



# Ames Procedural Requirements

APR 8800.3

New Chapter

**COMPLIANCE IS MANDATORY**

---

## Chapter 27 - Restoration

### Table of Contents

**27.1 Applicability****27.2 Purpose****27.3 Policy****27.4 Authority**

27.4.1 Federal

27.4.2 State

27.4.3 Santa Clara Valley Water District

**27.5 Responsibilities**

27.5.1 Environmental Services Office, Code QE

27.5.2 Facilities Engineering Branch, Code PFE

27.5.3 Line Management, Cotrs, Resident Agencies, And Nrp Partners

27.5.4 Plant Engineering (Code PFP)

27.5.5 Code DL

**27.6 Definitions****27.7 Restoration Program****27.8 Sources of Additional Information or Assistance****27.9 Appendicies**

27.9.1 Appendix A: Map of Areas of Investigation

27.9.2 Appendix B: Format for Removal Action Work Plan (RAW)

27.9.3 Appendix C: Map of Areas of Responsibilities for the Regional Groundwater Remediation Program (RGRP)

---

### 27.1 Applicability

This requirement is applicable to all civil servants, contractor employees, resident agency personnel, and NASA Research Park partners at Ames Research Center and Crows Landing Flight Facility.

[\[Back to Table of Contents\]](#)

### 27.2 Purpose

The purpose of the restoration program is to reduce the risk to human health and the environment from releases of hazardous substance contamination to soil and groundwater resulting from NASA activities at Ames Research Center.

[\[Back to Table of Contents\]](#)

### 27.3 Policy

It is the policy of the Ames Research Center to:

1. Comply with all pertinent statutory and regulatory requirements and Executive Orders related to the investigation and remediation of soil and groundwater contamination.
2. Consult about the best techniques and methods to conduct investigations and remedial actions, as appropriate, with Federal, state, and local agencies, including:

- a. U.S Environmental Protection Agency (EPA)
  - b. California Department of Toxic Substances Control (DTSC)
  - c. California State Water Resources Control Board (SWRCB)
  - d. Regional Water Quality Control Board, Regions 2 and 5 (RWQCB)
  - e. Bay Area Air Quality Management Department (BAAQMD)
  - f. Santa Clara Valley Water District (SCVWD)
3. Promote employee awareness of the contaminated soil and groundwater locations on the site.

[\[Back to Table of Contents\]](#)

## 27.4 AUTHORITY

### 27.4.1 Federal

- Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 USC § 9601 - 9675
- Superfund Amendments and Reauthorization Act (SARA), Public Law 99-499
- National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR 300
- Resource Conservation and Recovery Act (RCRA), 42 USC § 6901 - 6992k
- Endangered Species Act, 16 USC § 1531 - 1544 or 50 CFR 402
- Clean Water Act, 33 USC et seq.
- Clean Air Act, 42 USC § 7401 - 7671q
- National Environmental Policy Act, 42 USC § 4321 - 4370e
- Native American Graves Protection and Repatriation Act, 25 USC § 3001 - 3013
- Executive Orders
  - EO 12088, "Federal Compliance with Pollution Control Standards"
  - EO 12580, "Superfund Implementation"
  - EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations:"
  - EO 13016, "Amendment to EO 12580 Concerning Exercise of Authority Under CERCLA S 106"
  - EO 13148, "Greening the Government Through Leadership in Environmental Management"
- NASA Procedural Requirements (NPR) 8850.1, Environmental Investigation and Remediation - Potentially Responsible Party Identification and Analysis

[\[Back to Table of Contents\]](#)

### • 27.4.2 State

- California Health and Safety Code (HSC)
  - § 25187: gives DTSC authority to order remedial/corrective actions and levy penalties
  - § 25198: requirements for handling and testing of samples and data
  - § 25200.1: requires DTSC or unified program agency to require corrective actions for all releases from a solid waste management unit or hazardous waste management unit
  - § 25355.5: allows DTSC to enter into agreements to provide oversight services
  - § 25356: gives DTSC the authority to require response actions or corrective actions for hazardous substance/hazardous waste releases
  - Chapter 6.8 commencing with § 23500 - defines releases of contamination to the environment
- Water Code, § 13300 - 13308: gives water board the authority to require response actions or corrective actions for hazardous substance/hazardous waste releases
- California Code of Regulations (CCR)
  - Title 8, § 5192: Preparation of Health and Safety Plan
  - Title 22, Division 4: Environmental Health

- Title 23: Waters
- EO-95-006-PP: Voluntary Cleanup Program
- BAAQMD
  - Regulation 8
- Rule 40 - Aeration of Contaminated Soils and the Removal of Underground Storage Tanks
- Rule 47 - Air Stripping and Soil Vapor Extraction Operations
- State Well Standards
  - Department of Water Resources Bulletin 74-81
  - Department of Water Resources Bulletin 74-90

[\[Back to Table of Contents\]](#)

### **27.4.3 Santa Clara Valley Water District**

- Well construction permits
- Well destruction permits

[\[Back to Table of Contents\]](#)

## **27.5 Responsibilities**

### **27.5.1 Environmental Services Office, Code QE**

1. Manage and direct NASA's environmental restoration program
  - a. Maintain IDEAL cost estimating database
  - b. Request funding for restoration work
  - c. Prepare and maintain a schedule of all restoration projects and due dates for deliverables
  - d. Direct field work in coordination with restorations contractors
  - e. Review and distribute deliverables for restoration work
  - f. Maintain administrative record and information repository
  - g. Operation and maintenance of remedial systems
  - h. Respond to releases of hazardous substances to the soil and groundwater for both Ames and NRP activities
    - i. Provide advice and direction to line management, resident agencies, and NASA Research Park (NRP) partners on the best method to address contamination from releases
    - j. Coordinate the removal and disposal of contaminated soil and groundwater
    - k. Direct the preparation of required deliverables for restoration of spill sites
    - l. Establish requirements and review plans and specifications for remedial/removal designs and actions
  - m. Coordinate with regulatory agencies to obtain site closure
  - n. Review construction and development of projects that may have an impact to remediation of soil and groundwater
  - o. Sample, review, and approve import of soils or reuse of soils from construction activities.
  - p. Consult with other QE personnel concerning impacts to other environmental disciplines
  - q. Prepare Environmental Baseline Studies and FOST/FOSL for transfer or lease of property
2. Serve as technical point of contact with:
  - a. Regulatory agencies
  - b. Navy
  - c. Ames Research Center organizations
  - d. Resident Agencies
  - e. NASA Research Park Partners

- f. MEW Companies
  - g. Public
3. Oversee the Navy's environmental work on the former Naval Air Station Moffett Field and Naval Auxiliary Landing Field Crows Landing. This includes:
- a. Review and comment on Navy work plans
  - b. Provide oversight for Navy field work
  - c. Review and comment on Navy deliverables
  - d. Attend meetings with the Navy and regulatory agencies
  - e. Coordinate access for Navy personnel to carryout fieldwork and attend meetings.
4. 4. Provide oversight of Middlefield, Ellis, Whisman (MEW) companies activities with the regional plume and work at Ames.

[\[Back to Table of Contents\]](#)

### 27.5.2 Facilities Engineering Branch, Code PFE

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

[\[Back to Table of Contents\]](#)

### 27.5.3 Line Management, COTRs, Resident Agencies, and NPR partners

- [REDACTED]
  - [REDACTED]
  - [REDACTED]
  - [REDACTED]
- [REDACTED]

[\[Back to Table of Contents\]](#)

### 27.5.4 Plant Engineering (Code PFP)

- [REDACTED]
- [REDACTED]
- [REDACTED]

[\[Back to Table of Contents\]](#)

### 27.5.5 Code DL

- [REDACTED]
- [REDACTED]
- [REDACTED]

[\[Back to Table of Contents\]](#)

## 27.6 Definitions

### 27.6.1 Administrative Record

A compilation of information established for all CERCLA sites made available to the public at the start of the Remedial Investigation (RI) for remedial actions, or at the time of Engineering Evaluation/Cost Analysis (EE/CA) for removal actions. Information in the Administrative Record supports the selected remedy for remedial actions and removal actions.

[\[Back to Table of Contents\]](#)

### **27.6.2 CEQA, or the California Environmental Quality Act**

A statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to certain activities of state and local public agencies. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project." A project is an activity undertaken by a public agency or a private activity which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment.

[\[Back to Table of Contents\]](#)

### **27.6.3 CERCLA Comprehensive Environmental Response, Compensation, and Liability Act**

Also known as Superfund. Passed on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA:

- established prohibitions and requirements concerning closed and abandoned hazardous waste sites;
- provided for liability of persons responsible for releases of hazardous waste at these sites; and
- established a trust fund to provide for cleanup when no responsible party could be identified.

[\[Back to Table of Contents\]](#)

### **27.6.4 Contaminated**

A condition of a medium which contains one or more contaminants from an unintentional or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of a hazardous substance, hazardous waste, or pollutant at concentrations which fail to satisfy any applicable remediation standard or is likely to pose an immediate or long-term hazard to human health or the environment. Materials can also be considered contaminated when

- test positive for characteristics of a hazardous waste defined at Title 40 CFR Part 261 Subpart C 261.21-261.24.
- contain a listed waste as per 40 CFR 261 Subpart D 261.31-261.33.
- are a mixture of a solid waste (non-hazardous) and one or more hazardous wastes listed in 40 CFR 261 Subpart D 261.31-261.33.

[\[Back to Table of Contents\]](#)

### **27.6.5 DQOs Data Quality Objectives**

A seven-step planning approach to develop sampling designs for data collection activities that support decision making. This process uses systematic planning and statistical hypothesis testing to differentiate between two or more clearly defined alternatives. The seven steps are (see EPA document EPA/600/R-00/007, January 200):

1. State the problem
2. Identify the decision (identify the project goal(s) and objective(s))
3. Identify the inputs to the decision
4. Define the boundaries of the study
5. Develop a decision rule
6. Specify tolerable limits on decision errors
7. Optimize the design for obtaining the data

[\[Back to Table of Contents\]](#)

### **27.6.6 FOST (Finding of Suitability to Transfer/FOSL (Finding of Suitability to Lease)**

A document that presents the environmental condition of property and associated land/use restrictions, covenants, and warranties required by law, regulation, or guidance to ensure the public and regulators that the property is suitable to lease or transfer

[\[Back to Table of Contents\]](#)

### **27.6.7 Groundwater**

Any water found below the land surface. It is found in aquifers, in the pore spaces of rocks, in unconsolidated sediments, and as soil moisture. Groundwater flows to the surface naturally at springs and seeps and often forms oases or swamps. It may also be tapped artificially by the digging of wells.

[\[Back to Table of Contents\]](#)

### **27.6.8 Hazard Ranking System (HRS)**

The principal mechanism EPA uses to place uncontrolled waste sites on the National Priorities List (NPL). It is a numerically based screening system that uses information from initial, limited investigations -- the preliminary assessment and the site inspection -- to assess the relative potential of sites to pose a threat to human health or the environment.

The HRS uses a structured analysis approach to scoring sites. This approach assigns numerical values to factors that relate to risk based on conditions at the site. The factors are grouped into three categories:

- likelihood that a site has released or has the potential to release hazardous substances into the environment;
  - characteristics of the waste (e.g. toxicity and waste quantity); and
  - people or sensitive environments (targets) affected by the release.
- Four pathways can be scored under the HRS:
- ground water migration (drinking water);
  - surface water migration (drinking water, human food chain, sensitive environments);
  - soil exposure (resident population, nearby population, sensitive environments); and
  - air migration (population, sensitive environments).
- After scores are calculated for one or more pathways, they are combined using a root-mean-square equation to determine the overall site score.

[\[Back to Table of Contents\]](#)

### **27.6.9 Hazardous Material**

As defined in Section 25501 of Chapter 6.95 of the California Health and Safety Code, any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler believes would be injurious to the health and safety of persons or harmful to the environment.

[\[Back to Table of Contents\]](#)

### **27.6.10 Hazardous Waste**

A waste, which because of its quantity, concentration, or physical, chemical or infectious characteristics, or regulatory listing may cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

[\[Back to Table of Contents\]](#)

### **27.6.11 IDEAL - Integrated Data Evaluation and Analysis Library**

A program adopted by NASA to provide a set of tools to estimate the cost of environmental restoration projects. The software uses various cost-to-complete models to provide estimates that are defensible for audits and budget requests.

[\[Back to Table of Contents\]](#)

### **27.6.12 IRP - Installation Restoration Program**

This program was established in 1984 to help identify, investigate, and clean up contamination on Department of Defense (DoD) properties; conducted under the auspices of CERCLA, as amended; the DoD equivalent to the EPA Superfund program.

[\[Back to Table of Contents\]](#)

### **27.6.13 Long-Term Monitoring**

Monitoring which occurs at sites which have hazardous substances, pollutants, or contaminants remaining after removal/remedial

action has been completed or monitoring which confirms that previous site removal/remediation continues to be effective.

[\[Back to Table of Contents\]](#)

#### **27.6.14 NCP - National Contingency Plan**

Provides the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP is detailed in 40 CFR 300.

[\[Back to Table of Contents\]](#)

#### **27.6.15 Non-hazardous**

Any material that does not meet the definition of a hazardous material.

[\[Back to Table of Contents\]](#)

#### **27.6.16 NPDES - National Pollutant Discharge Elimination System**

An enforcement mechanism legislated by the Clean Water Act of 1977. NPDES permits are issued to municipal and industrial dischargers to ensure that pollutant discharges do not result in violation of water quality standards.

[\[Back to Table of Contents\]](#)

#### **27.6.17 NPL - National Priority List**

The list is required under S105(a)(8)(B) of CERCLA. Identification of a site for the NPL is intended primarily to guide EPA in:

- determining which sites warrant further investigation to assess the nature and extent of the human health and environmental risks associated with a site;
- identifying what CERCLA-financed remedial actions may be appropriate;
- notifying the public of sites EPA believes warrants further investigation; and
- serving notice to potentially responsible parties that EPA may initiate CERCLA-financed remedial action.

Sites are listed on the NPL upon completion of Hazardous Ranking System screening with a score of 28.5 or above, public solicitation of comments about the proposed site, and after all comments have been addressed. The NPL is in Appendix B of the NCP.

[\[Back to Table of Contents\]](#)

#### **27.6.18 Plume**

A well-defined, mobile zone of contaminated groundwater containing dissolved contaminants.

[\[Back to Table of Contents\]](#)

#### **27.6.19 RGRP - Regional Groundwater Remediation Program**

This program was developed to address remediation of the regional plume located under Moffett Field. The Program involves the coordination of the MEW companies, the Navy, the regulatory agencies, and NASA in the remediation of the regional plume.

[\[Back to Table of Contents\]](#)

#### **27.6.20 Release**

Defined by CERCLA as any spilling, leaking, pumping, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment. For purposes of the NCP, release also means the threat of release.

[\[Back to Table of Contents\]](#)

#### **27.6.21 Remedial Action**

Involves the construction, operation, and implementation of the final cleanup remedy until confirmatory sampling and analysis indicate that cleanup levels have been reached. The final remedy can include removing waste from a site for off-site treatment or disposal, containing the waste on-site or treating the waste on-site. Long-term RAs require continued monitoring, operation, and maintenance for a number of years.

[\[Back to Table of Contents\]](#)

#### **27.6.22 Removal Action**

An immediate action taken over the short term to address a release or threatened release of hazardous substances. The Comprehensive Environmental Response, Compensation and Liability Act of 1993 (CERCLA) defines three types of Removal Actions:

- emergency removals, where action is required within hours or days;
- time-critical removals, where action may be delayed up to six months; and
- non-time-critical removals, where action may be delayed more than six months.

[\[Back to Table of Contents\]](#)

### **27.6.23 SARA (Superfund Amendments and Reauthorization Act)**

Reauthorized the funding provisions, authorities, and requirements of CERCLA and associated laws in 1986.

[\[Back to Table of Contents\]](#)

### **27.6.24 Site Closure/Closeout**

The final step in the restoration process. Closeout occurs when all active management and long-term monitoring has been completed, no additional funds are required, and the EPA and state concur that all of the clean up criteria have been met.

[\[Back to Table of Contents\]](#)

### **27.6.25 Site Inspection (SI)**

An on-site investigation to determine whether there is a release or potential release and the nature of the associated threats. The purpose is to augment the data collected in the preliminary assessment and to generate, if necessary, sampling and other field data to determine if further action or investigation is appropriate.

[\[Back to Table of Contents\]](#)

### **27.6.26 MEW**

Superfund site south of Highway 101. Stands for Middlefield, Ellis, Whisman Roads which generally bound the site. The MEW companies include several computer manufacturing companies responsible for releasing chlorinated solvents into the groundwater. The contaminated groundwater has migrated north from the MEW site onto the former Naval Air Station Moffett Field and NASA Ames Research Center.

[\[Back to Table of Contents\]](#)

## **27.7 Restoration Program**

### **27.7.1 Background**

In 1991, NASA Ames conducted a site inspection of sites with known or potential contamination. The results of the investigation were used to determine the preliminary Hazard Ranking System (HRS) evaluation. The HRS is determined according to procedures provided in the NCP. Based on the listing site inspection, NASA Ames received a ranking of 1.09. As a result, NASA Ames was not listed on the National Priorities List (NPL), also known as the Superfund list.

NASA Ames divided the site into twelve areas of investigation (AOIs) to facilitate the site inspection and removal/remedial actions. These AOIs are listed below:

- AOI 1: Fuel Farm
- AOI 2: South Aircraft Ramp Area
- AOI 3: North Aircraft Ramp Area
- AOI 4: National Full-Scale Aerodynamics Complex (NFAC)
- AOI 5: N228 Area
- AOI 6: Storm Drain Channel (Lindbergh Ditch)
- AOI 7: Vertical Take Off Landing (VTOL) Pad
- AOI 8: [REDACTED] (Navarro Farms)
- AOI 9: [REDACTED] Area
- AOI 10: PCB Electrical Substations
- AOI 11: Underground Storage Tanks
- AOI 12: [REDACTED] Area

Since the formation of this list, the following AOIs have been added to the program:



- AOI 3 East: Area East of [REDACTED]
- AOI 13: Stormwater Retention Pond (SWRP), also known as Navy Installation Restoration Program Site 25
- AOI 5 was divided into two phases to be addressed separately:
  - AOI 5 soils
  - AOI 5 groundwater

A map is provided in Appendix A.

In addition to the AOIs, regional groundwater solvent plumes from upgradient sources exist beneath portions of Ames. The regional plumes include contamination from the MEW Companies, the Navy, contributions from NASA in AOIs 7 and 9, and a solvent plume migrating onto NASA from the Orion Park military housing beneath AOIs 4, 5, and 11 (U14).

[\[Back to Table of Contents\]](#)

### 27.7.2 Regulatory Oversight

Oversight of NASA's Restoration Program is carried out by two agencies: the California EPA represented by the Department of Toxic Substances Control (DTSC) and the U.S Environmental Protection Agency (EPA). AOIs that lie above the regional plume are regulated by the EPA. The remainder of the AOIs are administered by DTSC. Since NASA is not on either the US NPL or the state Superfund, NASA Ames has entered into voluntary cleanup agreements with DTSC and is voluntarily cleaning up AOIs under EPA oversight. The following chart indicates the AOIs administered by each agency.

DTSC Oversight	EPA Oversight
AOIs 4, 5, 8, 10, 11	AOIs 1, 2, 3, 6, 7, 9, 12,13

The California Regional Water Quality Control Board (RWQCB) does not exercise oversight over the NASA ARC AOIs. The RWQCB does however administer our NPDES permit for the discharge of treated water from the NASA Ames groundwater treatment system.

[\[Back to Table of Contents\]](#)

### 27.7.2 California Voluntary Cleanup Program (VCP)

#### 27.7.3.1 Background

NASA ARC is conducting the restoration program under the DTSC voluntary cleanup program. The program was developed to help sites that are not on the state superfund list (also known as the Annual Workplan (AWP)). DTSC is required to prioritize its work load according to the AWP. Due to cuts in budgets and personnel, DTSC cannot cover sites not on the AWP. Under the VCP, a site can enter into a cost recovery agreement to obtain oversight from DTSC. The project proponent pays DTSC for oversight to advance the remedial process. To enter the VCP, the following steps are taken:

1. Submit an application to DTSC
2. Scoping/screening/negotiation of services to be provided by DTSC
3. Implementation of site activities
4. Certification and property restoration

[\[Back to Table of Contents\]](#)

#### 27.7.3.2 VCP Requirements

##### 27.7.3.2.1 Voluntary Cleanup Agreement

NASA ARC entered into Voluntary Cleanup Agreements with DTSC for each of the AOIs under DTSC oversight. The agreements list the duties and responsibilities for both parties. The agreements also list the requirements needed to obtain certification and closure of each AOI.

[\[Back to Table of Contents\]](#)

##### 27.7.3.2.2 Tasks in VCP Agreements for Removal Actions.

1. Submittal of Existing Data. Background information, sample analysis results, and any pertinent information is submitted to DTSC for review so that DTSC can determine what additional work, if any, is required.
2. Sampling and Analysis. This tasks includes the following subtasks:
  - a. Sampling and Analysis Workplan. This lists the activities proposed to characterize soil and groundwater associated with

the site. The workplan includes:

- i. Data Quality Objectives (DQOs),
    - ii. Site Health and Safety Plan
    - iii. Quality Assurance/quality control plan
    - iv. Sampling Plan
    - v. Implementation Schedule
  - b. Site Characterization Report. Summarizes the findings of the investigation.
3. Preliminary Removal Action Workplan (RAW). If a removal action is warranted, a RAW is prepared following HSC S25323.1 and S25356.1. The RAW includes:
- a. A description of the onsite contamination
  - b. The goals to be achieved by the removal action
  - c. An analysis of the alternative options considered and rejected and the basis for that rejection. This should include a discussion for each alternative which covers:
    - i. effectiveness
    - ii. implementability
    - iii. cost
  - d. Administrative record list
  - e. A statement that the RAW serves as an equivalent document to the Engineering Evaluation/Cost Analysis (EE/CA) as required by the NCP
  - f. Appendix B contains a model format for a RAW.
4. California Environmental Quality Act (CEQA). DTSC prepares the CEQA documents.
5. Prepare the Final RAW. The preliminary RAW is revised according to the review comments received and issued as the Final RAW.
6. Implementation of the Final RAW. Once the final RAW is approved by DTSC, the removal action is carried out. Within 30 days of completion of the field activities, an Implementation Report documenting the implementation of the RAW is submitted.
7. Public Participation. To insure that the public is kept informed concerning the restoration work at NASA ARC and to meet the requirements of HSC S25358.7, the following steps shall be taken:
- a. A community profile shall be prepared to determine:
    - i. the level of the community's knowledge of the site
    - ii. the proximity to homes, schools, day care centers, etc.
    - iii. the current and proposed use of the site
    - iv. media interest
    - v. involvement of community groups and elected officials
  - b. Fact sheets are to be prepared. These are reviewed and approved by DTSC. NASA distributes the fact sheets to the environmental distribution list.
  - c. Notice of the availability of the RAW for public review is announced in a major local newspaper. The public review period must be at least 30 days.
  - d. A public meeting may be held to inform the public of the activities to be carried out under the RAW and receive public comments. The public meeting is optional.
  - e. Within two weeks of the closure of the public review period, responses to comments received are to be prepared and sent to DTSC for review and approval.
  - f. If needed, the RAW will be revised to reflect the comments received. The public is notified if there are any significant changes from the original actions proposed in the RAW.
8. Deed Restrictions. In accordance with direction from the General Services Administration (GSA), deed restrictions cannot be placed on federal property while the property is still being used by the government. In areas where land use restrictions or institutional controls are needed, NASA ARC will list these in the Environmental Resources Document. Whenever NASA ARC develops a master plan, the restrictions will be recorded there also.

9. Operation and Maintenance (O&M). If required for the removal action, an O&M Agreement is prepared. Once the O&M Agreement is completed, DTSC will certify the site in question.

Discontinuation of Remedial Technology. Once the criteria in the RAW have been met, DTSC will authorize in writing discontinuation of the remedial technology.

[\[Back to Table of Contents\]](#)

#### **27.7.3.2.3 Deliverables for VCP**

In order to meet the above requirements for the VCP, the following deliverables need to be prepared. The list provides the minimum reports/deliverables. Depending on the site, additional work/documentation may be required.

1. Voluntary Cleanup Agreement
2. Sampling and Analysis Plan (SAP)
3. Health and Safety Plan (can be part of the SAP)
4. Quality Assurance/Quality Control Plan (can be part of the SAP)
5. Site Characterization Report or Report of Findings (ROF)
6. Removal Action Workplan (RAW)
7. Fact Sheet
8. Response to Comments
9. Final RAW
10. Implementation Plan
11. Implementation Report
12. Operation and Maintenance Agreement (O&M)
13. Operation and Maintenance Plan (OMP)
14. Progress Reports as required under O&M Agreement

[\[Back to Table of Contents\]](#)

#### **27.7.3.2.4 DTSC Oversight Costs**

As part of the VCP, NASA ARC is required to provide funding to cover DTSC oversight costs. The amounts to be charged are listed in the voluntary cleanup agreement. On a quarterly basis, DTSC will provide NASA with a statement and invoice for services rendered. NASA has 30 days to send payment for the invoice. DTSC may add interest to payments after 30 days.

[\[Back to Table of Contents\]](#)

#### **27.7.4 US EPA AOIS/SITES**

NASA ARC is a potentially responsible party (PRP) for the regional solvent plume. In addition, the Navy and MEW companies are PRPs for the regional plume. NASA and the MEW companies have entered into an Allocation and Settlement Agreement that designates areas of responsibility for remediation of the regional plume. A map is provided in Appendix C. Since NASA is a PRP for the regional plume, the AOIs/Sites which overlie the plume are under EPA oversight. Since NASA is not a Superfund site, NASA uses the process described under the California Voluntary Cleanup Program.

[\[Back to Table of Contents\]](#)

#### **27.7.5 RWQCB - NPDES Permit Requirements**

NASA Ames operates a groundwater treatment system as part of the regional groundwater remediation program (RGRP). As part of the MEW Record of Decision (ROD), each PRP is required to maintain source controls for its portion of the contamination contribution to the regional plume. For NASA Ames, AOIs 7 and 9 contribute solvents to the plume. As a result, NASA Ames has installed a groundwater treatment system to treat the contaminated groundwater. The treated water is discharged to Stevens Creek by way of the MEW system discharge line. To be able to discharge to Stevens Creek, NASA obtained a NPDES permit from the RWQCB. NASA's obligation under the permit:

- Maintain the treatment system in good working order
- Report to the RWQCB any major problems or shut downs of the system
- Sample the influent and effluent of the treatment system on a quarterly basis
- File a quarterly sampling and operational report to the RWQCB; this report is due within 30 days of the end of the quarter.
- File an annual report for the sampling and operation of the system; this report is due to the RWQCB within 30 days of the end of the year.

Failure to meet these requirements can cause NASA to be fined, have the permit revoked, or both.

The MEW PRPs are required to reuse treated water to the maximum extent practicable. NASA reuses a portion of the treated MEW/NASA groundwater in cooling towers and boilers after additional treatment in the Industrial Wastewater Treatment Plant, N271.

[\[Back to Table of Contents\]](#)

### **27.7.6 New Sites And Releases Of Hazardous Materials**

The process for handling removals at sites where there is a new release of hazardous materials to the soil and groundwater will follow the same process as outlined in the VCP. The spill or release is reported according to the procedures in Chapter 15. The restoration group will use the process described for the VCP.

Newly discovered historical spills will be reported to DTSC according to DTSC requirements

[\[Back to Table of Contents\]](#)

### **27.7.7 Oversight of Navy Environmental Program**

In 1994, NASA became custodial agency of the former Naval Air Station Moffett Field (NASMF) and the former Naval Auxiliary Landing Field Crows Landing (NALF). NASMF is listed on the NPL, NALF Crows Landing is not on the NPL and is under state oversight. As part of the transfer of NASMF/NALF to NASA, a Memorandum of Understanding (MOU) was entered into between the Navy and NASA in 1992. In addition to other issues, the MOU requires the Navy to address contamination that occurred during its operation of NASMF and NALF. To monitor compliance with the MOU, one of the major functions of the restoration program is the oversight and review of the Navy's Installation Restoration Program (IRP) and underground storage tank (UST) work for both sites. The following tasks are part of this oversight process:

- Provide technical point of contact between NASA and the Navy
- Review and comment on Navy deliverables
- Observe and provide oversight for Navy field work
- Attend Base Closure Team (BCT) meetings
- Attend Navy Restoration Advisory Board (RAB) Meetings
- Attend Navy Public Meetings concerning NASMF and NALF

The deliverable for the Navy oversight is the written review comments

[\[Back to Table of Contents\]](#)

### **27.7.8 Oversight of MEW Remedial Work at Ames**

As part of the RGRP, the MEW companies have installed and maintain several monitoring wells and a groundwater treatment system. As with the Navy environmental program, the restoration program includes oversight of the MEW remedial work at NASA ARC. The following tasks are part of the oversight process:

- Provide technical point of contact between NASA and the MEW companies
- Review and comment on MEW deliverables
- Observe and provide oversight for MEW field work
- Attend the MEW All Parties meeting

The deliverable for the MEW oversight is the written review comments.

[\[Back to Table of Contents\]](#)

### **27.7.9 Databases**

The restoration group maintains several databases to keep track of the restoration program.

[\[Back to Table of Contents\]](#)

#### **27.7.9.1 IDEAL**

The IDEAL (Integrated Data Evaluation and Analysis Library) was adopted by NASA to develop costs that are defensible for audit purposes. The IDEAL database uses various cost-to-complete models that were developed by the Navy. Site-specific information is input to the models and the program then provides defensible cost estimates based on the input.

[\[Back to Table of Contents\]](#)

### 27.7.9.2 Geographic Information System (GIS)

The Code QE Restoration GIS database is used to store and manage data collected during investigations and remedial measures. Some of the information includes:

- Well location information
- Well construction data
- Lab data for soil and groundwater
- Water level data
- Geologic information

NASA, Navy, and MEW data is stored in the GIS.

[\[Back to Table of Contents\]](#)

### 27.7.10 Property Transfer/Leasing

The restoration group conducts the investigation and review of environmental contamination issues for property that is to be transferred from NASA to another entity or leased by another entity from NASA. The process used is based on the guidelines set up by the Department of Defense (DoD) and described by the American Society for Testing and Materials (ASTM) D6008. for the leasing or transfer of property from military bases closed under the Base Realignment and Closure (BRAC) process. The process fulfills the requirements of CERCLA S120(h). The goal of the process is the development of a FOST or a FOSL.

The FOST/FOSL process includes:

1. A review is made of all of the available data as to the environmental condition of the property.
2. Based on the review process, the property is divided into parcels based on the environmental condition of the property. Each Parcel is assigned one of the following Environmental Conditions of Property (ECP) categories:
  - a. Category 1: Areas where no release or disposal has occurred
  - b. Category 2: Areas where only release or disposal of petroleum products has occurred
  - c. Category 3: Areas where release of hazardous substances has occurred, but no remedial action is required
  - d. Category 4: Areas where release of hazardous substances has occurred, and all remedial action has been taken
  - e. Category 5: Areas where release of hazardous substances has occurred, and removal or remedial actions are underway
  - f. Category 6: Areas where release of hazardous substances has occurred, but response actions have not been implemented
  - g. Category 7: Areas that are unevaluated or that require further evaluation
3. The review information and property categories are documented in the Environmental Baseline Survey (EBS). The EBS is the support document for the conclusions based in the FOST/FOSL. The FOST/FOSL is made available for public review. The review period is for a minimum of 30 days. Depending on the community interest, a public meeting may be required.
4. At the end of the review period, any comments that are received are addressed.

A final FOST/FOSL is then prepared, modified in response to the review comments, and signed by the Center Director.

[\[Back to Table of Contents\]](#)

### 27.7.11 Import and Reuse of Soil

In order to prevent creation of new contaminated sites, all soils that are imported or to be reused at NASA ARC must be sampled. The sampling results shall be provided to Code QE Subsurface Group for review and approval before soil is imported or reused. Soil shall be sampled for the following compounds using the EPA test method provided in the parentheses:

- Total Petroleum Hydrocarbons, both for extractable and purgeable (EPA 8015M)
- BTEX (Benzene, Toluene, Ethylbenzene, Xylenes) (EPA 8020)
- Metals (EPA 6010B)
- Polychlorinated Biphenyls (PCBs) (EPA 8081A)
- Pesticides (EPA 8081A)
- Volatile Organic Compounds (8260B)

Once the sample results have been reviewed, Code QE will respond in writing or by e-mail whether or not soil is approved for use at NASA ARC. Further assistance is available by contacting the Subsurface Group at [REDACTED]

[\[Back to Table of Contents\]](#)


### **27.7.12 Metrics**

Metric Goal:

- Ensure that remedial actions are carried out according to plans and specifications 100% Compliance
- Obligate and accrue Environmental Compliance and Restoration funding 85% of ECR Budget for fiscal year

[\[Back to Table of Contents\]](#)

## **27.8 Sources of Additional Information or Assistance**

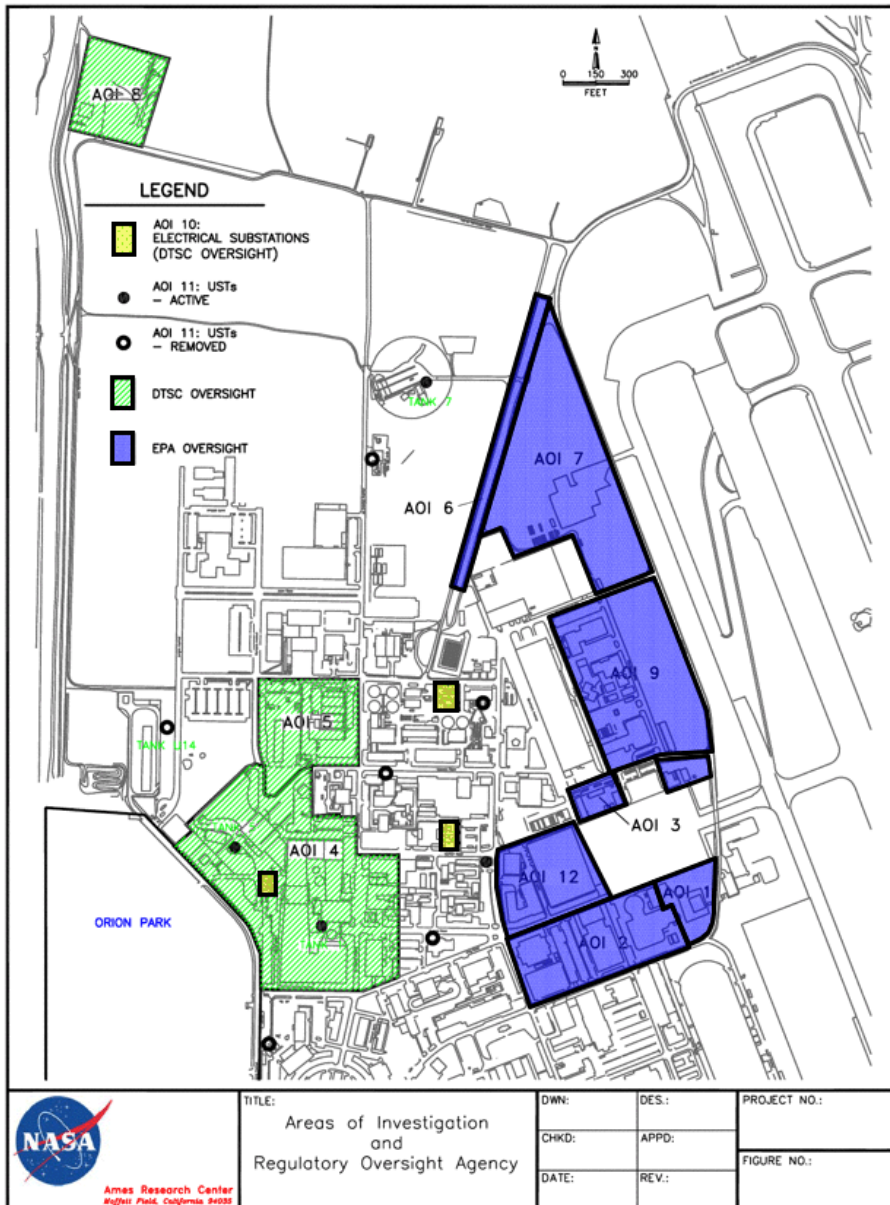
Environmental Office 

---

[\[Back to Table of Contents\]](#)

## **27.9 Appendices**

### **27.9.1 Appendix A: Map of Areas of Investigation**



[\[Back to Table of Contents\]](#)

## 27.9.2 Appendix B: Format for Removal Action Work Plan (RAW)

This outline provides a model to be used in the production of Removal Action Work Plans (RAWs). This model is modified from a model RAW provided by the California Department of Toxic Substances Control (DTSC).

### Table of Contents

### Executive Summary

### 1. Introduction

### 2. Site Characterization

#### 2.1 Site Description and Background

##### 2.1.1 Site Location and Description

Brief description of the location of the Removal Action.

- Short physical Description of the Site
- Photograph of the Site

### **2.1.2 Geology and Hydrogeology**

Briefly describe the geology and hydrogeology to be encountered at the site. This does not need to be highly detailed, just enough to present the general geology/hydrogeology of the site. Provide reference to document containing a more detailed discussion of the geology/hydrogeology (such as the RAW).

## **2.2 Source, Nature, and Extent of Contamination**

### **2.2.1 Summary of Investigations**

This section is a brief summary of the investigations carried out at the site. This is a summary of the information provided in the RAW.

### **2.2.2 Nature and Extent of Contamination**

This is also a brief summary on the nature and extent of contamination at the site. This section should include a map of the areal extent of the contamination and a figure showing the vertical extent of contamination. The vertical extent figure could be a detailed cross-section showing sample locations along with concentrations (copied from the RAW) to a simple drawing showing the vertical sample locations and concentrations. When possible, provide contours for both areal and vertical contamination.

## **2.3 Summary of Risk Evaluation**

Provide a summary of the risk evaluation performed in the RAW. If the removal action includes both soil and groundwater, use the following subdivisions.

### **2.3.1 Soil**

### **2.3.2 Groundwater**

## **3. Identification of Remedial Action Goals**

A summary of the Remedial Action Goals from the RAW.

## **4. Removal Action Alternatives**

### **4.1 Summary of Removal Action Alternatives**

This can be a table of the various removal action alternatives evaluated in the RAW. Include a brief description of the removal technology. There is no need to list all of the evaluation criteria from the RAW. The RAW should be referenced for a more detailed discussion.

### **4.2 Approved Removal Action Alternative**

Describe the chosen/approved removal action alternative. Include a summary for the reason(s) the alternative was chosen over the other alternatives.

## **5. Implementation of Approved Alternative**

### **5.1 Site Preparation and Security Measures**

#### **5.1.1 Delineation of removal action area**

Figure should show areal and vertical views.

#### **5.1.2 Utility Clearance**

#### **5.1.3 Security Measures**

Describe how the site will be secured and list any special safety concerns

#### **5.1.4 Contaminant Control**

#### **5.1.5 Permits and Notifications**



## **5.2 Construction**

This section is used to document the details for construction/implementation for the removal action. These steps would include but not be limited to:

- Equipment
- Materials
- Storage locations
- Waste segregation
- Decontamination area
- Confined space procedures
- Dust control
- Stockpiles
- Disposal of clean excess material
- Backfilling
- Other environmental issues
- Etc.

The operations to be listed under this section is dependent on the nature of the remedial action. For a large construction project, many of these items would be covered by the project specifications and drawings.

## **5.3 Field Documentation**

### **5.3.1 Field Logbooks**

This section describes how construction

### **5.3.2 Chain-of-Custody Records**

### **5.3.3 Photographs**

Photographs need to be taken of various steps of the removal action. Some of these photographs should be included in the Implementation Report once the removal action is complete.

## **5.4 Confirmation Sampling and Analysis Plan**

## **5.5 Monitoring Plan**

Describe the monitoring procedures that are to be carried out to show that the removal action adequately remediated the site.

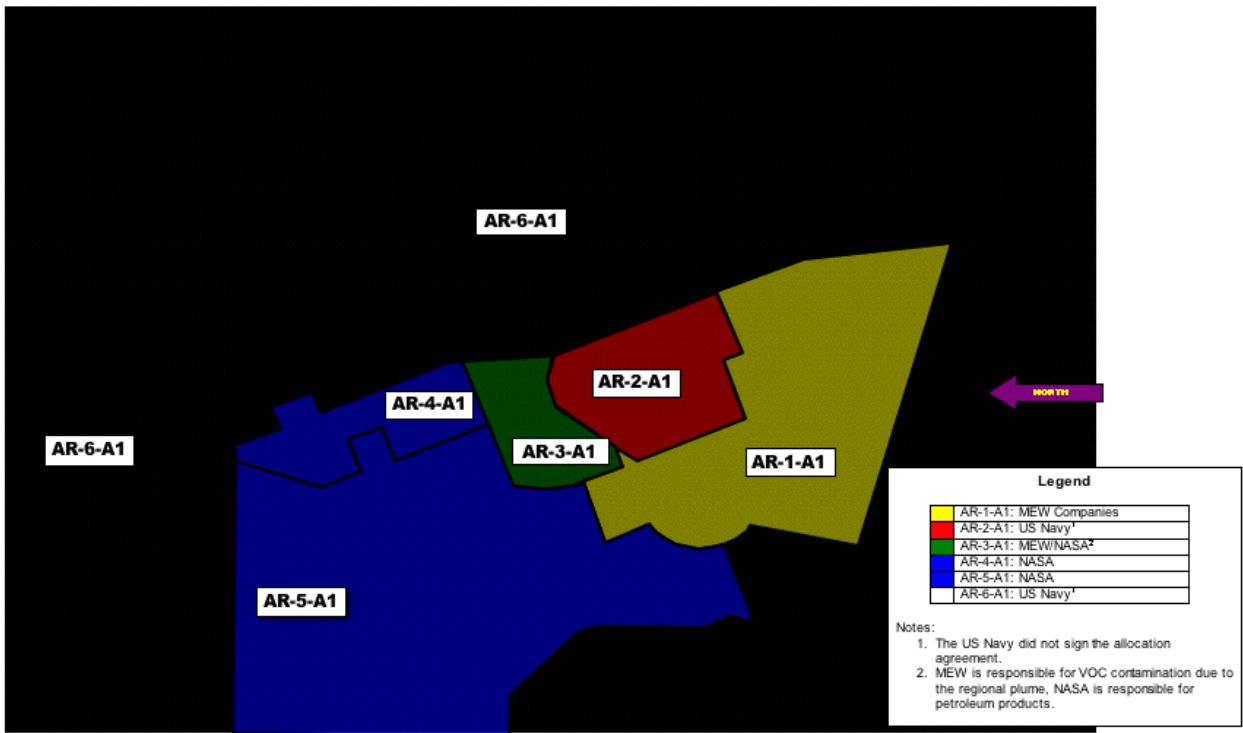
## **6. Project Schedule**

## **7. References**

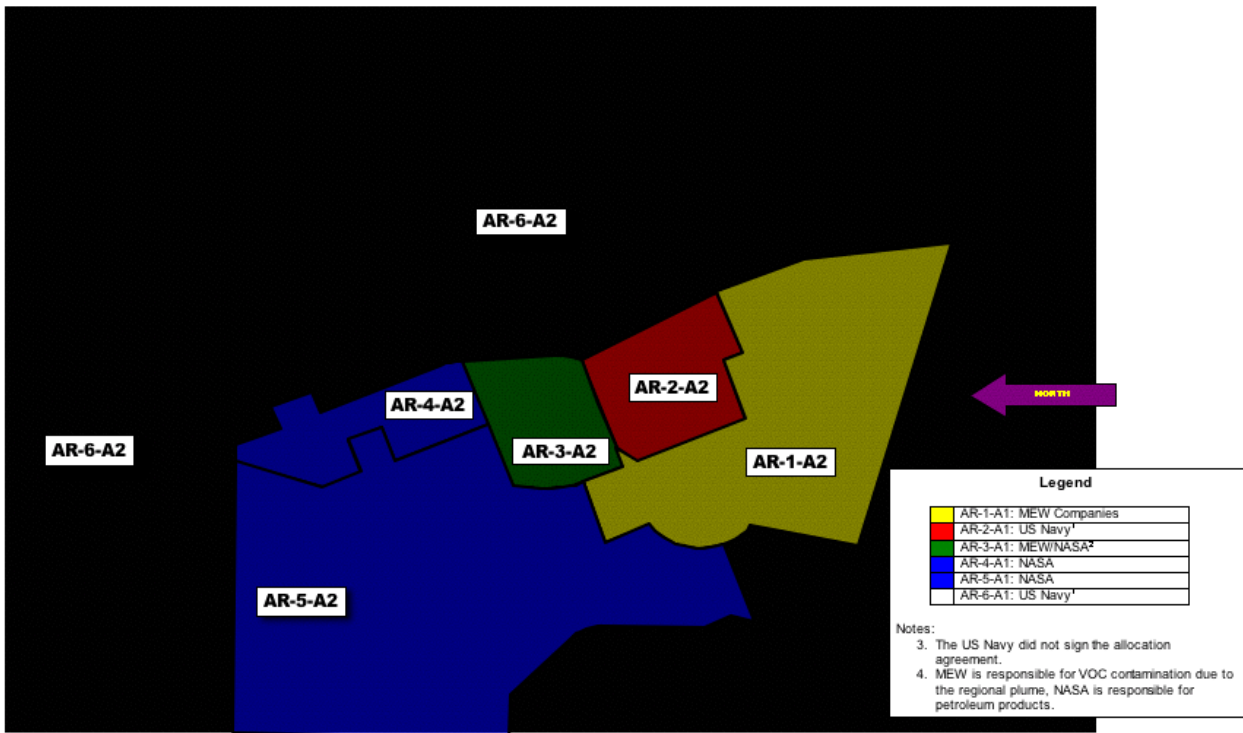
[\[Back to Table of Contents\]](#)

---

### **27.9.3 Appendix C: Map of Areas of Responsibilities for the Regional Groundwater Remediation Program (RGRP)**



Map of Allocation Areas for the A1 Aquifer



Map of Allocation Areas for the A2

[\[Back to Table of Contents\]](#)

END OF DOCUMENT

THIS DOCUMENT IS UNCONTROLLED WHEN PRINTED