	$ 1,243
TELEPHONE / COMMUNICATIONS	1,256 HOURS	@	$ 1.18/hour	$ 1,482
POSTAGE / FREIGHT	1,256 HOURS	@	$ 1.19/hour	$ 1,495
TOTAL ODC'S				$ 6,682

INTERNATIONAL TECHNOLOGY CORP.
EXHIBIT 3 TO SCHEDULE C
TRAVEL EXPENSES
CTO# 0018 RI/FS WORK PLAN - MCAS EL TORO ,CA

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6 TRIP(S) FROM: IRVINE,CA TO: SAN DIEGO,CA
1 PERSON(S) DATE: TBD DURATION: 1
ID#: 015001 PURPOSE: MONTHLY PROGRESS MEETING

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0 AIRFARE	@	$ 0/Each	$	0
6 DAYS CAR RENTAL	@	$ 45/Day	$	270
0 DAYS HOTEL	@	$ 0/Day	$	0
0 DAYS PER DIEM	@	$ 0/Day	$	0
0 MILES	@	$ 0.00/Mile	$	0
TOTAL TRIP			$	270

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1 TRIP(S) FROM: IRVINE ,CA TO: SAN FRANCISCO ,CA
1 PERSON(S) DATE: TBD DURATION: 2
ID#: 230001 PURPOSE: COLLECT EXISTING EPA DOCUMENTS

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1 AIRFARE	@	$ 306/Each	$	306
2 DAYS CAR RENTAL	@	$ 45/Day	$	90
1 DAYS HOTEL	@	$ 67/Day	$	67
2 DAYS PER DIEM	@	$ 34/Day	$	68
0 MILES	@	$ 0.00/Mile	$	0
TOTAL TRIP			$	531

TOTAL TRAVEL COSTS FOR INTERNATIONAL TECHNOLOGY CORP. $ 801
CTO# 0018 RI/FS WORK PLAN - MCAS EL TORO ,CA

NAVY CLEAN PROJECT
JACOBS ENGINEERING GROUP INC.
CONTRACT NO. N68711-89-D-9296
CONTRACT TASK ORDER: 0018
RI/FS WORK PLAN - MCAS EL TORO ,CA

SCHEDULE D
-->CH2MHILL<--

LEAD TECHNICAL	CONTRACT RATE CATEGORY	RES CODE	FUNCTIONAL CATEGORY	TOTAL HOURS	RATE	TOTAL COST
ED ROGAN	PROFESSIONAL 4	P4	PROJECT MANAGER	159	30.9400	4,919
	PROFESSIONAL 3	P3	PROFESSIONAL 3	569	21.9700	12,501
	TECHNITION 1	T1	TECHNITION 1	107	10.3600	1,109
	SUBTOTAL TECHNICAL			835		$ 18,529
	TOTAL CH2MHILL LABOR			835		$ 18,529
	COMPOSITE INDIRECT RATE @ 167%					$ 30,943
	SPECIALTY SUBCONTRACTOR (EXHIBIT 1-SCH D)					$ 0
	ODC COST (EXHIBIT 2-SCH D)					$ 4,442
	TRAVEL COST (EXHIBIT 3-SCH D) NON FEE BEARING					$ 0
	FIXED FEE @ 3%					$ 1,617
	AWARD FEE @ 7%					$ 3,774
	TOTAL COSTS:					
	RI/FS WORK PLAN - MCAS EL TORO ,CA					$ 59,306

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EXHIBIT 2 TO SCHEDULE D

OTHER DIRECT COSTS

CTO# 0018 RI/FS WORK PLAN - MCAS EL TORO ,CA

REPRODUCTION	835 HOURS	@ $	1.96/hour	$ 1,637
MAINFRAME COMPUTER	835 HOURS	@ $	0.99/hour	$ 827
TELEPHONE / COMMUNICATIONS	835 HOURS	@ $	1.18/hour	$ 985
POSTAGE / FREIGHT	835 HOURS	@ $	1.19/hour	$ 994
TOTAL ODC'S				$ 4,442

APPENDIX C

WASTE MANAGEMENT AND INDUSTRIAL PROCESS

TECH TRANSFER TOPICS

CH2MHILL

Author: David Lincoln/SEA Editor: Greg Peterson/CVO December 1, 1989

Observational Method in Site Investigation and Remediation

Uncertainty is a major technical and societal issue for hazardous waste site investigation and remediation, beginning with site characterization. From a technical perspective, the subsurface environment presents very substantial uncertainty. It is a heterogeneous, complex environment in which small subsurface features or changes in geologic conditions can have substantial impacts on water and chemical movement. Major uncertainties also plague source characterization, assessment of chemical fate and transport in the environment, assessment of exposure risks and health effects, and remedial action performance.

Taken together, these factors make uncertainty an inherent feature of hazardous waste sites. The consequences of this uncertainty for the traditional engineering paradigm of study, design, build should be considered early in site remediation. For example:

- It is generally assumed that more study will reduce uncertainty. But it has not been fully recognized to date that the marginal value of further study at hazardous waste sites declines rapidly. At some point, more study does not lead to better information.
- The implicit goal has been to design the "ultimate remedy" that can be "walked away from" following construction. But it will not be possible in most cases to walk away from a waste site. No matter what the chosen alternative, continued monitoring will be required.

Origins of the Observational Method

Karl Terzaghi, a soil mechanics engineer, first developed systematic procedures for engineering under conditions of uncertainty. He called these procedures the "observational," "experimental," or "learn-as-you-go" method. Geotechnical engineers have used the observational method for many years to work with the physical uncertainties in soils and foundations problems.

R.B. Peck summarized the key elements in the practice of the observational method:

a. Exploration sufficient to establish at least the general nature, pattern, and properties of the deposits, but not necessarily in detail.

b. Assessment of the most probable conditions and the most unfavorable conceivable deviations from these conditions.

c. Establishment of the design based on a working hypothesis of behavior anticipated under the most probable conditions.

d. Selection of quantities to be observed as construction proceeds and calculation of their anticipated values on the basis of the working hypothesis.

e. Calculation of values of the same quantities under the most unfavorable conditions compatible with the available data concerning the subsurface conditions.

f. Selection in advance of a course of action or modification of design for every foreseeable significant deviation of the observational findings from those predicated on the basis of the working hypothesis.

g. Measurement of quantities to be observed and evaluation of actual conditions.

h. Modification of design to suit actual conditions.

The observational method is not applicable if a design cannot be altered during construction. It also should not be applied if the monitoring and response to one of the potential deviations costs more than a more conservative design.

The nature and complexity of the work will determine the degree to which all of these elements are included. Some engineering projects have been initiated with the observational method, and it has been used on others as the only way out of a current situation (e.g., construction has started and some unexpected event has occurred).

Failures of the Observational Method

Failures of the observational method can occur under several conditions. Each condition is discussed below.

Failure to anticipate unfavorable conditions. This failure will leave a project without a course of action identified in advance, and there may be no available response to the current situation. A corollary of this is that the observational method should not be started if a contingency plan cannot be identified for all potential and significant deviations.

Failure to choose and interpret the correct quantities to observe. If the measured quantity does not address what is of real concern, then it may fail to give appropriate warnings. The results of the observations must also be reliable. (Peck explicitly suggests that whoever plans the monitoring program should have substantial field experience.) The field results must be examined promptly, and the field team should not feel compelled to wait for a fully documented report to be prepared. The results must be

presented in a thoughtful manner, reflecting on potentially significant events, not just filling in a table.

Failure to consider the influence of progressive failure. Progressive failures may be relatively small and undetected until something snaps and a massive failure occurs.

Incorporating the Observational Method

The observational method fundamentally recognizes that uncertainty is present and uses a structured approach to determine the appropriateness of the design as it is being implemented. It requires planning for potential unfavorable conditions and potential design modifications.

Figure 1 outlines the issues that need to be added to the traditional waste site investigation and remediation process to incorporate the observational method. It is important to understand, however, that there is no "cookbook method" for the application.

The observational method offers distinct benefits in the timely and effective implementation of waste site remediation in the presence of substantial uncertainty. The key contributions, through the method's explicit recognition of uncertainty, are:

- Remedial design based on most probable site conditions
- Identification of reasonable deviations from those conditions
- Identification of parameters to observe to detect deviations during remediation
- Preparation of contingency plans for each deviation. The observational method offers the potential, on a case-by-case basis, to reduce time and cost, as well as to decrease the risks associated with remediation.

Several CH2M HILL papers and projects have included the observational method. Our process is evolving with each application, and additional internal contacts for the method are being developed.

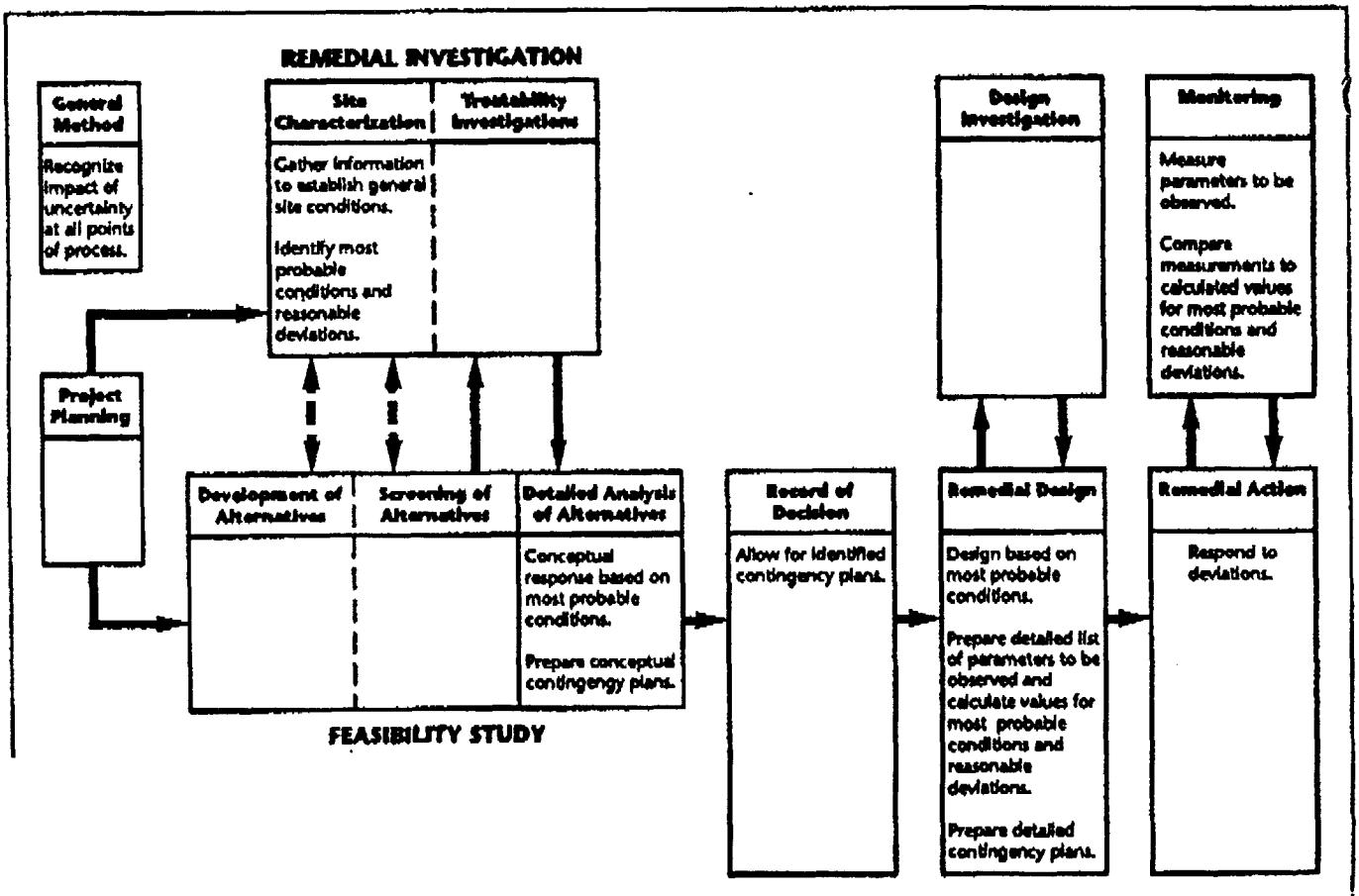

Figure 1
Issues Added to the Investigation and Remediation Process to Implement the Observational Method