



CASTLE AIRPORT COMPREHENSIVE BASEWIDE PROPOSED PLAN – PART 2

Preferred Alternatives for Three Contaminated Soil Sites, Ecological Risks at 233 Sites and Groundwater Use Controls During Cleanup

INTRODUCTION/OVERVIEW OF THE PROPOSED PLAN

The United States Air Force (Air Force) is issuing this **Proposed Plan**¹ for the cleanup of soil and groundwater contamination at Castle Airport. As the lead agency, the Air Force, with support from the **United States Environmental Protection Agency (EPA)**, the **California Department of Toxic Substances Control (DTSC)** and the **California Regional Water Quality Control Board (RWQCB)**, is seeking comments from the public on this Proposed Plan.

You have an opportunity to review and comment on the Proposed Plan during the public comment period from December 3, 2003 through January 5, 2004. A public hearing will be held in the Atwater City Council Chamber (750 Bellevue Road) on December 10, 2003 at 7:00 pm. This Proposed Plan addresses: (1) the **preferred alternative** for soil contamination at three sites; (2) the preferred alternative for ecological risks at 233 sites; and (3) groundwater use restrictions and wellhead treatment.

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¹ Key terms in **bold italics** are defined in the Glossary of Terms beginning on page 16.

Public Comment Period December 3, 2003 through January 5, 2004

Public Hearing Information

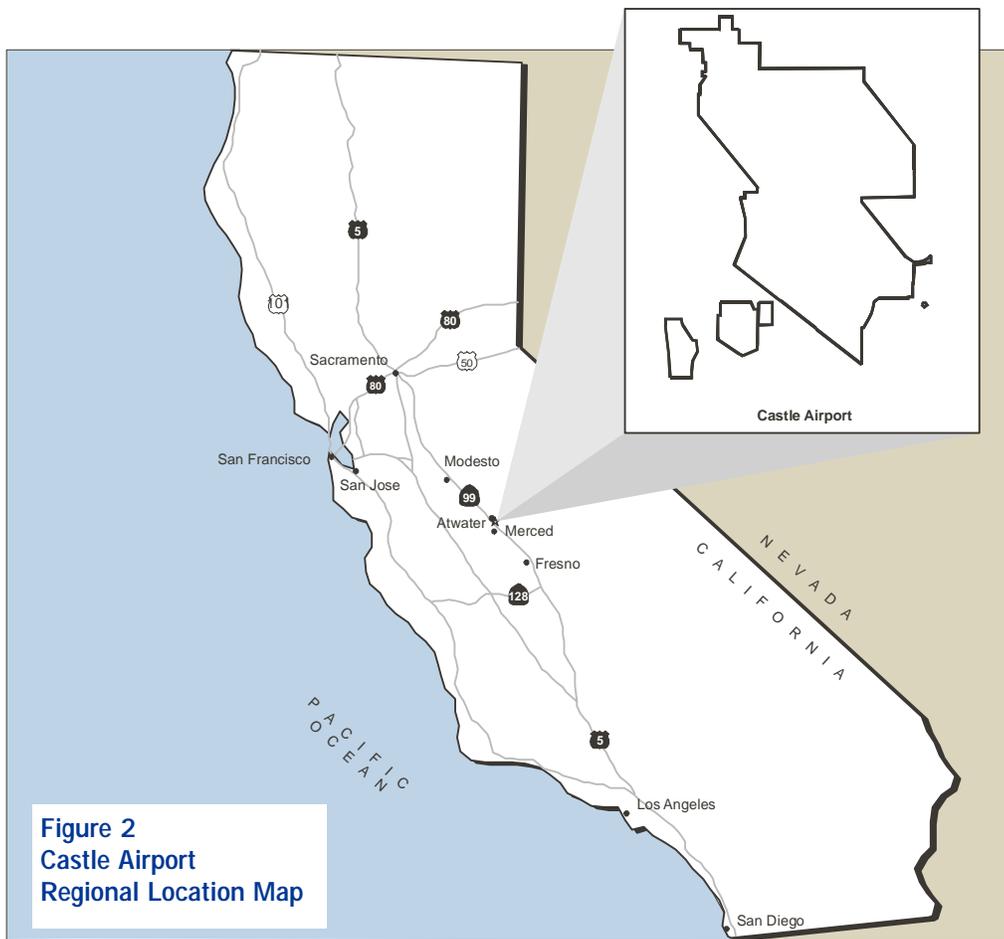
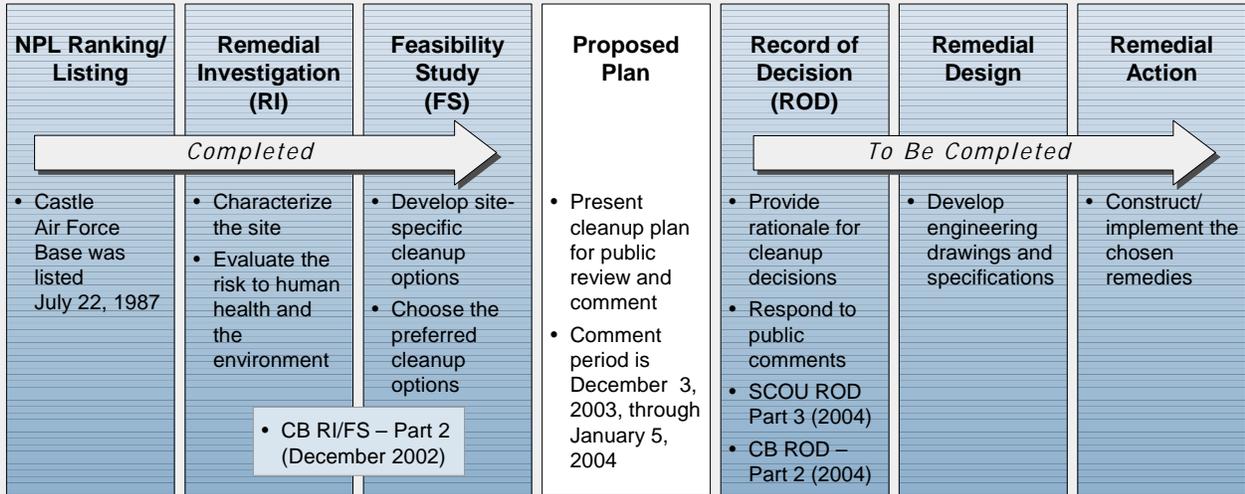
Purpose	To discuss the Proposed Plan, answer questions, and receive public comments
Location	Air Force Real Property Agency 4500 North Hospital Road Atwater, California 95301
Date	Wednesday, December 10, 2003
Time	7:00 p.m.
Contact	Mr. Greg Gangnuss BRAC Environmental Coordinator Castle Airport 4500 North Hospital Road Atwater, California 95301 (209) 726-4300

This Proposed Plan is submitted in accordance with Section 117(a) of the Federal **Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** (Figure 1). This Proposed Plan summarizes information that can be found in greater detail in the **Comprehensive Basewide Remedial Investigation/Feasibility Study (CB RI/FS)** – Part 2 report (2002) and other documents in the **Administrative Record** for Castle Airport.

The Administrative Record documents are available to all interested persons at the Merced County Library (2100 “O” Street, Merced) and in the Air Force office (4500 North Hospital Road) at Castle Airport (see page 15 for additional information). The public is encouraged to review these documents to gain a more comprehensive understanding of Castle Airport and the CERCLA activities that have been conducted there.

Figure 1
What is CERCLA?

The Air Force is issuing this Proposed Plan as part of the public participation responsibilities of Section 117(a) of CERCLA. CERCLA is a federal law passed in 1980 which established procedures for the investigation and cleanup of certain hazardous sites. The sequence of major site activities or milestones during investigation and cleanup are shown below.



Purpose of the Proposed Plan

This Proposed Plan will:

1. Provide summary background information on the Castle Airport cleanup program.
2. Describe cleanup alternatives evaluated, the methodology for evaluating cleanup alternatives and the rationale and preferred alternatives for three **Source Control Operable Unit (SCOU)** sites: Earth Technology Corporation 8 (ETC-8); ETC-10; and Fire Training Area 1 (FTA-1).
3. Describe alternatives evaluated, the methodology for evaluating alternatives and the preferred alternatives to address ecological risks at five SCOU sites: ETC-10; ETC-12; FTA-1; Landfill 3 (LF-3); and LF-5.
4. Describe the process used to select **no further action (NFA)** as the preferred alternative for ecological risks at 228 sites.
5. Identify updates to the groundwater remedy, including groundwater use restrictions and wellhead treatment.
6. Solicit public review and comment on all alternatives considered.
7. Provide information on how the public can be involved in the remedy selection process.

This Proposed Plan highlights key information from the CB RI/FS – Part 2. The CB RI/FS – Part 2 conducted a comprehensive evaluation of the current information, as well as the remedies selected in previous **Records of Decision (RODs)**, to determine if additional remedial actions were necessary at Castle Airport to fully protect human health and the environment. Supporting information about soil

contamination, completed **removal actions**, residual human health and ecological risks and alternative remedial actions considered to address the potential risks are discussed in the CB RI/FS – Part 2. Copies of the CB RI/FS – Part 2 can be found in the Castle Airport Information Repositories at Castle Airport and the Merced County Library. Information Repository locations and hours are provided on page 15.

SITE BACKGROUND

Castle Airport, formerly Castle Air Force Base, is located in central California approximately six miles northwest of the City of Merced and adjacent to the communities of Winton and Atwater (Figure 2).

Castle Air Force Base was established as the Merced Army Flying School on September 20, 1941. Castle Air Force Base was officially closed on September 30, 1995. Castle Airport currently contains an active airfield and industrial, recreational, office and medical facilities.

Fuels, solvents and other chemicals were used at Castle Air Force Base throughout its active life. Municipal and industrial wastes were also generated and disposed of on base. In the 1970s, the Air Force began investigating the possibility that past opera-

tions and waste disposal practices at the base may have resulted in soil and groundwater contamination. Following the sampling of several base water supply wells in 1978, the Air Force determined that groundwater beneath portions of the base was contaminated with **trichloroethene (TCE)** and other **volatile organic compounds (VOCs)**. The base was listed on EPA's **National Priorities List (NPL)** in 1987.

Beginning in the early 1980s, the Air Force developed and implemented an aggressive strategy to address the problem of groundwater contamination. As a result of extensive field investigations, removal actions designed to eliminate contaminant source areas, remove contaminants from groundwater,

control off-site movement of contaminated groundwater and protect human health and the environment were initiated in the 1980s and 1990s. Groundwater remedies were addressed and documented by the CB ROD – Part 1, signed in June 1997. Soil or

vadose zone remedies have been addressed and documented by the SCOUD ROD Part 1, signed in September 2002, the SCOUD ROD Part 2, signed in July, 2003 and the SCOUD ROD Part 3, scheduled for finalization in 2004.

SCOPE AND ROLE OF THE OPERABLE UNIT

Operable units (OUs) are used to group sites with similar contaminants and conditions. Two operable units have been defined at Castle Airport – the CB Part 1 addresses groundwater contamination

(incorporates original OU-1 and OU-2 operable units), while the SCOUD addresses soil or **vadose zone** contamination.

Groundwater Operable Unit

Six separate areas of contaminated groundwater (contaminant plumes) were identified at Castle Airport: Main Base Plume, East Base Plume, North Base Plume, Landfill 1 Plume, Landfill 4 Plume and Castle Vista Plume. The primary contaminant in all but the Castle Vista Plume is TCE; the primary contaminant in the Castle Vista Plume is **cis-1,2-dichloroethene (cis-1,2-DCE)**, an organic chemical related to TCE. The selected remedies for all groundwater plumes were established in the CB ROD – Part 1 and are outlined in Table 1. The cleanup levels for the plumes are the lower of the Federal and State **maximum contaminant levels (MCLs)**, which are 5 micrograms per liter (µg/L) or parts per billion (ppb) for TCE (Federal MCL) and 6 ppb for cis-1,2-DCE (State MCL). The current location and extent of each plume are shown on Plate 1. The Main Base Plume is the most extensive plume with the highest contaminant concentration. There is a portion of the Main Base Plume that is under the control of Atwater Municipal Well 18 (AM18) and therefore, capture is not practical. This Proposed Plan addresses this situation.

The East Base and Landfill 1 Plumes are not shown on Plate 1 because they no longer exceed the 5 ppb TCE cleanup level. The groundwater treatment systems in the Main Base Plume (OU-1, OU-2 and **Phase 3** systems) and the Castle Vista Plume (Castle Vista system) are shown on Plate 1.

**Table 1
Comprehensive Basewide Record of Decision – Part 1
Groundwater Remedies**

Plume	Grid Location of Plume Center on Plate 1	Selected Remedy
Main Base	Q10	Plume capture and treatment to the maximum contaminant level (MCL)
East Base	M15	Long-term groundwater monitoring and assessment
North Base, Landfill 1 and Landfill 4	F11 U13 G6	Institutional controls and long-term groundwater monitoring and assessment
Castle Vista	U4	Plume capture and treatment to the MCL

Source Control Operable Unit

The scope of the SCOUD is limited to addressing contamination in the surface and subsurface soil above the water table, a depth that today generally ranges from 70 to 80 feet below ground surface. Contaminants in surface and subsurface soil are of concern because they may pose a risk to human health and the environment and may be a continuing source of contamination to groundwater.

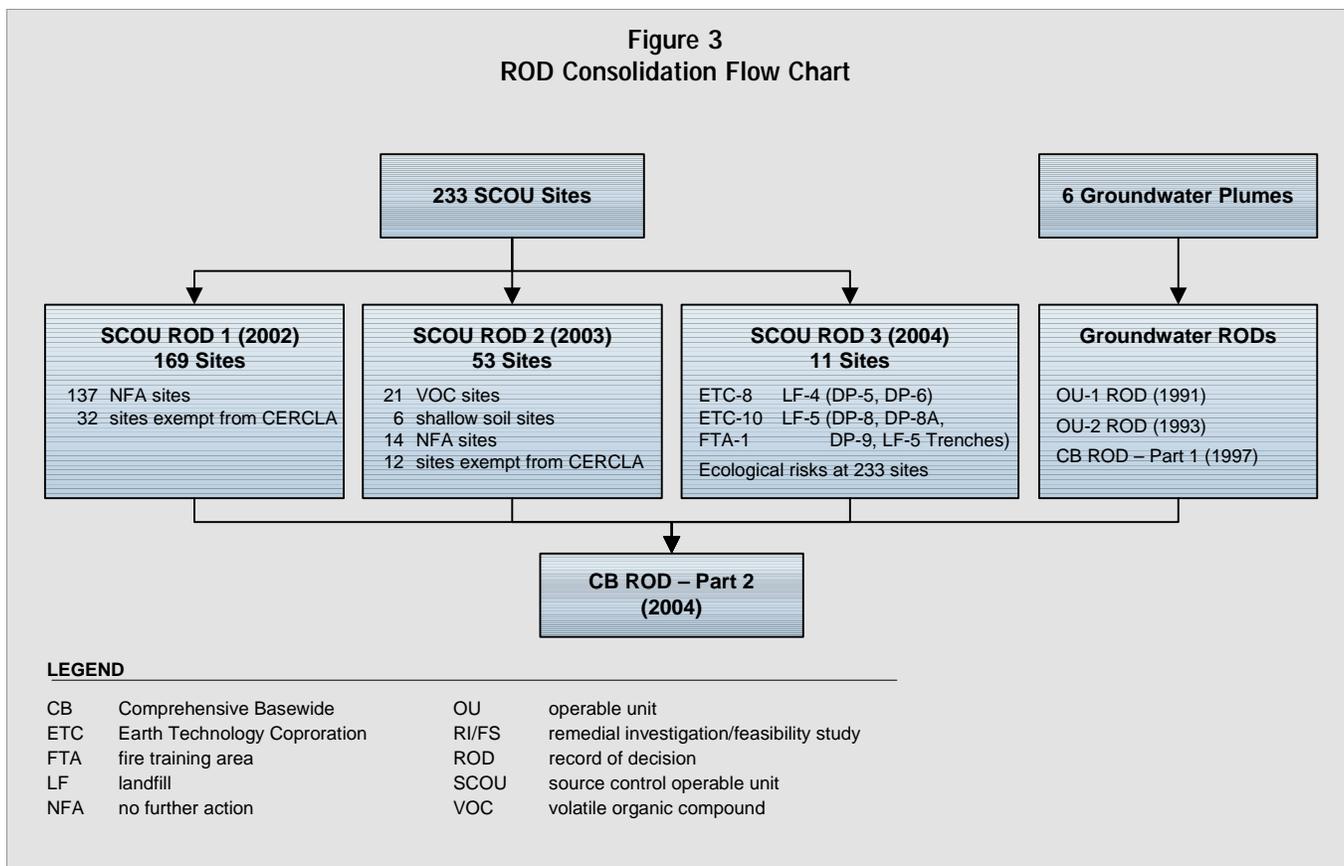
Two hundred and thirty-three SCOUD sites (shown on Plate 1) were considered in the SCOUD RI/FS. The

SCOU ROD Parts 1 and 2 addressed 169 and 53 sites, respectively. Table 2 on pages 18-22 provides a summary list that includes the Plate 1 grid location and selected remedy for each of the sites in the SCOU ROD Parts 1 and 2. Eleven sites will be addressed in the SCOU ROD Part 3, along with the ecological risks at all 233 SCOU sites. SCOU site locations, with each site color-coded as to ROD and remedy, are shown on Plate 1.

Contaminants identified at the various SCOU sites include VOCs (primarily TCE, *tetrachloroethene*, chlorofluorocarbons and benzene, toluene, ethylbenzene and xylenes), semivolatile organic compounds; polynuclear aromatic hydrocarbons (PAHs); polychlorinated biphenyls; fuels (gasoline, diesel and jet fuel); and various metals.

Consolidation of Records of Decision

The groundwater OU, addressed in the CB ROD – Part 1, and the SCOU, addressed in SCOU ROD Parts 1, 2 and 3, will be consolidated into a single comprehensive ROD for Castle Airport, the CB ROD – Part 2. The CB ROD – Part 2 will consolidate all Castle Airport remedies into a single ROD and provide confirmation that the remedies from previous RODs remain protective of human health and the environment. In addition, the CB ROD – Part 2 will restrict the use of groundwater affected by contamination from Castle Airport until cleanup levels have been attained. The flow chart on Figure 3 illustrates how these RODs will be consolidated.



SUMMARY OF SITE RISKS

In the CB RI/FS – Part 2, the previous individual **human health risk assessments (HHRAs)** were updated and combined into a basewide human health risk assessment, the **water quality site assessment (WQSA)** was reviewed and a basewide

ecological risk assessment (ERA) was conducted. The following subsections summarize the basewide human health, water quality and ecological risk assessments completed in the CB RI/FS – Part 2.

Human Health Risk Assessment

For cancer-causing chemicals, the acceptable risk level is generally defined as a cumulative risk that does not exceed one additional incidence of cancer in 1,000,000 (1×10^{-6}). This means that one additional cancer occurrence would be predicted if one million persons were exposed to a contaminant at a certain concentration for 30 years, with the overall risk spread over an estimated lifetime of 70 years. A risk of 1×10^{-6} is considered to be the threshold level of concern while the upper level of the acceptable risk range is 1×10^{-4} (1 in 10,000). The normal incidence of cancer in humans over their lifetimes is approximately one in four.

For non-cancer health concerns, estimated exposure levels are compared to a reference dose established by EPA. This comparison or ratio is called a hazard index. A hazard index greater than 1 indicates the potential for adverse health effects. Human health risk from lead is treated separately. Calculated blood-lead of 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) has been established by the World Health Organization as the level above which blood-lead would be

considered to be elevated.

The CB – Part 2 HHRA calculated combined baseline risk for each SCOUC site by addition of the baseline risks for soil from the SCOUC baseline human health risk assessment (BHHRA) and the baseline risk for groundwater adapted from the CB – Part 1 BHHRA. These combined baseline risks represent total site risks prior to implementation of a cleanup remedy. The CB RI/FS – Part 2 then evaluated the reduction of risk expected from the selected remedies (or preferred alternatives from the existing SCOUC Proposed Plan if a ROD had not yet been completed) identified in the independent SCOUC and CB – Part 1 RODs. The purpose of the CB RI/FS – Part 2 risk reduction evaluation was to determine if the post-remedy combined risk provided adequate protection of human health or whether additional action was needed due to the combined effect of residual contamination that might remain in soil and groundwater after cleanup. A three-step decision process was used for the combined post-remedy risk evaluation: (1) is the combined risk less than

the established levels of concern for cancer and non-cancer causing chemicals? (2) is further cleanup limited by technical or economic feasibility? (3) is combined risk greater than the upper acceptable limit of 1×10^{-4} ? While combined cancer risk did not exceed the upper acceptable limit of 1×10^{-4} at any SCOUC site, three sites were identified where additional action was appropriate – ETC-8, ETC-10 and FTA-1. Also, for the Main Base and Castle Vista Plumes, **institutional controls (ICs)** to restrict groundwater use until cleanup levels are achieved were identified as necessary for the protection of human health. Otherwise, the selected remedies established in the CB ROD – Part 1 and the preferred alternatives or selected remedies established in the SCOUC Proposed Plan and SCOUC ROD Parts 1 and 2, were determined to be protective of human health.

At ETC-8, a removal action consisting of excavation and disposal of PAH-impacted soil was completed in 2000. Calculated post-remedy human health risks were all lower than threshold levels of concern. However, additional action is deemed appropriate because

PAH-impacted soil remains beneath an asphalt-paved road that crosses the site.

At ETC-10, a removal action consisting of excavation and disposal of lead and PAH-impacted soil was completed during 1997 and 1998. However, because cleanup was only to occupational standards, lead concentration in remaining soil exceeds the allowable levels for unrestricted use.

At FTA-1, a removal action consisting of a *soil vapor extraction (SVE)* system and a cap to enhance SVE operation was installed and began operation in 1996. Since the removal action was not directed at VOCs, further evaluation of actions required to address the risk to human health from non-VOCs (metals, dioxins and PAHs) in soil is required.

Water Quality Site Assessment

In the SCOU RI/FS, WQSAs were conducted for all SCOU sites in accordance with RWQCB procedures to determine if site contaminants could migrate to groundwater and degrade water quality. The assessment covered a broad spectrum of potential contaminants including VOCs, semivolatile organic compounds, petroleum hydrocarbons and metals.

The WQSA process resulted in determining levels of soil contaminants that, if exceeded, could potentially degrade groundwater quality. Reported contaminant levels at SCOU sites were compared to these groundwater protective levels to identify sites with the potential to degrade groundwater quality. All of the SCOU sites where contaminant concentrations were determined to pose a threat to groundwater quality have been addressed in SCOU RODs or by removal actions prior to completion of a ROD. However, as determined in the CB RI/FS – Part 2, the ETC-10 removal action left contaminants at concentrations exceeding the WQSA groundwater-protective levels. In addition, site contamination at the FTA-1 site currently exceeds WQSA levels and the non-VOC contaminants (metals, dioxins and PAHs) will not be addressed by the ongoing SVE removal action.

Ecological Risk Assessment

The ERA consisted of three stages: Scoping, Phase I and Phase II ERAs. The Scoping ERA consisted of a qualitative assessment of habitats and identification of complete exposure pathways for plant and animal life at Castle Airport. Phase I consisted of a quantitative screening assessment of contaminant toxicity and potential for exposure. Phase II involved the verification, validation and refinement of Phase I assumptions and predictions.

The Scoping ERA screened out most of the 233 SCOU sites because they had no potential to impact ecological habitat. These sites consisted primarily of buildings, roads, parking lots and urban lawn. Those sites with potential to impact ecological habitat were further evaluated in the Phase I and Phase II ERAs, using the following information: (1) chemical analysis and toxicity data, (2) bioassays and (3) biological surveys of wetland plants and animals. Based on this evaluation, only five sites (ETC-10, ETC-12, FTA-1, LF-3 and LF-5) were determined to have enough potential for ecological impact to require further action. Soil contamination at all five of these sites has the potential to adversely impact plants and/or animals in associated wetland areas. The ERA determined the remaining 228 sites to be NFA for ecological risks.

REMEDIAL ACTION OBJECTIVES

When the SCOU and CB – Part 1 RODs were completed, *remedial action objectives (RAOs)* were established for the soil and groundwater remedial actions. RAOs are the cleanup levels that must be achieved at contaminated soil sites or in groundwater for the protection of human health and the environment and to allow for unrestricted use of the land. All Castle Airport RAOs were updated, as appropriate, during completion of the CB RI/FS – Part 2.

Groundwater RAO

The groundwater RAO established in the CB ROD – Part 1 is the capture and cleanup of groundwater

contaminants in excess of the MCL. Although not strictly risk-based, groundwater MCLs are considered protective of human health and the environment.

Soil RAOs

Castle Airport soil RAOs were separately established for the protection of human health and for the protection of groundwater quality. In cases where a human health-based RAO differed from the groundwater-protective RAO, the most stringent RAO was selected.

Human Health RAOs. Human health RAOs were calculated during the SCOUI/FS using standard EPA methodology for CERCLA sites and were developed to support unrestricted use of Castle Airport after site cleanup. Human health RAOs for soil were generally established at the lowest concentration that represents either a cancer risk of 1×10^{-6} or a chemical-specific non-cancer hazard index of 1.

The human health soil RAO for lead was established at a level protective of children (i.e., the concentration that would result in an estimated blood-lead concentration less than or equal to 10 µg/dL in a child).

Groundwater-Protective RAOs. The groundwater-protective RAOs for semivolatile organic compounds and metals were set at the groundwater-protective values established by the WQSA. However, due to technical and economic feasibility limitations of attaining the groundwater-protective numerical values for VOCs, the Air Force and the regulatory agencies negotiated a groundwater-protective RAO for VOCs. The VOC RAO requires the Air Force to demonstrate that the lowest levels of VOCs technically and economically achievable have been attained. An agency-approved process, called the SVE Termination or Optimization Process (STOP), is used after it has been determined that VOCs no longer present a human health risk and when contaminant concentrations have been reduced to levels where contaminant removal is no longer efficient or effective.

A detailed description of the STOP evaluation process is available from several documents in the Castle Airport Information Repository, including the CB RI/FS –Part 2.

Ecological RAOs

RAOs developed for the protection of ecological receptors were primarily qualitative in nature and were based on the potential for sites to impact important wetland habitat/species. Quantitative RAOs based on ecological toxicity values were then used on a very limited basis to define areas of contaminated soil requiring cleanup in addition to that conducted to meet human health and groundwater-protective RAOs.

SUMMARY OF ALTERNATIVES

Soil Cleanup at ETC-8, ETC-10 and FTA-1

The basewide assessment of risk to human health conducted in the CB RI/FS – Part 2 concluded that additional action was required at ETC-8, ETC-10 and FTA-1 for adequate protection of human health. ETC-8 and ETC-10 required further action due to contaminant levels that remain after completion of removal actions at the sites. At FTA-1, non-VOC contamination is not addressed by the ongoing SVE removal action and the remedy for non-VOC contamination was not fully evaluated in the SCOUI/FS. Table 3 provides a brief description of the treatment, removal and containment alternatives considered for ETC-8, ETC-10 and FTA-1 in the CB RI/FS – Part 2 *focused feasibility studies (FFSs)*.

Ecological Risks at ETC-10, ETC-12, FTA-1, LF-3 and LF-5

The ERA identified a potential impact to wetlands at five sites: ETC-10, ETC-12, FTA-1, LF-3 and LF-5. For these sites, the ecological FFS conducted in the CB RI/FS – Part 2 considered three alternatives: (1) no action, (2) excavation and restoration, and (3) long-

term monitoring. Since the ERA established the remaining 228 sites as NFA for ecological risks, due to lack of ecological habitat or minimal risk, they were not further evaluated in the ecological FFS.

Table 3
Summary of CB–Part 2 FFS Remedial Alternatives for
ETC-8, ETC-10 and FTA-1

Alternative	Description
TREATMENT OF CONTAMINATION	
Solidification/ Stabilization (FTA-1)	Solidification/stabilization is generally applicable for inorganic contaminants, but may also have limited effectiveness for halogenated and non-halogenated SVOCs and pesticides. The technology can be applied to in place (in situ) or excavated (ex situ) soil. Solidifying reagents consisting of cement, bentonite or complex polymers are mixed with the contaminated soil to physically bind contaminants within a stabilized mass or to significantly reduce contaminant mobility.
REMOVAL OF CONTAMINATION	
Excavation and Off-Site Disposal (ETC-8/ETC-10/FTA-1)	Following characterization, all soil or waste is disposed of at an appropriate off-site landfill or other disposal facility.
CONTAINMENT OF CONTAMINATION	
Class III Cap (FTA-1)	A cap is installed to prevent access to contaminated soil or wastes, to limit infiltration of rainfall and reduce further downward migration of contaminants, and/or to increase the radius of influence of SVE wells. A Class III cap consists of (1) a two-foot foundation layer (soil) to protect the structural integrity of the cap, (2) a flexible membrane liner (FML) to prevent infiltration of rainfall, (3) a drainage layer (sand or man-made drainage net) to promote runoff and further inhibit infiltration of rainfall, and (4) a soil and vegetative cover to prevent erosion and protect cap integrity. ICs would typically need to be established in coordination with capping to restrict access to the area, prevent unsuitable reuse of the area, and to ensure long-term cap monitoring and maintenance.
NO ACTION	
No Further Action (ETC-8/ETC-10)	Under no further action, groundwater sampling and analyses would be undertaken to monitor groundwater conditions related to the site. This would be accomplished through the LTGSP. No other remedial actions would be undertaken to clean up the site and there would be no site access restrictions.
INSTITUTIONAL CONTROLS	
Institutional Controls (ETC-8/ETC-10/FTA-1)	ICs are legal or administrative controls restricting the use of property and warning of hazards or other site limitations.

Notes

CB	comprehensive basewide	IC	institutional control
ETC	Earth Technology Corporation	LTGSP	long-term groundwater sampling program
FFS	focused feasibility study	SVE	soil vapor extraction
FTA	fire training area	SVOC	semivolatile organic compound

Groundwater Remedy Update

CB RI/FS – Part 2 data assessments and agency comments received during document review identified the need for groundwater use restrictions for the Main Base and Castle Vista Plumes until groundwater cleanup is attained per the CB ROD – Part 1 (cleanup to MCLs). The need for and the form of such restrictions for the Main Base and Castle Vista Plumes were not identified in the CB ROD – Part 1. For the remaining plumes (Table 1), ICs were identi-

fied in the CB ROD – Part 1 or are no longer needed due to cleanup of the plume. ICs, in the form of groundwater use restrictions applied as a restrictive deed covenant or through regulatory and administrative controls, will be required for property underlain by groundwater with contaminant concentrations exceeding MCLs. Generally, the deed covenant will apply to Castle Airport parcels that have underlying groundwater contamination and are transferred to

private ownership. For existing private parcels that have underlying groundwater contamination, regulatory and administrative controls would be used to restrict groundwater use. ICs are the only viable alternative; no other alternatives are considered.

Based on groundwater monitoring, plume capture is not practical south of the Base due to pumping of municipal well AM18. The groundwater remedy will be updated to include wellhead treatment within the plume and at AM18, if necessary.

EVALUATION OF ALTERNATIVES

Nine criteria to be used for evaluation of alternatives for cleanup of CERCLA sites were established in the ***National Oil and Hazardous Substances Contingency Plan (NCP)*** (Table 4). The criteria are grouped into three categories: threshold criteria, balancing criteria and modifying criteria. Threshold and balancing criteria were used during the FS and FFS processes. Modifying criteria will be considered after comments on this proposed plan have been received and given an appropriate response.

In order to satisfy the threshold criteria, a remedial alternative must:

- Be protective of human health and the environment
- Comply with all ***applicable and/or relevant and appropriate requirements (ARARs)***

All remedial alternatives that satisfy the threshold criteria are then compared based on the following

balancing criteria:

- Long-term effectiveness
- Reduction of toxicity, mobility and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Implementing the balancing criteria will generally indicate a technically and economically preferable alternative. However, in many cases the apparent preference for one alternative over another may not be significant. Also, the best alternative technically and economically may have other drawbacks. In these instances, modifying criteria are used to distinguish among alternatives that are otherwise closely ranked:

- State acceptance
- Community acceptance

ETC-8 Removal Action and Focused Feasibility Study

The preferred remedy specified for ETC-8 in the SCOU Proposed Plan (1997) was excavation and on-site disposal. In June 2000, the Air Force excavated and disposed of approximately 2,200 cubic yards of PAH-impacted soil in the on-site consolidation landfills (Landfills 4 and 5). The removal action achieved residential RAOs; however, PAH-impacted soil remains beneath the asphalt-paved road that bisected the site. To address the residual contamination, an FFS was completed for ETC-8 as part of the CB RI/FS – Part 2 (2002). Three alternatives were considered: no action, additional excavation and off-

site disposal, and ICs. ICs were identified as the preferred alternative since the roadway was expected to remain intact. However, there was minimal difference in scoring (threshold and balancing criteria) between the ICs and additional excavation and disposal alternatives. Given the demolition of buildings and paved areas in the ETC-8 area and to better meet the community desire for unrestricted use of as much of Castle Airport as possible, the Air Force will maintain the original preferred alternative of excavation and disposal, but with off-site rather than on-site disposal.

Table 4
U.S. Environmental Protection Agency Evaluation Criteria

THRESHOLD CRITERIA
<p>Overall Protection of Human Health and the Environment – Addresses whether or not a cleanup option provides adequate protection and describes how risks, posed through each pathway, are eliminated, reduced, or controlled through treatment, engineering controls or institutional controls.</p> <p>Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) – Addresses whether a cleanup option will meet all ARARs and/or provide grounds for invoking a waiver.</p>
BALANCING CRITERIA
<p>Long-Term Effectiveness or Permanence – Refers to the ability of a cleanup option to maintain reliable protection of human health and the environment, over time, once cleanup goals (i.e. remedial action objectives) have been met.</p> <p>Reduction of Toxicity, Mobility and Volume through Treatment – Refers to the anticipated ability of a cleanup option to reduce the toxicity, mobility and volume of the hazardous components present at the site.</p> <p>Short-Term Effectiveness – Addresses the period of time needed to complete the cleanup option, and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until the cleanup goals (i.e. remedial action objectives) are achieved.</p> <p>Implementability – Refers to the technical and administrative feasibility of a cleanup option, including the availability of materials and services needed to carry out a particular option.</p> <p>Cost – Refers to the estimated capital and operation and maintenance costs of each option. For comparison purposes, a present worth value was calculated using a 5 percent discount factor.</p>
MODIFYING CRITERIA
<p>State Acceptance – indicates whether, based on its review of the information, the state concurs with, opposes, or has no comment on the preferred cleanup options.</p> <p>Community Acceptance – Indicates whether community concerns are addressed by the cleanup option and whether or not the community has a preference for a cleanup option.</p>

ETC-10 Removal Action and Focused Feasibility Study

The preferred remedy specified for ETC-10 in the SCOU Proposed Plan (1997) was excavation and on-site disposal. Starting in July 1997, the Air Force excavated and disposed of approximately 5,000 cubic yards of PAH- and metals-impacted soil in the on-site consolidation landfills (Landfills 4 and 5). Prior to excavation, a decision was made that occupational RAOs were appropriate for ETC-10 because the site is located within property transferred to the Federal Bureau of Prisons in 1997 and would not be accessible to the public. Because the occupational RAO was used, the remaining lead in soil exceeds the allowable levels for unrestricted use. To address the residual lead contamination, an

FFS was completed for ETC-10 as part of the CB RI/FS – Part 2 (2002). Similar to ETC-8, three alternatives were considered: no action, additional excavation and off-site disposal, and ICs. ICs were identified as the preferred alternative because it was the only alternative that satisfied both of the threshold criteria. The no action alternative would not provide overall protection of human health. The additional excavation and off-site disposal alternative would not meet ARARs because ETC-10 is currently within a wetland preserve (i.e., no disturbance allowed) that is strictly controlled under a Wetlands Mitigation and Management Plan approved by the United States Fish and Wildlife Service and implemented by

the Bureau of Prisons. Given the existing limited access to ETC-10 and the Bureau of Prisons property, the ICs preferred alternative will provide additional protection of human health and the environment without damaging the wetland area.

FTA-1 Removal Action and Focused Feasibility Study

An SVE removal action for VOCs and fuels in soil, consisting of installation of an SVE treatment system and a cap over the site to enhance SVE operation, was implemented at FTA-1 in 1996. Over forty vapor extraction and monitoring wells were installed. The cap helped the SVE system perform more effectively by eliminating inflow of surface air within the area of vapor extraction. In addition, the cap acted as a barrier to (1) protect surface and groundwater by preventing rainwater from contacting contaminated soil at FTA-1; and (2) protect potential human and ecological receptors from direct contact with the contamination in shallow soil. The SVE system was started in November 1996 and operated more or less continuously until December 1999. The system was off for much of 2000 but since restart in December 2000 has again operated more or less continuously to the present. Through the end of 2002 the system has removed approximately 64,000 pounds of VOCs and fuel compounds. Eventually, SVE will cease at FTA-1 and *bioventing* will be used to complete fuels remediation.

The preferred remedy specified for FTA-1 in the SCOU Proposed Plan (1997) was SVE, bioventing, containment (solidification and stabilization) and ICs. The regulatory agencies accepted the SVE and bioventing aspects of the preferred remedy as implemented by the removal action described above. However, the agencies requested that an FFS be conducted to consider additional alternatives for non-VOC contamination. In response, an FFS for non-VOC contamination at FTA-1 was completed in early 2002 and the results subsequently incorporated into the CB RI/FS – Part 2. Three alternatives were considered: capping with ICs, excavation and off-site disposal, and *ex situ solidification and stabilization* with ICs. The no

action alternative was not evaluated because it had previously been evaluated and rejected in the SCOU FS. Capping with ICs to ensure long-term cap integrity was identified as the preferred alternative for non-VOC contamination at FTA-1. The one drawback for the capping alternative is that contaminated soil will remain on site. This drawback is significantly reduced by the fact that FTA-1 is on Bureau of Prisons property and within the wetlands preserve that is strictly controlled under a Wetlands Mitigation and Management Plan approved by the United States Fish and Wildlife Service and implemented by the Bureau of Prisons. Also, the existing cap installed as part of the SVE removal action meets all requirements of the cap specified for non-VOC contamination in the FFS. The only additional activity required is the excavation and off-site disposal of about 150 cubic yards of soil not covered by the existing cap. This soil exceeds ecological RAOs and would be a potential hazard to ecological receptors in the adjacent wetlands.

Ecological Focused Feasibility Study

To address the remaining ecological risks at ETC-10, ETC-12, FTA-1, LF-3 and LF-5, an ecological FFS was completed as part of the CB RI/FS – Part 2. Three alternatives were considered: no action, excavation and restoration, and long-term monitoring. Long-term monitoring was selected as the preferred alternative. Monitoring would involve sampling to assess the biological health of associated wetlands every five years for a 30-year period, beginning in 2006. Results of each monitoring event would be evaluated and incorporated into Castle's Five-Year Review reports. This evaluation would include an assessment of the wetland's health, as well as recommendations for any necessary action due to the observation of any ecological problems. Only threshold criteria were employed in the FFS because only the long-term monitoring alternative would provide overall protection of the environment. The no action alternative offered no protection; the excavation and restoration alternative might ultimately be protective, but recent monitoring data and experience with wetlands restoration indicate a low probability for successful restoration.

Groundwater Remedies

ICs are the only viable alternative for temporary (until groundwater cleanup is completed to MCLs) groundwater use restrictions. The ICs will be implemented through a restrictive deed covenant on Castle Airport parcels and through regulatory and administrative controls for off-base private parcels.

Based on groundwater monitoring, plume capture is not practical south of the Base due to pumping of municipal well AM18. The only practical groundwater remedy is wellhead treatment within the plume and at AM18, if necessary.

PREFERRED ALTERNATIVES

Based on the information currently available, the Air Force, EPA and DTSC believe the preferred alternatives presented in this Proposed Plan meet threshold criteria and, where considered, provide the best balance among the other alternatives considered with respect to balancing and modifying criteria. The Air Force, EPA and DTSC believe the preferred alternatives are protective of human health and the environment, will comply with ARARs, are cost-effective and utilize permanent solutions and alternative treatment technologies to the maximum extent possible. Where practical (SVE and bioventing for VOC and fuel contamination at FTA-1), the

preferred alternatives treat the source materials constituting principal threats and satisfy the preference for treatment as a principal element. The preferred alternatives can change in response to public comment or new site information.

This Proposed Plan addresses: (1) the preferred alternative for soil contamination at three sites; (2) the preferred alternative for ecological risks at 233 sites; and (3) groundwater use restrictions and wellhead treatment. These preferred alternatives are presented below and in Table 5.

Soil Contamination

The *selected remedy* for the soil sites will be established in the SCOU ROD Part 3.

ETC-8. Excavation and off-site disposal is the preferred alternative to address PAH-impacted soil at ETC-8.

ETC-10. The ICs alternative is the preferred alternative for lead in soil at ETC-10. Lead in site soil meets occupational but not residential RAOs. Additional excavation would do more harm than benefit to wetlands associated with ETC-10 and controls are already in place that restrict human access and site reuse.

FTA-1. SVE and bioventing remain the preferred alternative for VOC and fuels contamination at FTA-1. An SVE removal action is ongoing. The preferred alternative for non-VOC contamination is capping with ICs. The capping alternative includes maintenance and monitoring to ensure long-term cap integrity. The only additional activity required is the excavation and off-site disposal of about 150 cubic yards of soil not covered by the existing cap. This soil exceeds ecological RAOs and would be a potential hazard to plants and animals in the adjacent wetlands.

Ecological Risks

Long-term monitoring is the preferred alternative for ecological risks at ETC-10, ETC-12, FTA-1, LF-3 and LF-5. The selected remedy for ecological risks at these sites will be established in the SCOU ROD Part 3. The ERA determined the preferred alternative for ecological risks at the remaining 228 SCOU sites to be NFA.

For LF-5, the preferred alternative for ecological risks is in addition to preferred alternatives in the SCOU Proposed Plan (consolidation and capping, completed; long-term maintenance and monitoring, ongoing; institutional controls).

Groundwater Remedies

ICs are the preferred alternative for groundwater use restrictions on the Main Base and Castle Vista Plumes until groundwater cleanup is attained per the CB ROD – Part 1 (cleanup to MCLs). The selected remedy for groundwater use restrictions will be established in the CB ROD – Part 2.

In addition to the groundwater remedy established in the CB ROD – Part 1, wellhead treatment within the plume and at AM18, if necessary, is the preferred alternative for groundwater cleanup.

Site (Grid) ¹	Historical Use	Primary Contaminants	Issue	Preferred Alternative
ETC-8 (M9)	Skeet shooting range	Polynuclear aromatic hydrocarbons	Human health risk	Excavation and off-site disposal
ETC-10 (L15)	Skeet shooting range	Lead	Human health and ecological risk	Institutional controls; long-term ecological monitoring
ETC-12 (H15)	Disposal area	Metals	Ecological risk	Long-term ecological monitoring
FTA-1 (L15)	Fire training area	Metals	Human health risk, water quality, ecological risk	Excavation and off-site disposal; long-term cap and monitoring; long-term ecological monitoring; institutional controls
LF-3 (K16)	Landfill	Metals (primarily lead) and polynuclear aromatic hydrocarbons	Ecological risk	Long-term ecological monitoring
LF-5 (F11)	Landfill	Metals	Ecological risk	Long-term ecological monitoring
Groundwater Plume Areas (Main Base and Castle Vista)	–	Trichloroethene or <i>cis</i> -1,2-dichloroethene	Human health risk	Institutional controls; wellhead treatment
228 Sites Evaluated for Ecological Risk	–	–	–	NFA (based on minimal ecological risks or lack of habitat)

Note: ¹ For site locations see Plate 1; groundwater use restrictions apply to the Main Base and Castle Vista groundwater plume areas shown on Plate 1.

COMMUNITY PARTICIPATION

Restoration Advisory Board

The Community Relations Plan for Castle Airport was completed in 1990 and updated, by Castle Airport's Office of Public Affairs, in 1992, 1995 and 1997. Consistent with the plan, the Air Force established a **Restoration Advisory Board (RAB)** composed of representatives from the Air Force, EPA, DTSC, Merced County and local communities.

The RAB meets quarterly to provide the community representatives with up-to-date information on base cleanup activities. Castle Airport also publishes and distributes "CleanUpdate," a community newsletter that helps keep the community informed of recent activities.

Public Hearing and Comment Information

In accordance with the Castle Airport Community Relations Plan and the requirements of CERCLA, the public is invited to review and submit comments on the Comprehensive Basewide Proposed Plan – Part 2. The comment period will begin on December 3, 2003 and end on January 5, 2004. Written comments should be sent to Mr. Greg Gangnuss at the address listed in the Public Comment Period inset box on the first page. A public meeting will be held on Wednesday, December 10, 2003 at which representatives from the

Air Force, EPA, and DTSC will be present to answer questions about Castle Airport and the remedial alternatives under consideration. Public comments can be submitted either in writing or orally at the public meeting. Written comments must be post-marked no later than January 5, 2004 for consideration and official response. The public may use the pre-addressed form attached to this document to submit comments. Written comments sent by mail and oral comments presented at the public meeting will be equally considered.

Information Repository Location and Hours	
Purpose	Contains all documents relevant to the Proposed Plan
Location 1	Merced County Library 2100 "O" Street Merced, California 95340 (209) 385-7643
Hours	Tuesday 12:00 p.m. – 8:00 p.m.
	Wednesday 12:00 p.m. – 8:00 p.m.
	Thursday 12:00 p.m. – 8:00 p.m.
	Friday 12:00 p.m. – 6:00 p.m.
	Saturday 12:00 p.m. – 6:00 p.m.
Location 2	Castle Airport 4500 North Hospital Road Atwater, California 95301
Hours	Monday through Friday 8:00 a.m. – 5:00 p.m. Call (209) 726-4300 for an appointment to access the records.

The Air Force will prepare written responses to all substantive comments received pertaining to this Comprehensive Basewide Proposed Plan – Part 2. Responses to the public comments will be provided to the RAB. A summary of the responses will be included in the **Responsiveness Summary** of the SCOU ROD Part 3 and the CB ROD – Part 2, which, following publication will be made available in the Information Repository.

It should be noted that the preferred alternatives described herein may be modified or other alternatives may be selected based on public comments. Final remedies will not be selected until the public comment period has ended and all comments received are considered and responded to appropriately.

Points of Contact for Questions on this Proposed Plan

<p>Ms. Linda Geissingner AFRPA Regional Public Affairs Officer 3411 Olson Street McClellan Park, CA 95652 (800) 655-7200, ext. 109</p>	<p>Ms. Viola Cooper Community Involvement Coordinator SFD-8-3 USEPA Region 9 75 Hawthorne Street San Francisco, CA 94105 (415) 972-3243</p>	<p>Ms. Kim Rhodes Public Participation Specialist Department of Toxic Substances Control 8800 Cal Center Drive Sacramento, CA 95826 (916) 255-3651</p>
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GLOSSARY OF TERMS

Administrative Record – A collection of all information used by the Air Force to make decisions on the selection of a response action under CERCLA. This record is to be available for public review and a copy established at or near the site, usually at one of the information repositories.

ARAR - Applicable or Relevant and Appropriate Requirement – The set of federal and state laws and regulations that govern remedial actions and their associated activities. Selected remedies must comply with ARARs although in some instances individual ARARs may be waived.

Bioventing – A remedial technology that blows air below the ground surface to promote the growth of microorganisms that feed on and break down contaminants. At Castle Airport, bioventing is generally applied to fuels contamination.

CERCLA - Comprehensive Environmental Response, Compensation and Liability Act – Federal law passed in 1980, and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA), that governs the investigation and remediation of certain hazardous waste sites.

CB - Comprehensive Basewide – The integrated soil and groundwater cleanup program at Castle Airport.

cis-1,2-Dichloroethene (cis-1,2-dichloroethylene) – A volatile organic compound (VOC) that is a degradation product of trichloroethene (TCE) or tetrachloroethene (PCE).

DTSC - California Department of Toxic Substances Control – The agency responsible for implementing California laws and regulations regarding remediation of hazardous waste sites.

EPA - United States Environmental Protection Agency – The agency responsible for implementing federal environmental laws and regulations regarding

cleanup of hazardous waste sites and other environmental risks.

ERA - Ecological Risk Assessment – An evaluation of risks to habitat and biological receptors (plants and animals) associated with potential exposure to contaminants.

Ex-Situ Solidification and Stabilization – Remedial process in which contaminated soil is dug up, treated with additives to immobilize the contaminants, and put back in place.

FFS - Focused Feasibility Study – A feasibility study of limited scope and scale. Conducted when previous investigations or existing information limit the number of remedial alternatives and/or the criteria that can be used to assess alternatives.

HHRA - Human Health Risk Assessment – An evaluation of risks to human health associated with potential exposure to contaminants.

IC - Institutional Control – Legal or administrative controls or restrictions on specified actions.

MCL - Maximum Contaminant Level – A standard (maximum allowable concentration) for individual contaminants established by the federal government under the Safe Drinking Water Act (SDWA) or by states under their approved program equivalent to the SDWA.

NCP - National Oil and Hazardous Substances Contingency Plan – The federal regulation that guides determination of the sites to be corrected under the CERCLA program.

NFA - No Further Action – A determination that a site does not pose a significant threat to human health, the environment, or groundwater quality and thus does not require any further remedial action.

GLOSSARY OF TERMS

NPL - National Priorities List – A nationwide list of priority hazardous substance sites identified under the NCP.

OU - Operable Unit – A defined site or sites consolidated for analysis and remedial action under CERCLA.

PCE - Tetrachloroethene (tetrachloroethylene) – A volatile organic compound (VOC) that is used as a solvent in industrial and dry cleaning operations.

Phase 3 – The final phase of a sequence of actions implemented to achieve cleanup of the Main Base Plume. Phase 1 involved OU-1 plant upgrades (1996), Phase 2 involved construction of a groundwater treatment system focused on deeper groundwater (1997), while Phase 3 added additional extraction wells and expanded the treatment capacity of the Phase 2 system (2000).

Preferred Alternative – The action recommended by the lead agency for the cleanup of a contaminated site. The preferred alternative is developed during the RI/FS process and is presented in the Proposed Plan.

Proposed Plan – A public participation document that summarizes the findings of a Remedial Investigation/Feasibility Study, presents recommended remedial alternatives, and solicits public review and input on the preferred alternatives.

RAB - Restoration Advisory Board – Citizens' group advising the Air Force on community concerns related to environmental restoration of a base.

RAO - Remedial Action Objective – Cleanup standard, concentration, or limit established as protective of human health and the environment, including groundwater quality.

Removal Action – A short-term action implemented to clean up a site that poses an immediate threat to human health, the environment or groundwater quality.

Responsiveness Summary – A summary of oral and written public comments received during a comment period on key CERCLA documents, and lead agency responses to those comments.

RI/FS – Remedial Investigation/Feasibility Study – A study conducted to gather the data necessary to (1) determine the nature and extent of site contamination and associated risks, (2) establish recommended cleanup criteria, (3) identify potential remedial

alternatives, and (4) select preferred alternatives based on technical and cost analyses.

ROD - Record of Decision – A ROD documents the remedial action plan for a site or an operable unit. A ROD has three purposes: 1) certifies that the remedy selection was carried out in accordance with CERCLA and National Oil and Hazardous Substances Pollution Contingency Plan requirements; 2) outlines engineering components and remedial goals of the selected remedies; and 3) provides the public with a source of information on the site/operable unit and the rationale behind the selected remedy.

RWQCB - California Regional Water Quality Control Board – Agency responsible for protecting the waters of the State of California.

SCOU - Source Control Operable Unit – The operable unit established to identify, investigate and remediate surface and subsurface soil contamination sites at Castle Airport.

Selected Remedy – The action selected by the lead agency for the cleanup of a contaminated site. The selected remedy is chosen following public and regulatory agency input on the preferred alternative presented in the Proposed Plan. The selected remedy is presented in a ROD.

SVE – Soil Vapor Extraction – A remedial technology that extracts air containing contaminants (volatiles) from the vadose zone. If necessary to meet air quality standards, the extracted vapors are treated above ground to remove the contaminants. At Castle Airport, SVE is generally applied to solvent/VOC contamination.

TCE - Trichloroethene (trichloroethylene) – A volatile organic compound (VOC) that is used as a solvent in industrial and dry cleaning operations.

Vadose Zone – That portion of the soil column that is not permanently saturated with water. In general, the vadose zone includes soil between the land surface and the water table.

VOC - Volatile Organic Compound – Organic chemical compounds that readily evaporate.

WQSA - Water Quality Site Assessment – An evaluation of potential impact to groundwater resulting from soil contamination.

**Table 2
Remedies and Records of Decision for SCOU Sites**

Site (Linked Sites or Group)	Grid Location ¹	Selected Remedy	Record of Decision
B23	P10	NFA	SCOU-1
B47	R11	NFA	SCOU-1
B51 (B51 Group)	R11	SVE	SCOU-2
B52 (B51 Group)	R11	SVE	SCOU-2
B53 (B51 Group)	R12	SVE	SCOU-2
B54 (B54 Group)	R12	SVE	SCOU-2
B59 (PFFA Group)	S12	Exempt ²	SCOU-1
B79 (PFFA Group)	S12	Exempt ²	SCOU-1
B84 (ST-T85, SWMU 4.25)	R11	NFA	SCOU-1
B175 (SWMUs 4.7, 4.8)	P10	Exempt ²	SCOU-1
B325 (SWMUs 4.9, 4.10, 4.11, and 4.35)	R11	Exempt ²	SCOU-1
B508 (PFFA Group)	S12	Exempt ²	SCOU-1
B541	S10	NFA	SCOU-1
B545 (B547)	S10	NFA	SCOU-1
B547 (B545)	S10	NFA	SCOU-1
B551	S11	Exempt ²	SCOU-1
B871	T11	NFA	SCOU-1
B909 (PFFA Group)	S12	Exempt ²	SCOU-1
B917 (PFFA Group)	S12	Exempt ²	SCOU-1
B950 (DA-1/TCC-1, B951)	T13	Exempt ²	SCOU-1
B951 (DA-1/TCC-1, B950)	T13	Exempt ²	SCOU-1
B1182 (SWMU 4.24)	Q8	NFA	SCOU-1
B1204 (B1205)	M8	NFA	SCOU-1
B1205 (B1204, ST-1206)	M8	NFA	SCOU-1
B1207	M8	NFA	SCOU-1
B1253 (B51 Group)	R12	SVE	SCOU-2
B1260 (B54 Group)	R12	SVE	SCOU-2
B1266 (B54 Group)	S12	SVE	SCOU-2
B1314 (DA-4)	K8	SVE	SCOU-2
B1319 (SWMU 4.34)	L9	NFA	SCOU-1
B1324 (SWMUs 4.19 and 4.36)	N10	Exempt ²	SCOU-1
B1325/HWS-3 (STA-36, STA-37)	N10	Exempt ²	SCOU-1
B1335	P11	NFA	SCOU-1
B1344	P11	NFA	SCOU-1
B1350 (SWMU 4.31)	Q12	SVE	SCOU-2
B1404 (STA-19)	L10	NFA	SCOU-1
B1405	L10	NFA	SCOU-1
B1529 (DA-5)	Q12	NFA	SCOU-1
B1532 (SWMU 4.32)	R12	NFA	SCOU-2
B1541 SWMU 4.23)	Q13	NFA	SCOU-2
B1550 (DA-8, SS-6, SS-7)	R13	NFA	SCOU-1
B1560	Q14	Exempt ²	SCOU-1
B1562	R13	NFA	SCOU-1
B1709	L13	SVE	SCOU-2
B1762	K13	SVE	SCOU-2
B1865/1868	K14	Exempt ²	SCOU-1
CVLF-A	W5	NFA	SCOU-1
CVLF-B	U4	NFA	SCOU-1
DA-1/TCC-1 (B950, B951)	T13	Exempt ²	SCOU-1
DA-2	M10	NFA	SCOU-1
DA-3 (SA-B1)	T11	NFA	SCOU-1

**Table 2
Remedies and Records of Decision for SCOU Sites**

Site (Linked Sites or Group)	Grid Location ¹	Selected Remedy	Record of Decision
DA-4 (B1314)	K8	SVE/E&D	SCOU-2
DA-5 (B1529; SWMUs 4.1, 4.20, 4.21, 4.3 and 4.38)	Q13	SVE/E&D/BV	SCOU-2
DA-6	T12	Exempt ²	SCOU-1
DA-7 (PFFA Group)	S12	Exempt ²	SCOU-1
DA-8 (B1550, SS-6, SS-7, SWMU 4.33)	R13	NFA	SCOU-1
DBF (SWMU 4.28)	H14	NFA	SCOU-1
DP-1 (LF-1)	V13	NFA	SCOU-1
DP-2 (LF-1)	U13	NFA	SCOU-1
DP-3 (LF-1)	U13	NFA	SCOU-1
DP-4A/4B	T13	NFA	SCOU-1
DP-7 (LF-5)	F10	NFA	SCOU-1
DP-10 (LF-5)	G12	NFA	SCOU-1
ETC-2	T13	NFA	SCOU-1
ETC-3	S13	NFA	SCOU-1
ETC-4 (ST-T61/HWS-1)	S12	Exempt ²	SCOU-1
ETC-5 (B54 Group)	S12	SVE	SCOU-2
ETC-6	R10	NFA	SCOU-1
ETC-7	P9	NFA	SCOU-1
ETC-11	J16	NFA	SCOU-1
ETC-12 (ETC-13)	H15	NFA	SCOU-1
ETC-13 (ETC-12)	G12	NFA	SCOU-1
F-1 (F-2 and F-3)	L10	NFA	SCOU-1
F-2 (F-1 and F-3)	M10	NFA	SCOU-1
F-3 (F-1 and F-2)	M10	NFA	SCOU-1
F-4 (F-5 and F-6)	Q11	SVE	SCOU-2
F-5 (F-4 and F-6)	Q11	NFA	SCOU-1
F-6 (F-4 and F-5)	P12	NFA	SCOU-1
FR	L16	NFA	SCOU-1
FS-1 (STA-24)	L11	Exempt ²	SCOU-1
FS-2	K9	Exempt ²	SCOU-1
FS-3	H8	Exempt ²	SCOU-1
FS-4	L10	Exempt ²	SCOU-1
FTA-2	J7	NFA	SCOU-1
FTA-3	K8	Exempt ²	SCOU-1
H-1	S8	NFA	SCOU-1
H-2	S8	NFA	SCOU-1
H-3	S9	NFA	SCOU-1
H-4	R9	Exempt ²	SCOU-1
HWS-4 (SWMU 4.2)	K8	NFA	SCOU-1
IWL (SWMU 4.37)	- ³	NFA	SCOU-1
JP4 Fuel Line	- ³	Exempt ²	SCOU-1
JP7	R12/R13	Exempt ²	SCOU-1
LF-1 (DP-1, DP-2 and DP-3)	U13	NFA	SCOU-1
LF-2	S14/T14	NFA	SCOU-1
LF-3	K16	NFA	SCOU-1
LG-1	T12	NFA	SCOU-1
N-2 through N-10	H&J/12&13	NFA	SCOU-1
PCB-1,2,3 (HWS-6)	M8	NFA	SCOU-1
PCB-4	S11	NFA	SCOU-2
PCB-5	R10	NFA	SCOU-2
PCB-6	T11	NFA	SCOU-2

**Table 2
Remedies and Records of Decision for SCOU Sites**

Site (Linked Sites or Group)	Grid Location ¹	Selected Remedy	Record of Decision
PCB-7	L16	NFA	SCOU-1
PCB-8	R11	NFA	SCOU-1
PCB-9	N9	NFA	SCOU-1
PFFA (PFFA Group)	S12	Exempt ²	SCOU-1
SA-B1 (DA-3)	T11	NFA	SCOU-1
SA-B2 (SA-B4)	T13	NFA	SCOU-1
SA-B3 (B54 Group)	R12	SVE	SCOU-2
SA-B4 (SA-B2)	P12	NFA	SCOU-1
SDS-A1/A2	- ³	NFA	SCOU-1
SS-1	Q10	NFA	SCOU-1
SS-2	Q10	SVE	SCOU-2
SS-3	Q12	NFA	SCOU-1
SS-4	R12	SVE	SCOU-2
SS-5	R13	NFA	SCOU-1
SS-6 (B1550, DA-8, SS-7)	R13	NFA	SCOU-1
SS-7 (B1550, DA-8, SS-6)	R13	NFA	SCOU-1
SS-8 (PFFA Group)	S12	Exempt ²	SCOU-1
SS-9	Q11	NFA	SCOU-1
ST-1201	M8	NFA	SCOU-1
ST-1206 (B1205)	M8	NFA	SCOU-1
ST-1571 (SWMU 4.22)	R14	NFA	SCOU-1
ST-55 (B54 Group)	R12	SVE	SCOU-2
STA-1 (STA-11/41)	H8	Exempt ²	SCOU-1
STA-2 (STA-11/41)	H7	Exempt ²	SCOU-1
STA-3 (STA-11/41)	H8	Exempt ²	SCOU-1
STA-4 (STA-11/41)	J7	Exempt ²	SCOU-1
STA-5 (STA-11/41)	J8	Exempt ²	SCOU-1
STA-6 (STA-11/41)	J8	Exempt ²	SCOU-1
STA-7 (STA-11/41)	J8	Exempt ²	SCOU-1
STA-8 (STA-11/41)	J8	Exempt ²	SCOU-1
STA-9 (STA-11/41)	J9	Exempt ²	SCOU-1
STA-10 (STA-11/41)	J8	Exempt ²	SCOU-1
STA-11 (STA-11/41)	J9	Exempt ²	SCOU-1
STA-12 (STA-11/41)	K8	Exempt ²	SCOU-1
STA-13 (STA-11/41)	K9	Exempt ²	SCOU-1
STA-14 (STA-11/41)	K9	Exempt ²	SCOU-1
STA-15 (STA-11/41)	K9	Exempt ²	SCOU-1
STA-16 (STA-11/41)	K9	Exempt ²	SCOU-1
STA-17 (STA-11/41)	K9	Exempt ²	SCOU-1
STA-18 (STA-11/41)	K9	Exempt ²	SCOU-1
STA-19 (B1404)	K10	Exempt ²	SCOU-1
STA-20 (STA-11/41)	L9	Exempt ²	SCOU-1
STA-21 (STA-11/41)	L9	Exempt ²	SCOU-1
STA-22 (STA-11/41)	L10	Exempt ²	SCOU-1
STA-23 (STA-11/41)	L10	Exempt ²	SCOU-1
STA-24 (FS-1)	L10	Exempt ²	SCOU-1
STA-25 (STA-11/41)	L10	Exempt ²	SCOU-1
STA-26 (STA-11/41)	L10	Exempt ²	SCOU-1
STA-27 (STA-11/41)	M10	Exempt ²	SCOU-1
STA-28 (STA-11/41)	M11	Exempt ²	SCOU-1
STA-29 (STA-11/41)	M10	Exempt ²	SCOU-1

Table 2
Remedies and Records of Decision for SCOU Sites

Site (Linked Sites or Group)	Grid Location ¹	Selected Remedy	Record of Decision
STA-30 (STA-11/41)	M11	Exempt ²	SCOU-1
STA-31 (STA-11/41)	M10	Exempt ²	SCOU-1
STA-32 (STA-11/41)	M11	Exempt ²	SCOU-1
STA-33 (STA-11/41)	N11	Exempt ²	SCOU-2
STA-34 (STA-11/41)	MB	Exempt ²	SCOU-2
STA-35 (STA-11/41)	MB	Exempt ²	SCOU-2
STA-36 (B1325/HWS-3)	N10	Exempt ²	SCOU-2
STA-37 (B1325/HWS-3)	N10	Exempt ²	SCOU-2
STA-38 (STA-11/41)	N10	Exempt ²	SCOU-2
STA-39 (STA-11/41)	N12	Exempt ²	SCOU-2
STA-40 (STA-11/41)	N12	Exempt ²	SCOU-2
STA-41 (STA-11/41)	P12	Exempt ²	SCOU-2
STA-42 (STA-11/41)	P12	Exempt ²	SCOU-2
STA-43 (STA-11/41)	P13	Exempt ²	SCOU-2
STA-44 (STA-11/41)	F8	Exempt ²	SCOU-2
ST-T61/HWS-1 (ETC-4)	S12	Exempt ²	SCOU-1
ST-T66 (B54 Group)	R12	SVE	SCOU-2
ST-T67 (B54 Group)	R12	SVE	SCOU-2
ST-T85 (B84)	R11	NFA	SCOU-1
SWMU 4.1 (DA-5)	Q13	NFA	SCOU-1
SWMU 4.2 (HWS-4)	K8	NFA	SCOU-1
SWMU 4.3 (DA-5)	Q13	E&D/BV	SCOU-2
SWMU 4.4 (PFFA Group)	S12	E&D	SCOU-2
SWMU 4.5 (PFFA Group)	S12	NFA	SCOU-2
SWMU 4.6 (ETC-5)	S12	E&D	SCOU-2
SWMU 4.7 (B175)	P10	NFA	SCOU-2
SWMU 4.8 (B175)	P10	NFA	SCOU-2
SWMU 4.9 (B325)	R11	NFA	SCOU-1
SWMU 4.10 (B325)	R11	NFA	SCOU-1
SWMU 4.11 (B325)	R11	NFA	SCOU-1
SWMU 4.12	S12	NFA	SCOU-1
SWMU 4.13 (PFFA Group)	S12	NFA	SCOU-1
SWMU 4.14 (B551)	S11	NFA	SCOU-2
SWMU 4.15 (PFFA Group)	S12	NFA	SCOU-2
SWMU 4.16	S13	E&D	SCOU-2
SWMU 4.17 (B54 Group)	R12	NFA	SCOU-2
SWMU 4.18 (B54 Group)	R12	NFA	SCOU-2
SWMU 4.19 (B1324)	N10	NFA	SCOU-1
SWMU 4.20 (DA-5)	Q13	NFA	SCOU-1
SWMU 4.21 (DA-5)	Q12	E&D/BV	SCOU-2
SWMU 4.22 (ST-1571)	R14	E&D	SCOU-2
SWMU 4.23 (B1541)	Q13	NFA	SCOU-2
SWMU 4.24 (B1182)	Q8	NFA	SCOU-1
SWMU 4.25 (B84)	Q8	NFA	SCOU-1
SWMU 4.26 (B51 Group)	R12	NFA	SCOU-1
SWMU 4.27 (B51 Group)	R12	NFA	SCOU-1
SWMU 4.28 (DBF)	H14	NFA	SCOU-1
SWMU 4.29 (B54 Group)	R12	NFA	SCOU-2
SWMU 4.30 (B54 Group)	R12	NFA	SCOU-1
SWMU 4.31 (B1350)	Q12	NFA	SCOU-1
SWMU 4.32 (B1532)	R12	NFA	SCOU-1

Table 2
Remedies and Records of Decision for SCOU Sites

Site (Linked Sites or Group)	Grid Location ¹	Selected Remedy	Record of Decision
SWMU 4.33 (DA-8)	R13	NFA	SCOU-1
SWMU 4.34 (B1319)	L9	NFA	SCOU-1
SWMU 4.35 (B325)	R11	NFA	SCOU-1
SWMU 4.36 (B1324)	N10	NFA	SCOU-1
SWMU 4.37 (IWL)	BWS	NFA	SCOU-1
SWMU 4.38 (DA-5)	Q13	NFA	SCOU-1
UFL-1	R10	Exempt ²	SCOU-1
UFL-2	R12	Exempt ²	SCOU-1
UFL-3	P11	Exempt ²	SCOU-1
UFL-4	N11	NFA	SCOU-1

Notes

¹ see Plate 1

² sites with contamination of a type excluded from consideration under CERCLA but subject to state regulations for groundwater protection

³ basewide infrastructure sites not shown on Plate 1

Remedies

BV	bioventing	NFA	no further action
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	SCOU SVE	source control operable unit soil vapor extraction
E&D	excavation and disposal		

Sites

B	Building	IWL	Industrial Waste Line
HWS	Hazardous Waste Storage Area	JP	Jet Propulsion
CVLFA	Castle Vista Landfill A	LF	Landfill
CVLFB	Castle Vista Landfill B	LG	Lagoon
DA	Discharge Area	N	Ground Disturbance
DBF	Detonation and Burn Facility	PCB	Polychlorinated Biphenyls
DP	Disposal Pit	PFFA	Petroleum Fuel Farm Area
ETC	Earth Technology Corporation Site	SA	Storage Area
F	Aircraft Maintenance Hangar	SDS	Storm Drain System
FR	Firing Range	SS	Sanitary Sewer
FS	Fuel Spill	ST	Structure
FTA	Fire Training Area	STA	Stain
H	Gasoline Station	SWMU	Solid Waste Management Unit
HWS	Hazardous Waste Storage Area	UFL	Underground Fuel Leak

Site Groups

B54	B54, B1260, B1266, ETC-5, SA-B3, ST-55, ST-T66, ST-T67, SWMU 4.17, SWMU 4.18, SWMU 4.29
B51	B51, B52, B53, B1253, SWMU 4.26, SWMU 4.27, SWMU 4.30
PFFA	B59, B79, B508, B909, B917, DA-7, PFFA, SWMU 4.4, SWMU 4.5, SWMU 4.13, SWMU 4.15

PUBLIC COMMENT

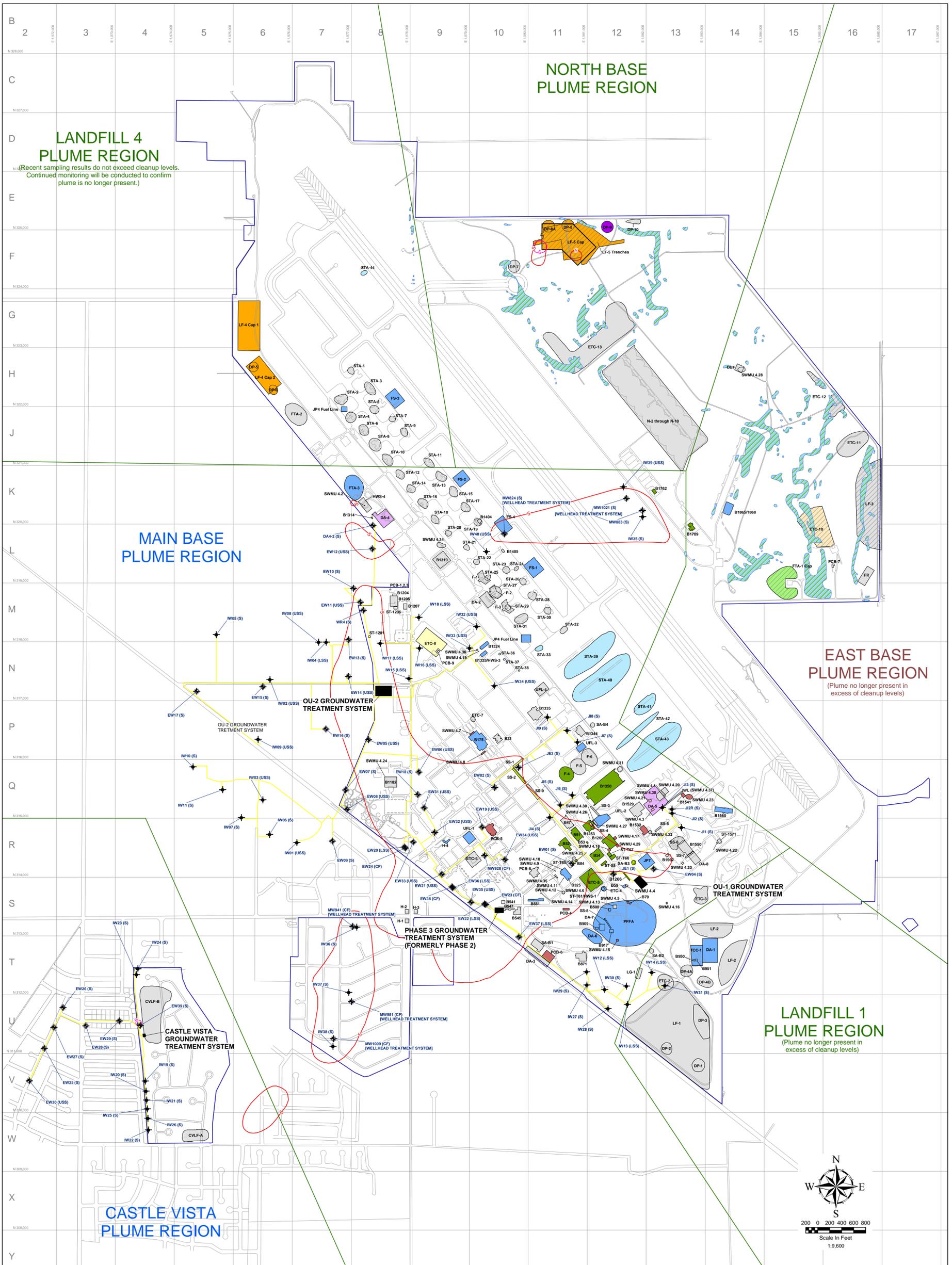


SHEET

Name _____
Address _____
City _____
State _____ Zip _____

PLACE
STAMP
HERE

GREG GANGNUSS
AFRPA/DD/CASTLE
4500 N HOSPITAL RD
ATWATER CA 95301



Legend

- Base Boundary
- MCL Contour for cis-1,2-DCE (6 µg/L) (Q1 2003; Shallow HSZ only)
- MCL Contour for TCE (5 µg/L) (Q1 2003; All HSZs)
- Groundwater Conveyance System
- Groundwater Treatment System
- Extraction Well
- Injection Well
- Wetlands

ROD, Remedy

Plume	CB-1, IC&M	CB	Comprehensive Basewide
Plume	CB-1, P&T	CB-1	CB ROD - Part 1
Plume	CB-1, WD&M	C&C	Consolidation and Capping
	SCOU-1, NFA	CF	Confined HSZ
	SCOU-1, PHO	E&D	Excavation and Disposal
	SCOU-2, CERCLA Exclusion	HSZ	Hydrostratigraphic Zone
	SCOU-2, E&D	IC	Institutional Controls
	SCOU-2, E&D/SVE	IC&M	Institutional Controls and Monitoring
	SCOU-2, NFA	LSS	Lower Subshallow HSZ
	SCOU-2, SVE	LTEM	Long-Term Ecological Monitoring
	SCOU-3, C&C/E&D/IC/LTM/SVE	LTM	Long-Term Cap Monitoring
	SCOU-3, C&C/IC/LTM	NFA	No Further Action
	SCOU-3, E&D	P&T	Pump and Treat
	SCOU-3, IC	PHO	Petroleum Hydrocarbon Only
	SCOU-3, LTEM	ROD	Record of Decision
	SCOU-3, NFA	S	Shallow HSZ
		SCOU	Source Control Operable Unit
		SCOU-1	SCOU ROD Part 1
		SCOU-2	SCOU ROD Part 2
		SCOU-3	SCOU ROD Part 3
		SVE	Soil Vapor Extraction
		USS	Upper Subshallow HSZ
		WD&M	Well Destruction and Monitoring

Sites:

B	Building	LG	Lagoon
CBVF	Castle Vista Landfill	N	Ground Disturbance
DA	Discharge Area	PCB	Polychlorinated Biphenyls
DBF	Detonation and Burn Facility	PPFA	Petroleum Fuel Farm Area
DP	Disposal Pit	SA	Storage Area
ETC	Earth Technology Corporation Site	SDS	Storm Drain System
F	Aircraft Maintenance Hangar	SS	Sanitary Sewer
FS	Fuel Spill	ST	Structure
FTA	Fire Training Area	SWMU	Solid Waste Management Unit
H	Gasoline Service Station	TCC	Test Control Center
HWS	Hazardous Waste Storage Area	UFL	Underground Fuel Leak
IWL	Industrial Waste Line		
JP	Jet Fuel		
LF	Landfill		

Notes:
Basewide Sites (IWL, JP4 Pipeline and SDS) not shown - All are SCOU ROD Part 1 NFA.

Scale: 1:9,600
Scale in Feet

Soil and Groundwater Remedial Actions at Castle Airport
CB Proposed Plan-Part 2
Castle Airport