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**Public Summary: Final Removal Action Landfill Cap Closeout Report
Parcel E-2, Hunters Point Shipyard, San Francisco, California,
February 7, 2005**

On August 16, 2000, a brush fire was reported on the Industrial Landfill portion of Parcel E-2, Installation Restoration Site (IR) 01/21, at Hunters Point Shipyard (HPS) in San Francisco, California. The Navy responded to the fire by installing an interim landfill cap on the burned portion of the Landfill after the surface fire and most of the smoldering subsurface areas were extinguished. The interim landfill cap was designed and constructed to extinguish any remaining subsurface fire and to inhibit the occurrence of fire in the future. The interim cap was placed over the burn area of the Landfill.

The Navy conducted perimeter air monitoring after the surface fire was extinguished and during installation of the interim landfill cap to determine whether any air contaminants from the landfill fire and the subsequent construction activities were migrating to adjacent areas of HPS or the nearby community. Perimeter air monitoring provided analyses on more than 1,700 samples collected from a 7-station monitoring network between September 8, 2000, and March 13, 2001. Nine analytes (arsenic, beryllium, chromium, manganese, chloroform, carbon tetrachloride, benzene, bis[2-ethylhexyl]phthalate, and Aroclor-1260) were intermittently detected at concentrations exceeding perimeter air monitoring plan action limits or U.S. Environmental Protection Agency preliminary remediation goals. These analytes, except Aroclor-1260, were either below detection limits, attributable to background concentrations, or naturally occurring in soil but above PRGs. Subsequent to changes in the construction methods on October 5, 2000, there were no further detections of Aroclor-1260 above action levels.

The cap contains a multilayer system that includes a 2-foot-thick compacted foundation and the following layers from bottom to top: a Geosynthetic Clay Liner, smooth high-density polyethylene synthetic membrane, single-sided geocomposite drainage layer, and 1.5-foot vegetative soil cover. This multilayer system provides a more effective barrier to both air and water than a cap comprising only soil. The Navy began installation of the landfill cap on September 13, 2000, and completed construction of the cap on March 31, 2001. The interim cap was vegetated to stabilize surface soils and prevent erosion.

The interim landfill cap was designed to channel most surface water to a central drainage swale that flows south to the Bay. The new drainage configuration generally followed the existing flow patterns at the site. The final drainage system was enhanced as required to handle the additional flows expected due to the new cap. This enhancement included upgrading existing ditches and installing new ditches. Storm water falling onto the interim cap flows over the completed cap surface, through the storm water control system and south into San Francisco Bay, avoiding contact with landfill waste.

Information Repositories: A complete copy of the "Final Removal Action Landfill Cap Closeout Report, Parcel E-2, Hunters Point Shipyard, San Francisco, California," dated February 7, 2005, is available to community members at:

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A-E CERCLA/RCRA/UST STUDIES AND REMEDIAL DESIGN

CONTRACT NUMBER N68711-00-D-005



Removal Action Landfill Cap Closeout Report Parcel E-2

Hunters Point Shipyard
San Francisco, California

DS.A057.10743

FINAL

February 7, 2005



Department of the Navy
Base Realignment and Closure
Program Management Office West
1230 Columbia Street, Suite 1100
San Diego, California 92101

A-E Services Contract Number N68711-00-D-0005
Delivery Order 057

Final

REMOVAL ACTION LANDFILL CAP CLOSEOUT REPORT

Parcel E-2, Hunters Point Shipyard
San Francisco, California

February 7, 2005

Prepared for



DEPARTMENT OF THE NAVY
Base Realignment and Closure
Program Management Office West
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A handwritten signature in blue ink, appearing to read "Stan Ali".

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B	Responses to Regulatory Agency Comments on the Draft Final Removal Action Landfill Cap Closeout Report

ATTACHMENTS

- A [Perimeter Air Monitoring Report](#)
(Note: Due to size, this attachment is provided on separately CD-ROM only.)
- B [2000-2001 Closure Construction As-Built Report, Hunters Point Shipyard, Parcel E, IR-01/21 Interim Landfill Cap](#)
(Note: Due to size, this attachment is provided on separately CD-ROM only.)
- C [Documentation of Waste Disposed Off Site](#)
(Note: Due to size, this attachment is provided on separately CD-ROM only.)

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ACRONYMS AND ABBREVIATIONS

AAMP	Ambient air monitoring plan
ARAR	Applicable or relevant and appropriate requirement
ATSDR	Agency for Toxic Substances and Disease Registry
Bay	San Francisco Bay
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CCR	<i>California Code of Regulations</i>
City	City of San Francisco
FS	Feasibility study
EPA	U.S. Environmental Protection Agency
GCL	Geosynthetic clay liner
GSE	GSE Lining Technology, Inc.
HDPE	High-density polyethylene
HPS	Hunters Point Shipyard
IT	International Technology Corporation
IR	Installation Restoration Site
lb/acre	Pounds per acre
Navy	U.S. Department of the Navy
NPDES	National Pollutant Discharge Elimination System
PAMP	Perimeter air monitoring plan
PAMR	Perimeter air monitoring report
PCB	Polychlorinated biphenyl
PRG	Preliminary remediation goal
RI	Remedial investigation
SVOC	Semivolatile organic compound
Triple A	Triple A Machine Shop, Inc.
Tetra Tech	Tetra Tech EM Inc.
UCSF	University of California, San Francisco
VOC	Volatile organic compound
VSC	Vegetated soil cover

1.0 INTRODUCTION

On August 16, 2000, a brush fire was reported on the Industrial Landfill portion of Parcel E-2, Installation Restoration Site (IR) 01/21, at Hunters Point Shipyard (HPS) in San Francisco, California (U.S Department of the Navy [Navy] 2000). The Navy responded to the fire by installing an interim landfill cap on the burned portion of the Landfill after the surface fire and the smoldering subsurface areas were extinguished. The interim landfill cap was designed and constructed to extinguish any remaining subsurface fire and to inhibit the occurrence of fire in the future. The interim cap was placed over the burn area of the Landfill. The Navy conducted perimeter air monitoring after the surface fire was extinguished and during installation of the interim landfill cap to assess whether any air contaminants from the landfill fire and subsequent construction activities migrated to adjacent areas of HPS or the nearby community.

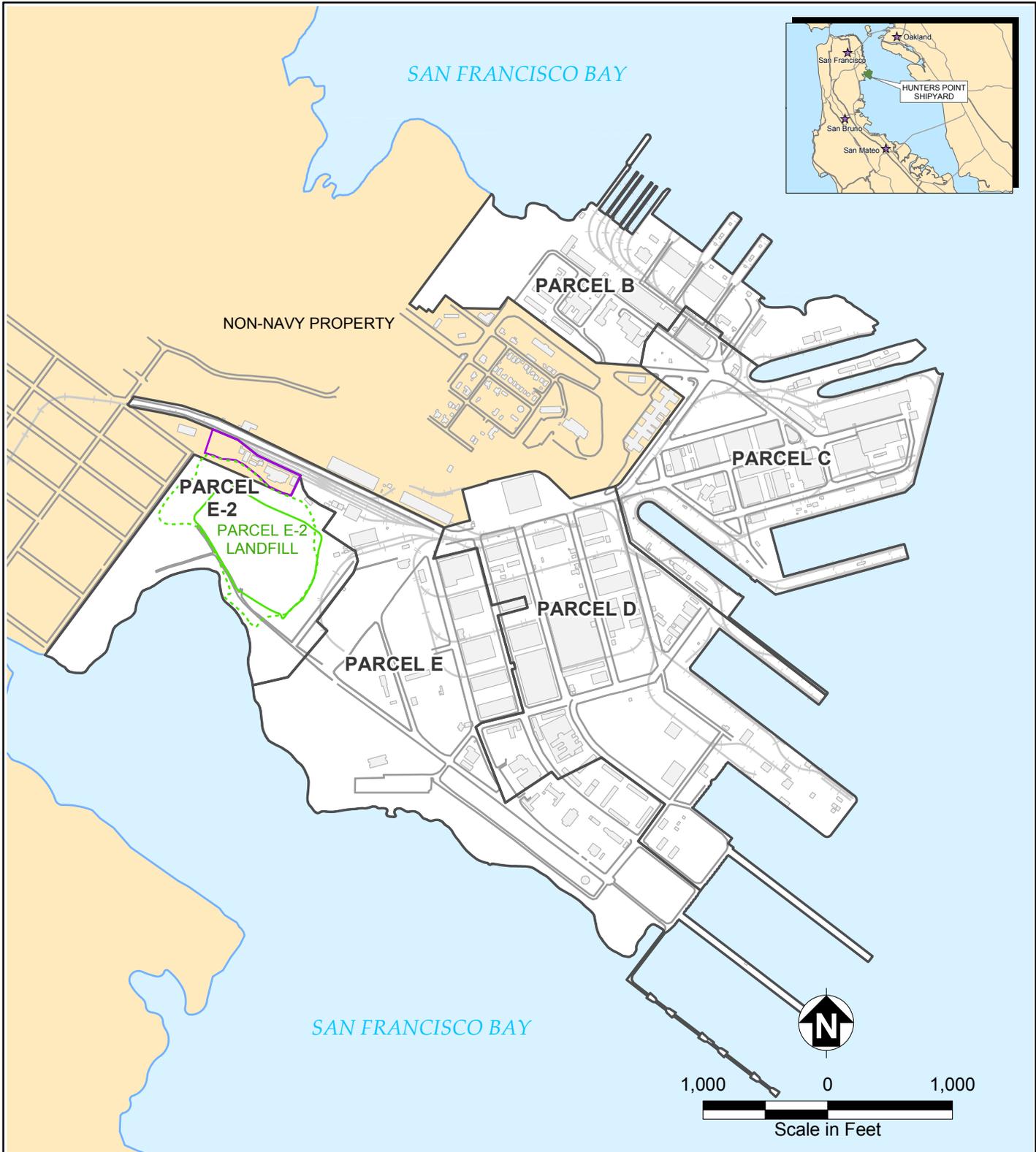
The purpose of this report is to summarize construction activities associated with the landfill cap removal action. The closeout report addresses the interim cap. The entire landfill area, referred to as Parcel E-2, will be addressed as part of the remedial investigation (RI) and feasibility study process under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program.

[Appendix A](#) and [Appendix B](#) provide the responses to regulatory agency comments on the draft and draft final landfill cap closeout reports, respectively. In addition, [Attachment A](#) presents the results of the preliminary air monitoring report (PAMR), [Attachment B](#) presents the results of the closure construction as-built report, and [Attachment C](#) documents the waste disposed off site.

1.1 SITE BACKGROUND

HPS is located in southeast San Francisco on a peninsula that extends east into San Francisco Bay (Bay). In 1992, the Navy proposed a parcel approach for the RI/FS process at HPS. The Navy divided HPS into five contiguous parcels (A through E) to expedite remedial action and land reuse. A sixth parcel (Parcel F), the offshore area, was added in 1996. In September 2004, the landfill area in Parcel E was designated as a separate Parcel E-2 in order to move the landfill area forward under the CERCLA program. In December 2004, Parcel A was transferred to the City of San Francisco (City). Currently, HPS is divided into six parcels: Parcels B, C, D, E, E-2, and F.

Parcel E-2 occupies approximately 48 acres of shoreline and lowland coast along the southwestern portion of HPS. Parcel E-2 is bounded by Parcel F to the south; off-base property to the west; property owned by the City and the University of California, San Francisco (UCSF) to the north; and portions of Parcels D and E to the east. [Figure 1](#) shows the Parcel E-2 boundaries and the locations of the Landfill, UCSF property, and adjacent areas. The central portion of Parcel E-2 served as a landfill for shipyard waste from the mid-1950s to 1974. No buildings are known to have existed on the landfill area. Filling of the Bay in this area began in the 1940s during construction of HPS. By 1946, the area immediately north of the Landfill, the current UCSF compound, had been filled using primarily soil and serpentinite rock. The west side of the area was filled with dredge spoil, soil, rock, and inert construction debris during the early 1950s.



2005-02-02 V:\Hunters Point\Projects\Landfill\Landfill Closeout Reporting\fig_1_Facility location.mxd TIEM-SF Kevin Ernst

- - - - Extent of Landfill
- _ _ _ _ Limit of Landfill Cap
- University of California, San Francisco Compound
- Parcel Boundary
- Non-Navy Property
- San Francisco Bay
- Building
- Road
- Rail Line



Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

**FIGURE 1
 HPS FACILITY LOCATION MAP**

Final Removal Action Landfill Cap Closeout Report

Parcel E-2 was affected by the operations of Triple A Machine Shop, Inc. (Triple A), which leased property at HPS from May 1976 to June 1986. Triple A operated a commercial ship repair facility and subleased portions of HPS to warehouse, industrial, and commercial firms. The San Francisco District Attorney's Office charged Triple A with illegally disposing of hazardous wastes at 19 locations throughout HPS, including Parcel E-2. Triple A allegedly disposed of industrial debris, sandblast waste, oily industrial sand, and asphalt over 5 acres along the shoreline and stored unlabeled, deteriorated and uncovered drums in the southeastern corner of Parcel E-2 ([City and County of San Francisco 1996](#)).

Based on the City and County of San Francisco's redevelopment plan, Parcel E-2 is designated for open space except for a small area in the eastern portion, which is designated for research and development reuse ([San Francisco Redevelopment Agency 1997](#)).

1.2 LANDFILL FIRE

A brush fire that lasted for 6 hours burned about 45 percent of the landfill surface area on August 16, 2000. Smaller areas (less than 5 acres) continued to smolder for about 1 month after the fire was extinguished (Agency for Toxic Substances and Disease Registry [[ATSDR](#)] 2001a). Federal and San Francisco fire fighters used water to contain the fire. The fire fighters reported that the fire produced white smoke and appeared to be a normal brush fire, with no appearance of burning chemicals. Fire fighters were tested for radioactive exposure by the San Francisco Department of Health, and no radioactive releases were found. A few bystanders and one fire fighter reported that green, yellow, and orange smoke was released when fire fighters shoveled dirt onto smoldering areas ([ATSDR 2001a](#)).

ATSDR prepared a health consultation summary ([ATSDR 2001a](#)) and a health consultation report ([ATSDR 2001b](#)) in response to a request from the U.S. Environmental Protection Agency (EPA). According to the report, only short-term health effects were expected to result from the fire. Individuals highly sensitive to these effects would be anyone with previous respiratory conditions such as asthma or emphysema, children, and the elderly. Health effects could have developed within a few days after the fire and would last for no more than 2 to 3 weeks.

Air sampling data were collected 15 days after the initial fire was contained. At that time, the extinguished fire was still smoldering. Air samples collected initially and during the subsequent response actions did not indicate a release of chemical or physical components likely to result in adverse health effects ([ATSDR 2001a](#)).

1.3 PREVIOUS WASTE DELINEATION SAMPLING

Pursuant to ongoing characterization of the site, several methods were used in the late 1980s (before the landfill fire) to delineate the extent of waste contained in the Landfill ([Harding Lawson Associates 1990](#)). These methods included the following:

- Geophysical surveys (such as electromagnetic profiling, ground-penetrating radar, and magnetometer and vertical soundings)
- Excavation test pits
- Soil borings
- Borehole geophysics

Using a combination of these methods, partial horizontal and vertical extents of the waste area were determined for the Landfill. As part of the Parcel E nonstandard data gaps investigation (Tetra Tech EM Inc. [Tetra Tech] 2002), an investigation was conducted in spring 2002 to delineate the physical lateral extent of the Landfill. Results of the investigation are provided in the final landfill lateral extent report (Tetra Tech 2004).

2.0 RESPONSE ACTIONS

This section summarizes the actions taken by the Navy in response to the brush fire on the Landfill in Parcel E-2. [Table 1](#) presents a timeline of the fire response activities. [Section 2.1](#) of this report summarizes air monitoring activities at the Landfill, and [Section 2.2](#) summarizes the response actions selected for the landfill fire area of Parcel E-2.

2.1 AIR MONITORING

The release mechanism for any contaminants of concern from the Landfill was assumed to be discharges to the air resulting from subsurface smoldering of landfill materials (Navy 2000). Shortly after the surface fire was extinguished, the Navy began monitoring the air at Parcel E-2 around the area of the fire. Monitoring continued until structural completion of the interim landfill cap. Air monitoring was performed to determine the potential for migration of air contaminants resulting from the fire and the capping activities at the Landfill. Air monitoring was performed in accordance with the ambient air monitoring plan (AAMP) for monitoring activities at Parcel E (International Technology Corporation [IT] 2000a) and the perimeter air monitoring plan (PAMP) for monitoring activities at Parcel B (IT 1998). Analytes detected during air monitoring were compared against PAMP action levels and EPA preliminary remediation goals (PRG) (EPA 2000). All target compounds and their associated PAMP action levels and PRGs are listed in [Table 1](#) of [Attachment A](#), the PAMR. Target compounds are those compounds that may present a health hazard and for which action levels were established in the AAMP. The PAMR was completed in June 2001 before the Parcel E-2 boundary was established and presents air monitoring for all of Parcel E. The results of the perimeter air monitoring are summarized below, and a detailed description of the air monitoring plan and results is provided in [Attachment A](#).

TABLE 1: LANDFILL FIRE RESPONSE ACTION TIMELINE

Final Removal Action Landfill Cap Closeout Report, Parcel E-2
 Hunters Point Shipyard, San Francisco, California

Date	Activity
August 16, 2000	Fire is reported on Landfill in Parcel E-2.
August 16 to 28, 2000	About 600,000 gallons of water was sprayed on the Landfill to extinguish the fire.
August 31, 2000	A single air sample was collected downwind of the fire area; the sample was analyzed for metals, VOCs, SVOCs, pesticides, PCBs, and low-resolution dioxins and furans.
September 8, 2000	Air monitoring equipment was moved from Parcel B to Parcel E, and daily air sampling for SVOCs, pesticides, PCBs, and low-resolution dioxins and furans began at Stations A through F (Figure 2, Attachment A).
September 9, 2000	Began daily air sampling for metals and VOCs.
September 13, 2000	Began clearing and grubbing activities at fire area.
September 16, 2000	Began cap construction and testing for high-resolution dioxins and furans (air samples collected every 8 days).
September 17, 2000	Station G (duplicate of station D) is added to sampling network. Station G air samples collected approximately every other sampling day
September 19, 2000	Began preparing the foundation layer for the landfill cap and daily testing for chlorine and phosgene in air samples.
September 27, 2000	Began receiving cap liner material.
October 3, 2000	To control dust, rock was placed on roads and near air stations. In addition, soil was placed and compacted at the liner laydown area.
October 5, 2000	Gravel placed over laydown area to reduce soil disturbance.
October 7, 2000	Testing for chlorine and phosgene was scaled back to about every other day.
October 15, 2000	New polyurethane foam air samplers were installed at Parcel E-2.
October 18, 2000	Ceased air sampling for SVOCs, pesticides, and low-resolution dioxins and furans.
October 19, 2000	Ceased air sampling for high-resolution dioxins and furans.
October 20, 2000	Ceased air sampling for chlorine and phosgene.
October 23, 2000	Grading and smooth-rolling activities completed on western portion of Parcel E-2.
October 24, 2000	Began placing geosynthetics on landfill cap.
November 21, 2000	Geosynthetic placement activities completed.
November 22 to 27, 2000	Air sampler maintenance conducted (no sampling conducted); suspended field activities.
November 30, 2000	Began placing vegetative cover at Parcel E-2 and transporting landfill fire debris off site.
December 6, 2000	Transport of landfill fire debris off site was completed.
December 8, 2000	Subsurface monitoring was initiated to confirm that combustion no longer existed within the Landfill.
March 13, 2001	Suspended air sampling and monitoring activities.
March 26, 2001	Installed central drainage ditch on cap.
March 27, 2001	Placement activities for the vegetative cover were completed; installation time for cover was extended because of inclement weather.
March 29 to 31, 2001	Landfill cap was hydroseeded.

Notes:

PCB Polychlorinated biphenyl
 SVOC Semivolatile organic compound
 VOC Volatile organic compound

An initial 24-hour sample was collected directly downwind from the fire on August 31, 2000. Samples were analyzed for metals, volatile organic compounds (VOC), semivolatile organic compounds (SVOC) (including polynuclear aromatic hydrocarbons), pesticides, polychlorinated biphenyls (PCB), and low-resolution dioxins and furans. Wind roses for the days that samples were collected are included in Appendix E, “Wind Rose Plots,” to [Attachment A](#). During September and October 2000, and March 2001, wind was predominantly from the west. During these periods, sampling station A was upwind, and sampling stations D, E, and G were downwind. From November through February, wind direction was much more variable, with the most prominent directions being west, north, and southeast ([Attachment A](#), Appendices E and F). During these periods, the sampling stations were located upwind, downwind, or crosswind from the Landfill.

Monitoring the air during installation of the interim landfill cap between September 8, 2000, and March 13, 2001, provided analytical results for more than 1,700 samples collected from a seven-station monitoring network. Of the 150 target analytes (or classes of compounds), only 9 exceeded the PAMP action levels or the annual average preliminary remediation goals (PRG), as listed in the table below.

Analyte	Criteria Exceeded
Arsenic	PRG only
Beryllium	PRG only
Chromium, trivalent	PRG only
Manganese	PRG and PAMP
Benzene	PRG and PAMP
Carbon tetrachloride	PRG only
Chloroform	PRG only
Bis(2-ethylhexyl)phthalate	PAMP only
Aroclor-1260	PRG only

Tables 8 and 9 in [Attachment A](#) list the detected concentrations of each analyte.

Although the analytes listed above exceeded PAMP action levels and PRGs, ATSDR concluded that the community should not experience long-term adverse health effects from the landfill fire ([ATSDR 2001b](#)). ATSDR evaluated the air monitoring data from August through December 2000 and, using conservative input parameters, modeled the possible exposure to the community. The results of ATSDR’s evaluation are summarized in Table 1 of the ATSDR Health Consultation and conclude that no health hazard exists from the detected concentrations of the analytes ([ATSDR 2001b](#)).

The paragraphs below describe the conditions under which these analytes exceeded the PAMP action levels or PRGs.

Arsenic and manganese were detected at concentrations exceeding PAMP action levels or PRGs during periods of heavy earthmoving. These analytes are naturally occurring in soil and appear to be associated with fugitive dust released during capping activities.

Beryllium, chloroform, and trivalent chromium were detected no more than 5 times during the monitoring program. The average concentration for each of these analytes exceeded the applicable PRG because the PRGs are below laboratory reporting limits. One detection would, therefore, cause the calculation of the average concentration to automatically exceed the PRG for each of these analytes.

Benzene was frequently detected above the PAMP action level and PRG, and carbon tetrachloride was detected above PRGs. However, average concentrations were below the ambient air background concentrations of 2.07 and 0.69 micrograms per cubic meter as recorded by the Bay Area Air Quality Management Division in San Francisco (see Section 4.2 of [Attachment A](#)). These detections are attributable to background concentrations in ambient air, rather than the landfill fire or capping activities.

Bis(2-ethylhexyl)phthalate is ubiquitous in nature at concentrations consistent with those detected at HPS. The landfill fire does not appear to be the source of this compound.

Results for Aroclor-1260 are attributable to an area of surface soil known to contain Aroclor-1260. The affected area is not within the area burned by the fire; as a result, the landfill cap does not address this area. The area was, however, used as a laydown area for construction during capping activities, and Aroclor-1260 was not detected until after capping activities were initiated. On October 5, 2000 gravel was placed over the area to reduce soil disturbance ([Attachment B](#), Appendix B). This gravel cover appeared effective because the last sampling period for which Aroclor-1260 exceeded the PAMP action level was from October 4 to 5, 2000.

After reviewing the results of the air monitoring program, these analytes do not appear to be attributable to the landfill fire. These analytes, except Aroclor-1260, were either below detection limits, attributable to background concentrations, or naturally occurring in soil. As explained above, detections of Aroclor-1260 were due to construction activities and were controlled by placing gravel over the construction laydown area.

2.2 SELECTION OF RESPONSE ACTIONS

The Navy considered several options in response to the fire and selected a multilayer interim landfill cap as the best response. The interim landfill cap was installed specifically to extinguish any remaining smoldering subsurface areas by inhibiting air intrusion into the area. In addition, the interim landfill cap will inhibit storm water from percolating into the landfill material.

The response consisted of the following actions:

- Clear surface debris and vegetation to the extent of the known burn area
- Compact the existing surface area
- Place a foundation layer of base rock and compacted soil
- Place liners and compacted soil

- Place drainage controls
- Extend groundwater monitoring wells to at least 3 feet above ground surface
- Vegetate the cap area

This response action fulfilled the three removal action criteria: effectiveness, implementability, and cost. This action provides long- and short-term effectiveness and protection of human health and the environment from chemical contaminants in soil by covering the Landfill. [Section 3.0](#) describes the design and construction of the cap used to achieve these goals.

3.0 DESIGN AND CONSTRUCTION OF THE INTERIM LANDFILL CAP

This section summarizes the design and construction of the approximately 14-acre interim landfill cap installed as a response to the landfill fire. [Figure 2](#) shows the interim landfill cap in relation to the delineated waste and the burned surface area. The interim landfill cap is a multilayer cap designed to inhibit air and water intrusion into the Landfill. The design of the interim cap system is described in “Technical Specifications, Hunters Point Shipyard, Parcel E IR 1/21 Interim Landfill Cap” (IT 2000b). [Attachments B and C](#) of this report contain detailed documentation of the cap construction and the quality assurance and quality control procedures.

The interim cap installation was conducted under an emergency removal action and a cursory analysis of applicable or relevant and appropriate requirements (ARAR) analysis was conducted; therefore, the Navy designed the cap to meet the most stringent landfill cap requirements. The interim cap was designed to meet the requirements of Title 22 of the *California Code of Regulations* (CCR), which exceed the cap requirements of Title 27 of the CCR. Landfill cap requirements for the final remedy at Parcel E-2 will be evaluated in the Parcel E-2 RI/FS report.

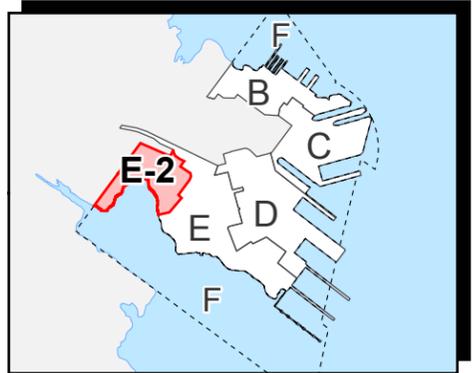
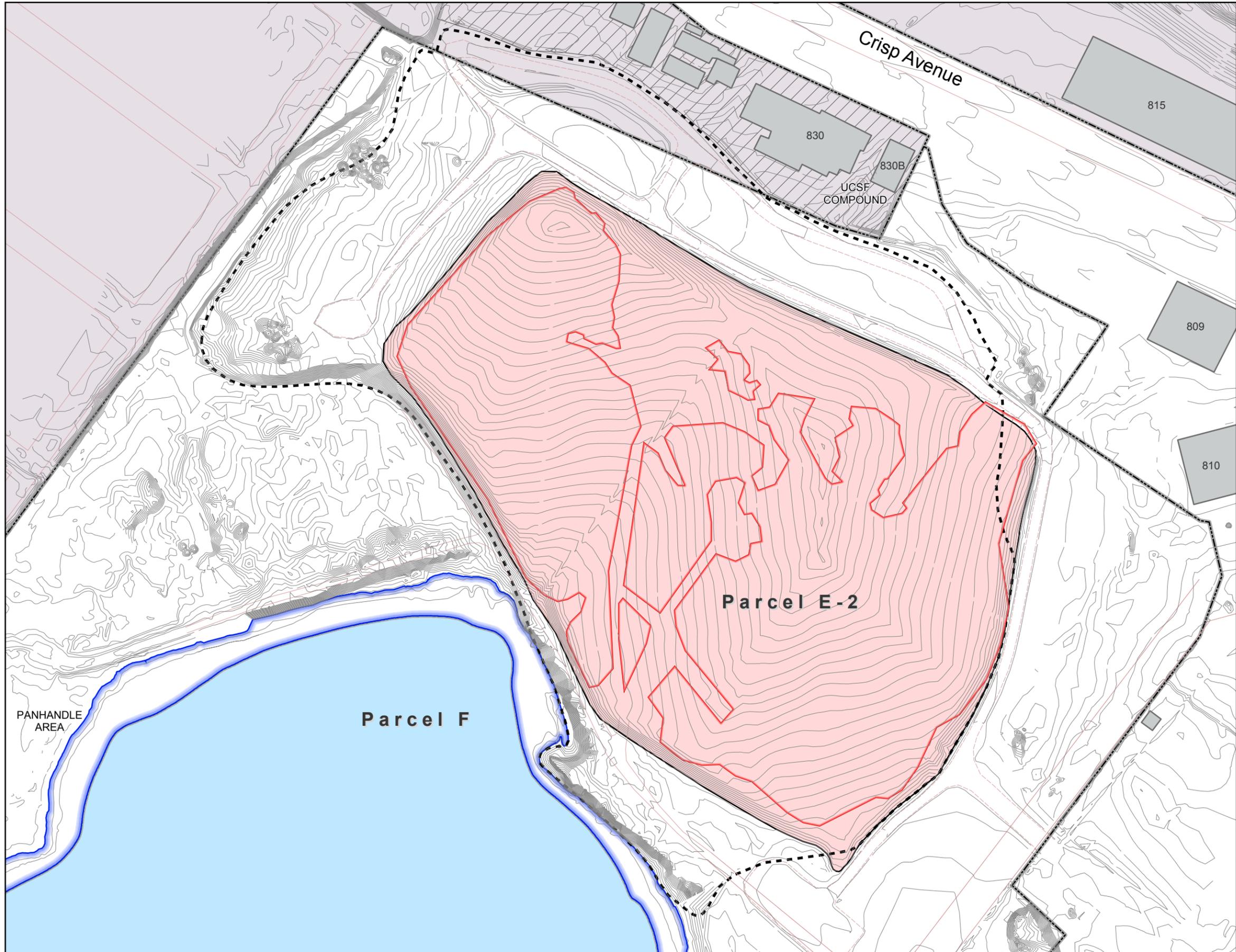
3.1 COVER

Two different covers were designed for shallow and steep slopes. The following sections summarize the type of cover and criteria for placement of the cover.

3.1.1 Shallow Slope Cover

The shallow slope cover, Cover A, was constructed in areas where the topographic grades are less than 8 percent. This type of cap covers most of the site. Cover A includes a 2-foot-thick compacted foundation then the following layers from bottom to top:

- Geosynthetic clay liner (GCL)
- Smooth high-density polyethylene (HDPE) synthetic membrane liner
- Single-sided geocomposite drainage layer
- 1.5-foot vegetative soil cover (VSC)



Location Map

- Parcel Boundary
- Shoreline Area
- Extent of Solid Waste
- Burn Area
- Landfill Cap Extent
- Non-Navy Property
- UCSF Compound
- Building
- Surface Contour (in feet)
- Road
- Gravel Road

Note:
UCSF University of California, San Francisco



150 0 150



Scale in Feet



Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 2
LATERAL EXTENT OF INTERIM CAP AND BURN AREA
Final Removal Action
Landfill Cap Closeout Report

3.1.2 Steep Slope Cover

The steep slope cover, Cover B, was constructed in areas where slopes were greater than 8 percent. Cover B includes a 2-foot-thick compacted foundation and the following layers from bottom to top:

- Textured HDPE synthetic membrane liner
- Single-sided geocomposite layer with nonfused geotextile on the other side of the drainage net. Geotextile that is fused to the drainage net was placed on the bottom against the textured geomembrane to retain sliding resistance. (Note: The construction documents called for a double-sided geocomposite drainage layer. This product was not readily available at the time of construction, necessitating a design change.)
- 1.5-foot VSC

Figure 3 shows the location of each type of cover.

The two types of covers selected were used for the following two reasons:

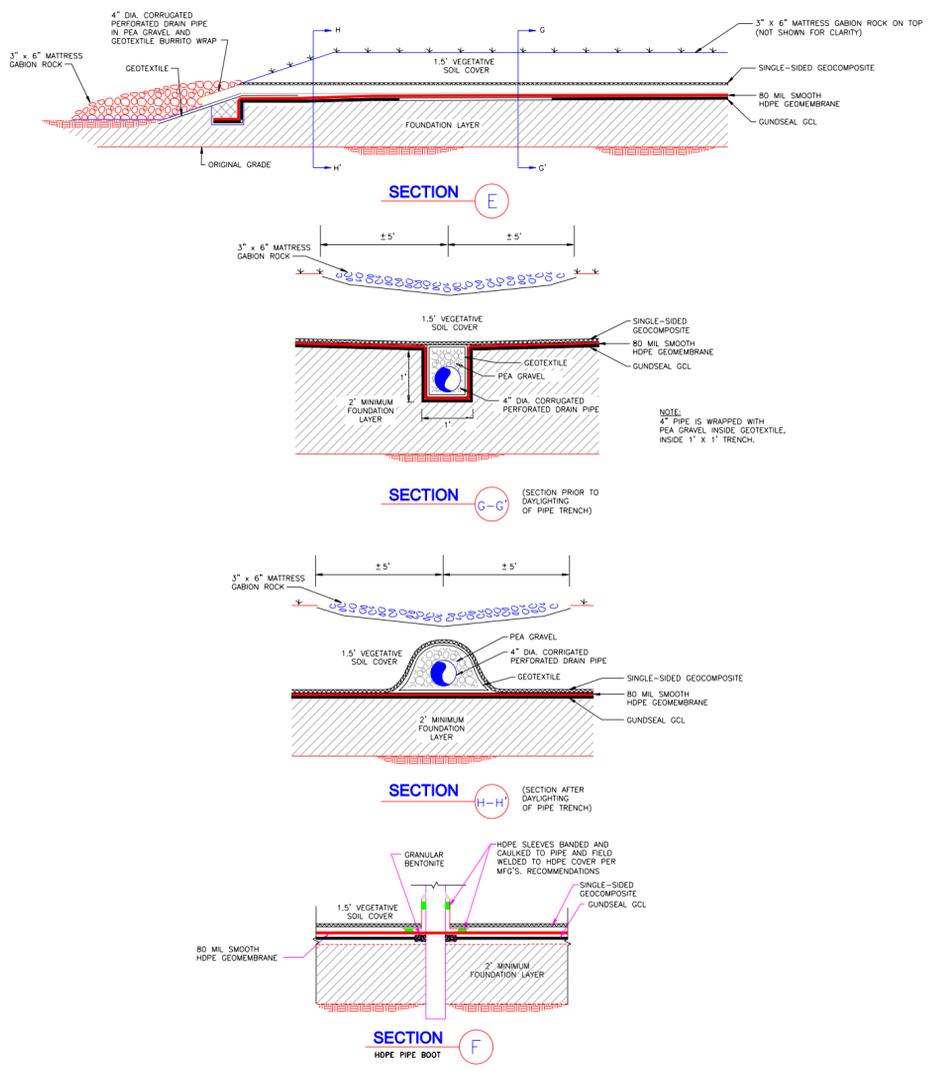
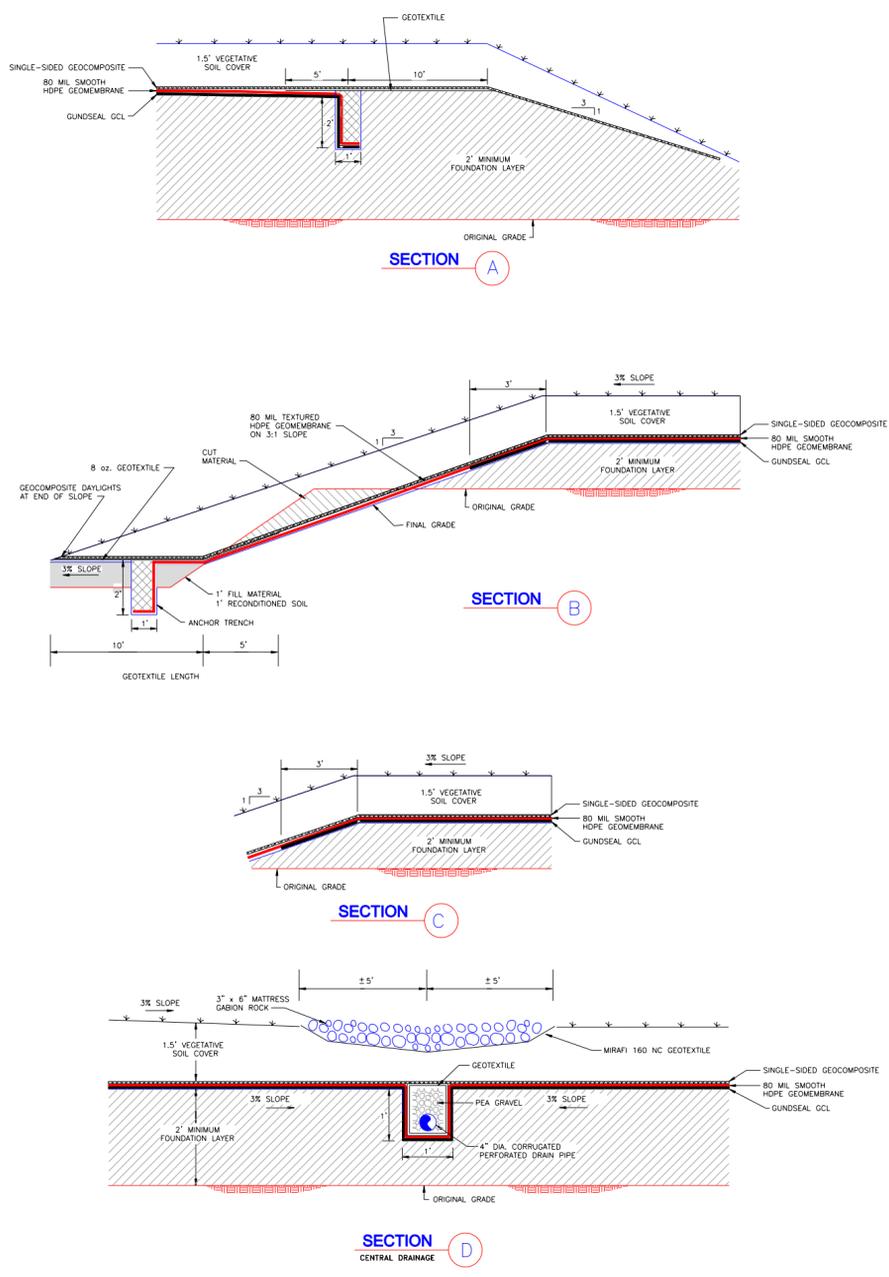
1. The use of textured membrane and a fused geocomposite layer will inhibit sliding of component layers and overlying soil on steeper slopes since the textured geomembrane in contact with the geotextile has a much higher coefficient of friction against sliding.
2. The GCL provides added protection in the event of leakage through the geomembrane liner. This liner is not required on steeper slopes because the enhanced drainage characteristics present on these slopes greatly reduce the potential for the liner to leak.

The following sections describe each layer of the foundation and the associated construction activities.

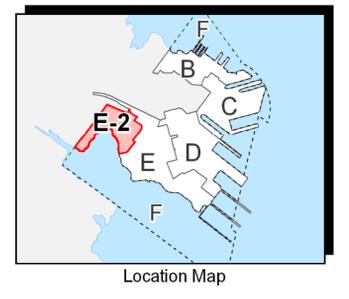
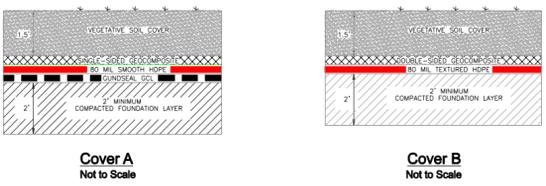
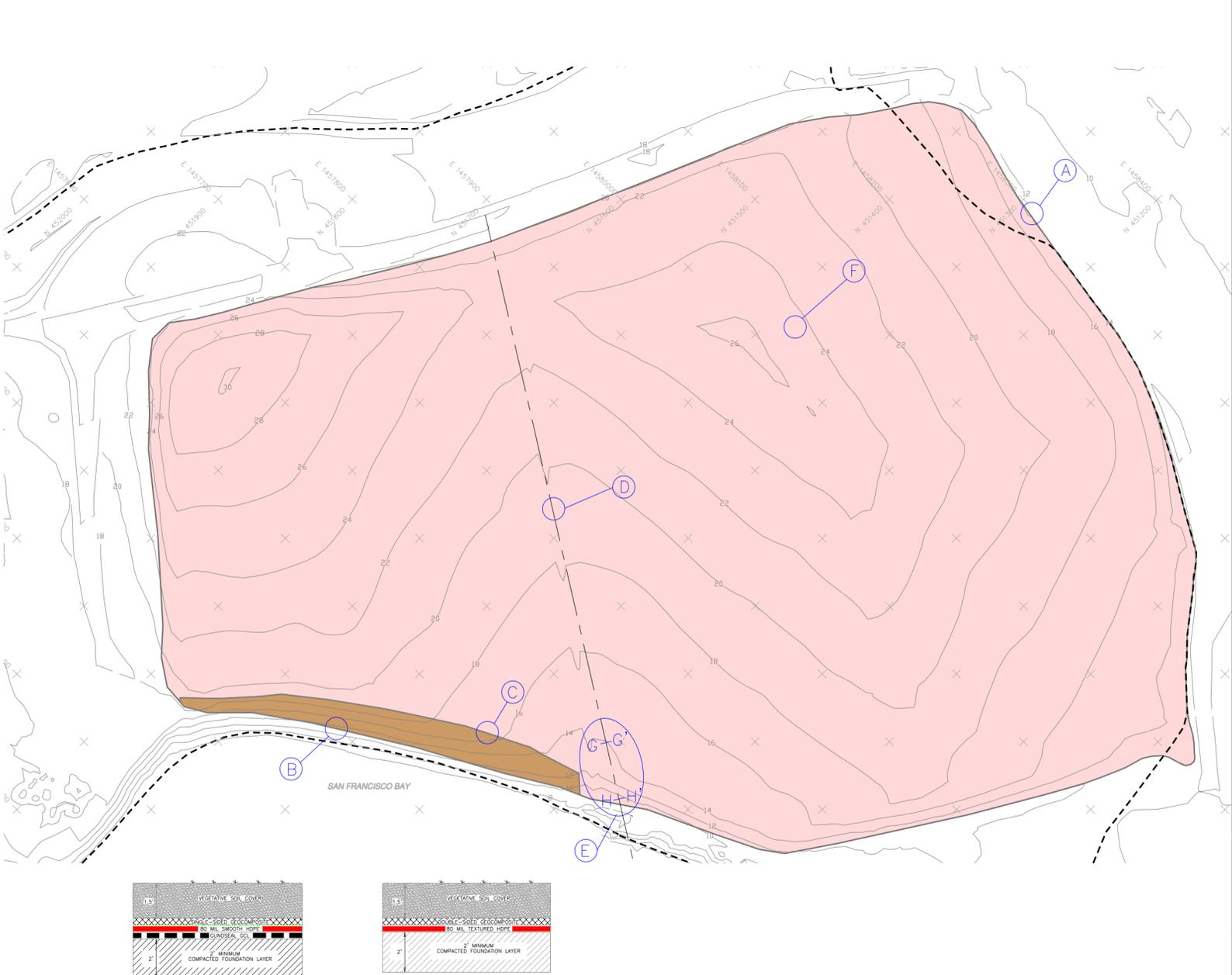
3.1.3 Foundation Layer

The foundation layer for the cover system is designed with the following objectives:

- Impede failure of the cover system because of settlement
- Provide adequate strength to support the loads associated with the cover system and maintain the integrity of the closure cover during and after an earthquake
- Provide appropriate grades for drainage control

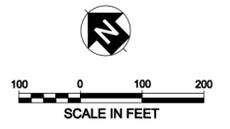


Reference:
Shaw (IT Corporation) drawing number 8125275-04
from as-built Cap Report Revision 1, approved 07-05-01



- Surface Contour (in feet above msl)
- Approximate Limit of Interim Landfill Cap - Cover A
- Approximate Limit of Interim Landfill Cap - Cover B
- Solid Waste Extent

Note:
Topography shown is as-built of top of the foundation layer.



Tetra Tech EM Inc.

Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 3
LOCATION OF FINAL COVER TYPES, SECTIONS, AND DETAILS
Final Removal Action
Landfill Cap Closeout Report

Reference:
Shaw (IT Corporation) drawing number 8125275-d6
from As-Built Cap Report, Revision 1, approved 07-05-01

The foundation layer was designed to be a minimum of 2 feet thick; it was constructed from either existing interim cover material, excavated or regraded subsoils, or clean off-site soil materials. The thickness of the foundation layer was adjusted as required during construction to ensure a smooth top surface for placement of the GCL and to promote a positive slope for drainage.

Compaction was performed as part of the installation of the foundation layer to provide adequate bearing capacity to support heavy construction equipment and the interim cap. Completion of the foundation layer included the following steps:

- Objectionable material was removed, including burned debris such as vegetation, soil, railroad ties, and concrete rubble
- Monitoring wells were extended and protected
- Existing vegetation was stripped and removed; stripped vegetative material was reused where feasible and incorporated into the foundation layer
- Soil was scarified to blend and incorporate remaining vegetative roots into the existing foundation
- Lifts of clean soil were placed and compacted with heavy equipment for preparation of the foundation layer. The foundation layer was constructed in controlled lifts not exceeding 8 inches in loose thickness to obtain a nominal 6-inch, compacted thickness.
- Smooth drum rolled the top lift (minimum of four passes) before placement of the GCL

Grading of the foundation layer provided an even surface that was free of depressions and suitable for placement of the GCL. The top lift was smooth drum rolled (minimum of four passes) and approved in writing by the engineer and the geosynthetic installation contractor before any of the geosynthetic materials were placed. GCL was placed on the compacted foundation layer to form a continuous bentonite blanket, which will minimize infiltration from any leaks in the overlying HDPE membrane. Before placement of the GCL, the foundation layer was surveyed on a minimum grid of 100 by 100 feet to verify thickness and surface slopes.

3.1.4 Geosynthetic Clay Liner

The GCL was placed under the geomembrane on flatter slopes (less than 8 percent) because of the possibility of poor drainage or ponding on the geomembrane as a result of future settlement of the Landfill. The GCL has very large volumetric swelling capacity when hydrated. In the event of a leak through the geomembrane, the GCL will swell and seal the liner to inhibit liquids from passing through the cap. Steeper slopes generally maintain good drainage characteristics even after settlement, so the GCL is not required. The Gundseal® GCL with a 15-mil smooth HDPE backing manufactured by GSE Lining Technology, Inc. (GSE) was used, as detailed on

[Figure 3](#), Sections A-F. A technical paper prepared by GSE detailing the installation of GSE Gundseal® was followed during the design process ([GSE 1997](#)). The GCL consists of a layer of natural sodium bentonite clay bonded with an adhesive to the HDPE backing. The design specified nonreinforced GCL. Because of a shortage in the available material, however, reinforced GCL was used for a portion of the Landfill. The nonreinforced material is GSE Gundseal®, and the reinforced material is Bentomat® ST. Although the two GCLs have slightly different installation techniques, they are functionally equivalent on the flat slopes where they were installed on this project.

3.1.5 High-Density Polyethylene Synthetic Membrane

The HDPE geomembrane liner is a very low-permeability liner that provides water flow resistance similar to that of several feet of clay. This liner will not be negatively affected by drying and wetting cycles as a clay or soil liner could. The geomembrane was installed on top of the GCL.

Installation of the HDPE cover over the GCL included the following steps:

- Anchoring synthetic membranes and the drainage net (including excavating and backfilling the anchor trench)
- Sealing the membrane around the pipe penetrations
- Using textured HDPE on slopes of about 8 percent or greater (smooth HDPE was used on flatter slopes)

The HDPE liner material installed was GSE HD 80-mil. The liner was designed and manufactured specifically for the purposes of this work, and it has been satisfactorily demonstrated by prior use at other sites to be suitable and durable for this type of installation. The HDPE panels were seamed using either hot-wedge fusion welding or extrusion welding, depending on the location. Both of these methods are manufacturer approved. In-place and destructive (laboratory) tests were performed on seams, as described in [Attachment B](#), to ensure the integrity of the liner.

3.1.6 Geocomposite Drainage Layer

The geosynthetic drainage system was installed to provide a preferential drainage path for storm water that penetrates the VSC and does not initially run off of the cap as surface drainage. This layer was installed directly on top of the geomembrane after acceptance of the geomembrane installation. This drainage layer will control water buildup on the HDPE geomembrane by allowing storm water to drain quickly from the cap system.

This layer consists of a drainage net with geotextile heat-bonded to the bottom of the net and a geotextile filter fabric on top on slopes of up to 8 percent. On slopes greater than 8 percent, the geosynthetic drainage layer consists of a drainage net with geotextile heat-bonded to the top and bottom of the net or a drainage net with geotextile heat-bonded to the bottom and a geotextile placed on top. The geocomposites used were GSE Fabrinet (single-sided) and GSE FabriCap (double-sided). The geotextile filter fabric used was a nonwoven, 8-ounce fabric, TC Mirafi 180N.

[Attachment B](#) contains the details of the installation and inspection procedures used to install the drainage system.

3.1.7 Vegetative Soil Cover

The VSC consists of clean soils to support vegetation, allow drainage, and resist erosion. Vegetation is restricted to shallow-rooted species, so penetration of roots is limited. Soil used for the VSC was from acceptable, clean soil sources that are free from debris, roots, decayed matter, or any other harmful substances. Soils were tested to ensure a plasticity index of 15 percent or less. The first 12 inches of material is free of rocks or particles greater than 2 inches, and subsequent lifts are free of rocks or particles greater than 6 inches. Material was placed in a minimum of two lifts to reach a minimum thickness of about 18 inches. The first 12 inches of material is moisture conditioned and compacted with a minimum of four passes of compaction equipment. To promote plant root growth, the second lift was trackwalked.

Hydroseeding was performed after trackwalking was completed. The hydroseed mix consists of temperature- and drought-resistant vegetation indigenous to the area with a root system that does not extend into the geosynthetic drainage layer, needs little maintenance, survives in low-nutrient soil, and has sufficient density to control the rate of erosion to less than 2 tons per acre per year. The hydroseeding mix used includes the following:

- Zorro annual fescue (*Vulpia myuros*) 15 pounds per acre (lb/acre)
- Blando brome (*Bromus hordeaceus*) 20 lb/acre
- Rose clover (*Trifolium hirtum*) 20 lb/acre
- Gulf annual ryegrass (*Lolium multiflorum*) 20 lb/acre
- Mixed California wildflowers 3 lb/acre

A minimum seeding rate of 58 lb/acre was used. The following ingredients were mixed with clean potable water for application with the seed:

- 16-20-0 fertilizer 500 lb/acre
- Wood fiber mulch 2,000 lb/acre
- Stabilizer (either type)

R Type:	100 lb/acre
M type:	80 lb/acre

3.2 SURFACE WATER DRAINAGE AND EROSION CONTROL SYSTEM

This section describes storm water drainage patterns and control measures as they existed during the landfill cap time-critical removal action. Routine additional storm water management is conducted as part of the 1997 National Pollutant Discharge Elimination System (NPDES) permit for Parcel E-2. These activities are described in the storm water discharge management plan (Tetra Tech 2005).

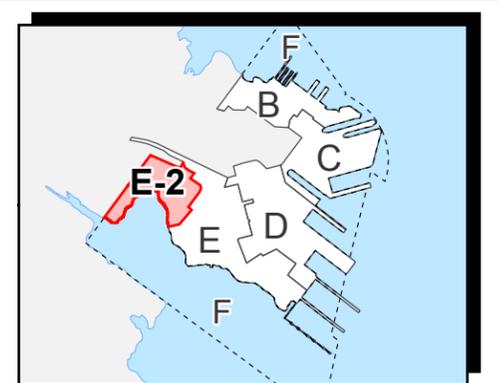
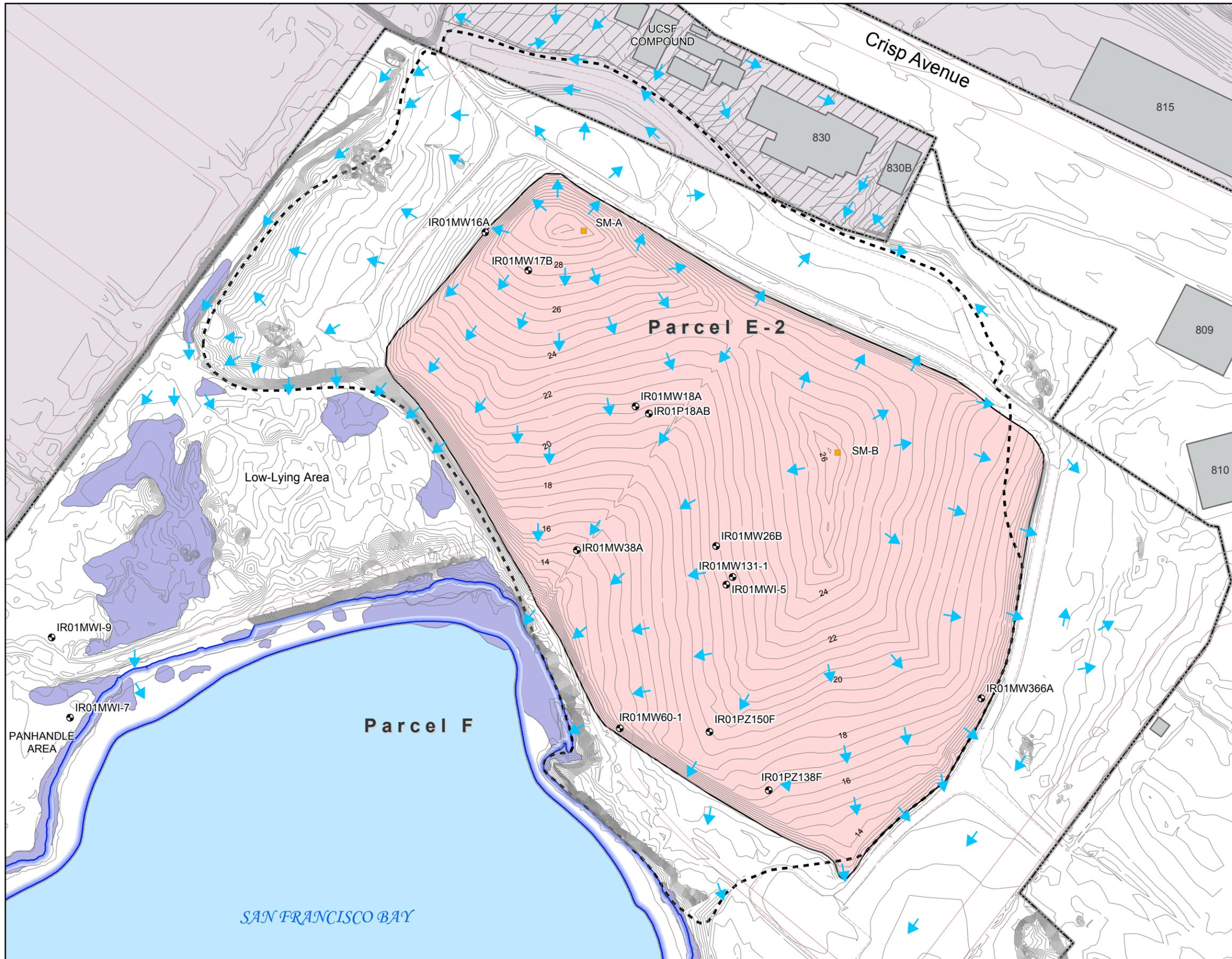
Before the interim landfill cap construction began, a silt fence was installed along the entire southern side of the construction area. Upstream of the silt fence, soil was windrowed, creating silt traps. Hay bales were used to reduce the storm water flow velocity and to assist in capturing silt throughout the construction period. Inspections of the entire construction area were conducted before and after each storm event. These practices appeared to successfully inhibit off-site silt migration based on visual inspections during construction.

The interim landfill cap is designed to channel most surface water to a central drainage swale that flows south to the Bay. The new drainage configuration generally followed the existing flow patterns at the site. The final drainage system was enhanced as required to handle the additional flows expected from the new cap. This enhancement included upgrading existing ditches and installing new ditches. Rock riprap was installed along the main central swale to inhibit erosion on the cap in areas expected to experience concentrated storm water flow. The riprap section is about 10 feet wide and 9 inches thick (Figure 3).

Storm water falling on the interim landfill cap will flow across the clean vegetated soil comprising the VSC cap and into the central swale or toward the outer edges of the cap (Figure 4). Storm water infiltrating the VSC will enter the interim cap subsurface drainage system, comprising the HDPE drainage net and perforated pipe, and will either flow toward the central swale or toward the outer edges of the cap. The VSC is designed to inhibit erosion over the cap.

The subsurface drainage system below the central swale consists of a perforated 4-inch drainage pipe surrounded by pea gravel and geotextile and follows the centerline of the ditch (Figure 3). The drainage pipe is underlain by the geomembrane and the GCL and overlain by the composite drainage layer. The drainage pipe terminates above the geomembrane and outside of the cap, discharging beneath the rock riprap at the southern end of the cap.

Edges of the cap slope outward toward the surrounding landscape. The surface elevations of the cap range from a high of 30 feet above mean sea level to an average of 15 feet above mean sea level around the edges where the cap meets the existing landscape. Storm water is controlled on the west and southwest side of the Landfill by constructed drainage channels that discharge indirectly to the Bay through the low-lying freshwater seasonal wetlands. Storm water runoff from the southeastern portion of the interim cap flows overland through existing swales south and east of the Landfill.



Location Map

- Surface Flow Direction
- Settlement Marker
- Monitoring Well
- Parcel Boundary
- Shoreline Area
- Extent of Solid Waste
- Landfill Cap Extent
- Non-Navy Property
- UCSF Compound
- Wetland Area
- Building
- Surface Contour (in feet)
- Road
- Gravel Road

Note:
UCSF University of California, San Francisco



150 0 150



Scale in Feet



Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 4
FINAL TOPOGRAPHY

Final Removal Action
Landfill Cap Closeout Report

North of the cap, the topography slopes downward from the edge of the cap toward the north-northeast, in the direction of the UCSF compound. After the construction of the interim cap was completed, the Navy installed storm sewers and inlets to intercept the storm water flow in the area and direct it to the existing storm sewer system.

3.3 MONITORING WELLS

Twelve existing monitoring wells were extended before work began on the foundation layer. One additional well point was installed to monitor subsurface activity in an area that was still smoldering when capping activities were initiated. These wells were painted with fluorescent organic paint, and cones were placed around the wells to protect them during construction activities. Within the construction area, drums were painted orange and placed over the wells for protection.

After completion of the VSC, concrete pads and bollards were installed around each well.

3.4 SETTLEMENT MARKERS

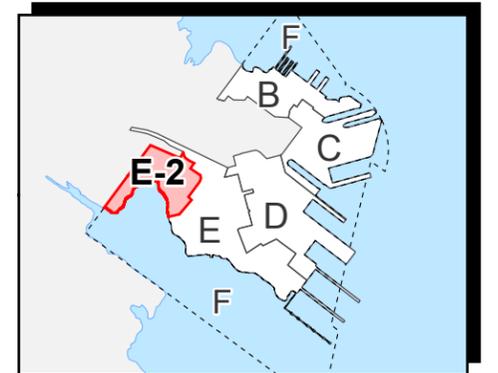
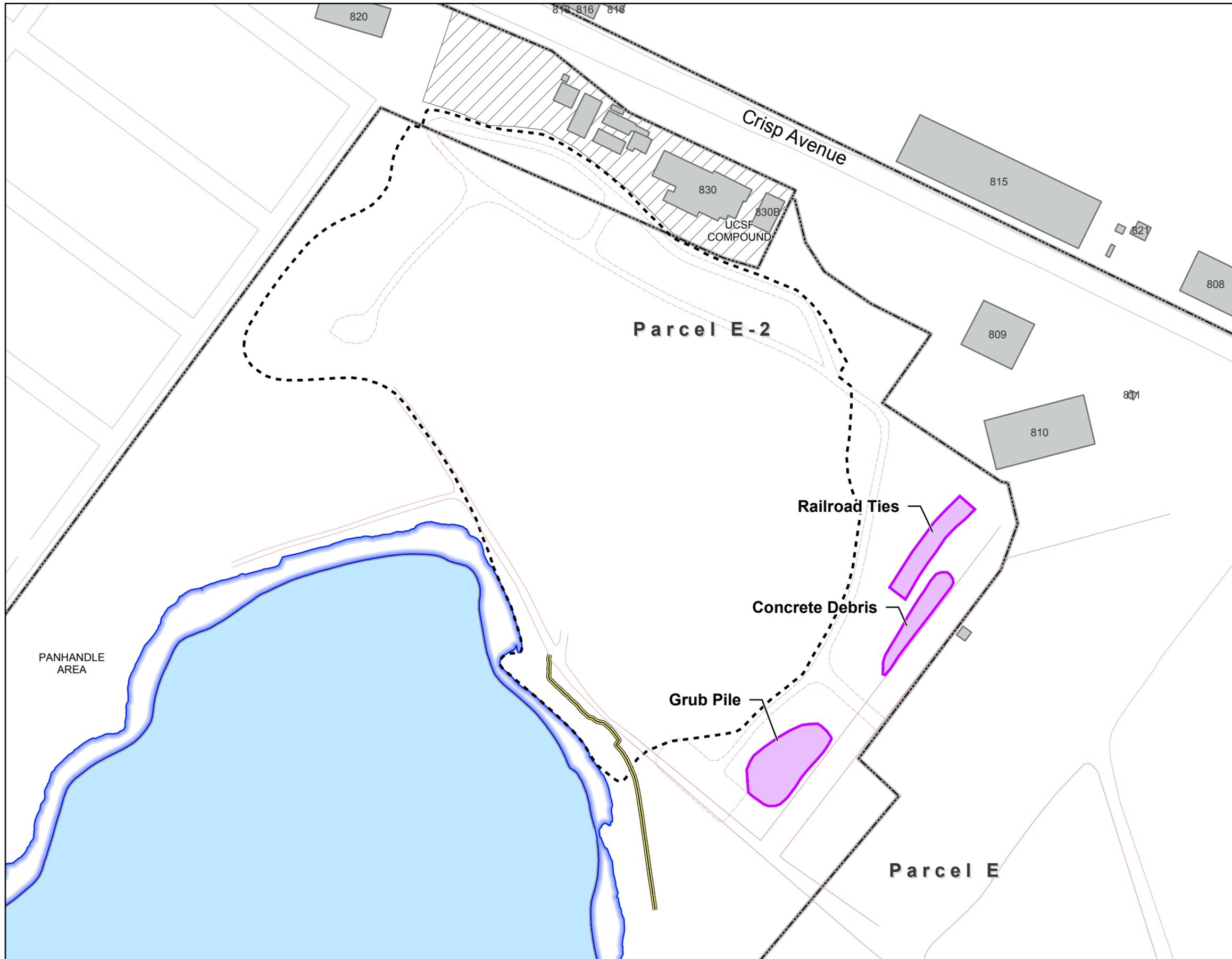
Two settlement markers were installed before completion of the foundation layer (Figure 4). The markers were placed at the center of the northeast and northwest high points of the original grade, where the thickness of the foundation layer is the greatest. The settlement markers consist of a 10-foot steel pole welded to a 3-foot square steel base. These markers were placed at the top of the original grade during placement of the foundation layer.

Elevations of the tops of the poles were tied to the existing vertical datum for use in future settlement determinations. The datum used to survey the settlement markers was monitoring well IR01MW60-1. The table below summarizes northing, easting, and elevation of the datum and settlement markers.

Type	Location	Northing	Easting	Elevation
Datum	IR01MW60-1	450982.5	1457653.0	14.7 (top of casing)
Settlement Marker	SM-A	451749.7	1457597.8	31.0 (top of marker)
Settlement Marker	SM-B	451415.3	1457999.5	27.7 (top of marker)

4.0 DEBRIS DISPOSAL ACTIVITIES

This section summarizes the disposal activities for debris generated during the construction of the interim landfill cap. Debris collected during construction activities was loaded into trucks and hauled to the on-site storage area (Figure 5). The storage area was lined with a 20-mil plastic liner. The Navy selected a low area adjacent to the cap construction area to minimize the potential for runoff. No runoff was observed during construction activities. The area was not vegetated before being used as the stockpile area. The debris consisted of vegetation, soil, railroad ties, and concrete rubble. Burned debris was also removed from the site. The debris was wet down before loading at the end of the day to minimize dust. The wetting process did not produce any runoff. The debris was sampled before off-site disposal. Attachment C provides the waste manifests and laboratory results for the off-site disposal.



Location Map

-  Debris Pile Locations (Approximated)
-  Parcel Boundary
-  Shoreline Area
-  Extent of Solid Waste
-  UCSF Compound
-  Building
-  Sheet-Pile Wall
-  Road
-  Gravel Road

Note:
UCSF University of California, San Francisco



200 0 200

Scale in Feet



Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5
DEBRIS PILE LOCATIONS

Final Removal Action
Landfill Cap Closeout Report

5.0 REFERENCES

- Agency for Toxic Substances and Disease Registry (ATSDR). 2001a. "Health Consultation Summary, Hunters Point Shipyard, Parcel E Landfill Fire, San Francisco, California." January.
- ATSDR. 2001b. "Health Consultation, Hunters Point Shipyard, August 2000 Parcel E Landfill Fire, San Francisco, California." March 2.
- City and County of San Francisco. 1996. *People of the State of California vs. Triple A Machine Shop, Inc.* Arlo Smith, District Attorney.
- GSE Lining Technology, Inc. 1997. "Technical Paper – GSE Gundseal General Installation Instructions." June 19.
- Harding Lawson Associates. 1990. "Reconnaissance Activities Report, Remedial Investigation/Feasibility Studies, Naval Station Treasure Island, Hunters Point Annex, San Francisco, California." Volumes I, II, and III. August 9.
- International Technology Corporation (IT). 1998. "Perimeter Air Monitoring Plan, Parcel B Remedial Action, Hunters Point Shipyard, San Francisco, California." Revision 1.
- IT. 2000a. "Ambient Air Monitoring Plan, Parcel E, Hunters Point Shipyard, San Francisco, California." Revised. October.
- IT. 2000b. "Technical Specifications, Hunters Point Shipyard, Parcel E, IR 1/21 Interim Landfill Cap." September 20.
- San Francisco Redevelopment Agency. 1997. "Hunters Point Shipyard Redevelopment Plan." July 14.
- Tetra Tech EM Inc. (Tetra Tech). 2002. "Draft Final Field Sampling Plan/Quality Assurance Project Plan (FSP/QAPP) for Parcel E Nonstandard Data Gaps Investigation (Industrial Landfill and Wetlands Delineation), Hunters Point Shipyard, San Francisco, California." January 8.
- Tetra Tech. 2004. "Parcel E Nonstandard Data Gaps Investigation, Landfill Lateral Extent Evaluation, Hunters Point Shipyard, San Francisco, California." Final Report. October.
- Tetra Tech. 2005. "Final (Revision 1) Storm Water Discharge Management Plan Industrial Landfill Parcel E-2, Hunters Point Shipyard, San Francisco, California." February 1.
- U.S. Department of the Navy. 2000. "Action Memorandum Parcel E Landfill Fire Emergency Removal Action, Hunters Point Shipyard, San Francisco, California." November 7.
- U.S. Environmental Protection Agency. 2000. "Preliminary Remediation Goals." Region IX. November 22. Available Online at: <http://www.epa.gov/region09/waste/sfund/prg/index.html>

**APPENDIX A
RESPONSES TO REGULATORY AGENCY COMMENTS ON THE
DRAFT REMOVAL ACTION LANDFILL CAP CLOSEOUT REPORT**

RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT REMOVAL ACTION LANDFILL CAP CLOSEOUT REPORT, PARCEL E HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to comments from the U.S. Environmental Protection Agency (EPA) and the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) on the "Draft Removal Action Landfill Cap Closeout Report, Parcel E, Hunters Point Shipyard, San Francisco, California," dated July 13, 2001. The comments addressed below were received from EPA on August 20, 2001, and from DTSC on September 18, 2001.

RESPONSES TO COMMENTS FROM EPA

General Comments

- 1. Comment:** This document should address concerns expressed by the community and the multiple stakeholders and demonstrate that human health and the environment were protected during construction of the interim cap and will be protected by this interim remedy. Specifically, concerns have been addressed relating to the presence of contamination in air, water (e.g., San Francisco Bay), soil and to the presence of toxic waste at IR01/21, both during and after the fire. Please include sufficient detail in this document to address known stakeholder issues.

Response: The report contains in-depth discussions on air monitoring activities, results, and interpretations of the results (in the main text and also within Attachment A). The purpose of the report is, however, to summarize construction activities. It is not designed to address any possible health effects caused by the landfill fire, the ongoing assessment of the Landfill, associated contamination, or selection of final remedies. The Landfill (and any possible effects to the community) continues to be addressed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program.

Following the landfill fire, the Agency for Toxic Substances and Disease Registry (ATSDR) performed a "Health Consultation." The Health Consultation concluded that the fire could have caused reversible short-term adverse health effects in people exposed to the smoke from the fire, but the effects would only have lasted a few weeks. ATSDR published the Health Consultation in January 2001 (contact: Bill Nelson, 415 744-2194). The Health Consultation has also been entered into the Hunters Point Shipyard (HPS) Information Repository, which is available to the public. It can be found at two different locations:

CITY OF SAN FRANCISCO MAIN LIBRARY
Science, Technical, and Government Documents Room
100 Larkin Street
San Francisco, California 94102
(415) 557-4500

BAYVIEW/ANNA E. WADEN BRANCH LIBRARY
5075 Third Street
San Francisco, California 94124
(415) 715-4100

Or on the Internet at: <http://www.atsdr.cdc.gov/>

2. **Comment:** **The report does not explain why the interim landfill cap did not extend over the extent of known waste. Please revise the report to indicate where the interim landfill cap does not extend over the entire extent of the waste and explain why the cap did not include all known waste.**

Response: The overall purpose of the interim cap was to create a subterranean oxygen-deficient environment that would assist in extinguishing any burning materials in the landfill area. The interim cap was, therefore, generally placed over the burn areas and was not intended to cover the entire landfill or to be a final remedy. The limits of waste are currently being addressed in the pre-feasibility study (FS) nonstandard data gaps investigation for Parcel E.

3. **Comment:** **Please provide additional details on the chronology of the landfill fire. Specifically, please indicate if combustion of landfill waste started the brushfire or if the brushfire started the landfill waste fire. If the areal extent of burning waste is known or can be estimated, please provide a figure showing the extent of the burning waste. Also, please discuss how the public can be assured that landfill fires will not occur in the future.**

Response: Table 1 of the draft final report contains a detailed chronology of the events that were related to the landfill fire. Although the exact cause of the landfill fire is still unknown, the Navy believes that a surface fire began, which ignited subterranean wood debris (mostly sawdust). Regardless of the initial cause, future fires in this area are highly unlikely because of the interim low-permeability cap that will prevent oxygen from reaching the waste. Figure 2 of the draft final report shows the aerial extent of the landfill surface burn area.

4. **Comment:** The report, using Attachment B, Final 2000-2001 Closure Construction As-Built Report, documents the geosynthetic installation, but lacks a description of pre-construction/post-fire conditions, sub-grade preparation, and foundation layer construction. This information is necessary for assessment of the success of remedy construction. Please revise the report to include detailed descriptions of the pre-construction conditions, the sub-grade preparation and the foundation layer construction.

Response: Details on the preexisting condition are provided in the draft final remediation investigation report (Tetra Tech EM Inc. [Tetra Tech] 1997). The landfill subgrade was only modified in areas that did not allow placement of 2 feet of soil cover. In that case, existing cap soil was scarified and recompact to a depth that ensured at least 2 feet of stable material was in place under the interim cap. No waste was exposed during the operation. Section 3.1.3 of the draft final report discusses the subgrade and foundation layer preparation.

5. **Comment:** It would be helpful if the introductory sections of the report could be expanded to incorporate a discussion of how the emergency action documented in this report fits into the overall plans for closure of the landfill and the Navy's response to the landfill fire. Please revise the report to discuss what regulations the landfill will be closed under, what additional steps the Navy intends to or may take to close the landfill, and how the landfill will be maintained during the post-closure period. A reference to future reports and plans (closure plan, post-closure maintenance plans, monitoring plans, et cetera) the Navy intends to produce along with other reports that might have been produced (e.g., the report documenting the waste characterization of the wastes disposed of off-site) would be helpful to allow for a proper assessment of the adequacy of this report.

Response: The Landfill is currently part of an ongoing CERCLA investigation. The investigation is currently preparing for a pre-FS data gaps investigation. The primary purpose of this report is to identify the steps taken to complete the interim cap; the report does not address larger-scale issues related to the Landfill or make final remedy selections.

The Navy has developed a draft landfill cap operation and maintenance (O&M) plan to maintain the integrity of the interim cap (Tetra Tech 2003a). The Navy submitted the plan to the regulatory agencies on January 7, 2003, and it will be updated periodically. The O&M plan is not intended to complement the final selected remedy but is for maintaining the interim cap until a final remedy is selected.

6. **Comment:** The community has expressed concerns on numerous occasions about air release during and after the fire. This document should clearly discuss contaminants that were detected during air monitoring and consider whether these contaminants were related to IR01/21 contaminants.

Response: Please see the response to general comment 1. For additional information on benzene and carbon tetrachloride, please see the response to specific comment 6. For additional information on arsenic and manganese, please see the response to specific comment 7. For additional information on bis(2-ethylhexyl)phthalate, please see the response to specific comment 8.

Specific Comments

1. **Comment:** Section 1.1, Site Background, Page 1, Second Paragraph: The report does not contain a complete description of site conditions that existed before the fire. An existing interim cover is mentioned in Section 3.1.3, but there is no description of the nature of the existing interim cover, or its extent. No discussion of surface water drainage is provided, for either run on or run off of the existing interim cover. Further, the description of the site conditions is missing any discussion of waste characteristics observed in the past, such as the occurrence or absence of odor, surface cracking or exposure in storm water erosion channels. This information is important for the evaluation of the long-term effectiveness of the interim landfill cap. Please revise the text to include a description of the conditions that existed before the fire for any pre-fire interim cover material, the surface water drainage patterns that existed on the pre-fire interim cap, and any pertinent data on the landfill waste.

Response: Installation of the interim cap was intended to smother the fire and to prevent future fires from occurring by preventing oxygen from entering the subsurface. The Navy is currently not addressing long-term effectiveness since the cap is interim only, and a final remedial action will be selected during the FS.

Sawdust and wood chips present in the burn area appeared to be soft and were expected to subside during the placement of the fill. Any subsidence during construction was remedied through the placement of fill. All design final grades were met.

No surface water runoff was observed during the preconstruction survey. During construction, activities requiring water application to control dust and to condition soils did not result in any surface runoff. Standard engineering controls were put in place to minimize silts from running off with storm water. Silt fences were installed by the wetlands as soon as

earth-moving for the construction began. Hay bales were placed as needed during work progression. Pre-cap contours indicated that storm water sheet flow moved toward San Francisco Bay (Bay), with existing drainage swales also discharging along the east and west sides of the property.

2. **Comment:** **Section 1.2, Landfill Fire, Page 2: The description of the conditions that existed after the fire is incomplete. This omission makes it difficult to assess the as-constructed interim cap. Was waste observed at the landfill surface after the fire? Could waste be differentiated from soil (note the statement in Section 2.1 about PCB-contaminated soils being present in the landfill)? What were the runoff pathways from the 600,000 gallons of fire-fighting water, and did significant erosion result from the fire-fighting? Where were the colored flames reported by some observers located? Please revise the report to provide this data. Photographs of the cover system sub-grade conditions should be included in the report, if available.**

Also, please attach the referenced documents from the Agency for Toxic Substance and Disease Registry (ATSDR) regarding the landfill fire, as these documents are unlikely to be widely available yet they have a substantial value in the documentation of conditions at the start of construction.

- Response:** Please see the response to general comment 1. The Site Superintendent for Shaw Environmental & Infrastructure, Inc., formerly International Technology Corporation, did not observe any runoff of firefighting water. Additionally, Tony Fields, Federal Fire Chief, stated that water used during firefighting was not released to the Bay. All firefighting water was absorbed by the highly porous soil and debris. The firefighters were instructed not to allow any runoff to flow to the Bay. No further actions regarding surface water runoff were required since the water was absorbed into the ground.

Water applied to the fire probably seeped down to the shallowest aquifer, where it created a slight mounding. Groundwater level measurements taken before and after the landfill fire (July 12 and September 13, 2000) indicated almost no change in gradient. Groundwater sampling performed on September 13, 2000, revealed only one noted rise in an analyte concentration (a metal). Since metals are characteristically immobile, it doesn't represent a significant risk to the Bay. Groundwater monitoring is continuing, and the Navy will evaluate future results for any other increases in measured contamination.

Since surface water runoff did not occur, no soil or waste was transported off site by water.

The Navy could not verify the existence of colored flames, and the exact location, if present, could not be determined; however, Section 1.2 of the draft final report discusses reports of colored smoke and refers to the ATSDR report ([ATSDR 2001](#)). The ATSDR documents referenced in the report may be found at the locations provided in the response to general comment 1.

3. **Comment:** Section 2.0, Response Actions, Page 3: The dates of water spraying in the first bullet appear to include a typographic error because according to the text in Section 1.2, water spraying began August 16, 2000, not August 26. Please revise the text to correct this discrepancy.

Response: The Navy has revised the text.

4. **Comment:** Section 2.0, Response Actions, Page 3: The report does not include information summarizing what was done to address fires that were still smoldering 15 days after the initial fire, as stated in Section 1.2, third paragraph about the conditions that existed when the air monitoring began. Please revise the report to include information about the whole fire response effort.

Response: Please see the response to specific comment 2 for information on firefighting water. Additional information was not available. As noted in Section 2.2, the Navy installed the landfill cap to smother any remaining smoldering subsurface areas. Cap construction began 30 days after the initial fire.

5. **Comment:** Section 2.0, Response Actions, Page 3: This section includes a description of a response action that included application of 600,000 gallons of water to douse the fire and smoldering debris, but does not discuss the impact of this action on the landfill (e.g., erosion). Please revise the section to include description of where the fire-fighting water was applied and run off patterns. Please include a description of the efforts made to protect both San Francisco Bay and construction operations. Also discuss why samples of run off were not collected to evaluate the potential impact to the Bay.

Response: Please see the response to specific comment 2 for information on the firefighting water. In addition, please see the response to specific comment 1 for information on surface water runoff during construction operations.

6. **Comment:** Section 2.1, Air Monitoring, Page 5, First Paragraph and Attachment A: The comparison of benzene and carbon tetrachloride to ambient air conditions does not justify disregarding measurements that continually exceeded the action limits. While the comparison to a nearby regional air monitoring station may be acceptable, more information is required before the comparison can be considered valid and community concerns will be satisfied. Specifically, please revise the report to include a description and map of the relative position of the regional air monitoring station in comparison to the site. Also, please include benzene and carbon tetrachloride concentration versus time plots for each site air monitoring station, with the concurrent regional air monitoring station values also shown on the same plot for comparison.

Response: The Navy would like to reiterate that the purpose of this report is to provide final documentation on construction of the interim landfill cap. Please see the response to general comment 1. For the purpose of these responses to comments, the following information has been provided but is not included in the text.

Benzene

Benzene was detected in 306 of 388 samples (47 at Station A, 49 at Station B, 45 at Station C, 51 at Station D, 49 at Station E, 46 at Station F, and 19 at Station G) during 60 sampling periods. The minimum detection was 0.32 micrograms per cubic meters ($\mu\text{g}/\text{m}^3$), and the maximum detection was $5.91 \mu\text{g}/\text{m}^3$.

Concentrations of benzene exceeded the project duration perimeter air monitoring plan (PAMP) and annual average EPA preliminary remediation goal (PRG) action levels of 0.32 and $0.25 \mu\text{g}/\text{m}^3$, respectively, at all seven sampling stations. The average observed concentration at each station ranged from 0.94 to $1.21 \mu\text{g}/\text{m}^3$.

Benzene is a by-product of gasoline combustion and is common in urban areas. The Bay Area Air Quality Management District (BAAQMD) monitors benzene concentrations at a site on 10 Arkansas Street in San Francisco, which is 2.9 miles north of HPS. In 1999, the annual average benzene concentration was $2.11 \mu\text{g}/\text{m}^3$ (California Air Resources Board [CARB] 2001). Because of the short duration of the project, average benzene concentrations at each sampling station were less than background concentrations, as measured by BAAQMD. It is unlikely that emissions from Parcel E contributed significantly to the observed data.

Additionally, 65 benzene samples were collected daily. Benzene was detected on 43 (or 66 percent) sampling days at all stations. Benzene was detected on 3 sampling days at all but one station and was not detected on 3 sampling days, representing 9 percent of the sampling days. For the

remaining 16 sampling days, benzene was not detected at two or more stations, representing 25 percent of the sampling days. Of the 16 days with nondetections at two or more stations, benzene was detected on 8 days at or near the laboratory reporting limit. These data indicate that off-site sources of benzene are the most likely cause of elevated benzene levels.

Carbon Tetrachloride

Carbon tetrachloride was detected in 69 of 388 samples (8 at Station A, 13 at Station B, 9 at Station C, 9 at Station D, 13 at Station E, 11 at Station F, and 6 at Station G) over 27 sampling periods. The minimum detection was $0.629 \mu\text{g}/\text{m}^3$, and the maximum detection was $1.636 \mu\text{g}/\text{m}^3$. A PAMP action level was not established for carbon tetrachloride.

Concentrations of carbon tetrachloride exceeded the annual average PRG of $0.13 \mu\text{g}/\text{m}^3$ at all seven sampling stations when averages were calculated using one-half the detection limit for nondetects. When averages were calculated using zero for nondetects only, however, concentrations were above the PRG at stations B, E, and F. The average observed concentration at each station ranged from 0.396 to $0.466 \mu\text{g}/\text{m}^3$ when calculated using one-half the detection limit for nondetects. The average observed concentration at each station ranged from 0.0983 to $0.160 \mu\text{g}/\text{m}^3$ when calculated using zero for nondetects. The PRG action level for carbon tetrachloride is almost a factor of 5 below the laboratory reporting limits; therefore, any detection is above the action level.

BAAQMD monitors the carbon tetrachloride concentration at a site on 10 Arkansas Street in San Francisco, which is 2.9 miles north of HPS. During 1996, the last year for which an annual average concentration of carbon tetrachloride was available, the annual average concentration was $0.51 \mu\text{g}/\text{m}^3$ (CARB 2001). Because the average carbon tetrachloride concentrations at each sampling station were less than the background concentrations for the duration of the project, as measured by BAAQMD, it is unlikely that emissions from Parcel E contributed significantly to the observed data.

Additionally, carbon tetrachloride was not detected at Station D, which is downwind and nearest to the fire area at the Landfill, from September 9 through November 11, 2000. The lack of detections is notable because the cap was being constructed during this period. If carbon tetrachloride emissions were associated with the subsurface smoldering or Landfill, then Station D would have had detections during this period, given its location. Also, Station B, which is generally an upwind station, had the highest average concentration of detected results as well as the highest number of detections.

7. **Comment:** Section 2.1, Air Monitoring, Page 5, Second Paragraph and Attachment A: The statement that arsenic and manganese measurements are related to the mineralogy of the site soils should be developed further before community concerns will be allayed and the occurrences of the metals can be disregarded. Please include missing information concerning arsenic and manganese analytical results for surface soil and imported fill composition; arsenic and manganese concentration versus time plots for each air station with detections; and response activity, location and wind direction plots for the time of measurement. Please also include information about arsenic and manganese measurements at the regional air monitoring station during the same time periods.

Response: The Navy would like to reiterate that the purpose of this report is to provide final documentation on construction of the interim landfill cap. Please see the response to general comment 1. For the purpose of these responses to comments, the following information has been provided but is not included in the text.

Manganese

As stated in the Navy's letter to the Base Realignment and Closure Cleanup Team, dated August 23, 2001, about the air monitoring program at Parcel B, manganese action levels that were used to compare with the Parcel E manganese results are overly conservative. The Navy stated that "after extensive review of the regulations and consulting with health protection specialists, use of the California Manganese Chronic Reference Exposure Level of $0.2 \mu\text{g}/\text{m}^3$ is the most appropriate screening criteria for this project."

The average observed concentration at each station ranged from 0.026 to $0.088 \mu\text{g}/\text{m}^3$. Concentrations of manganese did not exceed the California chronic reference exposure level of $0.2 \mu\text{g}/\text{m}^3$ for manganese. This exposure level is based on long-term exposure and not 24-hour time-weighted averages.

Arsenic

Arsenic was detected in 41 of 376 samples (4 at Station A, 3 at Station B, 9 at Station C, 14 at Station D, 3 at Station E, 6 at Station F, and 2 at Station G) over 27 sampling periods. The minimum detection was $0.002 \mu\text{g}/\text{m}^3$, and the maximum detection was $0.005 \mu\text{g}/\text{m}^3$.

Concentrations of arsenic did not exceed the PAMP action level of $0.014 \mu\text{g}/\text{m}^3$ at any monitoring station. Arsenic concentrations, however, exceeded the annual average PRG action level of $0.00045 \mu\text{g}/\text{m}^3$ at all seven sampling stations when averages were calculated using one-half the detection limit for nondetects. When averages were calculated using zero for nondetects, arsenic concentrations exceeded the PRG at Station D

only. The average observed concentration at each station ranged from 0.00105 to 0.00142 $\mu\text{g}/\text{m}^3$ when calculated using one-half the detection limit for nondetects. The average observed concentration at each station ranged from 0.00010 to 0.00065 $\mu\text{g}/\text{m}^3$ when calculated using zero for nondetects. The PRG action level for arsenic is almost a factor of 5 below the laboratory reporting limits; therefore, any detection is above the action level. Additionally, 27 of the 41 detected results were reported at the detection limit of 0.002 $\mu\text{g}/\text{m}^3$.

8. **Comment:** **Section 2.1, Air Monitoring, Page 5, Third Paragraph and Attachment A:** The description of the bis(2-ethylhexyl) phthalate detections is inadequate. The occurrence of the compound in some rubber gloves is not convincing evidence that the compound is acceptable above action levels for this site. Some gloves are made without phthalates. Phthalates may also be related to landfill contaminants. Please provide additional information to justify this statement, including the type of rubber gloves used at site. Please consider providing a comparison of the glove use time with the measurement time period. Please include plots of concentration versus time, with the regional air monitoring station measurements shown for assessment of background values.

Response: The Navy would like to reiterate that the purpose of this report is to provide final documentation on construction of the interim landfill cap. Please see the response to general comment 1. For the purposes of these responses to comments, the following information has been provided but is not included in the text.

Bis(2-ethylhexyl)phthalate

Bis(2-ethylhexyl)phthalate was detected in 160 of 231 samples (28 at Station A, 26 at Station B, 22 at Station C, 30 at Station D, 21 at Station E, 23 at Station F, and 10 at Station G) during 36 sampling periods. The minimum detection was 0.0006 $\mu\text{g}/\text{m}^3$, and the maximum detection was 0.7440 $\mu\text{g}/\text{m}^3$.

None of the station averages exceeded the PRG action level of 0.48 $\mu\text{g}/\text{m}^3$. The average observed concentration at each station ranged from 0.0074 to 0.038 $\mu\text{g}/\text{m}^3$.

Concentrations of bis(2-ethylhexyl)phthalate exceeded the PAMP of 0.018 $\mu\text{g}/\text{m}^3$ at Stations A, B, D, and E. The PAMP action level of 0.018 $\mu\text{g}/\text{m}^3$ is 25 times lower than the PRG for bis(2-ethylhexyl)phthalate. The derivation of the PAMP action level cannot be reproduced and the method used to derive it is no longer available. This value is inconsistent with the PRG, which is protective of human health.

As a result, concentrations above the PAMP but below the PRG are not considered exceedances.

Bis(2-ethylhexyl)phthalate is found in many materials from polyvinyl chloride pipe to rubber gloves. The concentrations shown in the sampling results could easily be influenced by the presence of these materials near the sampling stations. In addition, the concentrations at each station for each sampling period are relatively constant. Bis(2-ethylhexyl)phthalate as well as other phthalates were detected several times in the field blank, ranging in concentrations from 0.0036 to 0.006 $\mu\text{g}/\text{m}^3$. The site was not likely a significant emitter of bis(2-ethylhexyl)-phthalate. Bis(2-ethylhexyl)phthalate was detected numerous times during the Parcel B air monitoring program, even though it was not an analyte of concern on days when it was detected.

9. **Comment:** **Section 2.1, Air Monitoring, Page 5, Fourth Paragraph and Attachment A: The statement that Aroclor-1260 detections that the compound did not emanate from the landfill or fire areas. Please revise the report to include a map showing the location and extent of the contaminated area used for material lay down, in relationship to the air monitoring stations. Also, please include a chronology comparing when Aroclor-1260 detections were made and the construction activities that preceded that time. In particular, demonstrate the effectiveness of the gravel working surface placed over the lay down area by the change in Aroclor-1260 occurrence from before and after the gravel installation.**

Response: The Navy would like to reiterate that the purpose of this report is to provide final documentation on construction of the interim landfill cap. Please see the response to general comment 1. For the purposes of these responses to comments, the following information has been provided but is not included in the text.

Aroclor-1260

The detections of polychlorinated biphenyls (PCB) encountered during landfill interim cap installation activities are likely attributable to shallow PCB soil contamination that exists immediately south of the landfill. The Navy has delineated remediation area 02-NW-01, where several samples were previously found to have PCB concentrations above EPA PRGs.

The 2000 industrial PRG is 1.0 milligram per kilogram (mg/kg), and the 2000 residential PRG is 0.21 mg/kg. PCB concentrations found within remedial area 02-NW-01 ranged from 1.4 to 120 mg/kg, with an average concentration of 22.2 mg/kg, and were in soils shallower than 4 feet below ground surface.

During construction of the cap, this area was covered with gravel or clean backfill; therefore, the area is temporarily covered, and at present, it does not pose an air pathway risk.

10. **Comment:** **Section 2.2, Pages 5 and 6:** The description of the response action selection does not adequately address issues relating to landfill gas and air flow. First, the control of air flow to potentially smoldering subsurface materials does not address horizontal inflow of air from beyond the cap edges. Second, there is no consideration given to the release of sub-cap soil gas or combustion by-products that may otherwise build up beneath the cap and potentially cause disruption to surface grading. Please revise the report to describe how the final cover prevents significant influx of air from the perimeter and how the build-up of unacceptable levels of landfill gas pressure beneath the cap can be prevented.

Response: The Navy would like to reiterate that the purpose of the interim cap was to smother any possible smoldering landfill materials by blocking inflow of oxygen. The interim cap does not, therefore, have provisions for gas flow (into or out of the Landfill). The next phase of investigation in Parcel E assesses not only the potential for gas buildup and release but also for liquefaction. The investigation will also include an evaluation of the lateral extent of the Landfill in several key areas. This document only presents details about completion of the interim cap, and the Landfill will continue to be evaluated under the CERCLA process.

11. **Comment:** **Section 3.1.3 Foundation Layer, Page 8, Second Paragraph:** The prior soil cover material is mentioned, but the report does not describe this material. Because the soil cover material was used as the foundation for the interim cap, identification of the material is important. Please revise the report to include a description of the soil cover material.

Response: The original cap on the Landfill consisted of soil mixed with debris. Samples of the existing cover were collected and tested for ASTM (formerly American Society of Testing and Materials) International Standards D2166-91, "Standard Test Method for Unconfined Compressive Strength of Cohesive Soil," and D4318-95a, "Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils." Soils were found to be suitable for foundation material. Visual observation the cap over the past several years indicates that substantial settlement is not occurring and that the cap is functioning satisfactorily.

12. **Comment:** Section 3.1.3, Foundation Layer, Page 8, Second Paragraph: The report does not describe the foundation layer thickness measurements, yet it is stated that 2 feet minimum was the design requirement. Please revise this section to include a description of the foundation layer thickness measurements, including the location of the measurements, the spacing between adjacent measurements, the acceptance criteria for the layer, and any instances of rework done on the layer.

Response: The foundation layer thickness was determined by measuring the difference between the original and final surveys of the ground surface. Section 3.1.3 of the draft report describes the verification survey performed before placement of the geosynthetic clay liner. The Navy surveyed the foundation layer on a minimum grid of 100 by 100 feet to verify thickness and surface slopes. This survey was compared with the design elevations for the top of the 2-foot foundation fill. Areas that required less than 2 feet of foundation fill to reach the design elevations were ripped to a depth of 12 to 18 inches, reconditioned, and recompacted. Foundation fill was then added (as required) to reach the design elevations. This process ensured that at least 2 feet of stable material existed under the interim cap. Attachment B of the draft final report contains additional details of this process.

13. **Comment:** Section 3.1.4, Geosynthetic Clay Liner, Page 9: This section includes the statement "... because of possibility of poor drainage or ponding on the geomembrane as a result of future settlement of the landfill." Given the concern over future settlement and possible ponding, it is important to connect the discussion of this section with the proposed operations and maintenance activities that would address such future deficiencies. Please revise the report to include a reference to the specific provision of the Operations and Maintenance Plan for this site that will deal with differential settlement of the interim cap.

Response: The Navy has developed a draft landfill cap O&M plan ([Tetra Tech 2003a](#)) to maintain the integrity of the interim cap. The O&M plan addresses landfill gas generation, erosion, vegetation, settling, and contingency measures. The Navy will revise the plan following its issuance as necessary, and the plan is intended to be sufficient for maintaining the integrity of the interim cap until a final remedy has been selected for the Landfill.

14. **Comment:** Section 3.1.7, Vegetated Soil Cover, Pages 10 and 11: The condition of the grass cover at the time of the report is not described. Please revise the report to include a description of the grass germination success rate and growth in the time since hydroseeding.

Response: The Navy would like to reiterate that the purpose of this report is to provide final documentation on construction of the interim landfill cap. Please see the response to general comment 1. For the purposes of these responses to comments, the following information has been provided but is not included in the text.

After seeding and germination, the Navy found several bald areas on the landfill cap cover. At that time, the watering frequency was 1 to 1.5 hours per day, 3 days per week (for adequate pressure, only half of the system operated at a time). The vendor who had provided the seeds for vegetating the cap was asked to inspect the vegetative soil cover. He noted signs of stressed vegetation surrounding the bald areas. In some cases, the poor growth and yellowing seemed to be caused by insufficient watering. Several sprinkler heads were tilted and did not provide adequate coverage. Sprinkler piping was also found to be loose, and there was infiltration of dirt as well as leaks. In other areas of poor growth, lack of water did not seem to be the cause of balding. One soil sample was sent for analysis to Sunland Analytical Laboratory. The results showed that the soil is suitable for landscape gardening (sample was tested for pH, dissolved salts, soil texture, water infiltration and penetration, organic matter, soil boron, and soil micronutrients). The vendor suggested mowing down the current vegetation and reseeding the area. In addition, the sprinkler system needed to be periodically inspected and maintained to ensure proper functioning. It was also determined that the watering frequency should be increased to at least 2.5 hours per day, 3 days per week.

15. **Comment:** **Section 3.2, Surface Drainage and Erosion Control System, Page 11:** **The report does not describe sediment and erosion control efforts during construction, including documentation of precipitation events and analytical testing of potentially contaminated sediments. Some information is presented in Attachment B, however that information does not describe the activities sufficiently to demonstrate control of potentially contaminated sediments. Please revise the report to include information about the control, analysis and disposal of potentially contaminated sediments during construction.**

Response: Before construction began, the Navy installed a silt fence along the entire southern side of the cap. Upstream of the silt fence, soil was windrowed up, creating silt traps. Throughout the construction period, hay bales were used to reduce the energy of storm water and to assist in capturing silt. Inspections of the entire area were conducted before and after each storm event. The inspections did not reveal any failures of the system to control silt.

16. **Comment:** Section 3.3, Surface Water, Page 12: The description of the vegetative soil cover layer should include the specific assumptions made in design for the soil properties of the layer. For example, what infiltration characteristics were anticipated for the vegetative soil cover in the design of the geonet, and what are the actual characteristics of the different soil types? While specification levels may not have been established for the specific parameters, it is important that the report consider the effectiveness of the constructed elements. Please revise the report to include a discussion of the design assumptions for the vegetative soil cover layer and the characteristics of the actual soils used.

Response: The purpose of the vegetative cover is to protect the underlying geosynthetic layers and to minimize the hydraulic head above them. The materials also need to support vegetation to reduce erosion. The vegetative soil material was a sandy loam, which was tested for plasticity to ensure that shrinkage cracks would not occur in the cover. The tests showed the material was suitable. Water that permeates through the vegetative cover is collected in the geocomposite drainage layer and directed toward the central gravel swale and off the cap. Attachment B contains the specifications of the layers, including thickness, density, and transmissivity.

17. **Comment:** Section 3.4, Monitoring Wells, Page 12: The report does not include a description of the monitoring wells or any effects of the fire or fire fighting activities on the wells. Specifically, were any of the monitoring wells damaged and in need of repair? Please revise the report to include information about the monitoring wells and any effects of the fire or fire fighting activities might have had on the wells.

Response: Twelve monitoring wells were located near the area of the landfill fire. None of the wells appeared to have been damaged during the fire. For the cap construction, all wells were extended upward to accommodate cap installation. Boots were installed and extrusion welded to the geomembrane liner.

18. **Comment:** Attachment B, Section 1.1, Project Summary, Page 1-2, Second Paragraph: The location of the debris stockpiles is not provided in either the text or the figures. Because of the potential for the debris to be hazardous wastes, movement activities and storage locations are important to document. Please revise the report to include graphical presentation of the debris stockpile locations. Also please include a description in the text of how the movement was done and what control measures were taken to prevent any migration of potential chemical compounds from the debris.

Response: The landfill debris was loaded into trucks and hauled to the on-site storage area, where it was placed on a plastic liner. The Navy chose the storage area to prevent runoff or runoff. It was adjacent to the cap construction to minimize runoff. Before being used as the stockpile area, the area was not vegetated. The stockpile was underlain with 20-mil plastic. The approximate size of the stockpile was 80 by 150 feet. The debris was wet down before loading and at the end of the day to minimize dust. The process did not produce any runoff. Since construction occurred during the dry period, there has been no storm water runoff.

19. **Comment:** Attachment B, Section 1.1, Project Summary, Page 1-2, Third Paragraph: The methods and results of the well point monitoring of subsurface activity relating to continuation of subsurface combustion are not presented. This information has significant bearing on both the long-term effectiveness and the short-term implementation of the remedy and should be included in this report. Please revise the report to include a description of the methods and results for the well point monitoring of the subsurface combustion activity, as well as for any other means of monitoring subsurface combustion performed at the site.

Response: The Navy completed extensive gas surveys of the property in spring 2002. The data indicate that combustion is not occurring in the landfill. The data are available on the Navy website (<http://www.efds.w.navy.mil/06/indexHP.htm>) and will be included in the nonstandard data gaps investigation report and in the revised Parcel E-2 remedial investigation and FS report.

20. **Comment:** Attachment B, Section 2.3, Preparation of Subgrade, Page 2-1 First Paragraph: As stated in the comment on Attachment B, Section 1.1, 2nd Paragraph, Page 1-2, the location of the debris stockpiles is not provided in either the text or the figures. Because of the potential for the debris to be hazardous wastes, movement activities and storage locations are important to document. Please revise the report to include graphical presentation of the debris stockpile locations. Also include a description in the text of how the movement was done and what control measures were taken to prevent any migration of potential chemical compounds from the debris.

Response: Please see the response for specific comment 18.

21. **Comment:** Attachment B, Section 2.4, Debris Disposal, Page 2-2: No documentation is provided for the disposal of the accumulated debris described in this section, Because the debris originated from a hazardous waste site and could conceivably be hazardous waste itself, complete analytical analysis, waste identification, transportation manifesting, disposal location and disposal acceptance information is necessary to prove that no illegal disposal occurred. Please furnish this information as an appendix to the report, and revise the report body to include a summary of all disposal activities and approvals.

Response: The Navy sampled the debris pile, and samples were analyzed for disposal parameters. Subsequently, debris was sent to the appropriate facility. Concrete debris was recycled off site, and the railroad ties were sent off site as creosote-soaked Class II waste. See Table 2 in Attachment B of the draft final report for the quantity of debris removed. Additional information has been included in Attachment C.

22. **Comment:** Attachment B, Section 4.2.1, Foundation Approval, Pages 4-2 and 4-3: No mention is made of the method and means used for foundation layer thickness evaluation, yet the report clearly states that 2 feet minimum was the design requirement. Please revise this section to include a description of the foundation layer thickness measurements, including the location of the measurements, the spacing between adjacent measurements, the acceptance criteria for the layer, and any instances of rework done on the layer.

Response: Please see the response for specific comment 12.

23. **Comment:** Attachment B, Section 8.0, References: References have not been included for GSE (1997) and ASTM (in particular, the year of the ASTM standards cited). Please revise the report to include this information.

Response: The standards used for the technical specifications can be found at <http://www.cssinfo.com/info/astm.html>. In addition, information for GSE Lining Technology, Inc., Lining Technology can be found at <http://www.gseworld.com>.

RESPONSES TO COMMENTS FROM DTSC

General Comments

1. **Comment:** **The design of cover and Parcel E landfill(landfill) closure should follow the requirements of the site specific Applicable or Relevant and Appropriate Requirements(ARARs) and To Be Considered(TBC) requirements. The Report should demonstrate that the cover and landfill closure design is consistent with ARARs and TBCs.**

Response: The Navy constructed the interim cap as an emergency removal action in response to a brush fire. The cap was installed as an interim cover, not a closure cover. Consideration of applicable or relevant and appropriate requirements and “to be considered” requirements will be included in the revised Parcel E-2 FS if the landfill cap becomes part of the final remedy.

2. **Comment:** **The Report should include engineering design criteria for both cover and the landfill closure system.**

Response: Please see the response to general comment 1.

3. **Comment:** **The Report should include stability analysis of cover and landfill closure system for both static and seismic conditions.**

Response: Please see the response to general comment 1. A liquefaction study has been performed as a part of the nonstandard data gaps investigation and will be included in the revised Parcel E-2 FS. Geotechnical considerations and design parameters will be included in the revised FS if capping becomes a part of the final remedy.

4. **Comment:** **The Report should include critical subsurface cross section profiles (both north-south and east-west directions) of the landfill. The cross section profiles of the subsurface materials are important to evaluate the stability analysis of the landfill.**

Response: The purpose of the report is solely to summarize construction activities. It is not designed to address the ongoing assessment of the Landfill, associated contamination, or selection of final remedies. The next phase of investigation in Parcel E assesses the potential for liquefaction.

5. **Comment:** The Report should include settlement (both total and differential) analysis for the cover system. Also, the Report should provide assurance that the geosynthetic cover system will maintain its integrity after experiencing the predicted settlement.

Response: The purpose of the report is solely to summarize construction activities. It is not designed to address the ongoing assessment of the Landfill, associated contamination, or selection of final remedies. The O&M plan for the cap includes provisions for determining settlement and measures for maintaining the integrity of the cap ([Tetra Tech 2003a](#)).

6. **Comment:** The Report should include soil loss/erosion analysis for the cover system to meet the requirements of 2Tons/acre/year (REF: Design and Construction of RCRA/CERCLA Final Covers, EPA/625/4-91/025, May 1991).

Response: Please see the response to general comment 1.

7. **Comment:** Two settlement markers were installed for the cover system. It should be noted that the cover system extends about 14 acres and providing only two settlement markers are not sufficient. Moreover, with two settlement markers it is not possible to draw any settlement profile for the site. The number of settlement markers should be increased to obtain appropriate settlement profile of the site.

Response: Extensive filling with soil, debris, and waste has occurred at the site over numerous years, with fill thicknesses of 20 to 30 feet. Previous long-term settlement because of the Bay Mud was significant; however, significant additional settlement is not expected because of the capping activities. No significant settlement has been observed in the cap since its installation. Additional information and analyses will be included in the revised FS if capping becomes a part of the final remedy.

8. **Comment:** The Report should include the design for the surface drainage and the erosion control.

Response: Section 3.2 and Figure 4 of the draft report include discussion and details of the surface drainage and erosion control system.

9. Comment: The Report should include a typical monitoring well construction details.

Response: Although 12 monitoring wells in the area were extended upward to accommodate cap installation and tied to the geomembrane to ensure a seal, none of the wells was replaced or installed during the cap construction. It is not necessary, therefore, to provide monitoring well construction details.

10. Comment: **Figure 4: The report should include:**

Anchor trench design

Design of the pipe

Mattressed gabion riprap design

Response: The Navy installed riprap to prevent erosion along the concentrated flow path in the center of the cap; it has been performing satisfactorily. In addition, a storm water discharge management plan has been prepared to address overall erosion concerns within the landfill area ([Tetra Tech 2003b](#)). The anchor trench is typically a 2-foot by 1-foot trench in which the liner and geotextile are placed before backfilling. Section A of Figure 4 of the draft final report shows a typical anchor trench.

11. Comment: **Figure 2: The installation of the cover system should completely envelop the landfill waste. However, the edge of the waste goes beyond the coverboundary.**

Response: The Navy constructed the interim cap as an emergency removal action in response to a brush fire; the interim cap was placed mostly over the burn areas and was not intended to cover the entire Landfill or be a final remedy. The limits of waste are currently being addressed in the pre-FS nonstandard data gaps investigation.

12. Comment: **Department of Toxic Substances Control(DTSC) have not received the construction specifications or the Construction Quality Assurance(CQA) or the Construction Quality Control documents(CQC) for review.**

Response: Appendix A to Attachment B of the draft report contains the construction specifications. The appendices to Attachment B also contain construction quality control documents.

REFERENCES

California Air Resources Board. 2001. "The 2001 California Almanac of Emissions and Air Quality, Appendix B."

Agency for Toxic Substances and Disease Registry [ATSDR]. 2001. "Health Consultation Summary, Hunters Point Shipyard, Parcel E Landfill Fire, San Francisco, California." January.

Tetra Tech EM Inc. [Tetra Tech]. 1997. "Draft Final Remedial Investigation, Parcel E, Hunters Point Shipyard, San Francisco, California." October 27.

Tetra Tech. 2003a. "Draft Operation and Maintenance Plan, IR-01/21, Industrial Landfill, Parcel E, Hunters Point Shipyard, San Francisco, California." January 7.

Tetra Tech. 2003b. "Draft Storm Water Discharge Management Plan, IR-01/21, Industrial Landfill, Parcel E, Hunters Point Shipyard, San Francisco, California." January 7.

**APPENDIX B
RESPONSES TO REGULATORY AGENCY COMMENTS ON THE
DRAFT FINAL REMOVAL ACTION LANDFILL CAP CLOSEOUT REPORT**

RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT FINAL REMOVAL ACTION LANDFILL CAP CLOSEOUT REPORT, PARCEL E, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to comments from the regulatory agencies on the "Draft Final Removal Action Landfill Cap Closeout Report, Parcel E, Hunters Point Shipyard, San Francisco, California," dated February 4, 2003. The comments addressed in the following text were received from U.S. Environmental Protection Agency (EPA) on June 25, 2003, and the San Francisco Bay Regional Water Quality Control Board (Water Board) on April 24, 2003.

RESPONSES TO COMMENTS FROM EPA

Additional General Comments

- 1. Comment:** The intent of this document is unclear because it does not fulfill the requirements for a removal action report (OSC Report) or a closeout report, nor does it appear to contain sufficient information to document that public health was protected. This concern is partially based on the fact that many of the responses to comments contain the following note:

The Navy would like to reiterate that the purpose of this report is to provide final documentation on construction of the interim landfill cap. Please see the response to general comment 1. For the purpose of these responses to comments, the following information has been provided, but not included in the text.

The Code of Federal Regulations, at 40CFR300.165 requires a complete report on any removal action per the following:

§ 300.165 OSC reports. (a) As requested by the NRT or RRT, the OSC/RPM shall submit to the NRT or RRT a complete report on the removal operation and the actions taken. The RRT shall review the OSC report and send to the NRT a copy of the OSC report with its comments or recommendations within 30 days after the RRT has received the OSC report. (b) The OSC report shall record the situation as it developed, the actions taken, the resources committed, and the problems encountered.

If this document is not the required report documenting the actions taken during the removal action to safeguard the public, please provide a reference to where this information can be located. If this document is the report documenting the removal action, of which the installation of the interim landfill cover was a component, please revise the document to fully document the actions taken during the removal action.

Response: The landfill cap closeout report documents the action taken for the removal action as stated in the action memorandum (Tetra Tech EM Inc. [Tetra Tech] 2000), which is “to undertake emergency capping in response to the fire that broke out on August 16, 2000, on the Landfill at Parcel E of Hunters Point Shipyard (HPS).” The purpose of the cap was to prevent air from reaching any underground fuel source in the Landfill to smother any existing fire as well as prevent a future recurrence. The Navy implemented this removal action as selected in the action memorandum, and by definition, the public health has been protected.

The final closeout report documents all actions taken during the removal action, which includes only the installation of the cap. The report also follows the general guidance (EPA 1994) for an On-Scene Coordinator (OSC) report providing “a written summary of a removal activity, recording the situation as it developed, the actions taken, their effectiveness, the resources committed and the problems encountered.”

Review of the Responses to General Comments

- 1. Comment:** Please provide a specific internet address for the landfill fire health consultation report, which could not be located at the ATSDR website, and include an electronic version of the report on the accompanying CD in the final edition of this report.

Response: The Navy could not find the health consultation summary on the Agency for Toxic Substances and Disease Registry (ATSDR) website and contacted Bill Nelson, Senior Regional Representative of Region IX at the ATSDR. Mr. Nelson indicated that the summary had not been posted on the ATSDR website because of budget and volume constraints. It has subsequently been posted. Interested parties may also contact Mr. Nelson directly to obtain a copy of the health consultation summary (ATSDR 2001a):

Agency for Toxic Substances and Disease Registry
75 Hawthorne Street, MS: HHS-1, Suite 100
San Francisco, California 94105
Phone: (415) 947-4316
Fax: (415) 947-4323
E-mail: WQN1@cdc.gov

In addition, Mr. Nelson informed the Navy that ATSDR also published a full consultation report in March 2001 (ATSDR 2001b), which has also been added to the website (<http://www.atsdr.cdc.gov/>). The reports can also be found at the two locations (City of San Francisco Main Library and Bayview/Anna E. Waden Branch Library) listed in the response to general comment 1 in the responses to comments on the draft report. The Navy has not included this summary report on the compact disk with the

final cap closeout report because it is not intended to address health effects of the landfill fire. The purpose of the report is to summarize construction activities associated with the landfill cap removal action. The Navy cited the ATSDR health consultation summary report in response to EPA's request for an assessment of the effects on human health and the environment during and after the landfill fire.

2. Comment: The response appears to address the comment.

Response: No response is required for this comment.

3. Comment: The response appears to address the comment.

Response: No response is required for this comment.

4. Comment: The response appears to address the comment and was incorporated into the document.

Response: No response is required for this comment.

5. Comment: The response appears to address the comment.

Response: No response is required for this comment.

6. Comment: The response to this comment references the responses to specific comments 6, 7 and 8, but the responses to those comments are not sufficient if this report is intended to satisfy the Navy's reporting requirements under the National Contingency Plan (NCP). If this report is not the final report in which the Navy will document the work it conducted under the removal action, then the responses to Specific Comments 6, 7, and 8, are sufficient if the final report is produced in a timely manner.

A review of the air monitoring data contained in Attachment A to the report appears to confirm the Navy's view that the volatile organic compounds (VOC) detected in air samples collected at the site are not originating from the landfill. The highest VOC concentrations detected at the site appear to be mainly from upwind sampling locations. While the variation in VOC concentrations in air samples are significant from day to day, there is much less variation within the results from particular days (on days with higher VOC results, all of the air monitoring stations produced samples with VOC concentrations of about the same magnitude, indicating the VOC are from some regional source and not the landfill). There appears to be

some correlation between the day of the week and VOC concentrations (no detections on Saturdays) which implies the VOC are originating from an industrial facility and not the landfill - if the VOC were from the landfill, there would be no correlation between VOC concentrations and the day of the week. Further, on days where there was very little wind, there were very few detections of VOC, indicating that there is no significant VOC source in the vicinity of the landfill, rather that the VOC are being blown in from off-site. Presenting an analysis of the air monitoring data would likely provide the people who live adjacent to the landfill a better understanding of the landfill's impacts on their environment.

Response: Please see the response to EPA additional general comment 1.

EPA's review of the volatile organic compound data is noted. The air monitoring data is discussed in Section 2.1 of the draft final report. The report is, however, intended only to summarize the construction activities associated with the landfill cap removal action, and not to provide an analysis of the effects of the landfill fire or other fugitive emissions from the Landfill.

Review of the Responses to Specific Comments

1. **Comment:** The response appears to address the comment.

Response: No response is required for this comment.

2. **Comment:** The response appears to address the comment.

Response: No response is required for this comment.

3. **Comment:** The response appears to address the comment and was incorporated into the document.

Response: No response is required for this comment.

4. **Comment:** The response appears to address the comment.

Response: No response is required for this comment.

5. **Comment:** The response to this comment is not sufficient if this report is intended to satisfy the Navy's reporting requirements under the National Contingency Plan (NCP) because information about the 600,000 gallons of water was not incorporated in the document. If this report is not the final report in which the Navy will document the work it conducted under the removal action, then the response is sufficient if the final report is produced in a timely manner. If the Navy wishes to modify this report so that it fulfills the Navy's reporting requirements under the NCP, then the report should be modified to include the information that the 600,000 gallons of fire-fighting water appears to have all infiltrated into the waste and to address if the 600,000 gallons was sprayed uniformly over the landfill or was concentrated in one particular area. This information will be useful as the water, if concentrated in a relatively small area, may be exacerbating landfill gas production in that area.

Response: Please see the response to EPA additional general comment 1.

6. **Comment:** The response to this comment is not sufficient if this report is intended to satisfy the Navy's reporting requirements under the National Contingency Plan (NCP) because it does not include the charts and maps requested in the original comment. If this report is not the final report in which the Navy will document the work it conducted under the removal action, then the response is sufficient if the final report is produced in a timely manner. If the Navy wishes to modify this report so that it fulfills the Navy's reporting requirements under the NCP, then the report should be modified to include a more detailed assessment of the air monitoring data. This detailed assessment should include the charts and maps requested in the original comment as well as an assessment of the upgrading and downgradient concentrations of contaminants of concern detected at the landfill. This assessment should be conducted on a day by day basis as the wind directions shifted from day to day. The Navy should provide additional assurance that the background air monitoring location is appropriate for the Hunters Point landfill. While the landfill is on a promontory that sticks out into the Bay in an area of low traffic, it is unclear what conditions the background air monitoring location is located in.

Response: Please see the response to EPA additional general comment 1. The purpose of the report is to document the construction activities associated with the removal action. A detailed assessment of the air monitoring data is beyond the intent of the report. The background air monitoring station is located in San Francisco, outside of HPS; it is the closest air monitoring station to HPS in the San Francisco Bay Area Air Basin. Please refer to the 2001 "California Almanac of Emissions and Air Quality" ([California Air Resources Board 2001](#)) for more information on the background air monitoring station.

7. Comment: See the assessment of the response to Specific Comment 6. In addition, if the manganese and arsenic detected in air samples were due to fugitive dust, as seems likely, the concentrations should have noticeably dropped off once the HOPE final cover was put into place (assuming the imported soil for the vegetative cover did not contain high concentrations of arsenic and manganese). Please present the arsenic and manganese air sampling data as plots of concentration versus time suitably annotated to show the dates of appropriate construction milestones.

Response: Please see the response to EPA additional general comment 1.

8. Comment: See the assessment of the responses to Specific Comments 6 and 7.

Response: Please see the response to EPA additional general comment 1.

9. Comment: See the assessment of the responses to Specific Comments 6 and 7.

Response: Please see the response to EPA additional general comment 1.

10. Comment: The response appears to address the comment.

Response: No response is required for this comment.

11. Comment: The response appears to address the comment and was incorporated into the document.

Response: No response is required for this comment.

12. Comment: The response appears to address the comment and was incorporated into the document.

Response: No response is required for this comment.

13. Comment: The response appears to address the comment.

Response: No response is required for this comment.

14. Comment: The response appears to address the comment.

Response: No response is required for this comment.

15. Comment: The response appears to address the comment.

Response: No response is required for this comment.

16. Comment: The response appears to address the comment.

Response: No response is required for this comment.

17. Comment: The response appears to address the comment and was partially incorporated into the document.

Response: No response is required for this comment.

18. Comment: The response does not address the comment. Please revise the report to include a discussion of the location of the debris stockpile, operations conducted at the stockpile, the nature of the waste stored in the stockpile, and how the stockpile was decommissioned.

Response: EPA specific comment 18 on the draft final report ([Appendix A](#) of the final closeout report) states, “Please revise the report to include graphical presentation of the debris stockpile locations. Also please include a description in the text of how the movement was done and what control measures were taken to prevent any migration of potential chemical compounds from the debris.”

The response to this comment discussed the size of the stockpiles, operations at the stockpile, and control measures to prevent migration of potential chemical compounds from debris. In addition, [Attachment B](#) of the final closeout report describes the nature of the debris.

All debris stockpiles were removed from the site and sent off site for disposal. [Attachment C](#) of the final closeout report provides laboratory results and waste manifests for the debris.

The Navy also has revised [Section 4.0](#) of the final closeout report to include the discussion of operations and control measures at the debris stockpiles that was provided in the responses to comments on the draft report ([Appendix A](#)).

19. Comment: The response appears to address the comment.

Response: No response is required for this comment.

- 20. Comment:** See the assessment of the response to Specific Comment 18.
- Response:** Please see the response EPA specific comment 18.
- 21. Comment:** The response appears to address the comment and was incorporated into the document.
- Response:** No response is required for this comment.
- 22. Comment:** The response appears to address the comment.
- Response:** No response is required for this comment.
- 23. Comment:** The response did not address the comment. The response does not state which standards were used to assess the adequacy of the interim cover materials and the name of the paper it referenced for installation methods for the GundSeal(TM) membrane was not provided; the paper is referenced in the text as "GSE, 1997" but not included in the references section. Please revise Attachment B to include sufficient references to the standards used to assess the quality of the interim cover and please include the title and date of the GundSeal(TM) paper referenced in the text but excluded from the references section.
- Response:** Attachment B, "2000-2001 Closure Construction As-Built Report," has been published as final. The Navy has instead revised [Section 5.0](#), References, of the final closeout report to include the full reference for the GSE Lining Technology, Inc., technical paper.
- ASTM International (formerly American Society for Testing and Materials) standards cited in the As-Built Report are published by ASTM International and can be obtained from various sources.
- One such source (<http://www.cssinfo.com/info/astm.html>) was provided in the response for EPA specific comment 23 of the responses to comments on the draft closeout report ([Appendix A](#)).

RESPONSES TO COMMENTS FROM THE WATER BOARD

General Comments

None provided.

Specific Comments

1. Comment: Section 1.2, Landfill Fire:

The text states that the fire “appeared to be a normal brush fire” and that the fire “burned about 37 percent of the landfill area on August 16, 2000 and continued to smolder for about 1 month after the fire was extinguished”. It is Board staff’s impression that the purpose of the cap was to put a fire out that was within the landfill by starving the landfill of oxygen and that the fire was not simply “a normal brush fire”. The text should be clarified to reflect this.

Response: A brush fire occurred in August 2000 at the Landfill. The Landfill was capped to smother residual smoldering of near-surface debris and to prevent the future entry of air into the Landfill. A fire was never confirmed to be within the Landfill itself, and gas samples collected from within the Landfill did not indicate that any combustion of debris had occurred.

2. Comment: Section 1.2, Landfill Fire:

The text states that “Air sampling data were collected 15 days after the initial fire was contained”. The report should explain why air sampling was not conducted immediately after the occurrence of a fire at the landfill was reported. In addition, the report should state that it is unknown whether a release of chemical or physical components likely to result in adverse health effects occurred prior to the sampling date.

Response: Air monitoring was conducted as soon as was feasibly possible. The purpose of the report is to summarize the construction activities associated with the landfill cap removal action. The rationale for the delay of air monitoring and discussion of health effects of the fire are not appropriate topics for this report. [Section 1.2, Landfill Fire](#), does, however, briefly discuss the assessment of health effects that ATSDR published in a health consultation in 2001. Please see the health consultation ([ATSDR 2001a](#)) for more information concerning the health effects from the fire.

3. Comment: Section 1.3, Previous Waste Delineation Sampling:

The text is confusing as it first states that ongoing site characterization has been conducted to delineate the extent of waste. The text then refers to Figure 2, which shows the extent of the new landfill cap in relation to the burned surface area but does not illustrate the extent of waste. The text and Figure 2 should be revised to make clear that the waste extends beyond the cap and burned area or that the cap/burned area does not cover the entire landfill. In addition, the blue colored contour line is not explained in the legend for Figure 2.

Response: The Navy has revised the text and [Figure 2](#) to clearly illustrate that the cap and burned area do not cover the entire Landfill.

4. Comment: Section 2.1, Air Monitoring:

U.S. EPA's Specific Comment #9 regarding this section of the Draft Report (provided in Appendix A) requested information regarding Aroclor-1260 which was detected above the perimeter air monitoring plan (PAMP) action level. According to the Navy's response to U.S. EPA's comment, concentrations of Aroclor-1260 range from 1.4 to 120 mg/kg in this area, exceeding both industrial and residential PRGs for PCBs (1.0 and 0.21 mg/kg, respectively). The Navy stated that this area has been delineated as "remediation area 02-NW-01" and will therefore not be described in this report. Additionally, the Navy stated that there is no air pathway risk because this area was covered with gravel.

Board staff is concerned about this area as it may pose an ongoing threat to San Francisco Bay. Because this area is directly adjacent to the Bay, aquatic criteria for PCBs should be considered in addition to the PAMP action level and residential and industrial PRGs. In our letter dated February 18, 2003 regarding Parcel F, Board staff provided the Navy with an aquatic criterion of 0.2 mg/kg for PCBs in sediments (Note that a letter of concurrence with this criterion was sent to the Navy by U.S. EPA on April 3, 2003). Due to this potential ongoing threat to the Bay, we are requesting that the Navy describe when the following information will be shared with the BCT: 1) data delineating the extent of PCBs in and surrounding this area, demonstrating whether or not a release has occurred to the Bay; 2) steps taken by the Navy to prevent runoff of these sediments into the Bay during and after construction of the landfill cap, and 3) what steps are being taken on an ongoing basis to prevent runoff of these sediments into the Bay.

Response: The Navy would like to reiterate that this report is intended only to document the construction activities that occurred during the landfill cap removal action.

The Navy does not understand the Water Board's comment concerning polychlorinated biphenyls (PCB) in soil and sediment in relation to [Section 2.1, Air Monitoring](#). The delineation of PCBs in soil and sediments is addressed under the data gaps investigation. Likewise, surface runoff from the landfill area is addressed separately under the storm water discharge management plan for Installation Restoration Site 01/21 ([Tetra Tech 2003](#)).

Runoff of sediments was not observed during construction activities. Also, runoff to San Francisco Bay was not observed during the initial emergency response and firefighting activities. Please see the response to EPA specific comment 15 in [Appendix A](#) of the final closeout report for further details.

5. Comment: Section 3.0, Design and Construction of Landfill Cap:

The text states that “the interim cap was constructed to meet the applicable requirements of *California Code of Regulations* Title 22 and 23 and *Code of Federal Regulations*, Title 40, Section 265”. Board staff realizes that the interim cap was not specifically designed to meet the applicable requirements of the California Code of Regulations (CCR), Title 27, Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste (Title 27). However, please note that Board staff anticipates that Title 27 will be an ARAR in the Feasibility Study (FS) for Parcel E. Therefore, if the Navy anticipates proposing in the future that the interim cap will become a portion of the final cap, the Navy will be required to demonstrate both that the cap was installed in accordance with Title 27 and that the cap that will be placed on the remainder of the landfill will be seamlessly tied in with this portion of the cap.

Response: Comment noted.

6. Comment: Section 3.1, Cover:

Board staff’s review indicates that the landfill cap design for the portion of the landfill where the fire occurred appears to meet the Title 27 requirements for final cover as specified in Title 27, Section 21090. The landfill cap consists of a minimum 2-foot thick compacted foundation layer, followed either by a shallow or steep slope cover. The shallow slope (typically 3 to 8 percent) cover consists from bottom to top of geosynthetic clay liner (GCL), followed by smooth high-density 80 mil polyethylene (HDPE) membrane liner, a single-sided geocomposite drainage layer, and vegetative soil cover (VSC). The steep slope cover consists from bottom to top of a textured 80 mil HDPE membrane liner, single-sided geocomposite layer with nonfused geotextile on the other side of the drainage net and fused geotextile on the bottom, followed by a VSC.

If the Navy anticipates proposing that this is used as a portion of the final landfill cap, the Navy will be requested to demonstrate that it meets all of the substantive requirements of Title 27. This can be demonstrated using both information collected during cap construction as well as performance data collected during landfill cap maintenance and monitoring activities.

Response: Comment noted.

7. Comment: Section 3.1.3, Foundation Layer:

The text states that the foundation layer is designed to “prevent failure of the cover system because of settlement...provide adequate strength to support the loads associated with cover system and maintain the integrity of the closure cover during and after an earthquake...provide appropriate grades for drainage control”. The text also states that “compaction was performed as part of the installation of the foundation layer to provide adequate bearing capacity to support heavy construction equipment and the closure cover system”. The 2000-2001 Closure Construction As-Built Report provided in Attachment B states that the following tests were conducted to verify and document that the foundation design specifications were met:

1. A total of 39 samples were taken with 35 tests conducted at a rate of one test per 3 acres for each 6-inch lift for:
 - a. Unconfined compressive strength (ASTM 2166), with an acceptance criterion of 1.0 ton/square foot (t/sf).
 - b. Moisture Content (ASTM D2216) with no acceptance criterion
2. Five samples collected at a frequency of one test every 3 acres from the final grade of the foundation layer and were tested for hydraulic conductivity (ASTM D 5084). Results ranged from 2.70 E-05 to 9.84 E-08 centimeters per second (cm/sec).

Despite the above-stated intentions and test results, the text does not indicate that the foundation layer conforms to the minimum construction quality assurance (CQA) requirements for field and laboratory testing of earthen materials to be used as a component of a landfill containment system specified in CCR Title 27, Section 20324 (h). This section of Title 27 requires the following tests:

1. For representative samples of each layer within the containment system.
 - a. laboratory tests for:
 - i. compaction (ASTM D1557-91),
 - ii. grain size analysis (ASTM D422-63), and
 - iii. engineering soil classification (ASTM D2487-93)
 - b. a field test for visual-manual soil description and identification (ASTM D2488-93)
2. Four (4) field density tests for each cubic yards of material placed, or a minimum of four (4) tests per day.

The purpose of these tests is to meet the final cover requirements specified in Title 27, Section 21090 (a) which states that the foundation layer must be compacted to the maximum density obtainable at optimum moisture content using methods that are in accordance with accepted civil engineering practice. The methods specified in Section 20324(h) would be considered to be acceptable civil engineering practice for the foundation layer.

The ASTM methods conducted during installation of the cap and described in the subject report are more typically used (as stated in Title 27, Section 20324 (g)) to establish the correlation between the design hydraulic conductivity and density at which that conductivity is achieved for a soil barrier layer of a final cover system. This is not required by Title 27 for a foundation layer, as Title 27 does not consider the foundation layer to be a “soil barrier layer”.

Therefore, as stated above, if the Navy anticipates proposing that this cap is used as a portion of the final landfill cap, it will be necessary to demonstrate that all of the substantive requirements of Title 27. If the tests required by Title 27 for construction of a final cover system were not performed, the Navy will be asked to demonstrate that the cap meets the substantive requirements of Title 27.

Response: Comment noted.

8. Comment: Section 3.2, Surface Drainage and Erosion Control System:

The text states that there is a subgrade drain consisting of a perforated 4-inch drainage pipe surrounded by pea gravel and geotextile following the centerline of the landfill. The report should describe whether this discharge point of the drainage pipe terminates outside of the landfill. In addition, as requested by Board staff during field inspections on February 12 and March 6, 2003, a sampling port should be placed at the drainage pipe discharge point.

Response: As agreed to during a working meeting between the Navy and the Water Board on May 22, 2003, it is not feasible for the Navy to collect samples from the underdrain outfall of the cap’s drainage swale because of the low volume of discharge. The underdrain system captures surface flow and infiltration on the cap that results in a slow discharge.

The Navy has revised [Section 3.2](#) of the final closeout report to describe the discharge location of the underdrain pipe.

9. Comment: Section 3.3, Surface Water:

This section of the report states that “the landfill cap is designed to channel most surface water to a central drainage system that flows south to San Francisco Bay” and that “a smaller portion of the eastern edge of the landfill cap sheet flows to the eastern edge of the landfill and then southward toward the Bay”. The report should describe whether any of the water flowing off the landfill cap comes in contact with portions of the landfill that are not capped, or comes in contact with any areas on or outside the landfill with known contamination, and how the water flowing over these areas is managed.

Response: Please see the response to Water Board specific comment 4.

REFERENCES

- Agency for Toxic Substances and Disease Registry (ATSDR). 2001a. "Health Consultation Summary, Hunters Point Shipyard, August 2000 Parcel E Landfill Fire, San Francisco, California." January.
- ATSDR. 2001b. "Health Consultation Report, Hunters Point Shipyard, August 2000 Parcel E Landfill Fire, San Francisco, California." March 2.
- California Air Resources Board. 2001. "California Almanac of Emissions and Air Quality."
- Tetra Tech EM Inc. (Tetra Tech). 2000. "Action Memorandum, Parcel E Landfill Fire Emergency Removal Action, Hunters Point Shipyard, San Francisco, California." November 7.
- Tetra Tech. 2003. "Final Storm Water Discharge Management Plan, IR-01/21, Industrial Landfill, Parcel E, Hunters Point Shipyard, San Francisco, California." June 12.
- U.S. Environmental Protection Agency. 1994. "Superfund Removal Procedures Removal Response Reporting: POLREPs and OSC Reports." Publication 9360.0-03. June

ATTACHMENT A
PERIMETER AIR MONITORING REPORT

(Note: Due to size, this [attachment](#) is provided separately on CD-ROM only.)

ATTACHMENT B
2000-2001 CLOSURE CONSTRUCTION AS-BUILT REPORT, HUNTERS POINT
SHIPYARD, PARCEL E, IR-01/21 INTERIM LANDFILL CAP

(Note: Due to size, this [attachment](#) is provided separately on CD-ROM only.)

ATTACHMENT C
DOCUMENTATION OF WASTE DISPOSED OFF SITE

(Note: Due to size, this [attachment](#) is provided separately on CD-ROM only.)