# Supplemental Remedial Investigation Letter Report, Former Fuel Farm Sludge Disposal Area

## MARINE CORPS BASE HAWAII, KANEOHE BAY, OAHU, HAWAII

**July 2014**

**Department of the Navy**
**Naval Facilities Engineering Command, Hawaii**
**400 Marshall Road**
**JBPHH HI 96860-3139**

**Comprehensive Long-Term Environmental Action Navy**
**Contract Number N62742-03-D-1837, CTO HC25**

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**Prepared for:**

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**Contract Number N62742-03-D-1837, CTO HC25**

# EXECUTIVE SUMMARY

## INTRODUCTION

This report presents the results of a supplemental remedial investigation (RI) conducted to address detected petroleum contamination in subsurface soil and groundwater in the area southeast of the Former Fuel Farm Sludge Disposal Area, Marine Corps Base (MCB) Hawaii, Kaneohe Bay, Oahu, Hawaii. The supplemental RI was performed as a follow-on to the 2012 RI discussed in *Remedial Investigation Report, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii*, hereafter referred to as the "RI report," and addresses the area in proximity to monitoring well (MW) 58 (AECOM and WCP 2013b).

## PURPOSE AND OBJECTIVES

The purpose of the supplemental RI was to evaluate the nature and extent of selected chemicals of potential concern (COPCs) concentrations in subsurface soil and groundwater in the area in proximity to MW58 southeast of the Former Fuel Farm Sludge Disposal Area. During the 2012 RI, concentrations of total petroleum hydrocarbons (TPH) as gasoline range organics (GRO) and benzo(a)pyrene exceeded project-specific screening criteria in subsurface soil and groundwater RI samples collected from this area. These exceedances were surmised to be associated with either a prior release from historical underground storage tanks that were removed in the 1960s, or releases from the fuel lines that historically ran through the area. The RI report recommended that a supplemental RI be conducted to assess the nature and extent of TPH-GRO and benzo(a)pyrene exceedances in subsurface soil and groundwater (AECOM and WCP 2013b). For comparability, the selected COPCs for the supplemental RI are the same as those addressed in the 2012 RI (AECOM and WCP 2013b).

The objectives of the supplemental RI were as follows:

- Evaluate the presence of COPCs in subsurface soil and groundwater, and determine whether COPCs are at or above project-specific screening criteria.
- Evaluate the presence or absence of free-phase petroleum product in subsurface soil and groundwater.
- Determine if petroleum-impacted soil and groundwater extends beyond the defined site boundaries in proximity to MW58.
- Determine appropriate response actions (if applicable) to address the COPCs that exceed project-specific screening criteria.

## KEY FINDINGS

A total of six soil borings were advanced and subsequently converted into temporary groundwater monitoring wells to delineate the extent of petroleum contamination in an area southeast of the Former Fuel Farm Sludge Disposal Area. Subsurface soil and groundwater samples were collected and analyzed for TPH-GRO-diesel range organics (DRO)-lube oil range organics (LRO); benzene, toluene, ethylbenzene, and xylenes; polynuclear aromatic hydrocarbons; and lead.

All COPC concentrations were either non-detect, or were well below State of Hawaii Department of Health (DOH) Tier 1 environmental action levels (EALs). Interviews with MCB Hawaii Fuel Farm personnel revealed a possible reason for the TPH-GRO and benzo(a)pyrene exceedances detected during the 2012 RI in the area southeast of the Former Fuel Farm Sludge Disposal Area; prior to 1963 there had been an overflow fuel release in a subsurface concrete valve pit (Puulei 2013). Due to both the proximity of this valve pit to MW58 and the lack of exceedances detected during the

supplemental RI, it is believed that the prior valve pit overflow release is the source of TPH-GRO and benzo(a)pyrene exceedances observed during the 2012 RI (AECOM and WCP 2013b).

### CONCLUSIONS AND RECOMMENDATIONS

The supplemental RI results indicate the following:

- COPC concentrations in subsurface soil and groundwater samples collected during the supplemental RI did not exceed applicable DOH EALs. In addition, COPC concentrations in subsurface soil and groundwater samples collected during the 2012 RI from other monitoring wells in proximity to MW58 were either non-detect or were well below their respective DOH EALs (AECOM and WCP 2013b). Therefore, subsurface soil and groundwater exceedances of TPH-GRO and benzo(a)pyrene observed during the 2012 RI have been adequately delineated (both horizontally and vertically), and any existing residual contamination in this area can be managed in place as it poses no significant risk to human health and the environment. Measures described in *Environmental Hazard Evaluation / Environmental Hazard Management Plan [EHE/EHMP] for Aboveground Storage Tank 1253, Marine Corps Base Hawaii, Kaneohe, Hawaii, Revision 01* (AECOM and WCP 2013a), hereafter referred to as the "EHE/EHMP, Revision 01," are protective and appropriate for the MW58 location so no continued monitoring or further investigation is warranted.
- As stated in the RI report (AECOM and WCP 2013b), it is believed that the Former Fuel Farm Sludge Disposal Area is not the source of TPH-GRO and benzo(a)pyrene exceedances. The pre-1963 overflow fuel release in a subsurface concrete valve pit is the likely source of TPH-GRO and benzo(a)pyrene exceedances observed during the 2012 RI (AECOM and WCP 2013b). Therefore, no further action with institutional controls as described in the EHE/EHMP, Revision 01 (AECOM and WCP 2013a) is recommended for the Former Fuel Farm Sludge Disposal Area.

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| °F | degree Fahrenheit |
| µg/L | microgram per liter |
| APPL | Agriculture and Priority Pollutants Laboratories, Inc. |
| AST | aboveground storage tank |
| AVGAS | aviation gasoline |
| bgs | below ground surface |
| Bldg. | Building |
| BTEX | benzene, toluene, ethylbenzene, and total xylenes |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| COC | chain-of-custody |
| COPC | chemical of potential concern |
| DOH | Department of Health, State of Hawaii |
| DOT | Department of Transportation, United States |
| DRO | diesel range organics |
| DQAR | data quality assessment report |
| EAL | environmental action level |
| EHE | environmental hazard evaluation |
| EHMP | environmental hazard management plan |
| EPA | Environmental Protection Agency, United States |
| GRO | gasoline range organics |
| JP-5 | Jet Propellant 5 |
| HAR | Hawaii Administrative Rules |
| HSA | hollow-stem auger |
| IDW | investigation-derived waste |
| LRO | lube oil range organics |
| MCB | Marine Corps Base |
| mg/kg | milligram per kilogram |
| MOGAS | motor gasoline |
| MS | matrix spike |
| MSD | matrix spike duplicate |
| msl | mean sea level |
| MW | monitoring well |
| NAVFAC | Naval Facilities Engineering Command |
| No. | number |
| PAH | polynuclear aromatic hydrocarbon |
| PID | photoionization detector |
| PVC | polyvinyl chloride |
| QC | quality control |
| RCRA | Resource Conservation and Recovery Act |
| RI | remedial investigation |
| SIM | selective ion monitoring |
| SW | solid waste |
| TCLP | toxicity characteristic leaching procedure |
| TPH | total petroleum hydrocarbons |
| UIC | underground injection control |
| U.S. | United States |
| USCS | Unified Soil Classification System |

| | |
|---|---|
| UST | underground storage tank |
| VOA | volatile organic analyte |
| WP | work plan |

# 1. Introduction

This report presents the findings and results of supplemental remedial investigation (RI) activities conducted to address detected petroleum contamination in subsurface soil and groundwater in the area southeast of the Former Fuel Farm Sludge Disposal Area, Marine Corps Base (MCB) Hawaii, Kaneohe Bay, Oahu, Hawaii (Figure 1-1 and Figure 1-2). The supplemental RI was authorized by the Naval Facilities Engineering Command (NAVFAC), Hawaii under the Comprehensive Long-Term Environmental Action Navy III program, contract number (no.) N62742-03-D-1837, contract task order HC25.

The initial RI, performed in March and April 2012, was undertaken to evaluate the nature and extent of the threat to human health and the environment presented by the release of petroleum and petroleum-related constituents from disposal pits and leaching fields during 1973 tank-cleaning operations at the Former Fuel Farm Sludge Disposal Area site. The site is located within an active fuel farm and is used for fuel storage and distribution, which is consistent with its historical operations. Environmental concerns at the site were previously documented in various environmental investigations, and are discussed in *Remedial Investigation Report, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii*, hereafter referred to as the "RI report" (AECOM and WCP 2013b).

The purpose of the supplemental RI was to evaluate the nature and extent of total petroleum hydrocarbons (TPH) as gasoline range organics (GRO) and benzo(a)pyrene concentrations that were shown to exceed project-specific screening criteria in subsurface soil and groundwater RI samples collected from the area southeast of the Former Fuel Farm Sludge Disposal Area. These exceedances were surmised to be associated with either a prior release from historical underground storage tanks (USTs) that were removed in the 1960s, or a release from fuel lines that historically ran through the area. The RI report (AECOM and WCP 2013b) recommended a supplemental RI be conducted in this area to assess the nature and extent of the TPH-GRO and benzo(a)pyrene exceedances in subsurface soil and groundwater, and to make revisions to the *Environmental Hazard Evaluation / Environmental Hazard Management Plan for Aboveground Storage Tank 1253, Marine Corps Base Hawaii, Kaneohe, Hawaii* (AECOM and WCP 2009), whereby the administrative boundaries would be revised to include the area southeast of the Former Fuel Farm Sludge Disposal Area in proximity to monitoring well (MW) 58. The revised administrative boundaries are included in *Environmental Hazard Evaluation/Environmental Hazard Management Plan for Aboveground Storage Tank 1253, Marine Corps Base Hawaii, Kaneohe, Hawaii, Revision 01,* hereafter referred to as "EHE/EHMP, Revision 01" (AECOM and WCP 2013a).

The supplemental RI was conducted in accordance with the project-specific work plan (WP) entitled, *Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii* (AECOM and WCP 2013c). This technical memorandum, in conjunction with *Work Plan, Remedial Investigation, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii* (AECOM and WCP 2011), hereafter referred to as the "supplemental RI WP," served as the planning documents for the supplemental RI addressing the area southeast of the Former Fuel Farm Sludge Disposal Area in proximity to MW58. As stated in the EHE/EHMP, Revision 01 (AECOM and WCP 2013a), project-specific screening criteria for the supplemental RI are the State of Hawaii Department of Health (DOH) Tier 1 environmental action levels (EALs) for unrestricted sites, where groundwater beneath the site is not considered a drinking water resource, and where surface water is greater than 150 meters from the site (DOH 2011). For comparability, selected chemicals of potential

concern (COPCs) for the supplemental RI are the same as those addressed in the RI report (AECOM and WCP 2013b).

The Former Fuel Farm Sludge Disposal Area site is considered a petroleum hydrocarbon site, therefore is not regulated by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) because petroleum is not considered a hazardous substance under CERCLA. The RI instead follows the Hawaii State Contingency Plan (Hawaii Administrative Rules [HAR] 11-451) (DOH 1995), HAR 11-281 (DOH 2000), and the following guidance documents: *Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater* (DOH 2011) and *Long-Term Management of Petroleum-Contaminated Soil and Groundwater* (DOH 2007). DOH provides regulatory oversight for closeout and management of residual petroleum at RI sites.

## 1.1 PHYSICAL CHARACTERISTICS OF THE SITE

### 1.1.1 Physical Location and Description

The location investigated for the supplemental RI includes the area in proximity to MW58 southeast of the Former Fuel Farm Sludge Disposal Area within the MCB Hawaii Fuel Farm, and the storage yard area northeast of the MCB Hawaii Motor Pool (Buildings [Bldgs.] 351, 377, and 399) (Figure 1-2 and Figure 1-3).

The MCB Hawaii Fuel Farm and Motor Pool are located at the western portion of Mokapu Peninsula, southwest of Puu Hawaiiloa cinder cone and southeast of the MCB Hawaii Airfield. The Fuel Farm currently utilizes only aboveground storage tanks (ASTs) for fuel storage, the largest of which are ASTs 1252, 1253, and 6479.

The Former Sludge Disposal Area site is located southwest of ASTs 1252 and 1253 within the MCB Hawaii Fuel Farm. The Former Sludge Disposal Area, which was comprised of disposal pits and leaching fields, was approximately 550 feet long and 60 feet wide and located east of Bldgs. 349 and 370, parallel to Fifth Street (Figure 1-2).

The area surrounding the site is primarily used for military industrial, support, and command operations: i.e., the Fuel Farm to the north, Fuel Farm office (Bldg. 370) and general storage yards to the west, training facilities and parking areas to the east (Bldgs. 267 and 4041), general warehouse (Bldg. 209) to the south, and the Motor Pool (Bldgs. 351, 377, and 399) to the southwest.

### 1.1.2 Meteorology

Oahu's climate is mild and pleasant because of the location of the Hawaiian Islands in the northern tropics and the presence of cooling trade winds. The prevailing winds throughout the year are the northeast trade winds. The trade winds are more persistent in the summer than in the winter. Trade winds in the winter are interrupted by winds from other directions, particularly the southerly Kona winds. Temperatures are coolest in January through March, with mean daily temperatures of 69 degrees Fahrenheit (°F), and warmest in August through September, with mean daily temperatures of 75°F. Relative humidity on Oahu ranges from 30 to 90 percent. The main mechanism for rainfall is warm, moist ocean air rising and cooling as it passes over the mountains, which causes precipitation. The average annual precipitation at the site is approximately 38 inches per year (Giambelluca et al. 2013).

### 1.1.3 Topography

Mokapu Peninsula is composed of four volcanic craters. Ulupau Head dominates the peninsula and rises to an elevation of approximately 850 feet. Puu Hawaiiloa, Pali Kilo, and Pyramid Rock have

approximate elevations of 335 feet, 100 feet, and 70 feet, respectively. Elevation at MCB Hawaii ranges from 0 feet to 850 feet above mean sea level (msl). Approximately two-thirds of the peninsula is relatively flat, with ground surface elevations less than 20 feet above msl.

The MCB Hawaii Fuel Farm is relatively flat and covered with landscaped grass. The general elevation is approximately 15 feet above msl. The area slopes southwest toward Kaneohe Bay. A series of inlets along B Street, C Street, Third Street, and Sixth Street channel storm water to subsurface storm drains.

### 1.1.4 Surface Water Hydrology

Mokapu Peninsula is virtually completely surrounded by water. The surrounding water bodies are Kaneohe Bay to the west and southwest, the Pacific Ocean to the north and east, Kailua Bay to the southeast, and a series of ancient Hawaiian fishponds, known collectively as Nuupia Ponds, to the south. There are also a number of smaller delineated wetlands scattered across MCB Hawaii as shown on Figure 1-1.

The site is located in the west-central portion of MCB Hawaii (Figure 1-1). There are no surface water bodies that exist or cross through the site. Kaneohe Bay is the nearest major surface water body downgradient of the site, located approximately 800 meters to the south.

### 1.1.5 Vegetation

Vegetation at the MCB Hawaii Fuel Farm is dominated by introduced, non-native ornamental shrubs, trees, and grasses in landscaped areas. Ground cover throughout the Former Sludge Disposal Area is composed of non-native landscaped grasses.

### 1.1.6 Wildlife and Environments

Two wildlife management areas are located at MCB Hawaii on Mokapu Peninsula: Ulupau Wildlife Management Area and Nuupia Ponds Wildlife Management Area.

Ulupau Wildlife Management Area is located on the northern slopes of Ulupau Head (Figure 1-1). The red-footed booby is the primary nesting species at the Ulupau Wildlife Management Area. The red-footed booby colonization began during the early 1940s and was well established by 1946. Other species that nest at the Ulupau Wildlife Management Area include the black noddy, the Laysan albatross, the brown booby, and a variety of other shore birds (Rauzon 1992).

Nuupia Ponds Wildlife Management Area was set aside in 1966 as a wildlife conservation area as a result of an agreement with Marine Corps Air Station Kaneohe Bay, the State of Hawaii, the United States (U.S.) Department of the Interior, and the Navy. Nuupia Ponds represents one of the most important nesting and feeding areas for the endangered Hawaiian stilt on the island of Oahu (Environet 2005). According to a 2005 environmental baseline survey, MCB Hawaii Environmental Compliance and Protection Department personnel indicated that there are over 50 protected species of migratory or indigenous waterfowl that are found at MCB Hawaii, including four federally listed endangered waterbirds: (1) Hawaiian stilt; (2) Hawaiian gallinule; (3) Hawaiian coot; and (4) Hawaiian duck (Environet 2005). They frequent Nuupia Ponds, but also are seen in many of the scattered smaller delineated wetlands. When it rains, these endangered birds routinely and predictably disperse to opportunistically feed in rain puddles, ephemeral ponds, and drainage ditches around the entire base. In addition to avian species, there are at least 16 native species of aquatic life found at Nuupia Ponds (Environet 2005).

There are no wildlife management areas within or in the vicinity of the MCB Hawaii Fuel Farm. The most common avian species observed at the site during the supplemental RI were the cattle egret and the Pacific golden plover.

### 1.1.7 Cultural Resources

The MCB Hawaii Fuel Farm and the immediate surroundings have been extensively filled, excavated, graded, and developed. Therefore, no culturally significant prehistoric or historic cultural resources are known to exist at the site.

### 1.1.8 Geology and Soil Formations

#### *1.1.8.1 Regional Geology*

The Hawaiian Islands are the tops of large shield volcanoes that rise from the ocean floor. The island of Oahu is comprised of two major volcanic mountains: the Koolau range in the east and the Waianae range in the west. MCB Hawaii lies on Mokapu Peninsula on the northwest rift zone of the Koolau volcano (USDA SCS 1972).

The primary geological processes that formed the Kaneohe area are the natural building of the Koolau shield volcano, post-volcanic erosion, post-erosional eruptions of the Honolulu Volcanic Series, the building of fringing reefs, changes in sea level, and the deposition of alluvial and marine sediments. The main rift zones of the Koolau volcano run in a northwest direction through the Kaneohe area. These rift zones consist of dikes, which are dense, impermeable remnant conduits through which lava extruded from the Koolau volcanic shield. The dikes cut vertically through the more permeable lava flows and are numerous in the lowland areas of Kaneohe. The number of dikes in this central part of the rift zone average more than 100 per mile, and the region is referred to as the dike complex. In the mountain areas, the density of dikes is fewer than 100 per mile, consequently, this region is referred to as the marginal dike complex. The surface of the Koolau basalts is estimated to be 300 to 1,000 feet below ground surface (bgs) at Mokapu Peninsula (Stearns 1939).

A long period of quiescence followed the Koolau eruptions. During that time, the volcanic shield was eroded to nearly the present topography. This period lasted at least two million years and was followed by post-erosional eruptions that produced lava flows, cinder cones, and tuff cones of the Honolulu Volcanic Series. Four volcanic cones from the Honolulu Volcanic Series are located on the Mokapu Peninsula: Puu Hawaiiloa, Pali Kilo, Pyramid Rock, and Ulupau. Puu Hawaiiloa and Pali Kilo are cinder cones. Ulupau is a tuff cone, and Pyramid Rock is a nephelinite basalt cone.

Weathering, erosion, and alluvial deposition of the volcanic material shaped the topography both between and after the Honolulu Volcanic Series events. At Mokapu Peninsula, younger deposits of alluvium can be found around Ulupau Crater and Puu Hawaiiloa. Younger alluvium is found in inland areas up to an elevation of approximately 200 feet and is comprised mainly of gravel, sand, and silt.

Reef building and marine sediment deposition formed flat areas near sea level in areas fringing the volcanic cones in the central part of Mokapu Peninsula. These low-lying areas connect the volcanic cones of the peninsula with the main part of the island of Oahu.

#### *1.1.8.2 Site-Specific Soils Classification*

The soil series present at the site consists of the Mamala Series soil of the Kaena-Waialua Association, which occurs as a narrow band along the northern and eastern coastlines on the island of Oahu. The Mamala Series is composed of shallow, well-drained soils along the coastal plains on

Oahu, and is geographically associated with Ewa, Honouliuli, and Lualualei soils. These soils formed in alluvium deposited over coral limestone and consolidated calcareous sand. Permeability is moderate, runoff is very slow to medium, and the erosion hazard is slight to moderate. The available water capacity is about 2.2 inches per foot in the surface layer and 1.9 inches per foot in the subsoil. Specifically, the soil is classified as Mamala stony silty clay loam, which exists on 0 to 12 percent slopes. However, in most places the slope does not exceed 6 percent. Stones, mostly coral rock fragments, are common in the surface layer and in the profile. In a representative profile, the surface layer is dark reddish-brown stony silty clay loam about 8 inches thick. The subsoil is dark reddish-brown silty clay loam about 11 inches thick. The soil is underlain by coral limestone and consolidated calcareous sand at depths of 8 to 20 inches (USDA SCS 1972).

#### *1.1.8.3 SITE-SPECIFIC GEOLOGY*

The lithology in the site area consists of dark brown to reddish-brown silty clays to approximate depths of 5 to 10 feet bgs. Below this clay is lithified silty sand composed of weathered olivine-rich tuffaceous volcanic ash and poorly-graded, well-rounded coralline sand. The volcanic cone Puu Hawaiiloa is the likely source of the volcanic ash, and the intermixing of coralline sand within the lithified tuff is indicative of a former marine shoreline environment.

### 1.1.9 Groundwater Hydrogeology

#### *1.1.9.1 REGIONAL HYDROGEOLOGY*

Rain infiltrating in the mountain regions of Kaneohe is prevented from flowing seaward by impermeable dikes. These dikes form natural groundwater reservoirs. In the mountain regions (marginal dike zone), the number of dikes per mile is small, and large volumes of water are stored in dike compartments. In lowland areas (the dike complex zone), the density of dikes increases and less volume of water is stored in the compartments. Consequently, the productive sources of groundwater in the Kaneohe area are found in the mountain areas.

MCB Hawaii is located on the coastal plain in an area where near-surface sedimentary caprock groundwater overlies deeper (basal) aquifers in fractured basalt, which is part of the Waimanalo Aquifer System in the Windward Aquifer Sector of the island of Oahu. According to Mink and Lau (1990), MCB Hawaii lies within an area that was assigned two aquifer and status codes:

- Sedimentary caprock aquifer (Aquifer Code 30604116): The sedimentary caprock aquifer is classified as currently used, ecologically important, irreplaceable, low salinity water, with a high vulnerability to contamination (Status Code 12211).
- Dike-impounded basalt aquifer (Aquifer Code 30604122): This aquifer lies beneath the sedimentary caprock aquifer and is classified as currently used, fresh, irreplaceable, drinking water, with a low vulnerability to contamination (Status Code 11113).

Groundwater utility in Hawaii is determined based on the location of the site with respect to the underground injection control (UIC) line and *Aquifer Identification and Classification for Oahu* (Mink and Lau 1990). Groundwater situated mauka (toward the mountains; inland) of the UIC line is considered a potential source of drinking water, provided it is present in a suitably productive geologic formation. Groundwater situated makai (toward or by the sea; seaward) of the UIC line is not generally considered to be a potential source of drinking water due to high salinity, low permeability and production, or historical contamination (DOH 2011). MCB Hawaii is located seaward of the UIC line; therefore, the underlying aquifer is not considered a drinking water source.

The installation consequently purchases its potable water from the Honolulu Board of Water Supply (NEESA 1984).

Water infiltrating the ground surface at Mokapu Peninsula percolates into a shallow, unconfined groundwater body. The caprock groundwater table at MCB Hawaii is near sea level. Shallow, unconfined groundwater has been observed at Mokapu Peninsula in a number of soil borings and test pits completed for foundation investigations. Water level data reported in these investigations were referenced to mean low water, which is approximately 0.7 feet below msl (Environet 2005). Water level data from previous environmental investigations across MCB Hawaii indicate the depth to groundwater varies across the installation ranging from 5 to more than 19 feet bgs (Earth Tech and WCP 2008; WCP 2003, 2004a,b). The shallow, unconfined groundwater beneath the site is non-potable and likely tidally influenced. The source of the groundwater is believed to be infiltration of precipitation combined with intrusion of seawater, and is not presently used for drinking water or agricultural purposes (Ogden 1992).

Groundwater well no. 2545-01, installed by the City and County of Honolulu Department of Environmental Services, exists within an approximately 1-mile radius to the southeast of MCB Hawaii, and is currently unused by the Kailua wastewater treatment facility. According to the Hawaii State Department of Land and Natural Resources Well Database, well 2545-01 is nearest the site at a ground elevation of 12 feet above msl, with an average groundwater elevation of 0.5 foot above msl (i.e., a depth to groundwater of approximately 11.5 feet bgs). Well 2545-01 is not a drinking-water well, and the salinity of the water renders it unsuitable for irrigation purposes (DLNR 2011).

#### *1.1.9.2 SITE-SPECIFIC GROUNDWATER HYDROGEOLOGY*

Water infiltrating the ground surface at Mokapu Peninsula percolates into a shallow, unconfined groundwater body. The shallow groundwater body may receive recharge as leakage from the basalt aquifer. However, it is unlikely that potential contaminants from the area southeast of the Former Sludge Disposal Area could migrate from the shallow groundwater body to the basalt aquifer because of the distance between the two and the upward pressure gradient from the basalt aquifer toward the shallow groundwater body. Groundwater elevations occur near sea level and because the shallow groundwater body is surrounded by surface water bodies on all sides, groundwater levels are influenced by the tidal cycle. The depth to groundwater at the area southeast of the Former Sludge Disposal Area is approximately 10 feet bgs. The major surface-water body in the downgradient area of the site is Kaneohe Bay, which is located approximately 800 meters to the south (Figure 1-1). An evaluation of the hydraulic gradient and potentiometric surface at the site was conducted in August 2012, details of which are included in the RI report (AECOM and WCP 2013b).

## 1.2 SITE HISTORY

Prior to World War II, the Navy constructed Fuel Farm Bldg. 370 along with one hundred thirty-six 25,000-gallon USTs to store aviation gasoline (AVGAS), Jet Propellant 4, and motor gasoline (MOGAS) (NEESA 1984). The USTs were installed within an area bounded by Third Street, Fifth Street, and C Street. A detailed history of the fuel storage facilities at the MCB Hawaii Fuel Farm is included in the RI report (AECOM and WCP 2013b).

In 1959, two 5,000-gallon USTs (KB-54 and KB-55) were installed 150 feet north of Bldg. 370 to store Jet Propellant 5 (JP-5). In 1961, three large ASTs were constructed to store JP-5: ASTs 1252, 1253, and 1172. AST 1252 and 1253 are located south of Sixth Street, approximately 800 feet north of Bldg. 370, and have a capacity of 1,260,000 gallons (30,000 barrels) each. AST 1172 (also known

as KB-49) was a 210,000-gallon tank covered with earth (a mounded tank). KB-54, KB-55, and AST 1172 were removed by Morrison Knudsen in 1997 and replaced with new ASTs (WCP 2003).

By 1962, only 20 of the original 136 USTs installed at the MCB Hawaii Fuel Farm remained active, of which 12 were used to store AVGAS and 8 to store MOGAS (Ogden 1992). By 1963, the 116 inactive tanks had been removed and the excavations backfilled; however, the piping and valve systems of the tanks were left in place (Ogden 1992).

In 1973, the use of AVGAS was discontinued and the 20 remaining AVGAS and MOGAS USTs (KB-329A through KB-329H, KB-329J through KB-329N, and KB-329P through KB-329V) were cleaned with sandblasting grit and high-pressure water in a onetime event. To dispose of the cleaning waste, three sludge leaching fields and two disposal pits were excavated adjacent to the KB-329 series tank farm. The sludge leaching fields were 18 inches wide by 40 inches deep. One leaching field measured 70 feet long and two measured 200 feet long. Disposal pits were 6 feet deep by 30 inches wide at the base (HLA 1991). Approximately 15,000 gallons of cleaning wastewater and 200 to 300 gallons of an algae sludge that was generated during the tank cleaning were disposed of in the sludge leaching fields and disposal pits (Ogden 1992). A sign warning about the high concentrations of tetraethyl lead contamination was placed over the northernmost leaching field and remains in place today.

In 1996 and 1997, Morrison Knudsen removed the remaining USTs (including the 20 KB-329-series USTs) at the Fuel Farm, along with AST 1172; leaving ASTs 1252 and 1253 as the only original tanks still in use at the site (Morrison Knudsen 1998). KB-54, KB-55, and the original AST 1172 were replaced with ASTs. During removal activities, excavations around tanks KB-25, KB-329S, and KB-329V showed signs of petroleum contamination. These three tanks are listed on the DOH Leaking UST database under release identification No. 95-0067.

Today, the Former Sludge Disposal Area consists of mostly grassy fields with a recreational field situated between C Street and ASTs 1252/1253 at the northeast end of the site, and Bldgs. 6182 and 4041 to the south. A concrete-paved fuel truck staging area is located to the west of these buildings. The grassy area covering the approximate location of the Former Sludge Disposal Area between the recreational field and Fifth Street to the west is currently used as temporary storage for vehicles owned by Marines who are deployed overseas.

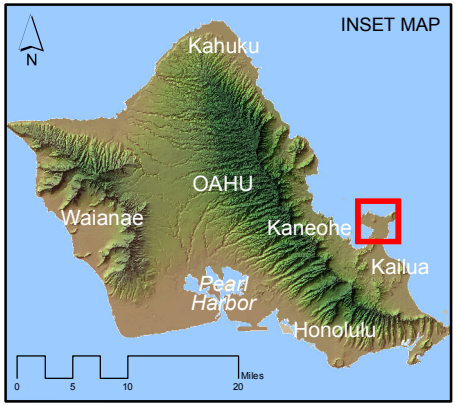
## 1.3 RESULTS OF PREVIOUS INVESTIGATIONS

Environmental investigations at the MCB Hawaii Fuel Farm began in 1987 and have continued to the present. A detailed history of the previous environmental investigations at the MCB Hawaii Fuel Farm is included in the RI report (AECOM and WCP 2013b).

In accordance with the RI WP (AECOM and WCP 2011), the RI was performed from March to April 2012 to investigate subsurface contamination associated with the Former Fuel Farm Sludge Disposal Area site. The site is located within an active fuel farm and is used for fuel storage and distribution, which is consistent with its historical operations. Environmental concerns at the site were previously documented in various environmental investigations, and are discussed in the RI report (AECOM and WCP 2013b). TPH-GRO and benzo(a)pyrene exceedances in subsurface soil and groundwater analytical results were observed in RI samples collected from the area southeast of the Former Fuel Farm Sludge Disposal Area in the proximity of MW58 (Figure 1-3 and Figure 1-4).

Groundwater and soil samples collected during the RI were reported to contain TPH-GRO at concentrations in excess of screening levels. The TPH-GRO concentration detected in a groundwater

sample from MW58 (7,300 micrograms per liter [µg/L]) exceeded the DOH Tier 1 EAL of 5,000 µg/L (DOH 2011). Confirmation sample analysis from MW58 detected TPH-GRO at concentrations of 7,600 µg/L in the primary groundwater sample, and 7,500 µg/L in its duplicate sample (as shown in Figure 1-4), again exceeding the DOH Tier 1 EAL. In addition, TPH-GRO was detected in a subsurface soil sample collected at the capillary fringe in the soil boring for MW58 at a concentration of 200 milligrams per kilogram (mg/kg), which exceeds the DOH EAL of 100 mg/kg (Figure 1-3). Approximately 150 feet north-northwest of MW58, TPH-GRO and benzo(a)pyrene were detected in a subsurface soil sample from soil boring B10 at concentrations of 490 and 0.76 mg/kg, respectively (Figure 1-3). These soil concentrations in boring B10 were detected in samples collected at the capillary fringe. Though purportedly related to petroleum, benzo(a)pyrene and TPH-GRO do not appear to be associated with the Former Fuel Farm Sludge Disposal Area, due to the lack of DOH EAL exceedances within the Former Fuel Farm Sludge Disposal Area. In addition, COPC concentrations in subsurface soil and groundwater samples collected from other monitoring wells in the southeast area (MW55, MW56, and MW59) were either non-detect or were well below their respective DOH EALs (AECOM and WCP 2013b). The petroleum-related constituents detected in soil samples from boring B10 and the boring for MW58 were surmised to be associated with either a prior release from historical USTs that were removed in the 1960s or a release from fuel lines that historically ran through that area. The outlines of these former USTs and associated pipelines are shown on Figure 1-3 and Figure 1-4. The RI report recommended that a supplemental RI be conducted in this area to assess the nature and extent of TPH-GRO and benzo(a)pyrene exceedances in subsurface soil and groundwater (AECOM and WCP 2013b).




**LEGEND**

- Supplemental Remedial Investigation Boundary
- Roads
- 100-foot Groundsurface Elevation Contour
- Wetland
- Ponds
- Airfield
- Buildings and Structures

**NOTES**

1. Map Projection is North American Datum 1983 HARN

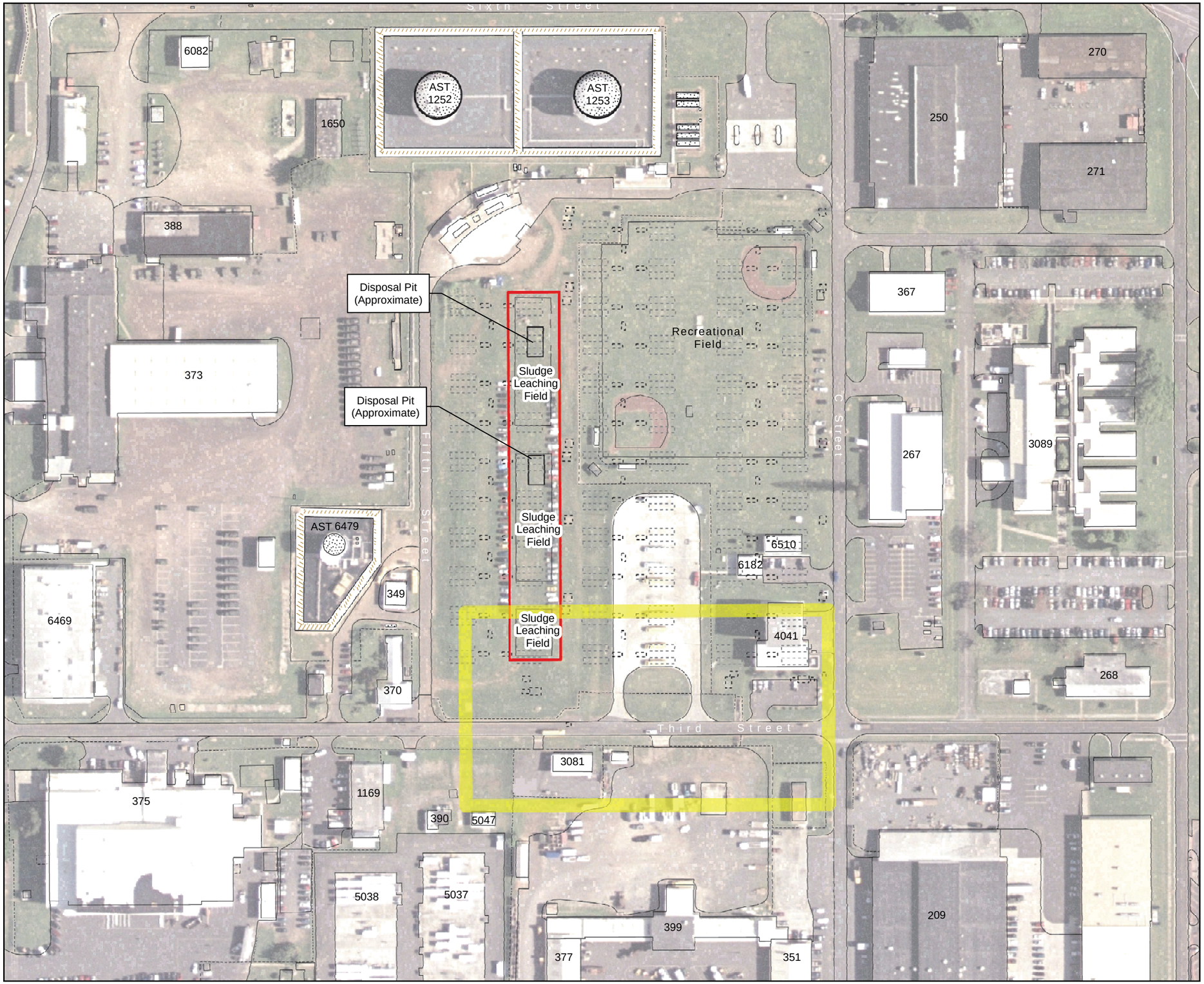
**SOURCES**

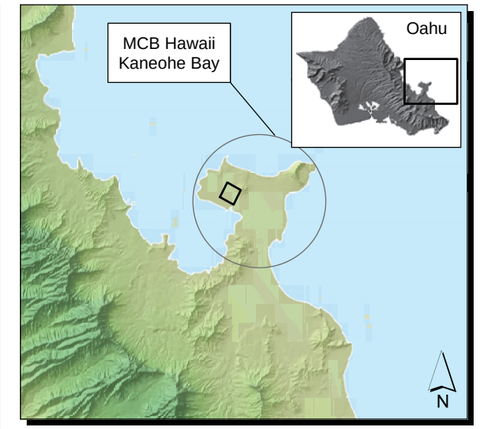
1. MCBH Kaneohe Bay Facilities Geodatabase (2011)

N

2,000 1,000 0 2,000 Feet

**Figure 1-1**
**Site Overview**
**Supplemental Remedial Investigation**
**Former Fuel Farm Sludge Disposal Area**
**Marine Corps Base Hawaii**
**Kaneohe Bay, Oahu, Hawaii**




**LEGEND**

- Supplemental Remedial Investigation Boundary
- Former Sludge Disposal Area
- Active Tank
- AST Berm
- Fence Line
- Former Underground Storage Tank
- Former Valve Pit or Tank Vault

**NOTES**

1. The accuracy of this map is limited to the quality and scale of the source information and is not suitable for mapping engineering applications and is not to be used for "As Built."

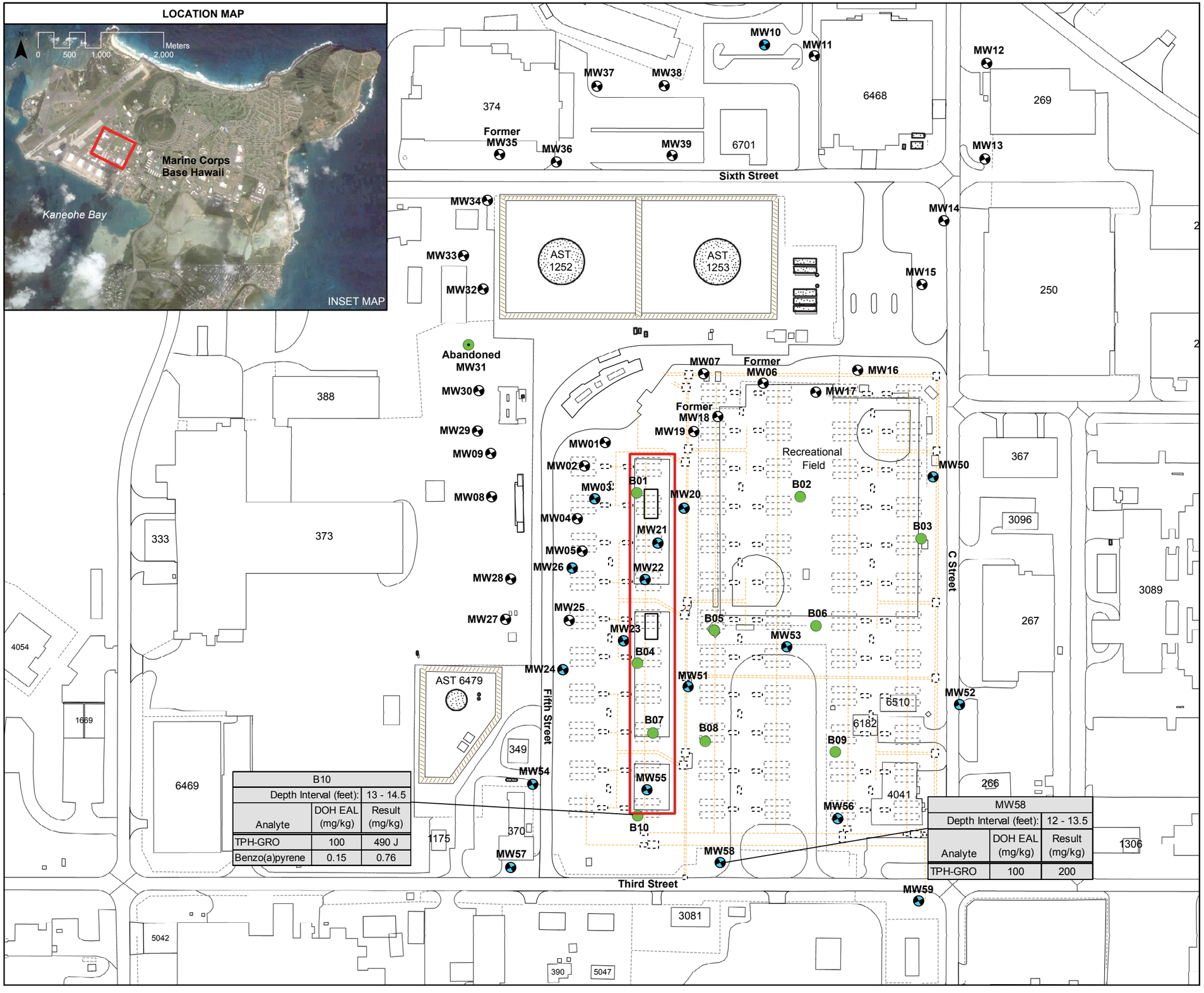
**SOURCE**

1. Harding Lawson Associates, 1991
2. MCBH-KBAY Facilities Geodatabase, November 2011
3. City and County of Honolulu GIS Data, August 2001
4. Dept of the Navy, Y & D Drawing No. 950721, 1962

N

200 100 0 200 Feet

**Figure 1-2**
**Site Map**
**Supplemental Remedial Investigation**
**Former Fuel Farm Sludge Disposal Area**
**Marine Corps Base Hawaii**
**Kaneohe Bay, Oahu, Hawaii**




## LEGEND

- Existing Monitoring Well
- Existing RI Monitoring Well Location
- RI Soil Boring Location
- Abandoned Well
- Former Fuel Farm Sludge Disposal Area
- Sludge Leaching Field
- Disposal Pit (Approximate Location)
- Active Tank
- AST Berm
- Former Underground Storage Tank
- Former Valve Pit or Tank Vault
- Fence Line
- Historical AVGAS/MOGAS Fuel Lines

## NOTES

1. The accuracy of this map is limited to the quality and scale of the source information and is not suitable for mapping engineering applications and is not to be used for "As Built."

2. Acronyms and Abbreviations

| | |
|---|---|
| AST | aboveground storage tank |
| AVGAS | aviation gasoline |
| DOH | Hawaii Department of Health |
| EAL | environmental action level |
| GRO | gasoline range organics |
| J | estimated value |
| mg/kg | milligrams per kilogram |
| MOGAS | motor gasoline |
| RI | Remedial Investigation |
| TPH | total petroleum hydrocarbons |

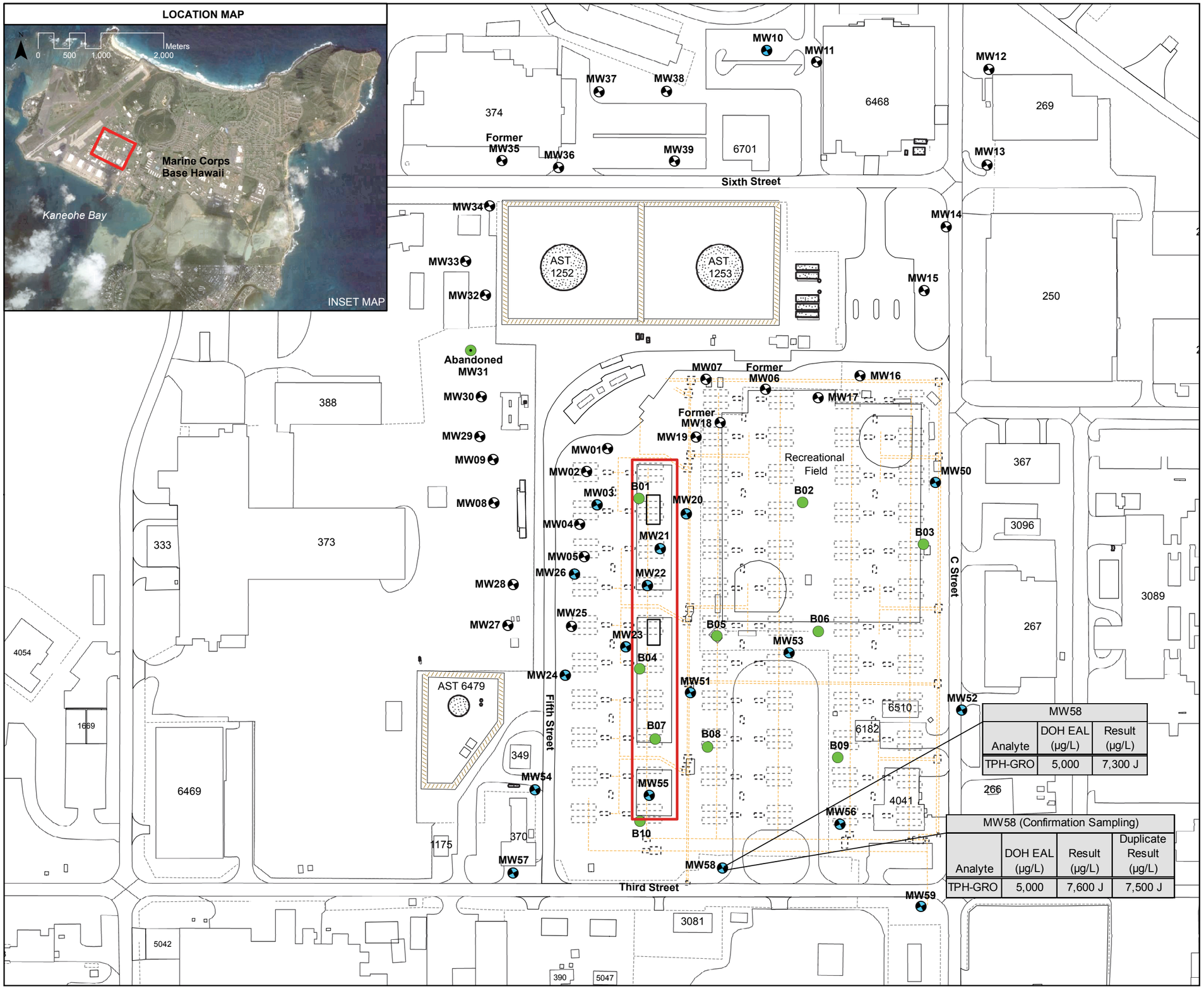
## SOURCE

1. Pacific Division, Naval Facilities Engineering Command, May 1989
2. Marine Corps Base Hawaii-Kaneohe Bay Facilities Geodatabase, November 2011
3. Sam O. Hirota Land Survey, January 2008, April and August 2012
4. Department of the Navy, Y & D Drawing 950721, 1962
5. Remedial Investigation Report, April 2013

N

200 100 0 200 Feet

**Figure 1-3**
**2012 RI Subsurface Soil Constituents Exceeding DOH EAL Screening Criteria**
**Supplemental Remedial Investigation**
**Former Fuel Farm Sludge Disposal Area**
**Marine Corps Base Hawaii**
**Kaneohe Bay, Oahu, Hawaii**




| MW58 | | |
|---|---|---|
| Analyte | DOH EAL (µg/L) | Result (µg/L) |
| TPH-GRO | 5,000 | 7,300 J |

| MW58 (Confirmation Sampling) | | | |
|---|---|---|---|
| Analyte | DOH EAL (µg/L) | Result (µg/L) | Duplicate Result (µg/L) |
| TPH-GRO | 5,000 | 7,600 J | 7,500 J |

## LEGEND

- Existing Monitoring Well
- Existing RI Monitoring Well Location
- RI Soil Boring Location
- Abandoned Well
- Former Fuel Farm Sludge Disposal Area
- Sludge Leaching Field
- Disposal Pit (Approximate Location)
- Active Tank
- AST Berm
- Former Underground Storage Tank
- Former Valve Pit or Tank Vault
- Fence Line
- Historical AVGAS/MOGAS Fuel Lines

## NOTES

1. The accuracy of this map is limited to the quality and scale of the source information and is not suitable for mapping engineering applications and is not to be used for "As Built."

2. Acronyms and Abbreviations

| | |
|---|---|
| AST | aboveground storage tank |
| AVGAS | aviation gasoline |
| DOH | Hawaii Department of Health |
| EAL | environmental action level |
| GRO | gasoline range organics |
| J | estimated value |
| MOGAS | motor gasoline |
| RI | Remedial Investigation |
| TPH | total petroleum hydrocarbons |
| µg/L | micrograms per liter |

## SOURCE

1. Pacific Division, Naval Facilities Engineering Command, May 1989
2. Marine Corps Base Hawaii-Kaneohe Bay Facilities Geodatabase, November 2011
3. Sam O. Hirota Land Survey, January 2008, April and August 2012
4. Department of the Navy, Y & D Drawing 950721, 1962
5. Remedial Investigation Report, April 2013

N

200 100 0 200 Feet

**Figure 1-4**
**2012 RI Groundwater Constituents Exceeding DOH EAL Screening Criteria**
**Supplemental Remedial Investigation**
**Former Fuel Farm Sludge Disposal Area**
**Marine Corps Base Hawaii**
**Kaneohe Bay, Oahu, Hawaii**

# 2. Field Activities

Supplemental RI field activities were conducted in July and August 2014, and consisted of the following:

- Geophysical survey
- Drilling soil borings and collection of subsurface soil samples
- Installation and development of temporary groundwater monitoring wells
- Collection of groundwater samples
- Land survey
- Temporary monitoring well abandonment
- Investigation-derived waste (IDW) management

The permanent completion of supplemental RI monitoring wells was contingent upon either groundwater analytical results exceeding DOH EALs or the presence of free-phase petroleum product. Because none of these conditions were observed (as discussed in Section 2.5 and later in Section 3.3), all six temporary supplemental RI groundwater monitoring wells were properly abandoned. Copies of the field and quality control (QC) logbooks are included in Appendix A, and the soil boring, well development, and groundwater sampling logs are included in Appendix B. Photographs of field activities are included in Appendix C.

## 2.1 Geophysical Survey/Utility Clearance

Prior to intrusive activities, a geophysical and utility clearance survey was conducted by Terra Physics on 28 January 2014 at proposed subsurface soil boring locations to identify and delineate underground utilities. The geophysical survey and utility clearance were conducted in accordance with NAVFAC Pacific Environmental Restoration Program Procedure I-A-5, *Utility Clearance* (DON 2007) and Procedure I-B-2, *Geophysical Testing Procedures* (DON 2007). The following three geophysical methods were employed:

- Ground-penetrating radar to detect changes in dielectric or conductive properties attributable to subsurface structures, changes in soil moisture content, or other variations in rock or soil conditions.
- An electromagnetic survey to identify subsurface anomalies by detecting amplitude variations in an electrical field artificially induced into the ground.
- A magnetic survey to locate buried ferrous metal objects by detecting the associated variations in the local magnetic field.

Other available information such as utility maps from MCB Hawaii Facilities and the Fuel Department were obtained to help locate underground utilities. All utilities depicted on utility maps or detected by geophysical methods, were marked on the ground using survey paint or stake chasers, and plotted on field maps. The geophysical survey report is presented in Appendix C.

## 2.2 Subsurface Soil Investigation

Six soil borings were advanced using direct-push drilling technology by Valley Well Drilling. All soil boring locations were converted into temporary groundwater monitoring wells, as discussed in Section 2.3 and depicted on Figure 2-1. Advancement of the soil borings and collection of subsurface

soil samples were conducted in accordance with Procedure I-H, *Direct Push Sampling Techniques* and Procedure I-B-1, *Soil Sampling* (DON 2007).

Soil samples were collected in polyvinyl chloride (PVC) liners and transferred to laboratory-supplied sample containers. Following sampler advancement, the PVC liners were brought to the surface and removed from the drill rod where the liners were cut open, the samples logged, and the percentage of sample recovery recorded. The field geologist classified and logged the soil within the borings according to the Unified Soil Classification System (USCS) and as specified in Procedure I-E, *Soil and Rock Classification* (DON 2007). The geologic description for each boring included the USCS classification and color, moisture, odor, particle size and its range, approximate percentage of grain size distribution, plasticity characteristics of the fine-grained fraction, and any evident stratification of the soil. Also recorded were estimated sampling depths, presence of staining, and any color changes. Soil boring logs are presented in Appendix B and a discussion of the site-specific geology is presented in Section 1.1.8.3.

Two subsurface soil samples were collected from each soil boring. Subsurface soil samples were collected from depths of approximately 3 to 6 feet bgs and extending to the capillary fringe. The selection of the first soil sampling interval was based on visual inspection, odor, headspace analysis, and photoionization detector (PID) screening. A second subsurface soil sample was collected at the capillary fringe.

Subsurface soil samples for volatile organic compound analysis (benzene, toluene, ethylbenzene, and total xylenes [BTEX] and TPH-GRO) were collected in accordance with Attachment I-B-1-1 of Procedure I-B-1, *Soil Sampling* (DON 2007) and U.S. Environmental Protection Agency (EPA) Solid Waste (SW)-846 Method 5035A (EPA 2002). To prevent volatile losses, subsurface soil samples collected for BTEX and TPH-GRO analysis were collected as quickly as possible directly from the PVC liners utilizing Terra Core samplers, then transferred into laboratory-supplied sample containers. Utilizing certified, pre-cleaned, disposable scoops, all nonvolatile soil samples were transferred from the PVC liners directly into laboratory-supplied jars. All sample containers were sealed, labeled, and recorded on chain-of-custody (COC) forms in accordance with Procedure III-E, *Record Keeping, Sample Labeling, and Chain-of-Custody Procedures* (DON 2007).

Samples were placed in a chilled and insulated container for shipment under standard COC protocol to fixed-base analytical laboratory Agriculture and Priority Pollutants Laboratory, Inc. (APPL) in Clovis, California—a Department of Defense Environmental Laboratory Accreditation Program-accredited laboratory—in accordance with Procedure III-F, *Sample Handling, Storage, and Shipping* (DON 2007).

Subsurface soil samples were analyzed for the following COPCs using EPA SW-846 methods (EPA 2007) listed below:

- TPH-GRO, TPH as diesel range organics (DRO), and TPH as lube oil range organics (LRO) by EPA Method 8015C
- BTEX by EPA Method 8260C
- Polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270D-selective ion monitoring (SIM)
- Total lead by EPA Method 6020A

As part of the subsurface soil sampling effort, trip blanks were required for both BTEX and TPH-GRO analysis. Trip blanks were analyzed for BTEX by SW-846 Method 8260C and TPH-GRO by SW-846 Method 8015C (EPA 2007). Field duplicates were collected at a rate of 10 percent per analytical method. As soil samples were collected in dedicated PVC liners, a field blank and equipment blank were not necessary. Matrix spike (MS) and matrix spike duplicate (MSD) samples were collected at a rate of 5 percent per matrix, per analytical method.

## 2.3 GROUNDWATER MONITORING WELL INSTALLATION

All six soil borings were converted to temporary, pre-packed, 1-inch-diameter PVC groundwater monitoring wells. As specified in the supplemental RI WP, each temporary pre-packed monitoring well was to be installed using direct-push technology within each approximately 2-inch-diameter borehole. However, the density of the lithified volcanic tuff encountered within each borehole prevented advancement of direct-push rods beyond 8 to 10 feet bgs. In addition, the 2-inch-diameter direct-push boreholes collapsed as the drill rods were withdrawn precluding insertion of pre-packed well materials. Therefore, once subsurface soil sampling was completed within each borehole, the drillers switched to hollow-stem auger (HSA) technology and over-drilled each direct-push boring using 6-inch-diameter augers to complete the temporary well installation. Each of the six temporary monitoring wells was placed approximately 15 feet bgs and screened so that at least 3 feet of screen remained above the water table at the time of installation. The annular space of each temporary monitoring well was filled with Monterey sand to approximately 2 feet above the top of the well screen and sealed to the surface with hydrated bentonite chips. Temporary monitoring wells were installed in accordance with Procedure I-C-1, *Monitoring Well Installation and Abandonment* (DON 2007). This well construction method accounted for the possibility of fluctuating groundwater levels due to tides, and allowed free-phase petroleum product, if present and mobile on top of the water table, to enter the monitoring wells. Well construction details are included on the boring logs in Appendix B.

Temporary monitoring wells were completed aboveground with approximately 2 to 3 feet of PVC well casing topped with a locking well cap. A temporary barricade was placed over each aboveground well casing and visibly enhanced with yellow caution tape to prevent damage to the installed monitoring wells. All temporary monitoring wells were left in place until the analytical results were received, to support a determination for either permanent well completion or abandonment.

## 2.4 GROUNDWATER MONITORING WELL DEVELOPMENT

Monitoring wells were developed in accordance with Procedure I-C-2, *Monitoring Well Development* (DON 2007). Well development was not initiated until a minimum of 24 hours after the completion of temporary monitoring well installation. Fine sediment and filter pack material entering the well during installation and development were removed by surging and pumping using a disposable bailer and a peristaltic pump with disposable tubing. To evaluate groundwater characteristics, pH, temperature, specific conductivity, turbidity, redox potential, and dissolved oxygen were all monitored during the purging process. Well development continued until stabilization of these parameters was within 10 percent during two consecutive measurements, turbidity was low, or at least three borehole volumes of water had been removed from each temporary monitoring well. Monitoring well development logs are included in Appendix B.2.

## 2.5 GROUNDWATER SAMPLING

Groundwater sampling was conducted from the six purged temporary monitoring wells in accordance with Procedure I-C-3, *Monitoring Well Sampling* (DON 2007). Monitoring well MW58

was not resampled given the two consecutive RI groundwater sampling events at this well and correlating results. Groundwater sampling logs are included in Appendix B.3.

Prior to purging and sampling, static water levels and the total depth of the wells were measured and recorded. Each temporary monitoring well was checked for free-phase petroleum product using a Solinst interface probe. None of the six temporary monitoring wells contained measurable free-phase product or exhibited any evidence of a petroleum sheen or odor.

Purging was accomplished using a bladder pump with disposable bladders and tubing. Static water levels and the total depth of the wells were measured prior to purging and were recorded on groundwater sampling logs (Appendix B.3). Groundwater physical parameters of pH, temperature, specific conductivity, turbidity, redox potential, and dissolved oxygen were monitored during the purging process. Once these field parameters had stabilized to within approximately 10 percent of three consecutive readings, turbidity was observed to be low, and at least three well volumes of water had been removed; groundwater samples were collected using a low-flow bladder pump in accordance with Procedure I-C-3, *Monitoring Well Sampling* (DON 2007). Groundwater samples were collected from the middle of the water column so as not to bias the sample, and to aid in comparability of samples collected from other area monitoring wells. Collected groundwater was transferred directly into laboratory-supplied, certified pre-cleaned vials and bottles that were sealed, labeled, and recorded on COC forms in accordance with Procedure III-E, *Record Keeping, Sample Labeling, and Chain-of-Custody Procedures* (DON 2007). Groundwater samples were placed in a chilled and insulated container for shipment under standard COC protocol to APPL in accordance with Procedure III-F, *Sample Handling, Storage, and Shipping* (DON 2007).

Groundwater samples were analyzed for the following COPCs using EPA SW-846 methods (EPA 2007) listed below:

- TPH-GRO, TPH-DRO, and TPH-LRO by EPA Method 8015C
- BTEX by EPA Method 8260C
- PAHs by EPA Method 8270D-SIM
- Total lead (filtered and unfiltered) by EPA Method 6020A

As part of the groundwater sampling effort, trip blanks were required for both BTEX and TPH-GRO analysis. Trip blanks were analyzed for BTEX by SW-846 Method 8260C and TPH-GRO by SW-846 Method 8015C (EPA 2007). Field duplicates were collected at a rate of 10 percent per matrix, per analytical method. One field blank was collected from the decontamination source water (distilled water), and one equipment blank was collected from pouring distilled water off of the decontaminated bladder pump. MS and MSD samples were collected at a rate of 5 percent per analytical method.

## 2.6 LAND SURVEYING

A hand-held Trimble Geo XT global positioning system unit was used to establish the horizontal coordinates of each temporary well location. Surveying activities were performed on 3 March 2014, immediately prior to well abandonment and in accordance with Procedure I-I, *Land Surveying* (DON 2007).

## 2.7 MONITORING WELL ABANDONMENT

The permanent completion of supplemental RI monitoring wells was contingent on either groundwater analytical results exceeding DOH EALs, or the presence of free-phase petroleum product. Because none of these conditions were observed (as discussed in Section 2.5 and later in Section 3.3), all six temporary supplemental RI groundwater monitoring wells were properly abandoned by Valley Well Drilling on 3 March 2014, in accordance with Procedure I-C-1, *Monitoring Well Installation and Abandonment* (DON 2007).

## 2.8 INVESTIGATION-DERIVED WASTE MANAGEMENT

The following types of IDW were generated during the supplemental RI field investigation:

- Soil cuttings generated during drilling and sampling
- Fluids generated during decontamination of non-consumable subsurface soil and groundwater sampling equipment
- Purge water generated during well development and groundwater sampling

Drill cuttings were placed in U.S. Department of Transportation (DOT)-approved 55-gallon drums, in accordance with Procedure I-A-6, *IDW Management* (DON 2007). Drilling rods, HSAs, and core barrels were decontaminated before each use and upon completion of sampling activities, in accordance with Procedure I-F, *Equipment Decontamination* (DON 2007). Equipment decontamination water and purge water were placed in DOT-approved 55-gallon drums, in accordance with Procedure I-A-6, *IDW Management* (DON 2007).

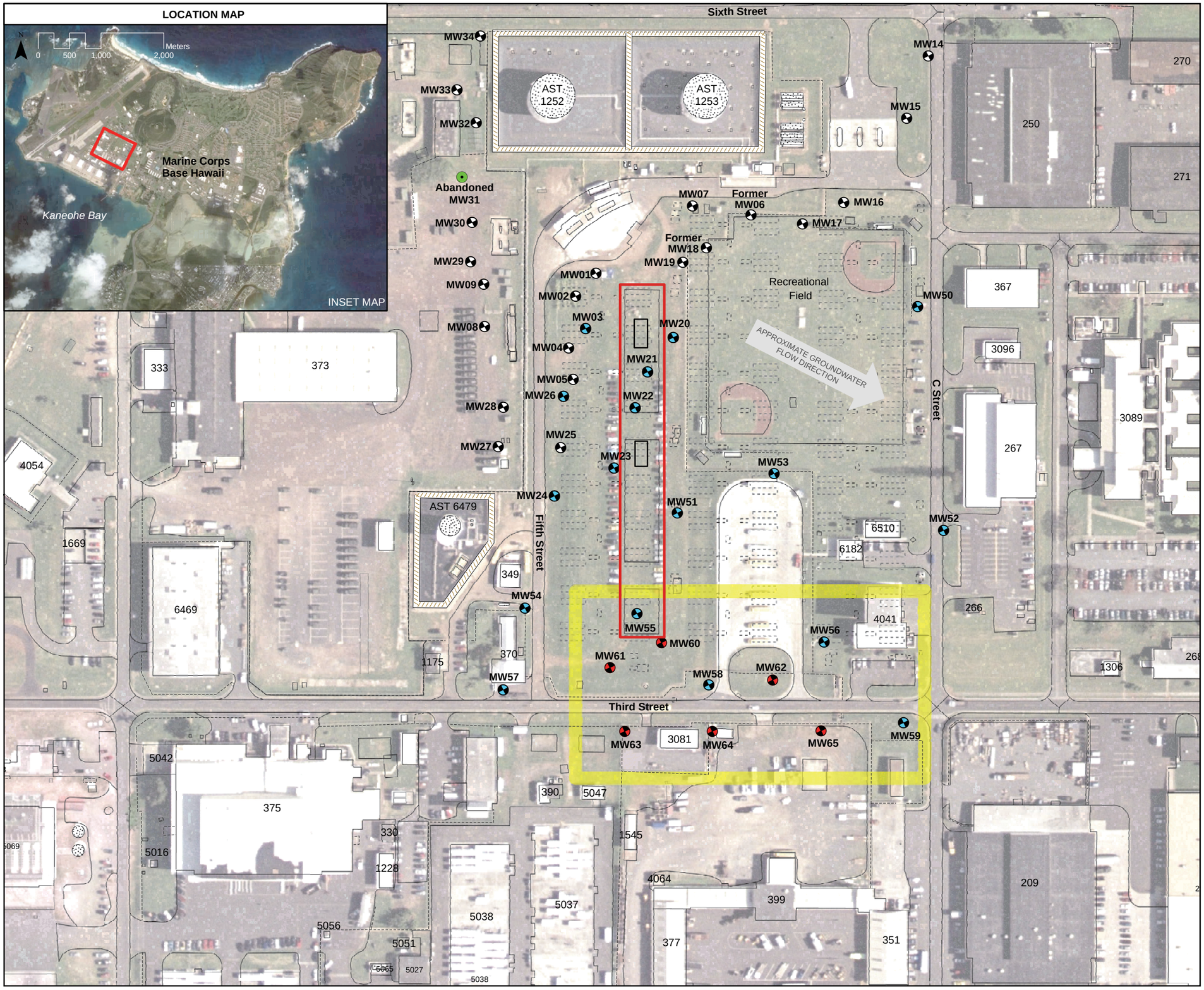
Five drums of IDW were generated during the field investigation: three drums containing soil cuttings and two containing decontamination and purge water. IDW was handled and labeled in accordance with Procedure I-A-6, *IDW Management* (DON 2007), then covered with tarps and stored temporarily on wood pallets at the designated MCB Hawaii Fuel Farm storage area near MW01.

Personal protective equipment and disposable equipment were decontaminated as appropriate, collected in double plastic trash bags, and disposed of as municipal solid waste. Disposable equipment generated for this project consisted of personal protective equipment, plastic sheeting, and dedicated sampling supplies. Well materials such as blank and screened PVC casings were decontaminated as appropriate and properly disposed of as municipal waste by Valley Well Drilling.

To characterize the soil IDW for disposal, samples were collected from each of the three drums, composited in the field, and express-shipped to APPL for leachable lead analysis via EPA's toxicity characteristic leaching procedure (TCLP). The composite soil sample did not contain leachable lead exceeding its toxicity characteristic maximum concentration of 5 milligrams per liter, therefore, the soil IDW was classified as non-hazardous waste. To characterize the liquid IDW for disposal, the maximum concentration of the analytes detected in groundwater samples were screened against Resource Conservation and Recovery Act (RCRA) hazardous waste regulatory limits found in Code of Federal Regulations, Title 40, Part 261. The drums did not contain COPCs exceeding RCRA limits; therefore, the liquid IDW was classified as non-hazardous waste.

The five 55-gallon drums containing decontamination fluids, well development and purge water, and soil cuttings were removed from the site on 11 April 2014 and properly disposed of by Pacific Commercial Services. Liquid IDW was sent to Unitek Solvent Services, Inc. in Kapolei, Oahu. Soil

IDW was sent to PVT Land Company, Ltd. in Waianae, Oahu. Copies of the IDW disposal documentation (soil profile and signed water and soil non-hazardous waste manifests) are included in Appendix E.




## LEGEND

- Temporary Supplemental RI Monitoring Well
- Existing Monitoring Well
- Existing RI Monitoring Well Location
- Abandoned Well
- Supplemental Remedial Investigation Boundary
- Former Fuel Farm Sludge Disposal Area
- Sludge Leaching Field
- Disposal Pit (Approximate Location)
- Active Tank
- AST Berm
- Former Underground Storage Tank
- Former Valve Pit or Tank Vault
- Fence Line

## NOTES

1. The accuracy of this map is limited to the quality and scale of the source information and is not suitable for mapping engineering applications and is not to be used for "As Built."

2. Acronyms and Abbreviations
   - AST — aboveground storage tank
   - RI — Remedial Investigation

## SOURCE

1. Pacific Division, Naval Facilities Engineering Command, May 1989
2. Marine Corps Base Hawaii-Kaneohe Bay Facilities Geodatabase, November 2011
3. Sam O. Hirota Land Survey, January 2008, April and August 2012
4. Department of the Navy, Y & D Drawing 950721, 1962

N

200 100 0 200 Feet

**Figure 2-1**
**Soil Boring & Monitoring Well Locations**
**Supplemental Remedial Investigation**
**Former Fuel Farm Sludge Disposal Area**
**Marine Corps Base Hawaii**
**Kaneohe Bay, Oahu, Hawaii**

# 3. Nature and Extent of Contamination

This section presents the supplemental RI investigation findings and analytical results used to further evaluate the nature and extent of the RI-related TPH-GRO and benzo(a)pyrene concentrations that exceeded projected-specific screening criteria in subsurface soil and groundwater samples collected in the area southeast of the Former Fuel Farm Sludge Disposal Area (AECOM and WCP 2013b). The primary supplemental RI COPCs in subsurface soil and groundwater were TPH-GRO, -DRO, and -LRO, BTEX, PAHs, and total lead. Assessment of data usability is discussed in Section 3.4. COC forms are included in Appendix F. Analytical results including field QC sample results are summarized in Appendix G.

## 3.1 ANALYTICAL PROGRAM

All supplemental RI samples were analyzed for the constituents listed in Table 3-1.

**Table 3-1: Analytical Program and Screening Criteria**

| Analyte | Soil EAL (mg/kg) [a] | Groundwater EAL (µg/L) [a] |
|---|---|---|
| **TPH by SW-846 Method 8015C** | | |
| TPH-GRO | 100 | 5,000 |
| TPH-DRO | 500 | 2,500 |
| TPH-LRO | 500 | 2,500 |
| **BTEX by SW-846 Method 8260C** | | |
| Benzene | 0.67 | 1,700 |
| Ethylbenzene | 21 | 300 |
| Toluene | 32 | 400 |
| Total Xylenes | 45 | 1,000 |
| **PAHs by SW-846 Method 8270D-SIM** | | |
| 1-Methylnaphthalene | 26 | 100 |
| 2-Methylnaphthalene | 28 | 100 |
| Acenaphthene | 120 | 200 |
| Acenaphthylene | 130 | 300 |
| Anthracene | 4.3 | 22 |
| Benzo(a)anthracene | 1.5 | 4.7 |
| Benzo(a)pyrene | 0.15 | 0.81 |
| Benzo(b)fluoranthene | 1.5 | 0.75 |
| Benzo(g,h,i)perylene | 35 | 0.13 |
| Benzo(k)fluoranthene | 15 | 0.40 |
| Chrysene | 30 | 1.00 |
| Dibenzo(a,h)anthracene | 0.15 | 0.52 |
| Fluoranthene | 460 | 130 |
| Fluorene | 100 | 300 |
| Indeno(1,2,3-cd)pyrene | 1.5 | 0.095 |
| Naphthalene | 4.5 | 210 |
| Phenanthrene | 440 | 300 |
| Pyrene | 44 | 68 |
| **Metals by SW-846 Method 6020C** | | |
| Lead | 200 | 29 |

[a] DOH EAL for unrestricted land use, drinking water not threatened, and distance to surface water is greater than 150 meters (DOH 2011). The only EAL applicable to groundwater is for discharges to surface water.

## 3.2 SUBSURFACE SOIL ANALYTICAL RESULTS

Six soil borings were advanced in the area southeast of the Former Fuel Farm Sludge Disposal Area in proximity to MW58. All six soil borings were converted to temporary groundwater monitoring wells. Three of the soil borings (MW60 to MW62) were located within the MCB Hawaii Fuel Farm area and three soil borings (MW63 to MW65) were located within the MCB Hawaii Motor Pool storage yard area (Figure 3-1).

Two subsurface soil samples were collected from each soil boring. The selection of the first soil sampling depth interval was based on the results of visual inspection of the core, odor, headspace analysis, and PID screening (approximately 3 to 6 feet bgs). The second subsurface soil sample was collected at the capillary fringe (approximately 9 to 15 feet bgs).

All subsurface soil samples were analyzed for TPH-GRO, -DRO and -LRO using SW-846 Method 8015C, BTEX using SW-846 Method 8260C, PAHs using SW-846 Method 8270C SIM, and total lead using SW-846 Method 6020C (EPA 2007). Analytical results for the 13 subsurface soil samples and 1 duplicate soil sample collected for the supplemental RI are summarized in Table 3-2.

### 3.2.1 TPH

TPH-GRO was not detected in any of the subsurface soil samples at concentrations exceeding the laboratory detection limits.

The only detections of TPH-DRO and TPH-LRO were in a single subsurface soil sample from MW61 collected at a depth of 5 to 6 feet bgs. Detected concentrations were well below their respective DOH Tier 1 EALs.

### 3.2.2 BTEX

BTEX was not detected in any of the subsurface soil samples. All limits of detection were below screening criteria.

### 3.2.3 PAHs

PAH compounds were not detected in any of the subsurface soil samples. All limits of detection were below screening criteria.

### 3.2.4 Total Lead

Lead was detected in all subsurface soil samples at concentrations ranging from 0.97 to 11.8 mg/kg, which are well below the DOH Tier 1 EAL of 200 mg/kg.

## 3.3 GROUNDWATER ANALYTICAL RESULTS

The supplemental RI groundwater sampling program included sampling of the six temporary groundwater monitoring wells (MW60 to MW65) installed in the area southeast of the Former Fuel Farm Sludge Disposal Area in proximity to MW58. Temporary groundwater monitoring well locations are shown on Figure 3-1.

All groundwater samples were collected and analyzed for TPH-GRO, -DRO, and -LRO using SW-846 Method 8015C, BTEX using SW-846 Method 8260C, PAHs using SW-846 Method 8270C SIM, and total and dissolved lead using SW-846 Method 6010/6020A (EPA 2007). Groundwater analytical results are discussed below and summarized in Table 3-3.

### 3.3.1 TPH

TPH-GRO was only detected in a groundwater sample collected from MW60 at a concentration of 360 µg/L, which is well below the DOH Tier 1 EAL of 5,000 µg/L. For all other groundwater samples, TPH-GRO was not detected. All limits of detection were below screening criteria.

TPH-DRO and TPH-LRO were not detected in any of the groundwater samples. All limits of detection were below screening criteria.

### 3.3.2 BTEX

Toluene was the only analyte detected in a groundwater sample from MW62 at an estimated concentration of 0.17 µg/L, which is well below the DOH Tier 1 EAL of 400 µg/L. All other BTEX analytical results in groundwater samples were not detected. All limits of detection were below screening criteria.

### 3.3.3 PAHs

Low levels of fluoranthene (0.36 µg/L) and pyrene (0.29 µg/L) were detected in a groundwater sample collected from MW60; however, these detections were well below their respective DOH Tier 1 EALs of 130 µg/L and 68 µg/L. All other PAH analytical results for groundwater samples were not detected. All limits of detection were below screening criteria.

### 3.3.4 Total and Dissolved Lead

Total lead was detected in only one groundwater sample collected from MW64 at a concentration of 0.51 µg/L, which is well below the DOH Tier 1 EAL of 29 µg/L. All other total and dissolved lead groundwater analytical results were not detected. All limits of detection were below screening criteria.

## 3.4 DATA QUALITY ASSESSMENT

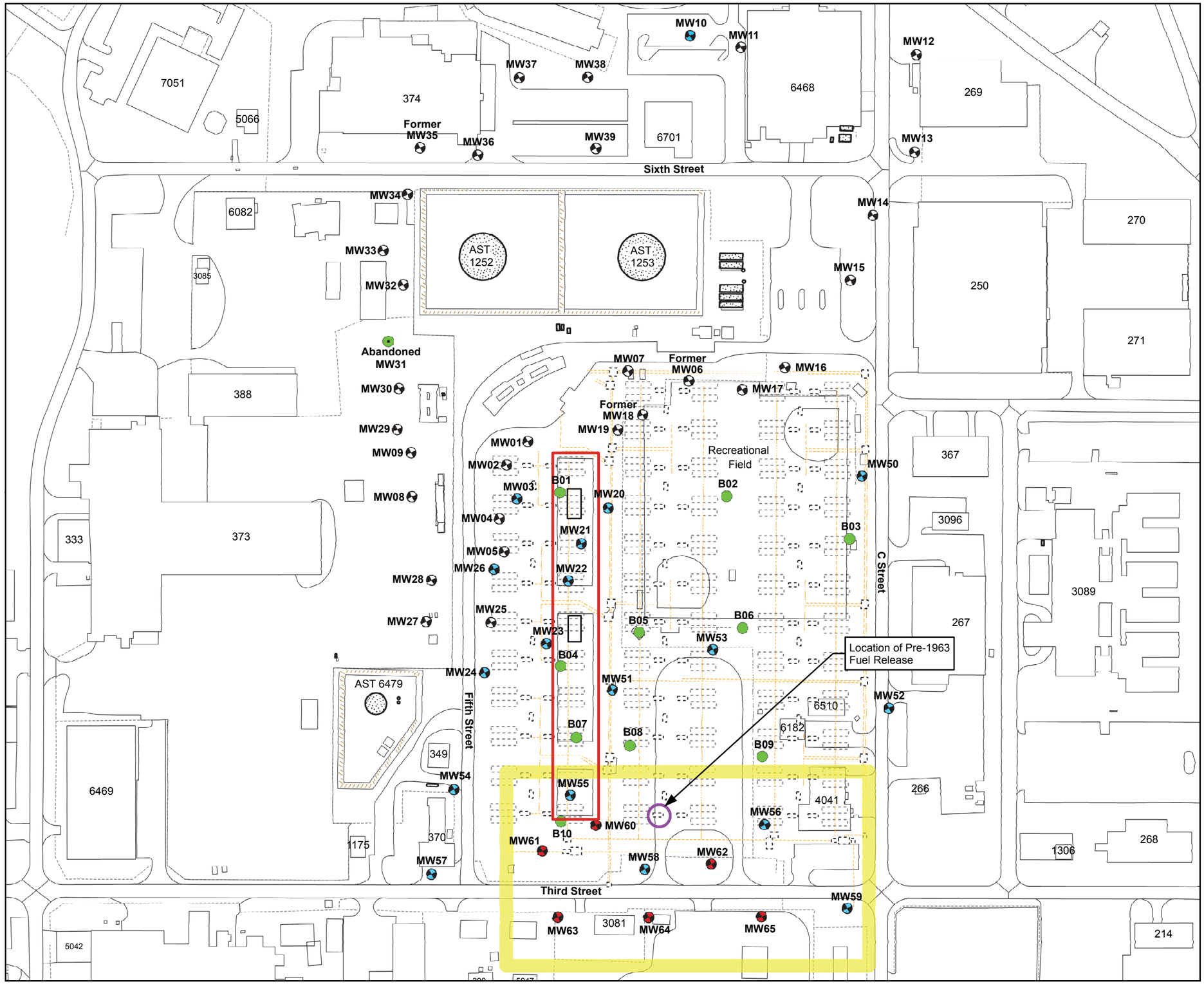
All groundwater and QC analytical results for the supplemental RI were subjected to independent, third-party validation by Laboratory Data Consultants, Inc., which evaluated the raw data (method detection limit studies included) against NAVFAC Pacific data validation procedures and *Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5* (DoD 2013) requirements. The COC forms are provided in Appendix F. All groundwater and QC analytical results for the supplemental RI are presented in Table G-1 and Table G-2 in Appendix G. The data quality assessment report (DQAR) and data validation reports are provided in Appendix H.

The data validation results concluded that there were no rejected data for the analyses performed for the supplemental RI. All TPH, BTEX, PAHs, and lead data were assessed to be valid based on precision, accuracy, representativeness, completeness, and comparability criteria. All surrogates and laboratory control samples were within acceptance criteria, and no contaminants were detected in the laboratory method blanks. All MS/MSD percent recoveries and calculated relative percent differences were within acceptance criteria. Headspace (bubbles) was observed in the trip blank volatile organic analyte (VOA) vials (samples KC129, KC142, and KC147) upon receipt at the laboratory. The presence of headspace in the trip blank VOA vials could introduce a low bias in the trip blank results for TPH-GRO and BTEX analysis; however, this does not affect the ability to evaluate cross contamination because only one sample reported a detection of TPH-GRO and only one sample reported a detection of toluene as discussed in Section 3.3. No other volatile analytes were detected. Further discussion of data validation results is presented in the third-party data validation report and DQAR in Appendix H.

## 3.5 OTHER FINDINGS

Interviews with MCB Hawaii Fuel Farm personnel revealed a possible reason for the TPH-GRO and benzo(a)pyrene exceedances detected during the RI in the area southeast of the Former Fuel Farm Sludge Disposal Area. According to long-time employee Henry Puulei, there had been an overflow release in a subsurface concrete valve pit (see Figure 3-1) (Puulei 2013). Painters working in the valve pit had removed a cap on the fuel line and failed to replace the fuel line cap upon completion of their work. When the next fuel shipment was received, MCB Hawaii Fuel Farm personnel noticed that their reported fuel storage volume did not match the volume of fuel received. During a subsequent inspection of the fuel systems, the valve pit was discovered to be full of fuel. According to plan file drawings (Y&D Drawing Nos. 950820 and 950721), the valve pit dimensions were approximately 7 feet wide, 10 feet long, and 9 feet deep (DON 1962). Mr. Puulei did not recall the amount of fuel that was released, but indicated that the type of fuel was likely MOGAS or AVGAS. The USTs associated with this valve pit were removed in 1963; therefore, the release must have occurred prior to 1963 when fuel releases were not required to be reported.

During the 2012 RI, the only COPC exceedances in subsurface soil and groundwater samples collected in the area southeast of the Former Sludge Disposal Area were TPH-GRO and benzo(a)pyrene in boring B10 and MW58 (AECOM and WCP 2013b). COPC concentrations in subsurface soil and groundwater samples collected from other monitoring wells to the southeast (MW55, MW56, and MW59) were either non-detect or were well below their respective DOH EALs (AECOM and WCP 2013b). Due to the proximity of the valve pit to MW58 and the lack of exceedances detected in other area monitoring wells during the 2012 RI and supplemental RI, it is believed that the valve pit overflow release is the source of TPH-GRO and benzo(a)pyrene exceedances observed during the 2012 RI.




**LEGEND**

- Temporary Supplemental RI Monitoring Well
- Existing Monitoring Well
- Existing RI Monitoring Well Location
- New RI Soil Boring Location
- Abandoned Well
- Supplemental Remedial Investigation Boundary
- Former Sludge Disposal Area
- Sludge Leaching Field
- Disposal Pit (Approximate Location)
- Active Tank
- AST Berm
- Former Underground Storage Tank
- Former Valve Pit or Tank Vault
- Fence Line
- Historical AVGAS/MOGAS Fuel Lines

**NOTES**

1. The accuracy of this map is limited to the quality and scale of the source information and is not suitable for mapping engineering applications and is not to be used for "As Built."

2. Acronyms and Abbreviations
   - AST aboveground storage tank
   - AVGAS aviation gasoline
   - MOGAS motor gasoline
   - RI Remedial Investigation

**SOURCE**

1. Pacific Division, Naval Facilities Engineering Command, May 1989
2. MCBH-KBAY Facilities Geodatabase, November 2011
3. Sam O. Hirota Land Survey, January 2008, April and August 2012
4. Dept of the Navy, Y & D Drawing 950721, 1962
5. Puulei, H., Personal Communication, November 2013

N

200 100 0 200 Feet

**Figure 3-1**
**Pre-1963 Fuel Release Location**
**Supplemental Remedial Investigation**
**Former Fuel Farm Sludge Disposal Area**
**Marine Corps Base Hawaii**
**Kaneohe Bay, Oahu, Hawaii**

**Table 3-2: Supplemental RI Subsurface Soil Analytical Results, Former Fuel Farm Sludge Disposal Area, MCB Hawaii**

| | Location ID | BS60 (MW60) | | | | BS61 (MW61) | | | | BS62 (MW62) | | | | BS63 (MW63) | | | | | | BS64 (MW64) | | | | BS65 (MW65) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | COC ID | KC140 | | KC141 | | KC138 | | KC139 | | KC135 | | KC136 | | KC132 | | KC133 | | KC134 | | KC127 | | KC128 | | KC130 | | KC131 | |
| | Sample Type | N | | N | | N | | N | | N | | N | | N | | N | | FD | | N | | N | | N | | N | |
| | Sample Depth | 5 to 6 feet bgs | | 12 to 13 feet bgs | | 5 to 6 feet bgs | | 12 to 13 feet bgs | | 5 to 6 feet bgs | | 10 to 11 feet bgs | | 5 to 6 feet bgs | | 9 to 10 feet bgs | | 9 to 10 feet bgs | | 4 to 5 feet bgs | | 10 to 11 feet bgs | | 5 to 6 feet bgs | | 10 to 11 feet bgs | |
| Analyte | 2011 DOH EALs [a] | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual |
| **Total Petroleum Hydrocarbons by SW-846 Method 8015C** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TPH-GRO | 100 | 1 | U | 0.9 | U | 0.9 | U | 1 | U | 0.9 | U | 0.9 | U | 0.9 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| TPH-DRO (C10-C24) | 500 | 1.2 | U | 1.1 | U | 2.3 | J | 1.3 | U | 1.2 | U | 1.1 | U | 1.2 | U | 1.3 | U | 1.2 | U | 1.3 | U | 1.2 | U | 1.3 | U | 1.2 | U |
| TPH-LRO (C24-C36) | 500 | 12 | U | 11 | U | 6.2 | J | 13 | U | 12 | U | 11 | U | 12 | U | 13 | U | 12 | U | 13 | U | 12 | U | 13 | U | 12 | U |
| **BTEX by SW-846 Method 8260C** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 0.67 | 0.0025 | U | 0.0023 | U | 0.0022 | U | 0.0025 | U | 0.0023 | U | 0.0023 | U | 0.0023 | U | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0024 | U | 0.0026 | U | 0.0024 | U |
| Ethylbenzene | 21 | 0.0025 | U | 0.0023 | U | 0.0022 | U | 0.0025 | U | 0.0023 | U | 0.0023 | U | 0.0023 | U | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0024 | U | 0.0026 | U | 0.0024 | U |
| Toluene | 32 | 0.0025 | U | 0.0023 | U | 0.0022 | U | 0.0025 | U | 0.0023 | U | 0.0023 | U | 0.0023 | U | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0024 | U | 0.0026 | U | 0.0024 | U |
| Xylenes (Total) | 45 | 0.0025 | U | 0.0023 | U | 0.0022 | U | 0.0025 | U | 0.0023 | U | 0.0023 | U | 0.0023 | U | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0024 | U | 0.0026 | U | 0.0024 | U |
| **PAHs by SW-846 Method 8270D-SIM** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Methylnaphthalene | 26 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| 2-Methylnaphthalene | 28 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Acenaphthene | 120 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Acenaphthylene | 130 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Anthracene | 4.3 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(a)anthracene | 1.5 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(a)pyrene | 0.15 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(b)fluoranthene | 1.5 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(g,h,i)perylene | 35 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(k)fluoranthene | 15 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Chrysene | 30 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Dibenzo(a,h)anthracene | 0.15 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Fluoranthene | 460 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Fluorene | 100 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Indeno(1,2,3-cd)pyrene | 1.5 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Naphthalene | 4.5 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Phenanthrene | 440 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Pyrene | 44 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| **Total Metals by SW-846 Method 6010C/6020A/7471B** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Lead | 200 | 11.8 | | 2.2 | | 1.7 | | 1.8 | | 1.6 | | 1.0 | | 2.0 | | 1.5 | | 1.6 | | 4.6 | | 0.97 | | 2.1 | | 1.3 | |

Note: All units are in mg/kg.
COC = chain-of-custody
DOH = Department of Health, State of Hawaii
DRO = diesel range organics
EAL = environmental action level
FD = field duplicate
GRO = gasoline range organics
ID = identification
J = laboratory-estimated qualifier
LRO = lube oil range organics
N = primary or normal sample
Qual = qualifier
TPH = total petroleum hydrocarbons
U = non-detect qualifier
[a] EAL is for unrestricted land use, where drinking water is not threatened, and the distance to surface water is greater than 150 meters from the site (DOH 2011).

**Table 3-3: Supplemental RI Groundwater Analytical Results, Former Fuel Farm Sludge Disposal Area, MCB Hawai**

| | Location ID | MW60 | | MW61 | | MW62 | | MW63 | | MW64 | | | | MW65 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | COC ID | KC146 | | KC150 | | KC149 | | KC148 | | KC143 | | KC144 | | KC145 | |
| | Date Sampled | 2/5/2014 | | 2/6/2014 | | 2/6/2014 | | 2/6/2014 | | 2/5/2014 | | 2/5/2014 | | 2/5/2014 | |
| | Sample Type | N | | N | | N | | N | | N | | FD | | N | |
| Analyte | 2011 DOH EALs [a] | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual |
| **Total Petroleum Hydrocarbons by SW-846 Method 8015C** | | | | | | | | | | | | | | | |
| TPH-GRO | 5,000 | 360 | | 18 | U | 18 | U | 18 | U | 18 | U | 18 | U | 18 | U |
| TPH-DRO (C10-C24) | 2,500 | 50 | U | 50 | U | 50 | U | 50 | U | 50 | U | 50 | U | 50 | U |
| TPH-LRO (C24-C36) | 2,500 | 500 | U | 500 | U | 500 | U | 500 | U | 500 | U | 500 | U | 500 | U |
| **BTEX by SW-846 Method 8260C** | | | | | | | | | | | | | | | |
| Benzene | 1,700 | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| Ethylbenzene | 300 | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U |
| Toluene | 400 | 0.3 | U | 0.3 | U | 0.17 | J | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| Xylenes (Total) | 1,000 | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| **PAHs by SW-846 Method 8270D-SIM** | | | | | | | | | | | | | | | |
| 1-Methylnaphthalene | 100 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| 2-Methylnaphthalene | 100 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Acenaphthene | 200 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Acenaphthylene | 300 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Anthracene | 22 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Benzo(a)anthracene | 4.7 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Benzo(a)pyrene | 0.81 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Benzo(b)fluoranthene | 0.75 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Benzo(g,h,i)perylene | 0.13 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Benzo(k)fluoranthene | 0.4 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Chrysene | 1 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Dibenzo(a,h)anthracene | 0.52 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Fluoranthene | 130 | 0.36 | | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Fluorene | 300 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Indeno(1,2,3-cd)pyrene | 0.2 [b] | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Naphthalene | 210 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Phenanthrene | 300 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| Pyrene | 68 | 0.29 | | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U |
| **Metals by SW-846 Method 6010C/6020A/7471B** | | | | | | | | | | | | | | | |
| Total Lead | 29 | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U | 0.51 | | 0.19 | U | 0.19 | U |
| Dissolved Lead | 29 | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U |

Note: All units are in µg/L.
µg/L = micrograms per liter
COC = chain-of-custody
DOH = Department of Health, State of Hawaii
EAL = environmental action level
FD = field duplicate
GRO = gasoline range organics
ID = identification
J = estimated qualifier
LOQ = laboratory limit of quantitation
N = normal sample
TPH = total petroleum hydrocarbons
U = non-detect qualifier
[a] EAL is for unrestricted land use, where drinking water is not threatened, and the distance to surface water is greater than 150 meters from the site (DOH 2011).
[b] As specified in the RI WP (AECOM and WCP 2011) the DOH EAL for this analyte is unachievably low (0.095 µg/L); therefore, the LOQ is used as the PAL.

# 4. Conclusions and Recommendations

## 4.1 CONCLUSIONS

The purpose of the supplemental RI was to evaluate the nature and extent of TPH-GRO and benzo(a)pyrene concentrations that exceeded project-specific screening criteria in subsurface soil and groundwater RI samples collected from the area southeast of the Former Fuel Farm Sludge Disposal Area. These exceedances were surmised to be associated with a prior release from either USTs that were removed in the 1960s or a release from fuel lines that historically ran through the area. The following summarizes conclusions made for the supplemental RI:

- Subsurface soil and groundwater sampling during the supplemental RI failed to detect levels of TPH-GRO, -DRO, -LRO, BTEX, PAHs, and lead exceeding DOH Tier 1 EALs in subsurface soil and groundwater samples. COPC concentrations in subsurface soil and groundwater samples collected during the 2012 RI from other monitoring wells (MW55, MW56, and MW59) in proximity to MW58 were either non-detect or were well below their respective DOH EALs (AECOM and WCP 2013b). Therefore, the subsurface soil and groundwater exceedances of TPH-GRO and benzo(a)pyrene observed during the 2012 RI have been adequately delineated (both horizontally and vertically) and are isolated to the area in close proximity to boring B10 and MW58.
- As stated in the RI report (AECOM and WCP 2013b), it is believed that the Former Fuel Farm Sludge Disposal Area is not the source of the TPH-GRO and benzo(a)pyrene exceedances. The pre-1963 overflow fuel release in a subsurface concrete valve pit is the likely source of TPH-GRO and benzo(a)pyrene exceedances observed in the 2012 RI data.

## 4.2 RECOMMENDATIONS

The recommendations are as follows:

- The subsurface soil and groundwater exceedances of TPH-GRO and benzo(a)pyrene observed during the 2012 RI have been adequately delineated (both horizontally and vertically) and are isolated to the area in close proximity to boring B10 and MW58. Any existing residual contamination in this area can be managed in place as it poses no significant risk to human health and the environment. Measures described in the EHE/EHMP, Revision 01 (AECOM and WCP 2013a) are protective and appropriate for the MW58 location so no continued monitoring or further investigation is warranted.
- The Former Fuel Farm Sludge Disposal Area is not the source of the TPH-GRO and benzo(a)pyrene exceedances observed in subsurface soil and groundwater in boring B10 and monitoring well MW58; therefore, no further action with institutional controls is recommended for the Former Fuel Farm Sludge Disposal Area.

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# Appendix A
# Field Logbooks

# Appendix A.1
# Field Logbook

CTO HC25

Remedial Investigation
Former Sludge Disposal
Area

"Rite in the Rain"®
ALL-WEATHER
ENVIRONMENTAL
No. 550F

Field Logbook

CTO HC25

No ENVIRONMENTAL HARDBOUND
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Price $18 95
464
ISBN 978-1-932149-50-0

# HC825 RI for Fuel Farm Sludge Disposal Area

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(808) 596-4688 (W)
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Rachel Kaminaka (RK) - WCP

Kelly Shoji (KS) - WCP

* Refer to sampling logs for additional information (see page 4 for detail!)

## SOPs

*PPE: Level D

I-A-5: Utility Clearance
I-A-6: IDW Management
I-A-7: Analytical Data Validation Planning and Coordination.
I-A-8: Sample Naming
I-B-1: Soil Sampling
I-B-2: Geophysical Testing Procedures
I-B-3: Active Soil Gas Survey.
I-C-1: Monitoring Well Installation + ~~Development~~ Abandonment
I-C-2: Monitoring Well Development
I-C-3: Monitoring Well Sampling
I-E: Soil + Rock Classification
I-F: Equipment Decontamination
I-I: Land Surveying
II-A: Data Validation Procedure
II-B: Standard + Full Data Validation Procedure for GC/MS VOCs by SW-846 8260B
II-C: Standard + Full Data Validation Procedure for GC/MS SVOCs by SW-846 8270C (Full + SIM)
II-H: Standard + Full Data Validation Procedure for Extractable TPH by SW-846 8015B
II-Q: Standard + Full Data Validation Procedure for Metals by SW-846 6000/7000 →

SOPs Cont'd

II-S: Data Quality assessment Report Procedure
III-A: Laboratory QC Samples (Water, Soil)
III-B: Field QC Samples (Water, Soil)
III-C: Field & Lab QC Samples (Air)
III-D: Logbooks
III-E: Record keeping, Sample Labeling, + COC procedures
III-F: Sample Handling, Storage + Shipping

ALL-WEATHER WRITING PAPER
ALL-WEATHER
ENVIRONMENTAL FIELD BOOK

Name Wil Chee - Planning + Environmental

Address 1018 Palm Drive
Honolulu, HI 96814

Phone 808-596-4688

Project CTO HC25
Remedial Investigation Former
Fuel Farm Sludge Disposal Area
MCB Hawaii, Kaneohe, HI
CLEAN III Contract No. N62742-03-D-1837

**This book is printed on "Rite in the Rain" All-Weather Writing Paper** - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

*This Logbook will be copied/scanned daily.
* Refer to HC25 QC Logbook for Sample IDs, COC info, Sample type, Analyses, Container Volumes.

Specifications for this book

| Page Pattern | | Cover Options | |
|---|---|---|---|
| Plain Page | Grid Page | Vinyl Cover | Fabrikoid Cover |
| Columnar | 1/4" Grid | Item No. 550 | Item No. 550F |

Page Size 8 1/2" x 11" Weight Not Specified

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| PAGE | REFERENCE | DATE |
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| | Field Equipment | |
| | Trimble ~~AT~~ Geo XT 2005 series | |
| | Sound Level Meter QST/SP-DL-1-20 | |
| | Ultra RAE 3000 - benzene specific | |
| | RAE Benzene tubes for Ultra RAE | |
| | Passive Dust Meter TEI/PDR-1000 AN | |
| | ~~Ex~~ LEL $CH_4$, $O_2$ meter | |
| | RKI/GX2003 72-0253 RKC | |
| | Calibration gas: 5ppm Benzene | |
| | Geotech GeoControl Pro #2871 | |
| | Geotech Portable Bladder Pump 1.66" x 18" | |
| | YSI 556 MPS Water Quality Probe | |
| | Unit # 05E2000 AJ | |
| | Solinst Interface Probe | |
| | Model 122, 122 00 38444-7 | |
| | Turbidity Meter HACH 2100Q | |
| | AF Sci Turbidimeter #3345 | |
| | 2nd Geotech GeoControl Pro #3588 | |
| | Geotech GeoControl Pro #2892 | |

(8/20-21/12)

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153 Soil Classification
154 Conversions (Length, Area, Volume, Temperature)
155 Conversions (Concentration, Volumetric Flow, Time, Velocity, Acceleration)
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Motor Pool: Bill Otto 257-2304

WWP-Marty - 352-1274

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Airtoxics (800) 985-5955 x 1038
Kelly Buettner 916 605-3378 (direct



Location MCBH Date

Project / Client

Acronyms

| | |
|---|---|
| WCP | Wil Chee Planning, Inc |
| VWD | Valley Well Drilling |
| RK | Rachel Kaminska |
| ClSh | Christie Shacat |
| KS | Kelly Shoji |
| MCBH | Marine Corps Base Hawaii |
| ID | Identification |
| KH | Kerry Hennon |
| TH | Terri Hennon |
| MW | Monitoring Well |
| B | Boring |
| DTW | Depth to Water |
| BOS | Bottom of Screen |
| BOH | Bottom of Hole |
| bgs | below ground surface |
| ft | foot / feet |
| POC | Point of Contact |
| SG | Soil Gas |
| UST | Underground Storage Tank |
| BA | Betsy Aspaugh (Aecom) |
| SL | Carol Lewis (Aecom) |
| H&S | Health & Safety |
| JS | John Sunggao |

continued on page 145

Location

Date

Project / Client Information Contained on Sampling Logs

Sampling Identification Numbers
Date Time
PID Readings
Blow counts
Depth
Particle Size Distribution
Soil description
Type of Drill Rig
Sampling Type, Hammer Type
Auger Diameter
Drillers
Depth to groundwater
Total Depth of well
turbidity
pH
Temperature
Redox
conductivity
evidence of sheen/odors



Location MCBH

Date 3/5/12

Project / Client Sludge Disposal Area

Overcast

NAVFAC HI

1140 RK left office
1215 At Pass/ID office

1230 At Fuel Farm office
spoke to secretary
Locate borings

1330 Leave MCBH

RKamish
3/5/12

Location MCBH Date 3/6/12

Project / Client HC25 Fuel Farm Sludge Disposal NAVFAC HI

cloudy rainy

0630 RK left home

0700 Meet up with Kerry (KH) & Terri (TH) Hennon & Christin Shelcat (ChSh) Could not get passes. Called Jeff Larson to get sponsored on base. WCP has passes but not Terraphysics. Called BSA to ~~get~~ check on status of passes for subs.

0800 Stop at Fuel Farm office and sign in. Spoke to Henry about our plans.

0830 Start on MW52

1130 Surveyed B05, MW56 B02, MW50, MW52

1145 Leave for Lunch.

1230 Back at B03 KH & TH setting up

1253 Raining again Terraphysics equipment do not like rain! They need to pause every time it rains.



Location MCBH Date 3/6/12

Project / Client HC25 Fuel Farm Sludge Disposal

1330 ChSh offsite to get GPS working

1333 Raining harder. We are sitting in the rain

1400 Leaving site, Weather forecast flash flood warning until 3:30 pm & may extend. Decide to shut down for the day.

3/16/12

Location MCBH Date 3/7/12

Project / Client HC25 Sludge Disposal Area RI NAVFAC HI

Sl. overcast

700 Terraphupics + WCP meet at Pass/ID

~~[illegible]~~ 730 Leave Pass/ID
Everyone has passes
RK signs in at Fuel Farm

0735 Terraphupics sets up at B03.
RK Conducts H&S briefing
Heartrate on Tailgate log.

0803 Grounds Maintenance cuts grass pretty much daily
Told them we wanted the markings to stay for about a month.

0816 Metal object found at B03

N-S ~18ft $\pi r^2 x l$
E-W ~12ft dia.

5 ~~7.5~~ gal/ft$^3$
~ 6400 gal. capacity



Location MCBH Date 3/7/12

Project / Client HC25 Sludge Disposal Area RI

KH says it is not a piled burned debris It is metal Not concrete. ~~It is sloped on top like a cylinder top~~ 2ft bgs. and a separate water line runs on top of it 1ft bgs.

There is a dividing line between it.
One solid metal piece on south side. North end has multiple metal objects. KH does not believe it is a UST.

0941 Called Jeff Larson
MW57 and MW58 need to be moved further South.
Too many utilities along Third Street.

1030 Jeff Larson came out
we visited the Motor Pool

→ Go to page 15

Location MCBH Date 3/7/12

Project / Client HC25 Sludge Disposal Area RI

overcast, cloudy windy NAVFAC HI

Soil Boring

B01 7/12/12

B02: surveyed 3/6/12

B03: surveyed; metal anomaly 3/7/12

B04: 3/12/12

B05: surveyed 3/6/12

B06: 3/12/12

B07: surveyed 3/13/12

B08: surveyed 3/13/12

B09: surveyed 3/13/12

B10 3/12/12



Location MCBH Date 3/7/12

Project / Client HC25 Sludge Disposal Area

cloudy windy NAVFAC HI

MW50: surveyed 3/6/12

MW51 3/12/12

MW52: surveyed 3/6/12

MW53 3/12/12

MW54 3/9/12

MW55 3/9/12

MW56: surveyed 3/6/12

MW57 3/9/12

MW58 3/9/12

MW59: surveyed 3/7/12

Location MCBH Date 3/7/12

Project / Client HC25 Sludge Disposal Area RI NAVFAC HI

partly sunny

Mission Support Facility - Soilgas (14)

SG01 surveyed 3/8/12

SG02 surveyed 3/8/12

SG03 surveyed 3/8/12

SG04 surveyed 3/8/12

SG05 surveyed 3/8/12

SG06 surveyed 3/8/12

SG07 surveyed 3/8/12

SG08 surveyed 3/8/12

SG09 surveyed 3/8/12

SG10 surveyed 3/7/12

SG11 surveyed 3/7/12

SG12 surveyed 3/7/12



Location MCBH Date 3/7/12

Project / Client HC25 Sludge Disposal Area NAVFAC HI

partly sunny windy

SG13 survey 3/7/12

SG14 surveyed 3/7/12

Ball Field Soil gas (10)

SG15 surveyed 3/8/12

SG16 surveyed 3/8/12

SG17 surveyed 3/8/12

SG18 surveyed 3/8/12

SG19 surveyed 3/8/12

SG20 surveyed 3/8/12

SG21 surveyed 3/8/12

SG22 surveyed 3/8/12

SG23 surveyed 3/8/12

SG24 surveyed 3/8/12

Location MCBH Date 3/7/12

Project / Client HC25 Sludge Disposal Area RI NAVFAC HI

partly cloudy windy

| | | |
|---|---|---|
| SG25 | 3/12/12 | surveyed |
| SG26 | 3/12/12 | surveyed |
| SG27 | 3/12/12 | surveyed |
| SG28 | 3/12/12 | surveyed |
| SG29 | 3/12/12 | surveyed |
| SG30 | 3/12/12 | surveyed |
| SG31 | 3/12/12 | surveyed |
| SG32 | 3/12/12 | surveyed |
| SG33 | surveyed | 3/12/12 |
| SG34 | surveyed | 3/12/12 |
| SG35 | surveyed | 3/12/12 |
| SG36 | surveyed | 3/12/12 |
| SG37 | survey | 3/12/12 |



Location MCBH Date 3/7/12

Project / Client HC25 Sludge Disposal Area RI NAVFAC HI

SL overcast. windy

Jeff Larson will contact Motor Pool POC about drilling wells in their yard. Informed Jeff of the anomaly ~~at~~ at BO3.

1045 KH says the soil gas area at Mission Support Facility is slow going there are alot of utilities in this area.

1145 offsite for lunch. KH continues to survey

~~1205~~

1225 Back onsite

1432 KH is still clearing SG7-SG14 near the proposed Mission Support Facility.

Asked Henry at Fuel Farm office about the anomaly detected at BO3. He didnt think it was a UST. He said the USTs

Location MCBH Date 3/7/12

Project / Client MC25 Sludge Disposal Area

Partly cloudy

were ~40 feet long.

Jeff Larson called about moving MW58 to the Motor Pool. POC is Otto - said we could drill well in corner of their lot which is off of our map, Figure 5 of WP

Jeff was trying to contact POC of lot south of proposed MW57 location but hasn't made contact yet. Jeff said he'd keep trying but she wouldn't be working tomorrow (Thurs.)

1500 Informed BA of situation with MW57 & MW58. She did not want us to install well in motor pool area. We discussed other options such as coring through the sidewalk.



Location MCBH Date 3/7/12

Project / Client MC25 Sludge Disposal Area

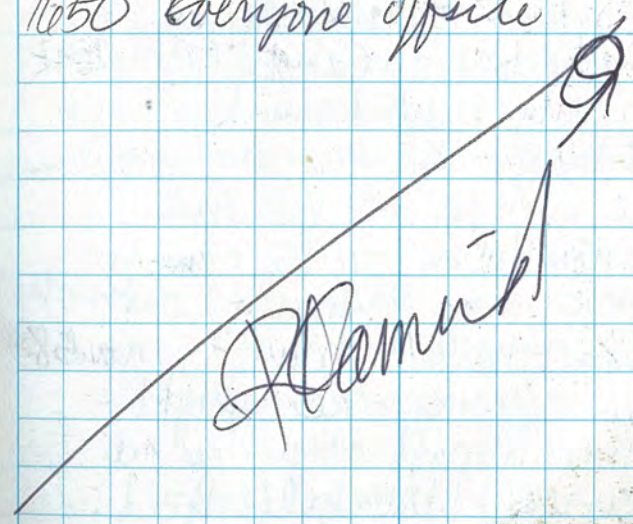
Cloudy, windy

1600 KH said we will be halfway through this project by end of Friday based on the rate we are going

weather is windy, slight rain feels colder.

KH will work up alternatives tonite and we'll discuss in morning.

1650 Everyone offsite



Location MCBH Date 3/8/12

Project / Client HC25 Sludge Disposal Area NAVFACHI

Cloudy, v. windy

0700 KH RK onsite. TH has left Oahu to return home for a wedding.
KH will remain til Tuesday night. He requires $1000 additional to cover his perdiem. He said he would have to work for free on Mon + Tues.

0715 Held H&S briefing. HR on tailgate log.

0730 Go over to field office Spoke to Ed Campbell about moving MW57 in his driveway. We has no problem as long as we let him know when so he can move his equipment out

0745 RK remarked MW57, MW58 KH clearing the flight trainer pad area in the current baseball field.



Location MCBH Date 3/8/12

Project / Client HC25 Sludge Disposal Area NAVFACHI

Cloudy, Very windy

0924 Starting to rain. a little

0945 Stopped raining

1000 BSA called. Filled him in on repositioning MW57 MW58 and cost ramifications for continuing geophysical survey next week.

1145 Spoke to Ed Campbell let him know that when soil gas survey starts we'll need Bldg 6510 parking lot to be cleared of all vehicles

1200 Offsite for Lunch

1240 Back onsite
KH continues w/ clearing SG15 - SG24

1404 Call Phil Lum to ask about water valves that do not appear to be connected to anything and the fiber optic cable lines
Left message

Location MCBH Date 3/8/12

Project / Client HC25 Sludge Disposal Area RI NAVFAC HI

Cloudy, windy

1448 KH is setting up to GPS all borings + soil gas locations near proposed mission Support Facility and Flight Training Pads.
The existing new flight training concrete pad has a 300KVA transformer has high voltage wiring ~~comin~~ leading to it. We need to stay well away from it!

1516 Called Ed Campbell since he seems to know how the utility lines run on his facility. Asked about the water valves and the fiber optic cable. ~~The water line appears to~~ Two valves run to a fire hydrant and eye wash station. Ed came out and determined the water line was not a problem.

1520 It is raining.



Location MCBH Date 3/8/12

Project / Client HC25 Sludge Disposal Area RI NAVFAC RI

Cloudy, windy

1544 BA called. Filled her in on the days events.
The borings and soil gas locations near the proposed Mission Support Facility are cleared for utilities. KH is doing GPS locations for ~~all~~ each location and all pertanent utilities.

We will continue with GPS tomorrow and then move on to the Sludge Disposal Area.

1553 Everyone offsite
Rain is starting up again

[signature]
3/8/12

Location MCBH Date 3-12-12

Project / Client HC25 Sludge Disposal Area RI

Cloudy, windy, 80°F Navfac HI

0630 RK + CLSh leave WCP Office

0710 RK + CLSh arrive at MCBH Pass/ID Office, John Sunigao (JS) + Paul Demay (PD) (VWI) already there, getting passes

0735 Brian Ramos (Ikaika) arrives with Support Truck, gets pass

0740 JS, PD, RK, CLSh leave to go to site, Kerry Hennon (Terraphysics) at Ballfield

0750 RK holding H&S Briefing, recorded pulses

0803 still waiting for BR to arrive to continue H&S Briefing

0810 BR arrives, setup at B-03

0820 Finish H&S Briefing

0830 Calibrated PID, setup Explosimeter, Noisemeter, Dust Meter

0847 Start advancing B-03

0908 Encountered GW at 15'
No PID readings so far
No sample until capillary fringe

0910 Collected first sample at 15' (1.5' split spoon)



Location MCBH Date 3-12-12

Project / Client HC25 Sludge Disposal Area RI

Cloudy, windy 86°F Navfac HI

1 807 jar for TPH-L,D, Pb, PAHs

40ml VOA { 2 Stirbar (UPBW) 5g soil plug
1 MeOH 5 TPH-GRO + BTEX

13.45' DTW
16.5' BOH

Sample ID - COC:
KC001

0935 ~~Discontinuous~~ Pulling augers up and preparing to grout hole

1005 Start mixing grout for B-03

1023 Move Drill Rig to next Boring
Grout at B-03 is done, just needs to be topped off

1025 Mobilize to B-06

1033 Setup at B-06

1039 Start Advancing B-06
No PID readings so far (=0 ppm)

1102 at 12' bgs
Noise level: 55-75 dB
Dust: 0.185 mg/m³

1105 Auger at 13.5' bgs
Taking sample here as last

Location MCBH Date 3-12-12

Project / Client HC25 Sludge Disposal Area RI

Partly cloudy, windy Navfac HI

location's splitspoon was ~ 50% (400) saturated (Bottom section)

~~1140~~ @ Collect KC002 at ~~13.5' bgs~~ @

1125 15' bgs from capillary fringe - tried to collect sample at 13.5' but absolutely no indication of moisture in split spoon. The augers were advanced by 1 more foot, then splitspoon from 15-16.5' bgs - sample taken from 15.5 to 16.5' section, saturation showed through lexite splitspoon, but not > 50% saturated

1205 Grouting B-06

RK had been decanning sampling material according to SOPs (splitspoon, shoe etc.)

1230 Secure site and break for lunch

1310 Return from lunch

1315 Move materials and drums to IDW staging area

1330 Set up at B-05

1340 Start advancing B-05

1405 Collect sample KC003 from 15-16.5' bgs



Location MCBH Date 3-12-12

Project / Client HC25 Sludge Disposal Area RI

Mostly cloudy Navfac HI

1510 Finish grouting B-05 and top off B-06 and B-03

1515 VWD secures site

1520 VWD leaves site

1540 Sign out at Fuel farm office WCP leave MCBH

Kerry Hemon cleared B-08 and B-10, left site ~ 1500 to repair a broken antenna (completely)

1610 RK + Alish arrive at office

Trip blank KC004

3-12-12 1700

Location MCBH Date 3-13-12 (13 RK)

Project / Client HC25 Sludge Disposal Area RI

mostly cloudy, cold Navfac HI

0645 RK + ClSh leave office
0735 RK + ClSh arrive onsite
VWD already here, putting topsoil on 3 borings
0740 Brief Kerry Hanon, H&S by RK for him
H&S VWD, Record Heartrate
0750 Set up at MW-50
0800 Advance boring, no visible
0840 staining or PID readings
Collect Sample KC006 from 15-16.5' bgs
(Trip blank KC005)
0850 Start installing MW-50
Water level 13.8' bgs DTW
Bottom of Screen 22.3' bgs
Top of Screen 12.3' bgs
MW-13 DTW 16.3' bgs

1013 Setup on MW52
1027 Start MW52
1059 Wet at 15' bgs
No odor, no staining
PID < 0.0 ppm



Location MCBH Date 3/13/12

Project / Client HC25 Sludge Disposal Area RI

Mostly cloudy, Navfac HI

1100 Collect sample KC007 15-16.5'
1142 BASECOM office Bldg 268 gentlemen visited asking if we had hit a line. The tower has lost communications. ~~Dutton~~ Happened yesterday. Said line has copper running through it, RK told him we were zoning. Geophysical Surveyor is doing a thorough job. He was satisfied with the answer.
1200 Finish setting well MW-52
screen 22.5 - 12.5 bgs
DTW 13.5', 10ft screen
Schedule 40 2" PVC
1205 Rain for ~ 15 min
1215 Leave for lunch (RK + ClSh)
1300 check w/ Kerry Hanon, he is in Sludge Disposal Area, checking last MW location

Location MCBH Date 3-13-12

Project / Client HC25 Sludge Disposal Area RI

Sunny, slight breeze Navfac HI

He will GPS the SDA area for the remainder of today

1330 Drillers return from dropping off drums at staging area

1338 Set up at MW-59

1345 Start advancing boring

1402 At ~12' petroleum odor occured, PID reading: 13.45 ppm, very strong odor, taking sample KC 008 12-13.5'

1405

1444 Advancing boring to 18' bgs

Bottom of screen to 17.5'

DTW 10.12'

1453 Changing bit on augers. Pulled all augers out of hole.

1500 Reset augers

Setting well at 17.5' bgs.

1530 Finish applying filter pack to 5.0' bgs

"Swabbing" the well to make sure sand is settled (i.e. surging with 1.5 in diameter metal slurge) slowly up and down (5' long)



Location MCBH Date 3 13 12

Project / Client HC25 Sludge Disposal Area RI

Sunny, breezy Navfac HI

1537 Finish swabbing

Sand is at 5.5' bgs (2 feet above top of screen)

1549 Drillers inform us that augers were grinding solid basalt at 17.5' bgs, seeing the fragments now after pulling all soil off augers + drill bit - all soil cuttings from this boring are in D-006

no others will be added as this is obviously petroleum contaminated, most likely gasoline, sharp smell, not like waste oil

1610 WWD leave site, dropped off drums at SIK staging first

RK + CJS also to staging area to put more tags on drums

1635 Sign out at fuel farm

1703 Andrew Keen, he is finishing GPS'ing of the Mission Support Facility utilities

1736 Arrive at office

3-13-12 1700

Location MCBH Date 3.14.12

Project / Client HC25 Sludge Disposal Area RI, Navfac HI

Partly cloudy, windy

0625 RK + Cash leave office

0705 Amie at fuel farm office + sign in Talk to Ed about poss. blocking the drive way for MW-58

0718 Amie at staging area, no one here yet

0730 Paul Demay arrives, had to get a pass for his vehicle first

0736 Ikaika and 3rd person arrive = "Bulla" = Henry

Drillers are de connecting augers

0800 Set up at MW-58, blocking ~ half of drive way, no problems with Fuel truck drivers, got enough room to manouver.

0819 RK holds H&S Briefing

0844 Petroleum odor at ~ 12' PID=33ppm

0850 Collect sample KC010

34ppm in augers

KC009 = trip blank 0730

DTW 8'30" (Bottom of Screen)

0925 Augers down to 15.5' (BOS)

10' screen + 5' casing don't fit all the way down, injected water, put



Location MCBH Date 3.14.12

Project / Client HC25 Sludge Disposal Area RI, Navfac HI

Sunny, windy

drilling mechanism back on, well casing is inside augers, advancing augers further down, spinning in place - casing sank to bottom of hole

0930 First sand in hole

1015 Finish setting well, swabbed and dripped and hydrated

1020 Secure site and mobilize to MW-53

1050 Start advancing boring

1105 Started to get wet at 15' bgs

1107 Line jumped shive at top Ikaika and Bulla off site to smoke

1110 Paul fixed the pulley-swivel-head

1125 Drillers return from smoke break

1128 Start sample - hammering

1140 Collect sample KC011 from 15-16.5' bgs no odor, no staining, no PID ~ 80% of Splitspoon were lignified wood

DTW 12.4', BOS 19.5'

Location MCBH Date 3-14-12

Project / Client HC25 Sludge Disposal Area R1

Sunny, windy Navfac H1

1215 leave for lunch, secure site

Return from lunch

1315 RK + Clish Return from lunch, no drillers here yet

1323 WWD returns

1327 Swabbing / Surging

1334 Instances is out

1401 Secure site and mobilize to MW-57

1410 Setup at MW-57

Incl Tam office just let us know that the power has been shut off for other work activities by Mission Support Facility (MSF) (until 8pm)

1420 Set up to drill through asphalt

1430 RK + Clish stop work and leave site to use bathroom (no power here)

1445 RK + Clish drive by MSF to find out about a possible communications line that has been hit Monday. Noticed a lot of contractors there earlier, in area where we drilled - talked to Verizon contractors



Location MCBH Date 3-14-12

Project / Client HC25 Sludge Disposal Area R1

Sunny, no wind

a comm line for tower and crash pad has lost connection between two man holes they isolated, one north of baseball field at NW side of road (entrance to "gas station", second man-hole is E of C-Street across from new simulator pad. In between the two point we drilled MW-50 and B-03, both on the W-side of the street. Verizon did not know yet where their cable crosses C-Street. We gave them our card and they will call us w/ an update asap.

1500 RK + Clish return to MW-57, continue advancement of soil-boring

1520 Well at ~8.5' bgs

1530 Collect sample KL012 at 9-10.5' bgs, no odor, no staining

1540 DTW 7.39'

BOS 14.5' MW-57

0 ppm on PID

Location NCBH Date 3·14·12

Project / Client HCS Sludge Disposal Area R1

Mostly cloudy, calm NavJacH1

1556 Casing is sticking up above ground ~ 1.5-2'
With 5' on top of 10' screen, it should stick out by 0.5', if BOS = 14.5' bgs

1559 Every time augers are lifted up, the well casing is coming up with them. They are trying to hold well down with shovel end

1601 Continue to drill and rotate augers around casing in attempt to free up the well

1602 pulled up the casing, entire well is out, pulled bottom end cap off full of sand and mud

1609 Adding another auger section to overdrill more (I'm assuming)

1614 Remove 4th auger; overdrilled to 15'
→ noticed this around 8am hydraulic fluid is leaking from control panel, absorbed pad placed (seems to be a normal occurrence...)

1616 First sand is going down, now able to pull up augers w/o



Location NCBH Date 3·14·12

Project / Client HCS Sludge Disposal Area R1

overcast, calm NavJacH1

casing coming up

1645 ~ 4 bags of sand have gone in

1700 Finish setting well
Secure site, leave rig on well – MW57

1745 Offload more gear from trucks at staging area

1808 WD & WCP leave Fuel Farm

1835 Arrive at office

3·14·12

Location MCBH Date 3-15-12

Project / Client HC25 Sludge Disposal Area R1

Partly cloudy, windy NavfacHI

0630 RK + Clish leave office
0705 Arrive at fuel office & sign in
0713 At staging / decon area – Paul just about ready to start deconning yesterday's augers
0715 Start decon
0725 Finish decon, waiting for drillers to arrive to continue
0745 Paul back from dropping off augers at MW-57, Bulla + Ikaika waiting for us there...
0750 IK + B leave MW-57 to get supplies from staging area
0752 RK + Clish stay at MW-57
0804 Checking on what is taking drillers so long
Ikaika + Bulla are sitting in truck at staging area not doing anything second we get out of car they are starting truck and leaving to go back to MW-57
0810 All 3 drillers are finally at the rig
0820 DTW 6.71'
BOW 14.30' MW-57



Location MCBH Date 3-15-12

Project / Client HC25 Sludge Disposal Area R1

Partly cloudy, one 1hr squall; NavfacHI

0822 Rain squall
0828 Mixed cement and poured around Well Cap
When Bulla used shovel to adjust casing, pulling it up, the rim of metal ripped off the plastic cylinder.
They pushed it back on, not sure if it is sealed now, concrete is on top already
0850 Start advancing MW-54
0905 Collect KC014 and duplicate
0910 KC015 from 9-10.5' bgs
(0730 Trip blank) KC013
0920 Rain stopped
0950 IK + B are taking another smoke break while helper Paul is trying to unmount the augers himself
(no smoking inside fuel farm fence) – yelling across the field at Paul b/c he does not know what

Location MCBH Date 3-15-12

Project / Client HC25 Sludge Disposal Area, RI

Partly Cloudy, windy; Navjac #1

he is doing.
For some reason the drillers seem very angry today.
- Noticing big difference b/t Bulla (and Tolu) (Tolu is salary, everyone else is by the hour)
- everything seems to take much longer and a lot of idle time seems to happen when one to two people (s) are just standing around.

1002 Ikaika is back at drilling,
1004 Bulla as well,
Very much not in any rush
1018 Paul is cleaning off mud off the augers by himself while Bulla is not doing anything - Ikaika is dealing with screwing on the line to the slide hammer
1028 Well traffic Box is on, DOH: 16' bgs
1035 mobilize to MW-55
1054 Start advancing MW-55
1115 Wet at 13.5' bgs
1120 Collect sample from 140 - 15.5' bgs
KC016



Location MCBH Date 3-15-12

Project / Client HC25 Sludge Disposal Area, RI
Navjac #1

1130 DTW 13.00' bgs BOS 20.00' bgs
1137 Continue advancing MW-55
1202 Break for lunch, well is in, need to swab
1300 RK + Chsh get back on site
1315 Drillers arrive
1319 Drillers back at work (2/3)
1330 Swabbing / Surging
1350 Cutting off ~ 9-12 inches of casing above ground surface
1352 Paul + Bulla get back from probably decontaminating augers
1406 leave the bottom augers at site to "dry out" - need to make sure that the soil off that augers makes it into IDW drum
1409 set up at MW-51 (bathroom) (they left in 2 cars) drillers need to take break
140 RK + Chsh leave for fuel farm office
1420 Paul back on site
1424 RK + Chsh back on site, no
1425 Ik and Bulla arrive
1434 Start advancing MW-51

Location MCBH Date 3-15-12

Project / Client HC25 Sludge Disposal Area R1

Partly Cloudy, windy Navfac H/

1455 Collect sample KC017 from 13.5 - 15.0' bgs

1500 BOH = 21' bgs DTW: 14.1' bgs MW-51

1539 All augers are out of the hole

1545 Swabbing (i.e. surging)

1610 Site secured, rig parked over hole, casing had already been cut

leaving for staging area

1625 Ikaika + Bulla leave

Paul remains to decon

1650 Paul leaves

1700 RK + Cliff sign out at fuel farm office

1736 Back at office

3-15-12 1800



Location MCBH Date 3-16-12

Project / Client HC 25 Sludge Disposal Area R1

Partly cloudy, breezy, Navfac H/

0646 RK + Cliff leave office

0730 Arrive at MW-51, Paul is already here; Ikaika + Bulla on their way, stuck in traffic

RK holds Safety & Health Briefing

Paul will start with the Boxes

0732 Picking up frames for Boxes

0920 MW-50 Frame is around traffic box, no concrete yet, but frame is flush w/ ground

Ikaika is still at Unitek getting more traffic boxes, will be dropped off by his wife

0926 still working on MW-52 frame

0950 Moved on to MW-59, had finish pouring concrete at MW-52.

1009 Paul + Bulla are leaving to pick up Ikaika at the gate. He did not have to get boxes as Paul + Bulla determined we had enough -

MW-59 is not yet done w/ digging

Location MCBH Date 3·16·12

Project / Client HC25 Sludge Disposal Area RI Navfac HI

Sunny, windy, isolated showers

1100 Bulla arrives and we meet him + Ikaika + Paul at last well's location; they all had lunch.

1115 Set up at MW-56
Paul + Ikaika will drill this well and Bulla will dig out remaining boxes for the other wells.

1130 Start advancing MW-56
KC018 = trip blank

1148 Wet at 13.5', taking spltspoon

1150 Collect sample KC019 from 13.5' bgs
DTW: 12.3' bgs BOH: 19.5' bgs

1315 Finish well, half 2 boxes

1330 Squares dug out

1407 Still cementing MW-56

1425 Move onto MW-59 to pour concrete

1435 Moving to MW-58 to pour

1500 At MW-53 pouring concrete

1549 Finish MW-55 concrete

1615 finish MW-54 concrete

1617 Ikaika + Bulla leave



Location MCBH Date 3·16·12

Project / Client HC25 Sludge Disposal Area, RI Navfac, HI

Mostly cloudy

1619 At staging area w/ Paul

1625 RK, Cash, Paul leave fuel farm, putting cones on all wells

1700 Arrive at office

3·16·12 1730

Location MCBH Date 3-19-12

Project / Client HC25 Sludge Disposal Area RI

Mostly cloudy, windy Navfac H

0645 Ch Sh + RK + Kelly Suji (KS) leave office

0730 Trip blank KC Ø2Ø

0730 WCP arrive at Fuel farm office + sign in

0731 No Drillers at staging area WCP leave to pick up cones from MW + Boring and drop them off at rig (by MW-56)

0744 WCP arrive at staging area

0745 VWD arrives (BR, PD, Bulla)

0803 leave decon area to mobilize to B-09

0750 RK holds H&S Briefing, records onsite

0805 Arrive at MW-56 to move rig to B-09; needs to build up air pressure first to be able to move

0811 Moved rig onto B-09

0875 Started advancing B-09

0840 Wet at 13.5' bgs

0900 Sample collected at 13.5'-15' bgs KC Ø21

0926 Secure site and mobilize to



Location MCBH Date 3-19-12

Project / Client HC25 Sludge Disposal Area RI

Mostly cloudy, windy Navfac H1

B-02

Drillers left for staging area to fill up water in rig

0945 VWD arrives at B-02

0950 Setup at B-02

1000 Start advancing B-02

1014 Scott Lewis (SL) arrives on site RK - Safety Briefing for SL - all work stopped

1030 Continue drilling - at 10' bgs

1035 Sample at 13.0' bgs Wet at 13.0'

1040 Sample KC Ø22 collected from 13 - 14.5' bgs

1045 Pulling up augers

1055 B02 is grouted. Drillers are packing up + cleaning area

1110 Secure site, taking early lunch

1215 RK, SL, KS, Ch Sh back on site

1235 Drillers back (VWD) at staging

1247 Mobilize to B-Ø1 ; windy, Nice tradewind weather, 50% sunny

Location NCBH Date 3·19·12

Project / Client HC25 Sludge Disposal Area RI

Sunny, windy Navpac HI

1300 Start advancing B-Ø1

1307 Splitspoon at 3-4.5' bgs to check for staining; No stains or odors evident; collecting another split spoon from 4.5-6' bgs to look for evidence of sludge disposal pits

1311 Collecting sample KC Ø23 from 4.5-6' bgs

1339 Sample collected from 14-15.5' bgs - When split spoon came up PID = 133 ppm (Benzene)

1340 KC Ø24, wet at 15.5'

1348 Pulling up augers

1400 Hole is grouted

1405 Drillers left to decon

1435 Start advancing B-Ø4

1439 Collect split spoon at 3' bgs to look for staining, only 8 inch sample in shoe, after 12/12 blowcount; drilling to 4.5 and attempting another; no odor or stain

1445 Collect sample KC Ø25 from 4.5'-6' bgs



Location NCBH Date 3·19·12

Project / Client HC25 Sludge Disposal Area RI

Sunny, Breezy Navpac HI

1455 Collect sample KC Ø26 from 14-15.5' bgs; wet no vis. staining or odor

1508 Pulled all augers and grouted hole

1520 Drillers left to topoff holes

1529 Audit debrief:

Logbooks: • QC logbook needs to be referenced in main field book; on cover pages for example

• when we mention "calibrate instruments" need to reference what to; can do that in front of main logbook

Soil Sampling: VOA vials - additional labels adding weight; for the rest of this project, just put label in addition to their label + tape (they did not weight their label)

- use disposal scoops

- Should leave tarp on them by the pallet; IDW Water drum needs pallet

Health & Safety: Print out certs; A&S box needs to be more accessible

Fire Extng. out of certification

Location MCBH Date 3.19.12

Project / Client HC25 Sludge Disposal Area RI

Sunny, windy Navfac HI

FA+ Fire ext. need to be out of the car readily available

→ be more conscient of where we put our table for sampling far enough up wind

1549 Drillers get back ~~from~~ to staging area cleaning up site and staging area

1600 VWD leaves site

1608 Complete audit w/ SL

1630 Sign out at fuel farm office

1702 Arrive at office

3.19.2012



Location MCBH Date 3/20/12

Project / Client HC25 Sludge Disposal Area RI

Sunny NAVFAC HI

0715 ~~Dr~~ KS & RL sign in at Fuel Farm office

0720 Set up to do equipment blank.

0730 Collect Equipment blank FSDA-QW-E01 (KC027)

Calibrate all equipment PID

PD arrives on site. Said Drillers will be late. they are stuck in traffic. 0730pm Bergne

0800 Collect FSDA-~~QA~~ QW-T07 trip blank (KC028)

0832 Ikaika & Bulla arrive onsite

PD is steam cleaning augers.

Do the HAS tailgate meeting. HR is on tailgate meeting log.

0843 Drillers are loading up materials & equipt.

Location MCBH Date 3/20/12

Project / Client Fuel Farm Sludge Disposal RI NAVFAC HI

sunny, clear skies

0857 Setting up on B07

0900 start drilling B07
Collect sample at 3 - 4.5'
this is the MS/MSD (KC029)

0930 Collect KC030
KC031 (duplicate) at 5' bgs

0950 B07 is grouted

1004 drillers take a break offsite

1015 Drillers back onsite move to B10.

1030 Start drilling B10

1040 Collect sample KC033

1055 EBN Pacific Karen Carvallo is still in Chile
EBN can hopefully do the soilgas during week of April 2

1057 All augers are out of hole.

1100 Collect sample KC034 black staining in sand no odor



Location MCBH Date 3/20/12

Project / Client Fuel Farm Sludge Disposal RI NAVFAC HI

partly cloudy breezy

1105 B10 is grouted.

1110 Pack up

1120 Drillers offsite for lunch
Kelli is cleaning decon station

1130 Go to lunch at Fuel Farm office

1230 Drillers back onsite
Said they will decon the augers and drill bit
RK + KS waiting at B08 location

1310 Drillers back. Setting up on B08

1315 Start drilling B08

1325 At 5' ~~0.13 at 4'~~ PID = 0.13 ppm

1330 Collect KC035 5-6.5'
faint musty odor.
PID has low reading on borehole 0.13 ppm

1335 Headspace reading = 0.0 ppm

1350 Collect KC036 at 14.5 to 16.0
KC037 (dup)

Location MCBH Date 3/20/12

Project / Client HC25 Fuel Farm Sludge Disposal RI
NAVFAC HI

1400 BDS is granted
Drillers packup
1415 Drillers head to staging area. Drillers are packing up theyre extra materials, drum marshalling + deconning augers.
Paul is washing drill rig.

Ed Campbell is helping reload ~~to~~ VWD sand/cement
1500 Bulla + Ikaika leave offsite w/ chase truck
1505 Paul starts on the concrete to finish concrete around traffic box at MW50

Concrete not mixed properly? not setting right.
Paul works on concrete pad for an hour.
1645 everyone offsite

R Clement 3/20/12



Location MCBH Date 3/21/12 PC

Project / Client HC25 Fuel Farm Sludge Disposal RI
NAVFAC. HI

0615 RK arrive at office
0630 Collect Field blank at office ~~at~~ and trip blank
See QC logbook

0930 Leave office
0800 RK + KS arrive onsite
Paul is onsite already
0815 Drillers Ikaika + Bulla arrive onsite. They are emptying the decon trailer and drumming the decon water.
0840 Paul offsite to deliver the decon trailer to someone at MCBH gate.
0904 Paul back onsite
Setting up on MW54
pH meter has been calibrated to 7 + 10 pH
~~at~~ and Conductivity 1413 mS/cm
0910 Start pumping MW54
0954 Finish developing MW54
See well development log

Location MCBH Date 3/21/12

Project / Client Fuel Farm Sludge Disposal NAVFACHI

sl. cloudy breezy

1013 Setup on MW58

1018 Start pumping MW58
PID = 20 ppm

1115 Recovery is slow on MW58
after an hour pumped ~20 gals.
has an odd odor, not petrol.
No sheen on water.

1125 Stopped pumping

1130 Drillers offsite for Lunch

1145 RK + KS back onsite ~~from~~
Drillers are here already.

1250 called Jeff Larson. He will ~~talk~~ talk to facilities to see if they can ~~avoid~~ avoid cutting the stake chasers.

1307 Start pumping MW51

1330 Paul onsite with more gas for the pump.

1342 Stop pumping on MW51
Packup

1345 Drillers take a smoke break



Location MCBH Date 3/21/12

Project / Client Fuel Farm Sludge Disposal RI NAVFACHI

part. cloudy, sunny hot breezy

1356 RK + KS Setup on MW53
PID = 0.0 ppm
no odor no sheen

1410 ~~1400~~ Start developing MW53
RK checks SG stake chasers in baseball field and around Mission Support Facility.

1445 Stop pumping MW53
~ 40 gal. removed.

1459 Setup on MW56

1509 Start pumping on MW56

1528 Complete development of MW56
purged 55 gallons.

1530 Packup site

1543 Drillers leave for staging area.

1600 Drillers offsite
RK finishes labeling drums

1614 RK + KS offsite

R Carroll
3/21/12

Location MCBH Date 3/22/12

Project / Client Fuel Farm Sludge Disposal

partly cloudy, sunny breezy NAVFAC HI

0709 RK leaves Office

0745 Arrive onsite Talk to Ed Campbell about setting up at MW57 in front Fuel Farm office.

0800 drillers arrive onsite Ikaika + Bulla pick up pump + drums and we set up at MW57

Calibrate pH meter w/ 7.0 pH + zero PID

PID = 0.5 at opening. might be from ~~passing~~ idling vehicle nearby.

No odor or sheen

0920 Stop pumping MW57. Added to D017

Drillers leave to check on Paul. Paul is completing the concrete pad filling w/ soil

0942 Setting up on MW55

Start pumping MW55

1025 Finish Developing MW55



Location MCBH Date 3/22/12

Project / Client Fuel Farm Sludge Disposal

partly cloudy, sunny breezy NAVFAC HI

1025 Christine onsite w/ 6 VOAs

the equipment blank VOAs were frozen and broke. They ~~needed~~ needed to be resampled.

Had to clean the split spoon which Paul had already greased w/ WD-40.

Tried to clean it really well.

1045 Collected 6 VOAs HCl for equipment blank KC040.

1050 Christine off site

1100 Setting up on MW50

1112 Start pumping MW50

liftgate of chase truck doesn't work.

1150 Stop pumping on MW50

pumped ~65-70 gal + well is still cloudy.

~~1155~~ ~~1255~~ Drillers leave for staging area

~~1300~~

Location MCBH Date 3/22/12

Project / Client Fuel Farm Sludge Disposal RI
NAVFAC HI

~~A~~ Sl. cloudy, sunny

1200 Drillers leave for lunch
1255 Drillers back onsite
1303 Start pumping MW52
1320 Stop pumping MW52
Removed 55 gal.

1340 Move to last well MW59
1350 Start pumping MW59
1402 very windy
~~no~~ petrol odor, no sheen
no product
1422 Stop pumping MW59
pack up
1430 Drillers leave for the
staging area
Drillers ~~p~~ drum marshall
and clean up area.
pack up their equipment

1505 total 27 drums.
Drillers all offsite
RK ~~to~~ finishes labeling
drums



Location MCBH Date 3/22/12

Project / Client Fuel Farm Sludge Disposal
NAVFAC HI

~~S~~ cloudy

1553 We need 8 small
tarps. ~10X10

~~2 more~~ 3 more containers
of bungee cords

1600 RK offsite

3/22/12

Location MCBH Date 3/23/12

Project / Client Fuel Farm Sludge Disposal RI NAVFAC HI

sunny, part cloudy

1444 RK onsite to remark soil gas locations

1604 RK offsite

9

Plamond 3/23/12



Location MCBH Date 3/27/12

Project / Client Fuel Farm Sludge Disposal RI NAVFAC

cloudy, windy

0757 ~~the~~ RK + CASh Check in at Fuel Farm office

0800 Set up at MW 55

0830 Conduct HAS briefing PID calibrated to zero.

0850 DTW 13.15' TOC
TD 19.22'

0910 Setting up the pump. pH meter calibrated to pH=7 + spec. conductivity 14.13 mS/cm³

Realize forgot the rope to lower the ~~top~~ pump into the well. Called office Marie will bring out the rope.
Label trip blank KC041

1015 meet marie at Subway to get rope

1020 Stop at Fuel Farm office and check that drums arrived

Location MCBH Date 3-27-12

Project / Client Fuel Farm Sludge Disposal RI NAVFAC HI

Sunny, sl. cloudy

1030 Setting up on MW55 again

1052 Start pumping MW55

No odor, no sheen

PID = 0 ppm in bucket.

1130 Purged 3 gal from MW55

Collect bottle for sampling.

1155 Collect sample KC042 from MW55

DTW 13.15' TOC

1230 Pack up equipment

1253 Lunch time

1330 End of lunch

1345 Drum marshalling — add decon/purge water to drum D028.

1354 Set up on MW51

1419 Start pumping MW51

DTW = ~~8.~~ 13.01

TD = 21.55

Saturated zone = 8.53 ft.

1503 Stop purging MW51

Purged 4 gal.



Location MCBH Date 3/27/12

Project / Client Fuel Farm Sludge Disposal RI NAVFAC HI

Sunny windy

1520 Collect sample KC043 from MW51.

1533 Clean up, package samples

1550 Decon pump + equipment

1607 Pack up equipment

1615 Drop off DWT decon $H_2O$ at staging Area. Coverall Soil drums with tarps + Bungees

1640 Sign out at fuel farm office

1720 Arrive at office

9

3/27/12

Location MCBH Date 3/28/12

Project / Client Fuel Farm Sludge Disposal RI

sunny breezy NAVFAC HI

0730 ~~Re~~ ChSh leave office
0800 Arrive at Fuel Farm
Sign in at Fuel Farm office
0810 Conduct HTS briefing
HR info on tailgate
~~meet~~ meeting log
Setting up on MW54
~~0848~~ 0838 PID zeroed
0820 turbidity meter calibrated w/ 509 NTU standard.
pH meter calibrated w/ 7 pH.
0840 Start pumping MW54
No odor
No sheen
Water starts out sl. cloudy
0947 Water is clear
0953 Stop pumping on MW54
1010 Collect sample KC045 from MW54
ChSh labels & packages samples
RK packs up equipment
1115 Lunchtime
1140 Back to work
1150 Drive to IDW staging area to dump decon / Pure water



Location MCBH Date 3/28/12

Project / Client Fuel Farm Sludge Disposal RI

sunny breezy NAVFAC HI

1159 Setting up on MW53
DTW 12.34' TOC
TD 19.49' TOC

1231 Start pumping MW53
No odor
No sheen
Water is clear

Pumping is very slow.

1325 Called Geotech for input and assistance
~~Data~~
Discharge time : ~20
Fill time : 15
PSI : 60
~110 ml / discharge

1400 Collect groundwater sample KC046 from MW53.
ChSh packages sample
1425 Start packing up equipment

Location MCBH Date 3/28/12

Project / Client #C25 Fuel Farm Sludge Disposal Area II

Sunny, light breeze Navfac HI

1504 finish packing up

1505 RK off to inspect soil gas locations in ball field, disappeared again (Tue, Wed grass cutting)

1538 RK + ClSh find and mark 7 existing wells in FSDA

1540 sign out at fuel farm office

1617 Arrive at office

1711 Collect Equipment blank KC047

1720 collect Field Blank KC048

1819 ~~Put~~ Put equipment away and collect equipment for tomorrow's fieldwork.

R Clamrock

3/28/12



Location MCBH Date 3/29/12

Project / Client #C25 Fuel Farm Sludge Disposal

Sunny clear skies NAVFAC HI

0730 Arrive on base RK + ClSh
Sign in at Fuel Farm office
Calibrate PID zero gas
Calibrate turbidity meter to 0.08 NTU
Calibrate pH meter to 7 = pH

0800 Setting up at MW-57

0830 Start pumping MW-57

0930 Stop purging MW-57
purged over 4 gallons

1000 Collect sample KC050

1015 Collect sample KC051 (dup) + MS/MSD

1137 Finished collecting sample

1211 Finished packaging and placing samples in coolers

1245 Lunchtime.

1324 End lunch go to FDW staging area to dump our purge $H_2O$

1336 Setting up on MW 50
it is sunny, hot, breezy
PID = 0.0 ppm
DTW = 13.63
TD = 21.40

Location MCBH Date 3/29/12

Project / Client HC25 Fuel Farm Sludge Disposal NAVFAC HI

Sunny, hot, breezy.

1408 Start pumping MW 50. Slow going

1500 Christin leaves to GPS the boring locations in the area

1520 Cash returns. She got all the boring locations

1615 Collect sample KC052 from MW 50

1655 All packed up & leaving site

1710 Sign out at fuel farm office and leave base

1747 Arrive at office

Kennedy 3/29/12



Location MCBH Date ~~3/29/12~~ Re 4/2/12

Project / Client HC25 Fuel Farm Sludge Disposal NAVFAC HI RI

Sunny, hot, ~~breezy~~

0745 Arrive at Pass/ID office
Hirota surveyors arrive
they get their passes

0800 Conduct H+S tailgate mtg. HR on tailgate mtg 105.

0815 Sign in at Fuel Farm office.

0825 Setting up on MW-52

Have surveyors a wrench to open wells and a map to help locate wells. w/ instructions to take top of cover, top of casing.

0830 Collect KC053 trip blank
Calibrate PID to 5 ppm benzene
DTW = 11.25
TD = 22.27
Calibrate pH meter
pH 7
Conductivity 1.413 mS/cm
Turbidity 6.08 NTU

Location MCBH Date 4/2/12

Project / Client HC25 Fuel Farm Sludge Disposal RI
NAVFAC, HI

Sunny, hot

0916 Start pumping MW52
1023 Pumped 2 gallons, pumping is slow. need 5 gal

1200 Stop pumping
Collect sample KC054
1240 Pack up equipment
1248 Leave for lunch
1330 Return from lunch; drop off water at IDW Station
1339 Set up at MW-58
1345 PID = 94 ppm

1358 Start pump on MW 58
Slight petroleum odor.
1500 Collect sample KC055
1529 Turn off pump
1535 Wrap samples and pack up
1600 Stop at IDW storage to dispose of decon/purge $H_2O$ in drum. D028.
1616 Sign out at fuel farm and leave fuel farm
1645 Arrive at office



Location MCBH Date 4/2/12

Project / Client HC25 Fuel Farm Sludge Disposal RI
NAVFAC HI

Sunny hot

0654 Leave office
0730 Sign in at Fuel Farm office
0740 Arrive at MW 59
Setting up
PID zeroed calibration
pH calibrate to 7,
turbidity calibrate 608 NTU
Conduct HH 5 briefing
HR on tailgate log

PID = 77.1 upon opening
MW 59 ~~DTW~~
DTW = 10.16
TD = 17.70
0844 Label trip blank KC056
Received a new pump from Geotech. Works really well
#3588

0900 ~~Set~~ Collect sample KC057 from MW 59

~~0944~~ 0956 Packed up equipment

Location MCBH Date 4/3/12

Project / Client HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

Sunny hot

1000 Drop off purge decon $H_2O$ in drum D028 at IDW Storage

1015 Setting up on MW 56

1046 Start pumping ~~1046~~

1105 Stop pumping

1115 collect Sample KC058 from MW56

1145 Packed up. Going to IDW area to dump water.
Drum D028 is full.

1210 Lunchtime

1254 At MW-03
PID = 0.75 ppm

DTP = 15.09 0.01 in
DTW = 15.10 thickness

We will not sample this well product observed - lt. brown strong odor on interface probe



Location MCBH Date 4/3/12

Project / Client HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

Sunny hot

1337 MW 26
PID = 0.15 ppm

DTW = 13.28
TD = 17.71

1340 Setting up to sample MW-26

1402 start pumping MW-26

1430 Collect ~~Sampling~~ Sample KC059 from MW26

1445 Start packing up.

1500 Drive to IDW storage to drop off purge/decon $H_2O$ at staging area.

1530 Go to soil gas to check on soil gas points and stake chasers.

1600 Sign out of Fuel Farm Office

1630 Arrive last office

4/3/12

Location: MCBH  Date: 4/4/12

Project / Client: HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

Sunny

0715 RK + RP leave office

0815 Stop at Fuel Farm office to sign in. Conduct HSS meeting

0820 Setting up on MW-20
15.16' = DTP  0.34' thickness
15.50' = DTW  ~4 in
product in MW 20. We are not sampling. PID = 333ppm

0857 Move to MW-21
Bent bolt on cover, unable to access.

~~0857 MW-21~~

0900 Move to MW-22
Setting up
DTW = 15.44'
TD = 23.72
PID = 1ppm

1003 Got steady water coming out of the well.
The traders are back.



Location: MCBH  Date: 4/4/12

Project / Client: HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

~~Sunny~~ overcast, windy

1030 Collect sample KC061

1106 Packing up. Starting to rain.

1130 Drop off Purge/decon $H_2O$ at IDW storage in Drum D029

1136 go to Fuel Farm office to wrap samples.

1153 Lunch time

1230 Setting up on MW23

1326 Start pumping

1347 Stop pumping

1400 Collect sample KC062 from MW23
Pack up & package samples.

1510 Set up at MW-24.

1546 Start pumping

1610 Finish pumping

1620 Collect sample KC063 from MW 24

1625 Collect sample (duplicate) KC064 from MW-24

Location MCBH Date 4/4/12

Project / Client HC25 Fuel Farm Sludge Disposal RI
NAVFAC HI

overcast windy

1715 Drop off purge/decon $H_2O$ at IDW staging area

1730 Sign out at Fuel Farm office

1800 Arrive at office
offload samples to frig.

4/4/12



Location MCBH Date 4/4/12

Project / Client HC25 Fuel Farm Sludge Disposal
NAVFAC HI

overcast, windy

0730 RL + RP leave office

0820 Sign in at Fuel Farm Office.
Conduct H+S briefing
Calibrate PID = zero

0901 Use crowbar to get well cover off of MW21. Now crowbar is stuck.
Ray + ? tried to get crowbar out, ended up pulling the concrete collar out. While trying to hammer the bolt, cracked the concrete collar into 3 pieces.
They took the monument cover to cut off the bolt.
Setting up to sample

0931 MW21
DTW = 15.32
TD = 24.29

0950 ~~Label~~ Label trip blank KCD65

Location MCBH Date 4/4/12

Project / Client HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

overcast, windy

1010 Turned pump on
1034 pumped 3.5 gallons
1040 pumped 45 gallons.
1050 Collect sample KC066
1100 RK starts wrapping samples which RP collects rest of sample & start packing equipment up.
1130
1200 Go to IDW staging area to finish labeling drums & covering drums
1215 At fuel farm office for lunch.
1245 End lunch
1301 at MW04 * BSA said indicate thickness = 0.01

DTW = 13.66
No product
very strong odor on probe though there is product on probe



Location MCBH Date 4/4/12

Project / Client HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

overcast, windy

1316 MW-05 PID = 0
DTP = 13.81
DTW = 13.82 Strong petrol odor on probe

1327 MW ~~21~~ 19
PID = 129ppm

DTW = 16.20
Faint petrol odor

1330 Check all soil gas locations.

1410 offsite - Signed off at Fuel Farm office.

1442 Back at office

4/4/12

Location MCBH Date 4/9/12

Project / Client HC25 Fuel Farm Sludge Disposal Area RI

Mostly cloudy / breezy Navfac HI

0700 Rel + Chsh leave. Office
0730 At Pass/ID Office
0800 Arrive at Ball field area.
~~Setting~~ Conduct HAS briefing
Setting up on SG-24
0840 Rods are in ground for SG-24, now trying to get tubing into rods
0847 Pulling rods back out to attach tip. drilling it back down; leaving tubing inside
0905 Push rods down at SG23
Hook up tubing
Finish setting up SG23
0930 Move onto SG22
Plan is to set ~5 SG points, then do the Helium-seal test, then purge each hole and then sample
Purge Volume ~ 83 cc
0936 Finish SG22
0937 Set up at SG21
0941 Finish SG21
0942 Set up at SG 20
0950 Finish SG20

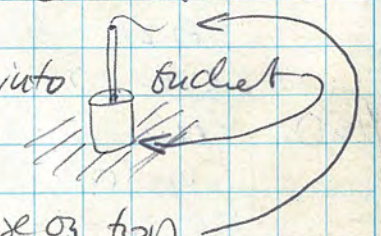


Location MCBH Date 4/9/12

Project / Client HC25 Fuel Farm Sludge Disposal RI

overcast, breezy Navfac HI

0951 Set up at SG24 for He-Test
Helium canister: Balloon Time
Worthington Cylinders
DOT-39 NRC 260/325
M 1005 UN 1046 Helium,
Compressed CAS # 7440-59-7
WC 70 53A
1001 Bucket w/ hole in bottom is put over rod
- introduce He into bucket



attached He-
Detector at hose on top
0.00004 cc/sec Helium
1004 Purge SG24 ~ 85 ccs
1030 finish purging all 5 holes
1035 Set up at SG24 to sample
1040 Connect 1L Summa canister to tubing
CA# 31767 FILE # 84530
Certification Date 4.4.12
Pressure at -30 in. Hg
to be analyzed for TO-15, TO-03, Methane
KC 0617

Location NCBH Date 4-9-12

Project / Client HC25 Sludge Disposal Area R1

Overcast, Breezy Navfac H1

1045 Connect CAN # 35601 to SG 23; File # 84530
KC Ø68

1050 Connect CAN# 33723 to SG 22, File # 84530
KC Ø69

1055 Connect CAN# 12040 to SG 21, File # 84530
KC Ø70

1100 Connect CAN# 34098 to SG-20, File # 84530
KC Ø71

1128 Disconnect SG 23; 0 ~~psi~~ in. Hg

1130 Disconnect SG 22; 0 ~~psi~~ in. Hg

1137 Rain ~ 10 min

1148 Set up at SG 19; finish

1155 SG-21 still at -16 in. Hg

(113) Disconnect SG 20; 0 in. Hg

1158 SG-24 still at -26 in. Hg

1200 Set up at SG-18

1204 Finish setting SG-18

1205 Move to SG 17; finish setting

1215 Set SG-16



Location NCBH Date 4-9-12

Project / Client HC25 Sludge Disposal Area R1

Overcast, Breezy Navfac H1

1234 SG-24 at -25 in. Hg; ESN will pull up rods by ~ 1 ft to see if canister will fill

1240 No immediate change in in. Hg; lifted rods by ~ 1 ft. Will let it sit for a while and check back later

1241 Pull rods at SG-23

1247 At SG-23; after pulling rods up noticed drops off tip, i.e. at penetrable point; did not fall off; i.e. sample may have pulled air.
37 prim + 4 QC + 5 Trip + 5 Ambient = 51

1250 Pull up SG-22; tip came off

1256 Pull up SG-20; tip came off

1303 Set up at SG-15

1325 Move to SG-19 to He-test and purge

1326 SG-21 at -5 in. Hg
SG-24 at -25 in. Hg

1355 Collect CAN # 37744
KC Ø72

Location NCBH Date 4-9-12

Project / Client HC25 Sludge Disposal Area RI

Sunny, Breezy Navfac HI

1400 and Duplicate CAN # 35635 KC073

1413 37744 filled much quicker than 35635

1417 Decided to close 35635 as dial cover is off and can may have been tweaked. Stopped at 0 -2; started at ~-32 in. Hg; lower than all other ones

1421 Set up at SG-18

1436 Opened valve

1440 Sample CAN# 2057 KC075 SG-18

(1430 Ambient Blank KC074, CAN # 36376)

1443 ESN has been purging SG-17, SG-16, SG-15 (after He-testing)

1445 Collect CAN# 33709 KC076 from SG-17

1500 Connect CAN# 37294 KC077 at SG-16

1505 Connect CAN# 23838 KC078 at SG-15



Location NCBH Date 4-9-12

Project / Client HC25 Sludge Disposal Area RI

Overcast, Breezy Navfac HI

1510 Disconnect SG-21; 0 in. Hg

1512 Disconnect SG-18; 0 in. Hg

1520 Trip blank KC079 CAN # 37337 -29 → -29 in. Hg.

1525 Disconnect SG-15, -16, -17

1535 Pulling out rods

1538 - SG-24 is still only at 23 in. Hg

1546 Decided to abandon SG-24 since its reading is still 23 in. Hg.
Re-do tomorrow w/ new canister
- tip was still on rod; very caked on; prob why it didn't not fill

1554 ESN filling all drill holes

1605 ESN leaves site

1610 WCP sign out at fuel farm

1645 arrive at office

4-09-12

Location MCBH Date 4/9/12

Project / Client HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

SL overcast breezy

0630 RK leaves office to -

0700 RK stops at home to pick up computer.

0730 Check in to Fuel Farm office. ask Ray if the 24-hr crew can move their vehicles out of parking lot. Calibrate PID zeroed

0740 ~~at~~ meet with Noah + Zack at SG24
Need to dry this one again since it failed to fill the canister yesterday. Do HAS briefing

0803 ESN Starts on SG24 installs probe

0811 ESN moves rig to SG03

0815 Installs probe for SG03

0820 moves rig to SG02

0827 & Installs probe for SG02

0831 moves rig to SG01



Location MCBH Date 4/9/12

Project / Client HC25 Fuel Farm Sludge Disposal NAVFAC HI

SL overcast, breezy

0838 Probe set up at SG01
moving to SG04

0844 Probe set up at SG04

0849 Zach sets up equipt to do helium check. on SG03

0854 Helium check on SG02

0856 Helium check on SG01

~~8~~0857 Helium check on SG04

0905 Collect ~~D~~ KC080

0910 Collect KC081

0912 Collect KC082

0915 Collect KC083

0920 Collect KC084

0933 All samples are at 0 in Hg.

0935 ESN Starts ~~dismantl~~ dismantling the tubing

0944 ESN Starts removing the probes from the ground.
Starts raining,
gray clouds, breezy
Take a break

Location MCBH Date 4/10/12

Project / Client HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

overcast windy

0956 Continue with removing probe
1010 break
1016 Setting ~~on~~ up on SG09
1020 SG09 is installed w/ tubing
1026 Setting up on SG06
1032 SG06 is installed.
Setting up on SG05
1040 SG05 is installed
Setting up on SG08
1045 SG08 is installed
1050 Setting up on SG07
1100 Collect Sample KC085 SG07
1105 Collect sample KC086 SG08
1110 Collect Sample KC087 SG05 ~~SG06~~
1120 Collect sample KC088 SG06 ~~SG05~~
1130 Collect Sample KC089 SG09
1135 Collect sample KC090 dup SG09

1145 ESN Offsite for lunch.
We will remove the probes after lunch. Probes left in ground w/ traffic cones next to each one.
1200 RK offsite to Fuel Farm office



Location MCBH Date 4/10/12

Project / Client HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

Sl overcast breezy

1230 RK back at Mission Support Facility area.
1235 ESN back onsite
1236 Start removing all probes.
1240 RK labels trip blank KC091
1306 ESN finish filling the holes in parking lot with granular bentonite and topping with black patch.
1310 ESN installed SG 12
1320 Drove SG14 - hit refusal moved over a foot & half redrilled.
SG14 was ~~st~~ moved ~10 ft from original location because of utilities
1325 Installed SG-13
1338 Installed SG-10
Moving to SG11
1345 Installed SG-11

1360 Conduct Helium check on all

Location MCBH Date 4/10/12

Project / Client HC25 Fuel Farm Sludge Disposal RI NAVFAC HI

Sl. overcast, breezy

1410 Collect sample KC092 Ambient blank

1413 Collect KC093 from SG12

1415 Collect KC094 from SG14

1416 Collect KC095 from SG13

1420 Collect KC096 from SG10

1425 Collect KC097 from SG11

1430 ESN Removing probes

1435 RK removing stake chasers + ESN packing up

1440 Packing up samples in boxes.

1500 ESN offsite

1520 RK signing out of Fuel Farm office

1600 Arrive at office

R Demuth 4/10/12



Location MCBH Date 4/10/12

Project / Client HC25 Fuel Farm Sludge Disposal Navfac HI

overcast, breezy

0700 RK + CASH leave office

0736 sign in at Fuel Farm office.

0745 ESN onsite

0750 RK leads H&S briefing

0801 Set up on SG-35

0808 Install probe on SG-35

0812 Move rig to SG-34

0814 Install probe on SG-34

0819 Move rig to SG36

0821 Install probe at SG-36

0825 Move rig to SG-37

0828 Install probe at SG-37

0838 Move rig to SG-33

0845 Install probe at SG-33

0849 Move rig to SG-31

0852 Install probe at SG-31

0853 Move rig to SG-32

0856 Install probe at SG-32

0859 Break

0904 Set up at SG-29

0906 Install probe at SG-29

0910 Helium testing and purging all 7 probes

Location MCBH Date 4-11-12

Project / Client HC25 Sludge Disposal Area R1

Partly cloudy, breezy Navfac HI

0915 KC 098 Trip blank
CAN # 1352

0934 Finish all Helium tests and purging

0936 Set up at SG-29
CAN # 30818

0940 Ambient Blank KC 099
CAN # 36550

0945 Open canister CAN # 32818
at SG-29 KC 100

0947 Set up at SG-32

0950 Open canister CAN # 37715
KC 101

0952 Set up at SG-31

0955 Open canister CAN # 31774
KC 102

0957 Set up at SG-33 for duplicate

1000 Open canister CAN # 37403
(Primary) KC 103

1001 Open duplicate canister CAN # 36548
KC 104

1002 Set up at SG-36

1005 Open canister CAN # 37659
KC 105



Location MCBH Date 4-11-12

Project / Client HC25 Sludge Disposal Area R1

Mostly sunny, slight breeze Navfac HI

1006 Open canister CAN # 20781
at SG-37 KC 106

1007 Open canister CAN # 34579
at SG-35 KC 107

1008 Open canister CAN # 35826
at SG-34 KC 108

1009 Break

1017 Disconnect SG-34, SG-37,
SG-35, SG-36, SG-32,
SG-31, SG-33, SG-29

1032 Start pulling rods up at
SG-29 and 07 other location

1053 Backfilling all 8 locations

1105 Finish pulling rods + back-
filling

1115 Setup at SG-30

1120 Install probe

1123 Setup at SG-28

1127 Install probe

1129 Set up at SG-26

1133 Install probe

1135 Set up at SG-25

1138 Install probe

1140 Moving to SG-27

Location MCBH Date 4.11.12

Project / Client HC25 Sludge Disposal Area RI

Partly cloudy Navfac HI

1144 Set probe at SG-27

1150 Set up for Helium-Testing at SG-27, finish test + purge

1159 Open canister CAN# 37695 KC 109

1201 Helium test & purge SG-25

1204 Open canister CAN# 35555 KC 110

1206 Helium test & purge SG-26

1210 Open canister CAN# 2103 KC 111

1212 Set up at SG-28, Helium test + purge

1229 KC 112 CAN# 35655 prim

1230 KC 113 CAN# 2180 dup

1231 Set up at SG-30

1233 CAN# 36387 KC 114

1240 Disconnect SG-28, SG-26, SG-25, SG-27,

1248 Pull rods at SG-27 and backfill

Un-used cans: 33397, 37667, 31775 (Ambient + Trip x 2; used one Ambient extra for SG-24 Resample)



Location MCBH Date 4.11.12

Project / Client HC25 Sludge Disposal Area RI

Mostly sunny Navfac HI

1254 Pulling rods + back filling remaining 4 locations

1320 Finished

1322 ESN leaves site

1325 RK + Cash to fuel farm office to have lunch + sign out

1452 arrive at office. unpack car and stow equipment in office

RK

END of Day

1500

Location MCBH Date 7/3/12

Project / Client HC25 Sludge Disposal Area RI NAVFACHI

overcast, rainy

~~0900~~ 0845 RK & RG meet PCS at Pass/ID office.

0908 Arrive at Fuel Farm

0909 Conduct H&S briefing

0915 Start drum marshalling & PCS applying their labels

PCS finish applying their labels

Start loading onto trucks

1027 PCS done loading and drums and forklift are all secured.

1036 Manifests are signed

1040 PCS offsite

1042 RK stops at Fuel Farm office to let Ed Campbell



Location MCBH Date 7/3/12

Project / Client HC25 Sludge Disposal Area RI NAVFAC HI

overcast, rainy

Know that the 29 drums of IDW ~~a~~ have been removed and WCP will be back out in 2 weeks for addl drilling for HC30

1050 RK & RG offsite

7/3/12

Location MCBH Date 8/20/12

Project / Client HC25 Sludge Disposal Area

overcast Resample NAVFAC HI

0810 Arrive at MCBH Fuel Farm Office. RK + RP

0830 Setup at MW 24
Conduct H&S briefing
~~0908~~ Calibrate PID w/ 100
Calibrate pH meter + turbidimeter

0911 Start purging MW24

~~0928~~

0930 Collect sample from MW24
See QC log + sampling log.

1000 ~~Pa~~ Packing up

1020 Setting up on MW26
PID=0
cover is missing one (1) bolt

1100 Start pumping



Location MCBH Date 8/20/12

Project / Client HC25 Sludge Disposal Area

sl. overcast NAVFAC HI

1120 Collect sample from MW26

1155 Packed up. Head to IDW storage

1200 Lunch

1300 Setting up on MW22

1330 Conference call with Brian Whitehouse + Randy Jordan

1345 Call finished
Finish ~~setting~~ up

~~1~~1357 Start pumping

1420 Collect sample from MW22

1430 Start packing up.

1440 Head to IDW area to put decon $H_2O$, undecon. (purge $H_2O$)

Location MCBH Date 8/20/12

Project / Client HC25 Sludge Disposal Area

Sunny Resample MWs NAVFACHI

1500 Sign out of Fuel Farm Office

1530 Arrive at Office

Kamerah 8/20/12



Location MCBH Date 8/21/12

Project / Client HC25 Sludge Disposal Area

Sunny Resample MWs NAVFACHI

0800 RK & RP leave ~~site~~ office

0830 Sign in at Fuel Farm Office

0850 Setting up at MW21
Conduct H&S briefing
Calibrate instrument
Zero PID, pH meter,
turbidimeter

0908 Start pumping MW-21

0935 Collect sample from MW-21
See QC logbook &
sampling log

0957 Finish packing up.
Drop off Purge $H_2O$ in drum

1000 Drive to MW10 - car is parked
out. Will recheck it
before lunch.

1005 Drive to MW58
Setting up on MW58

Location MCBH Date 8/21/12

Project / Client HC25 Sludge Disposal Area

Sunny Resample MWs NAVFAC HI

1040 Start pumping MW58
Water is quite turbid in the well. Tried to raise the pump.

1125 Sample MW58
1130 Collect Duplicate sample

1200 Check on MW10
Truck is still parked on MW10

Ford F150 navy blue truck
PZU 417

1219 Found the owner!
Place cones on space
1227 Lunch
1300 Dispose of purge $H_2O$ in IDW drum

1315 Setting up on MW 10
1345 Start pumping

1425 Collect sample from MW10



Location MCBH Date 8/21/12

Project / Client HC25 Sludge Disposal Area

Sunny Resample MWs NAVFAC HI

1430 Clean up & pack up equipment

1500 Dispose of IDW $H_2O$ in drum

1518 Sign out of MCBH Fuel Farm office

1600 Arrive at office
Start unloading equipment

1655 Collect equipment blank off of pump

1700 Collect field blank

8/21/12

Location MCBH Date 10/12/12

Project / Client CTO HC25 Sludge Disposal

sunny IDW pickup NAVFACHI

0715 RK leaves office

0730 RK picks up Rachel Gilhooly (RG)

~~0875~~

0758 RK gets call from PCS saying they just left the yard and will be late.

0800 RK and RG wait at MCBH Pass/ID office.

0825 Alan of PCS arrives at MCBH. We drive to the Fuel Farm.

0830 RK conducts H&S briefing

0846 PCS starts labeling the drums with non-hazardous labels. ~~They are~~ He is picking up one (1) drum IDW H2O

0907 Alan finishes loading the drum onto his truck. Sign paperwork

0915 Stop to talk to Steve Spengler



Location MCBH Date 10/12/12

Project / Client CTO HC25 Sludge Disposal

sunny IDW Pickup NAVFACHI

about the Treatability Study they started out at the Fuel Farm

0930 Stop at Fuel Farm office to let Ed Campbell know all drums are picked up and to ask questions.

0945 Leave MCBH

1025 Drop off RG

1030 Arrive at office

Location MCBH Date 11/7/13

Project / Client CTO HC25 Supplemental RI NAVFAC H

Sunny

0900 Arrive at MCBH Fuel Farm office

Spoke to Henry regarding a spill. that occurred some years ago.
There had been an overflow ~~near the~~ at the vault near MW 58

Painters had been working in the vault forgot to put the cap back on and when the fuel was received it overflowed into the vault. Did not notice until they did their fuel calculation and noticed a loss.

0915 Leave to head for Electric shop

11/7/13



Location MCBH Date 1/28/14

Project / Client CTO HC25 Supplemental RI NAVFAC H

Cloudy windy Geophysical Survey

RK

0720 Arrive at MCBH pass/ID office

Kerry Hennon (KH) of Terra Physics is here.

0723 Pass/ID does not have pass Call Jeff Larson who sponsors us on

0734 KH has his pass

0740 Arrive onsite at MCBH Fuel Farm

0745 RK conducts H&S briefing HR info on tailgate form Cloudy, windy weather

0755 RK & KH mark the MW60 - MW62 location

0800 RK leave to check in with Fuel Farm office ~~and~~ KH starts his survey

0834 RK drives to Bldg 8031 area to mark MW63 Bldg 8031 is an ~~empty~~ storage bldg

0840 RK drives to motor pool area

Location MCBH Date 1/28/14

Project / Client CTO HC25 Supplemental RI

cloudy windy NAVFAC HI

0845 RK marks locations for MW64 & MW65.

0905 Drive back to KH

0941 KH finishes cleaning MW60 and MW61

0942 KH moves to MW62 to finish the GPR.

0959 KH collects GPS information for MW60 - MW62
RK heads to Fuel Farm office to wait for him.

1039 Start on MW63 Location

1130 KH finished MW63

1135 Drive into the motorpool area check in at office

KH starts geophysical survey of MW65

1230 KH is done. RK & KH walk over MW64 & MW65 areas.



Location MCBH Date 1/28/14

Project / Client CTO HC25 Supplemental RI

cloudy windy NAVFAC HI

1245 KH will send the GPS coordinates and maps when they are ready.

1315 RK & KH leave site

1321 RK & KH leave MCBH.

Location MCBH Date 1/29/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

Rainy Cloudy

0640 RK + CS Leave office

0707 RK + CS arrive at MCBH pass ID VWD are here

0717 Getting vehicle pass for the direct push probe rig with VWD

0736 Setup on MW64

0740 RK conducts H+S briefing

0800 Start driving MW64

0830 Jocelyn Tamashiro arrives we are at 12 ft bgs

0900 JT leaves site
we are at 16' bgs - hitting refusal.
Removed rode to set well hole collapsed at water level so redriving the hole w/ 3" rods.



Location MCBH Date 1/29/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

Rainy, cloudy

0949 Redriving the hole for MW64

1100 We are at 12' bgs hitting refusal

We decide ~~to~~ need to return w/ augers to ~~finish~~ complete the site wells.

1200 Drillers pack up and leave site

CS + RK conference call with B. Alpaugh + D Yasaka — Navy + AECOM will allow us to proceed with ASA tomorrow.

1230 CS + RK leave site

CS

Kamita

Location MCBH Date 1/30/14

Project / Client CTO HC25 Supplemental RI

partly cloudy no wind MAUPACH

0709 RK + CS arrive onsite at MW64 location to redrill again.
Drillers have also arrived and are filling there water tanks.

0720 RK conducts H+S briefing HR on tailgate form.

Calibrated PID + sound level meter.

0730 Drillers Marty Guillmette + Kimo Sidotti set up rig on ~~MW 48~~ MW64.
The MW will be offset from the original boring.

0740 Start drilling boring for MW64. We are advancing the hole with 3" solid stem ~~augers~~

0808 Drillers have ~~ran~~ reamed the



Location MCBH Date 1/30/14

Project / Client CTO HC25 Supplemental RI

hole and pulling the solid stem augers out.

~~Sky~~ ~~Stop~~
Skies are clear, no wind

Drillers have removed the solid stem and are trying to advance the 3" direct push rods.

0900 ~~A~~ ~~B~~ setting in the DP rods is not working. inner rod gets stuck and cuttings re-enter the 3" DP rods.

We are switching to HSA 6" augers.

0939 HSA is driven ~~at~~ to 18' and well casing is dropped in.

Location MCB H Date 1/30/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

clear skies, lt. breeze

0957 MW64 is set at 116' bgs
Marty sets the well
with filter pack to

1000 Kimo sets up on MW65

1016 Drives to 0-4' bgs no
odor. HS = 0.30ppm

1027 4-8" ~~Odor~~ No odor
No staining

1052 ~~[illegible]~~ Water table at
~80' bgs. No odor

Drillers are setting up for
switching to HSA

1110 HSA driven to 15' bgs.

1124 HSA is driven to 17' bgs and
well is dropped in.

1127 Removing the augers



Location MCB H Date 1/30/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

clear skies, Lt breeze

1200 Lunch

1230 Setting up on MW63
Rod Koch is onsite

1245 Starting MW63 with DP

1315 Collected to soil samples
from ~~[illegible]~~ soil boring for
MW63.

Drillers have switched to
HSA

1330 Monitoring well casing
has been dropped in
Augers being pulled.

1351 Augers pulled
Monitoring well being completed

1354 2 drillers ~~[illegible]~~ set up
rig on MW62

~~[illegible]~~ 1400 Start drilling MW62

Location MCBA Date 1/30/14

Project / Client CTO HC25 Supplemental RI

clear skies, light breeze NAVFACH

1440 Soil samples are collected for MW62
Drillers set up for HSA

1511 Drillers have dropped in the well and are removing augers, and setting the well.

1530 MW62 has been sanded and bentonite sealed.

~~1[illegible]~~ Crew packs up and gets ready to move drums to IDW storage area.

1545 Marty sets up drums on pallet in storage area

1600 Everyone offsite

1651 RK + CS in office

1/30/14



Location MCBA Date 1/31/14

Project / Client CTO HC25 Supplemental RI

clear skies, lt breeze NAVFACH

0700 RK + CS arrive onsite
Drillers are here and are setup on MW61.
RK conducts HAS briefing

0720 Start drilling MW61 with DP

0745 Soil sampling completed ~~[illegible]~~ switch to HSA

0810 HSAs are at 20 ft bgs.
Drillers have dropped well caeing in and are setting up well.

0839 Well is set at 22' bgs.
Drillers situate rig on MW60

0850 MW61 is completed and started drilling on MW60

0920 Completed soil sampling of MW60. Drillers switching to HSA

1000 Drillers have dropped in well and

Location MCBH Date 1/31/14

Project / Client CTO HC25 Supplemental RI

Clear skies, lt breeze NAVFAC,HI

are setting well MW60

1045 Well MW60 is set
we are packed up & moving
to IDW area.

Drums are staged in IDW
Storage area on pallets

1105 Kimo leaves with the
DP rig.
Marty is preparing the
paperwork.

1115 Marty leaves site
1120 Lunch time
1200 Setup on MW64 for well
development

1215 DTW = 13.10'
TD = 20.02'

~~1230~~ RK Calibrates the pH meter &
turbidity meter.



Location MCBH Date 1/31/14

Project / Client CTO HC25 Supplemental RI

partly cloudy NAVFAC,HI

1230 CS sets up the pump.
Start pumping ~~MW64~~
MW64

1334 Pumped 6 gallons

1410 Pumped 12 gallons.

Packing up to leave
Motor Pool Area

1423 Leaving motor pool area

1427 At IDW storage area
It is pouring rain.

1452 ~~Drum~~ Purge $H_2O$ placed in
drum and covered
drums ~~with~~ with tarp.

1500 RK & CS offsite

1/31/14

Location MCBH Date 2/3/14

Project / Client CTO HC25 Supplemental RI

overcast, dk clouds no rain NAVFAC HI

0759 RK+CS onsite at MW65
RK conducts H2S briefing.
HR info on tailgate log
RK+CS setup at MW65

0818 DTW = 12.37
TD = 20.05
RK calibrate pH + turbidimeter

~~0838~~

0838 Start pumping

0943 13 gallons pumped from MW65
no odor no sheen observed

0944 Pack up equipment

1011 Drive to MW60, and setup equipment

1012 Forgot to drop off IDW $H_2O$
Drive over to drum storage area to empty buckets



Location MCBH Date 2/3/14

Project / Client CTO HC25 Supplemental RI

cloudy, rainy NAVFAC HI

1027 Arrive back at MW60

DTW = 16.87
TD = 27.6

1048 Start pumping MW60

1135 Starts to rain.
Pumped about 9 gallons.

1219 Finish well development of MW60. 18 gallons

1235 Drive to IDW storage to empty purge water

1253 Lunchtime.

1330 Setting up on MW61

1345 Start pumping MW61

1515 Finished well development of MW61

Location MCBH Date 2/3/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

Rainy

1525 Transferred IDW purge $H_2O$ into drums at staging area
It is pouring rain!

1535 Offsite

2/3/14



Location MCBH Date 2/4/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

Rainy

0740 RK + CS Arrive onsite
Start setting up at MW63
It is pouring rain.

RK conducts H&S briefing
HR unp on tailgate.

0753 DTW 11.55
TD 20.05

RK calibrates equipment
pH meter, turbidimeter
PID

0815 Start pumping MW63
Well development includes surging with a bailer and pumping with a peristaltic pump.

Finish well development of MW63. Pack up equipment
It is steady rain.

Location MCBH Date 2/4/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

Raining

0930 Drive to IDW storage area and empty ~~to~~ Purge water in drum

0945 Stop at Fuel Farm office for bathroom break

0958 Set up at MW62
DTW = 12.25
TD = 20.05

1057 MW62 is a slow recovery well. There is a sulfur odor in water.

1115 Allowed well to refill & drawdown 3x There is no sediment in well and water is slightly cloudy

1130 Transfer purge water to drum at IDW storage area.

1145 Offsite

2/4/14



Location MCBH Date 2/5/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

overcast

0803 RK + CS arrive onsite check into motorpool office and start setting up at MW64
RK conducts H&S briefing & calibrating equipment

0900 Start pumping MW64

0930 Finish purging MW64

0943 Collect groundwater sample KC143

0945 Collect groundwater duplicate KC144 at MW64.

1108 Finish collecting samples. Start decontaminating the pump & packing up.

1121 Loading up

1134 Lunch

Location MCBH Date 2/5/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

Overcast

1289 Set up on MW65

1235 Start purging MW65

1325 Collect sample KC145 from MW65

1400 Pack up equipment

1421 Set up at MW60

1445 Start purging MW60

1530 collect sample from MW60

1600 Clean up site

1615 At IDW Storage area to transfer purge/decon water to drums.

1635 RK & CS offsite

R Kamm 2/5/14



Location MCBH Date 2/6/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

Overcast

0706 CS & RK arrive onsite at MW63
RK conducts H&S briefing
HR info on tailgate.
Finish calibration of equipment & setup site
Looks like it will rain.

DTW = 11.30
TD = 20.04

0749 Start purging MW63

0820 Stop purging & start sampling

0830 collect sample KC148 from MW63

1000 Sampling complete
decomming and packing up site

1020 Setting up on MW62

DTW = 13.15 TD = 20.03

Location MCBH Date 2/6/14

Project / Client CTO HC25 Supplemental RI NAVFAC HI

cloudy

1044 Start purging MW62

1110 Collect sample KC149 at MW62

1150 Lunch time

1235 Set up on MW61

1255 Start pumping MW61 No odor or sheen

1325 Collect sample KC150 from MW61

1400 Packing up equipment

1422 Dropped off decon/purge $H_2O$ in IDW drums. Drums are covered w/ tarp

1432 RK + CS off site

R Kammerly 2/6/14



Location MCBH Date 3/3/14

Project / Client CTO HC25 SUPPLEMENTAL RI NAVFAC HI

1115 CS DEPART WCP OFFICE

1200 ARRIVE AT SITE AND MEET VWD AT MW62
CONDUCT SAFETY BRIEFING

UNABLE TO MANUALLY REMOVE CASING. CALLED RK TO DETERMINE WHAT TO DO.

RK SAYS TO PULL OUT AT LEAST 5' OF CASING.

VWD USES LIFT GATE AND LOCKING ~~PLIERS~~ VISE GRIP TO LIFT (10' PVC REMOVED) CASING OUT. CASING BREAKS AND SCREEN REMAINS IN GROUND. VWD POURS ~1/4 BAG OF FINE BENTONITE IN HOLE

1230 MOVE TO MW61
USED SAME PROCEDURE AS MW62. 5' OF PVC REMOVED. POURS ~1/8 BAG

Location MCBH Date 3/3/14

Project / Client CTO HG25 SUPPLEMENTAL R1

WELL ABANDONMENT INFO

| WELL NO. | DATE OF ABANDONMENT | CASING/SCREEN REMOVED Y/N | ANNULAR MATERIAL REMOVED Y/N | SEALING MATERIAL ~~DEPTH~~ | DEPTH |
|---|---|---|---|---|---|
| MW62 | 3/3/14 | YES SCREEN NO | NO | BENTONITE ~~AND PORTLAND CEMENT~~ | 10' |
| MW61 | 3/3/14 | YES SCREEN NO | NO | BENTONITE | 5' |
| MW60 | 3/3/14 | CASING YES SCREEN ~~NO~~ YES | NO | BENTONITE | 20' |
| MW63 | 3/3/14 | CASING YES SCREEN NO | NO | BENTONITE | 10' |
| MW64 | 3/3/14 | CASING YES SCREEN NO | NO | BENTONITE | 10' |
| MW65 | 3/3/14 | CASING YES SCREEN NO | NO | BENTONITE | 10' |

END OF ENTRIES



Location MCBH Date 3/3/14

Project / Client CTO HG25 SUPPLEMENTAL R1

WELL ABANDONMENT INFO

| VOLUME | MIXING RATIO | METHOD OF SEALING MATERIAL PLACEMENT |
|---|---|---|
| | 100% CASING ~~SEAL~~ BENTONITE | FROM TOP TO BOTTOM |
| | 100% CASING SEAL BENTONITE | FROM TOP TO BOTTOM |
| | 100% CASING SEAL BENTONITE | FROM TOP TO BOTTOM |
| | 100% CASING SEAL BENTONITE | FROM TOP TO BOTTOM |
| | 100% CASING SEAL BENTONITE | FROM TOP TO BOTTOM |
| | 100% CASING SEAL BENTONITE | FROM TOP TO BOTTOM |

END OF ENTRIES

Location MCBH Date 3/3/14

Project / Client CTO HC25 SUPPLEMENTAL R1
NAVFAC HI

FINE BENTONITE

1240 MOVE TO MW60
PULLED OUT ENTIRE CASING
INCLUDING PREPACK SEALED SCREEN.
1 BAG FINE BENTONITE POURED
INTO HOLE

1250 MOVE TO MW63
UNABLE TO PULL OUT CASING
WITH TRUCK'S MECHANICAL
LIFT GATE. INSTEAD OF PULLING
CASING OUT, VWP UNSCREWS
TOP 10' OF ~~GA~~PVC CASING.
ENTIRE CASING TURNS, DID NOT
UNSCREW. 10' OF CASING PULLED
OUT, BROKE AT THREAD TO
SEALED WELL

1300 MOVE TO MW64
USED GATE LIFT AND PULLED
OUT 10' OF CASING, BROKE
AT THREAD TO PRE-PACK



Location MCBH Date 3/3/14

Project / Client CTO HC25 SUPPLEMENTAL R1
NAVFAC HI

1310 MOVE TO MW65
USED LIFT GATE AND RATCHET
STRAPS TO PULL OUT 10' OF
CASING. BROKE AT THREAD
TO PRE-PACK.

1330 CS GPS ALL 6 MW LOCATIONS

1405 DEPART SITE

End of Entry
PHe 3/4/14

Location MCBH Date 3/14/14

Project / Client CTO HC25 SUPPLEMENTAL RI
NAVFAC HI

0915 CS DEPARTS WCP OFFICE

1000 ARRIVE AT MW64. NO BENTONITE ~~SHRINKAGE~~ SETTLING. MATCH SURFACE COVER

1006 ARRIVE AT MW65. NO BENTONITE SHRINKAGE/SETTLING. MATCH SURFACE COVER

1013 ARRIVE AT MW62. NO BENTONITE SHRINKAGE/SETTLING. MATCH SURFACE COVER.

1022 ARRIVE AT MW60. NO BENTONITE SHRINKAGE/SETTLING. MATCH SURFACE COVER.

1028 ARRIVE AT MW61. NO BENTONITE SHRINKAGE/SETTLING. MATCH SURFACE COVER.

1035 ARRIVE AT MW63. NO BENTONITE SHRINKAGE/SETTLING. MATCH SURFACE COVER.

1040 DEPART SITE

END OF ENTRIES



Location MCBH Date 3/4/11/14

Project / Client CTO HC25 Supplemental RI
NAVFAC HI

overcast

0845 RKaminaka picks up Rachel Gulhody at AECOM office.

0915 RK & RG arrive at MCBH pass ID office. Waiting for PCS.

Purpose of fieldwork is to pick up IDW - five drums at MCBH Fuel Farm.

0935 Called Danny Ishii of PCS. There was miscommunication with Dispatch and this job was not reassigned to another person. Danny is just leaving the Kapolei baseyard.

1045 PCS arrives

1100 Arrive at MCBH Fuel Farm
1105 RK conducts HAS briefing
1110 Danny properly labels drums and tightens bungs.

Location MCB 7 Date 4/11/14

Project / Client CTO 1425 Supplemental RI

Overcast NAVFAC #1

1140 PGS completes loading of drums
RG signs the IDW manifest

~~1200~~
1150 RL & RG stop at Fuel Farm
office to let Ed Campbell
know the drums have been
removed.
Ed says ~~#~~ he is trying
to push to get AST 1252
~~as~~ tank berm relined on
a fast-track.

1205 RL & RG offsite

4/11/14



Location Date

Project / Client

# Appendix A.2
# QC Logbook

ENVIRONMENTAL HARD BOUND
FABRIC, 156 PG
550F
4 5/8 X 7"
ENVIRO FABRI
$19.95
464

No. 550F Environmental - Fab
ISBN 978-1-932149-50-0

CTO HC25
Remedial Investigation
Former Sludge Disposal
Area

Rite in the Rain®
ALL-WEATHER
**ENVIRONMENTAL**
**FIELD BOOK**
№ 550F

QC Logbook

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COC ID: KC___

*this logbook will be copied/scanned daily*

## Navy SOPs * PPE: Level D

I-A-5: Utility Clearance
I-A-6: IDW Management
I-A-7: Analytical Data Validation Planning and Coordination
I-A-8: Sample Naming
I-B-1: Soil Sampling
I-B-2: Geophysical Testing Procedures
I-B-3: Active Soil Gas Survey
I-C-1: Monitoring Well Installation & Abandonment
I-C-2: Monitoring Well Development
I-C-3: Monitoring Well Sampling
I-E: Soil + Rock Classification
I-F: Equipment Decontamination
I-I: Land Surveying
II-A: Data Validation Procedure
II-B: Standard + Full Data Validation Procedure for GC/MS VOCs by SW-846 8260B
II-C: Standard + Full Data Validation Procedure for GC/MS SVOCs by SW-846 8270C (Full + SIM)
II-H: Standard + Full Data Validation Procedure for Extractable TPH by SW-846 8015B
II-Q: Standard + Full Data Validation Procedure for Metals by SW-846 6000/7000
II-S: Data Quality Assessment
III-A: Laboratory QC Samples (Water, Soil)
III-B: Field QC Samples (Water, Soil)
III-C: Field + Lab QC Samples (Air)

SOPs Cont'd

III-D: Logbooks
III-E: Recordkeeping, Sample Labeling + COC procedures
VII-F: Sample Handling, Storage + Shipping

Rite in the Rain®
ALL-WEATHER WRITING PAPER

ALL-WEATHER
# ENVIRONMENTAL FIELD BOOK

Name Wil Chee - Planning + Environmental

Address 1018 Palm Drive
Honolulu HI 96814

Phone 808 596-4688

Project CTO HC25
Remedial Investigation (RI)
Former Fuel Farm Sludge Disposal Area
CLEAN III Contract No.
N62742-03-D-1837

**This book is printed on "Rite in the Rain" All-Weather Writing Paper** - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

*This Logbook will be copied/scanned daily

Refer to HC25 Field Logbook for chronological entries of field efforts.

Specifications for this book:

| Page Pattern | | Cover Options | |
|---|---|---|---|
| Full Page | 20lb Paper | Flexible Cover | Fabrikoid Cover |
| Columnar | 1/4" Grid | Item No. 550 | Item No. 550F |

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| PAGE | REFERENCE | DATE |
|---|---|---|
| | Field Equipment | |
| 69555520 | Trimble Geo XT 2005 series | |
| BJJ080001 | Sound Level meter QST/SP-DL-1-20 | |
| 596-901649 | UltraRAE 3000 - benzene specific RAE Benzene Tubes for UltraRAE | |
| 7060 | ~~RE~~ Passive Dust Meter TEI/PDR-1000 AN | |
| 913070098 | AN LEL $CH_4$, $O_2$ Meter RKI/GX 2003 72-0253 RKC | |
| | Mobile B-61 drill rig (WWD) | |
| | Geotech Geocontrol Pro | |
| | Geotech Portable Bladder Pump 1.66" x 18" | |
| | YSI 556 MPS Water Quality Probe Unit # 05E 2000 AJ | |
| | Solinst Interface Probe model 122 ; 122-003846-1 | |
| | Turbidity meter | |

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148 Error codes, Hazardous classifications, Container types
149 Sampling guidelines (Solids)
150 Approximate Volume of Water in Casing or Hole, Ground Water Monitoring Well
151 PVC Pipe casing tables
152 Soil Classification
153 Soil Classification
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155 Conversions (Concentrations, Volume/Flow or Time, Velocity, Acceleration)
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APPL Laboratory Shipping Address:
908 N. Temperance Ave
Clovis, CA 93611
phone (559) 275-2175
fax (559) 275-4422

SW-846 Methods for Soil Samples

8260C (BTEX)
8015B (TPH-GRO)
2 40ml VOA w/ $H_2O$ + stir bar
1 40-ml VOA w/ methanol

8015B (TPH-DRO/LRO)
8270D SIM (PAHs)
6020B (Pb)
1-8oz jar



Location _____ Date _____

Project / Client _____

SW-846 Methods for Groundwater Samples

| | |
|---|---|
| 8260C (BTEX)<br>8015B (TPH-GRO) | 6-40ml VOA w/ HCl |
| 8015B (TPH-DRO/LRO)<br>8270D-SIM (PAHs) | 4-1L Amber unpreserved |
| 6020B (Dissolved Pb) | 1-500ml poly $HNO_3$ |
| 6020B (Total Pb) | 1-500ml Poly $HNO_3$ |

Location _____ Date _____

Project / Client _____

SW-846 Methods for Soil Gas



Location _____ Date _____

Project / Client _____

Pages left blank for Soil Gas & GW sampling.

Location Sludge Disposal Area HC25 Date 3/12/12

Project / Client MCBH

cloudy, windy

NAVFAC HI

| COC ID | Sample ID | Date | Time | Preserv Bottles | Analyses | Samp Type | Note |
|---|---|---|---|---|---|---|---|
| KC001 | ~~FSDA-BS03-N-D15.0~~ FSDA-BS03-N-01-D15.0 16.5 | | 0910 | 8oz jar | PAHs<br>Lead<br>TPH DRO/LRO | N | No odor in this hole PID = 0 ppm |
| | | | | 2-40ml<br>1-40ml | VOAs BTEX + TPH-GRO<br>VOA | | |
| KC002 | FSDA-BS06-N-01-D ~~15.0~~ 16.5 | | 1125 | 8oz jar | PAHs<br>Pb<br>TPH DRO/LRO | N | No odor in this hole PID = 0ppm |
| | | | | 2-40ml (stirbar) $H_2O$<br>1-40ml (methanol) | VOAs BTEX + TPH-GRO<br>VOA | | |
| KC003 | FSDA-BS05-N-01-D15.0 | | 1405 | 8oz jar | PAHs<br>Pb<br>TPH DRO/LRO | N | No odor PID = 0.0ppm black staining observed in layers |
| | | | | 2-40ml VOA<br>1-40ml VOA | (stirbar) BTEX + TPH-GRO<br>(methanol) | | |
| KC004 | FSDA-~~F01~~ QW-T-01* | | 1500 | 3-40ml VOAs | HCl | QC | |

COC# 38128 stapled



Location HC25 Sludge Disposal Area Date 3/12/12

Project / Client MCBH

cloudy windy

NAVFAC HI

R Kammel 3/12/12

Location: MCBH
Date: 3/13/12
Project / Client: HC25 Fuel Farm Sludge Disposal Area NAVFAC HI

| COC ID | Sample ID | Date | Time | Bottles (Preserv) | Analytes | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC005 | FSDA-~~T02-D~~ QW-T-02 | 3/13/12 | 0730 | 3-40ml VOA w/ HCl | BTEX/ TPH-GRO | QC | trip blank |
| KC006 | FSDA-~~AAA~~ BS50-N-01-D~~15.0~~ 16.5 | 3/13/12 | 0840 | 1 8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA w/ stirbar | PAHs, TPH DRO/LRO, Pb<br>BTEX/ TPH-GRO | N | No odor/ staining |
| KC007 | FSDA-BS52-N-01-D15.0 | 3/13/12 | 1100 | 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA w/stirbar | PAHs, TPH-DRO/LRO, Pb<br>BTEX/ TPH-GRO | N | |
| KC008 | FSDA-BS59-N-01-D12.0 | 3/13/12 | 1405 | 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA w/stirbar | PAHs, TPH-DRO/LRO, Pb<br>BTEX/ TPH-GRO | N | strong petrol odor |

COC# 38127 sent 3/14/12



Location: MCBH
Date: 3/13/12
Project / Client: HC25 Fuel Farm Sludge Disposal NAVFAC HI

R Kamrial
3/13/12

Location MCBH Date 3/14/12

Project / Client MC25 Sludge Disposal RI NAVFAC HI

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC009 | FSDA-~~TB~~ GW-T-03 | 3/14/12 | 0730 |
| KC010 | FSDA-~~SB~~ BS58-N-01-D12.0 | 3/14/12 | 0850 |
| KC011 | FSDA-BS53-N-01-D15.0 | 3/14/12 | 1140 |
| KC012 | FSDA-BS57 (7 pk 6)-N-01-D | 3/14/12 | 1530 |

COC # 38107

Shipped 3/15/12



Location MCBH Date 3/14/12

Project / Client MC25 Sludge Disposal RI NAVFAC HI

| Bottles (Preserv) | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOAs w/ HCL | BTEX/TPH-GRO | QA/QC | trip blank |
| 1-8oz jar<br>~~2~~ 1-40ml VOA MeOH<br>2-40ml VOA w/ $H_2O$ stirbar | PAHs, TPH DRO/ORO, Pb<br>BTEX/TPHGRO | N | MW58 ~~strong~~ petrol odor |
| 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA w/ $H_2O$ stirbar | PAHs, TPH DRO/ORO, Pb<br>BTEX/TPH-GRO | N | MW53 |
| 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ stirbar | PAHs, TPH DRO/ORO, Pb<br>BTEX/TPH-GRO | N | MW57 ~~MW56~~ |

3/14/12

Location: MCBH  Date: 3/15/12

Project / Client: Fuel Farm Sludge Disposal Area NAVFACHI

cl. overcast, hot, breezy

| COC ID | Sample ID | Date | Time | Bottles (Preserv) | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC013 | FSDA-~~F04~~ QW-T-04 | 3/15/12 | 0730 | 3-40 ml VOAs (HCl) | BTEX TPH-GRO | QC ~~B~~ Trip blank | MW54 |
| KC014 | FSDA-BS54-~~N-D9.0~~ 01-D9.0 | 3/15/12 | 0905 | 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ str bar | PAHs, ~~BT~~ TPH-DRO/LRO, Pb<br>BTEX/ TPH-GRO | N | MW54 No odor |
| KC015 | FSDA-BS54-D-01-D9.0 | 3/15/12 | 0910 | 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ str bar | PAHs, TPH-DRO/LRO, Pb<br>BTEX/ TPH-GRO | | MW54 Duplicate No odor/ staining |
| KC016 | FSDA-BS55-N-01-D14.0 | 3/15/12 | 1120 | 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ w/ str bar | PAHs, TPH-DRO/LRO, Pb<br>BTEX/ TPH-GRO | | MW55 No odor/ staining |
| KC017 | FSDA-BS51-N-01-D13.5 | 3/15/12 | 1435 | 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ str bar | PAHs, TPH-DRO/LRO, Pb<br>BTEX/ TPH-GRO | | MW51 faint petrol odor |

COC # 38/38 shipped 3/16/12



Location: MCBH  Date: 3/15/12

Project / Client: Fuel Farm Sludge Disposal Area

R Stevenson 3/15/12

Location MCBH Date 3/16/12

Project / Client Fuel Farm Sludge Disposal Area

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC018 | FSDA-QW-TD5 | 3/16/12 | 0730 |
| KC019 | FSDA-B556-N-01-D13.5 | 3/16/12 | 1150 |

COC # 38131

Shipped 3/22/12



Location MCBH Date 3/16/12

Project / Client Fuel Farm Sludge Disposal Area

| Bottles (Preserv) | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOA HCl | BTEX/TPH-GRO | QC | Trip blank |
| 1-8oz jar | PAHs, TPH-DRO/LRO, Pb | N | MW56 |
| 1-40ml VOA MEOH | BTEX, TPH-GRO | | No odor/ staining |
| 2-40ml VOA $H_2O$ Stirbar | | | |

3/16/12

Recommended

Location MCBH Date 3/19/12

Project / Client Fuel Farm Sludge Disposal RI

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC020 | FSDA-QW-T06 | 3/19/12 | 0750 |
| KC021 | FSDA-BS09-N-01-D~~14.5~~ 13.5 | 3/19/12 | 0900 |
| KC022 | FSDA-BS02-N-01-~~14.5~~ RL D13.0 | 3/19/12 | 1040 |
| KC023 | FSDA-BS01-N-01-~~D5.0~~ D4.5 | 3/19/12 | 1311 |
| KC024 | FSDA-BS01-N-01-~~D5.0~~ D14.0 RL | 3/19/12 | 1340 |
| KC025 | FSDA-BS04-N-01-~~D5.0~~ D4.5 ~~FSDA-BS04-N-5.0~~ | 3/19/12 | ~~1455~~ 1445 |
| KC026 | FSDA-BS04-N-01-D14.0 ~~FSDA-BS04-N-D15.0~~ RL | 3/19/12 | 1455 |

COC# 38131
Shipped 3/24/12

[signature] 3/19/12



Location MCBH Date 3/19/12

Project / Client Fuel Farm Sludge Disposal RI

| Bottles (Pres.) | Analyses | ~~Sam~~ Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOA HCl | BTEX/TPH GRO | QC-TB | |
| 1-8oz jar<br>1-40ml VOA MEOH<br>2-40ml VOA $H_2O$<br>stirbar | PAHs, TPH/DRO/LRO, Pb<br>BTEX, TPH-GRO | N | No odor<br>PID=0<br>blk staining |
| 1-8oz jar<br>1-40ml VOA MEOH<br>2-40ml VOA $H_2O$ | PAHs, TPH-DRO/LRO, Pb<br>BTEX, TPH-GRO | N | No odor<br>PID=0 |
| 1-8oz jar<br>1-40ml VOA MEOH<br>2-40ml VOA $H_2O$ | PAHs TPH-DRO/LRO, Pb<br>BTEX, TPH-GRO | N | |
| 1-8oz jar<br>1-40ml VOA MEOH<br>2-40ml VOA $H_2O$ | PAHs, TPH-DRO/LRO<br>BTEX, TPH-GRO | N | strong odor |
| 1-8oz jar<br>1-40ml VOA MEOH<br>2-40ml VOA $H_2O$ | PAHs, TPH DRO/LRO<br>BTEX, TPH-GRO | N | |
| 1-8oz jar<br>1-40ml VOA MEOH<br>2-40ml VOA $H_2O$ | PAHs, TPH DRO/LRO<br>BTEX, TPH-GRO | N | |

Location MCBH Date 3/20/12

Project / Client Fuel Farm Sludge Disposal

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC027 | FSDA-QW-E01 | 3/20/12 | 730 |
| | nanopure water steamed distilled 81533 44444 | | |
| KC028 | FSDA-QW-T07 | 3/20/12 | 800 |
| COC# ~~318~~ 38137 3/22/12 | | | |
| KC029 | FSDA-BS07-QS-D3.0 | 3/20/12 | 0920 |
| KC030 | FSDA-BS07-N-01-D4.5 | 3/20/12 | 0930 |
| KC031 | FSDA-BS07-D-01-D4.5 | 3/20/12 | 0931 |
| KC032 | FSDA-BS07-N-02-D15.0 | 3/20/12 | 950 |
| COC# 38129 3/22/12 38132 3/22/12 31834 3/22/12 | | | |



Location MCBH Date 3/20/12

Project / Client Fuel Farm Sludge Disposal RI

| Bottles (Pres) | Analyses | Sample Type | Notes |
|---|---|---|---|
| 4 1L Amber<br>6 - 40ml VOA HCl<br>1 - 500 poly HNO3 | PAHs TPH DRO/LRO<br>BTEX, TPH GRO<br>Pb (unfiltered) | QC | Equipt blank |
| 3 - 40ml VOA HCl | TPH GRO<br>BTEX | QC | trip blank |
| 2 - 8oz jar<br>6 VOAs H2O<br>3 40ml VOAs MeOH | PAHs, TPH DRO/LRO, Pb<br>BTEX, TPH-GRO | QC | MS/MSD |
| 1 - 8oz jar<br>1 - 40 VOA MeOH<br>2 - 40ml VOA H2O | PAHs, TPH DRO/LRO, Pb<br>BTEX, TPH-GRO | N | No odor/stain |
| 1 - 8oz jar<br>1 40ml VOA MeOH<br>2 - 40ml VOA H2O | PAHs TPH DRO/LRO, Pb<br>BTEX, TPH-GRO | Duplicate | No odor/Stain |
| 1 - 8oz jar<br>1 40ml VOA MeOH<br>2 - 40ml VOA H2O | PAHs, TPH DRO/LRO, Pb<br>BTEX, TPH-GRO | N | No odor/stain |

Location MCBH Date 3/20/12

Project / Client Fuel Farm Sludge Disposal RI

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC033 | FSDA-BS10-N-01-D~~0.5~~ 4.5 | 3/20/12 | 1040 |
| KC034 | FSDA-BS10-N-02-D~~10.0~~ 3.0 | 3/20/12 | 1100 |
| KC035 | FSDA-BS08-N-01-D6.00 | 3/20/12 | 1330 |
| KC036 | FSDA-BS08-N-02-D~~15.0~~ 14.5 | 3/20/12 | 1350 |
| KC037 | FSDA-BS08-D-02-D~~15.0~~ 14.5 | 3/20/12 | 1350 |

COC# 38133 3/22/12 shipped
38134 3/22/12 "



Location MCBH Date 3/20/12

Project / Client Fuel Farm Sludge Disposal RI

| Bottles (Pres) | Analyses | Sample Type | Note |
|---|---|---|---|
| 1-8oz jar<br>1-40ml MeOH<br>2-40ml $H_2O$ | PAHs, TPH DRO/LRO, Pb<br>BTEX, TPH-GRO | N | |
| 1-8oz jar<br>1-40ml MeOH<br>2-40ml $H_2O$ | PAHs, TPH DRO/LRO, Pb<br>BTEX, TPH-GRO | N | faint odor |
| 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ | PAHs, TPH DRO/LRO, Pb<br>BTEX, TPH-GRO | faint | musty? odor<br>PID = 0.13 ppm |
| 1-8oz jar<br>1-40-ml VOA MeOH<br>2-40ml VOA $H_2O$ | PAHs TPH DRO/LRO, Pb<br>BTEX, TPH-GRO | | musty odor<br>PID $H_2S$ = 0 |
| 1-8oz jar<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ | PAHs, TPH-DRO/LRO, Pb<br>BTEX, TPH-GRO | | PID = 0.0 fr. borehole<br>No sample for $H_2S$. |

Location MCBH Date 3/21/12

Project / Client Fuel Farm Study Disposal RI

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC038 | FSDA-QW-T08 | 3/21/12 | 0651 |
| | Menehune Water for Field blank Steamed distilled | 81533 44444 | |
| KC039 | FSDA-QW-F01 | 3/21/12 | 0653 |

COC # 38129 shipped 3/22/12
38137 " "



Location MCBH Date 3/21/12

Project / Client Fuel Farm Sludge Disposal RI

| Bottles (Pres.) | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOA HCl | BTEX, TPH-GRO | QC | trip blank |
| 4-1L Amber | PAHs, TPH DRO/RO | QC | field blank |
| 6-40ml VOA HCl | BTEX, TPH-GRO | | |
| 1-500ml poly $HNO_3$ | Pb (unfiltered) | | |

Shannah
3/21/12

Location MCBH Date 3/22/12

Project / Client Fuel Farm Sludge Disposal

| COC ID ~~KC0240~~ | Samp ID | Date | Time |
|---|---|---|---|
| KC0240 | FSDA-QW-E02 | 3/22/12 | 1045 |
| COC # 38129 | | 3/22/12 | Shipped |



Location MCBH Date 3/22/12

Project / Client Fuel Farm Sludge Disposal

| Bottles Pres- | Analyses | Sample Type | ~~Cat~~ Notes |
|---|---|---|---|
| 6-40ml VOAs HCl | BTEX, TPH-GRO | QC | Eq. blank ~~[illegible]~~ resample for VOCs. |

[illegible]
3/22/12

Location MCBH Date 3/27/12

Project / Client Fuel Farm Sludge Disposal RI

| QC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC041 | FSDA-QW-T09 | 3/27/12 | 0910 |
| KC042 | FSDA-GW55-N-01-D | 3/27/12 | 1155 |
| KC043 | FSDA-GW51-N-01 | 3/27/12 | 1520 |

COC # 38126 shipped 3/29/12



Location MCBH Date 3/27/11

Project / Client Fuel Farm Sludge Disposal RI

| Bottles (Pres) | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOA HCl | BTEX, TPHGRO | QC | trip blank |
| 4-1L Amber | PAHs TPH DRO/LRO | N | |
| 6-40ml VOA HCl | BTEX, TPH-GRO | | |
| 1-500ml $HNO_3$ | Pb unfiltered | | MW55 |
| 1-500ml poly $HNO_3$ | Pb filtered | | |
| 4-1L Amber | PAHs, TPH DRO/LRO | N | MW51 |
| 6-40ml VOA HCl | BTEX, TPH-GRO | | |
| 1-500ml $HNO_3$ | Pb unfiltered | | |
| 1-500ml $HNO_3$ | Pb filtered | | |

3/27/11

Location: MCBH  Date: 3/28/12

Project / Client: Fuel Farm Sludge Disposal RI

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC044 | FSDA-QW-TIP | 3/28/12 | 0830 |
| KC045 | FSDA-GW54-N-01 | 3/28/12 | 1010 |
| ~~KD~~ KC046 | FSDA-GW53-N-01 | 3/28/12 | 1400 |
| KC047 | FSDA-QW-E-01 | 3/28/12 | 1711 |
| | Menehune Water Company 81533 44444 | | |
| KC048 | FSDA-QW-F-01 2 | 3/28/12 | 1720 |
| | Menehune Water Company 81533 44444 | | |

COC # 38135 shipped 3/29/12
38136 " "



Location: MCBH  Date: 3/28/12

Project / Client: Fuel Farm Sludge Disposal RI

| Bottles (Pres) | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOA HCl | BTEX, TPH-GRO | QC | Trip blank |
| 6-40ml VOA HCl | BTEX, TPH-GRO | N | MW54 |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | |
| 1-500mL $HNO_3$ | unfiltered Pb | | |
| 1-500mL $HNO_3$ | filtered Pb | | |
| 6-40ml VOA HCl | BTEX, TPH-GRO | N | MW53 |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | |
| 1-500mL $HNO_3$ | unfiltered Pb | | |
| 1-500mL $HNO_3$ | filtered Pb | | |
| 6-40ml VOA HCl | BTEX, TPH-GRO | Equip. blank | |
| 4-1 Liter Amber | PAHs, TPH-DRO/LRO | | |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| 1-500ml $HNO_3$ | filtered Pb | | |
| 6-40ml VOA HCl | BTEX, TPH-GRO | Field blank | |
| 4-1 Liter Amber | PAHs, TPH-DRO/LRO | | |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| ~~1-500~~ | | | |

[signature] 3/28/12 [signature]

Location MCBH Date 3/29/12

Project / Client Fuel Farm Sludge Disposal RI

| COCID | Sample ID | Date | Time |
|---|---|---|---|
| KC049 | FSDA-GWT11 | 3/29/12 | 0730 |
| KC050 | FSDA-GW57-N-01 | 3/29/12 | 1000 |
| KC051 | FSDA-GW57-D-01 | 3/29/12 | 1015 |
| KC052 | FSDA-GW50-N-01 | 3/29/12 | 1615 |

COC # 35075 3/30/12
35087 "
35086 "
35085 "

[illegible] 3/29/12



Location MCBH Date 3/29/12

Project / Client Fuel Farm Sludge Disposal RI

| Bottles (Pres) | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOA (HCl) | BTEX, TPH-GRO | QC | |
| 6-40ml VOA (HCl | BTEX TPH-GRO | | MW57 |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| 1-500ml $HNO_3$ | filtered ~~Pb~~ Pb | N | |
| 6-40ml VOA (HCl) | BTEX, TPH-GRO | QC | Dup/ |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | ~~MS/MSD~~ |
| 1-500ml $HNO_3$ | unfiltered Pb | | MW57 |
| 1-500ml $HNO_3$ | filtered | | |
| 14-40ml VOA (HCl) | BTEX, TPH-GRO | QC | MS/MSD |
| 12-1L Amber | PAHs, TPH-DRO/LRO | | MW57 |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| 1-500ml $HNO_3$ | filtered Pb | | |
| 6-40ml VOA (HCl | BTEX, TPH-GRO | N | MW50 |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| 1-500ml $HNO_3$ | filtered Pb | | |

Location MCBH Date 4/2/12

Project / Client Fuel Farm Sludge Disposal RI

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC053 | FSDA-~~GW~~ QW-T12 | 4/2/12 | 0830 |
| KC054 | FSDA-GW52-N-01 | 4/2/12 | 1200 |
| KC055 | FSDA-GW58-N-01 | 4/2/12 | 1500 |

COC # 35088 shipped 4/3/12 1130



Location MCBH Date 4/2/12

Project / Client Fuel Farm Sludge Disposal RI

| Bottles (Pres) | Analyses | Sample Type | Note |
|---|---|---|---|
| 3-40ml VOA HCl | BTEX, TPH-GRO | QC | trip blank |
| 6-40ml VOA HCl | BTEX, TPH-GRO | N | No odor |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | No sheen |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| 1-500ml $HNO_3$ | filtered Pb | | |
| 6-40ml VOA HCl | BTEX, TPH-GRO | N | |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| 1-500ml $HNO_3$ | filtered Pb | | |

4/2/12

Location MCBH Date 4/3/12

Project / Client HC25 Fuel Farm Sludge Disposal RI

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC056 | FSDA-QW-TB- | 4/3/12 | 0844 |
| KC057 | FSDA-GW59-N-01 | 4/3/12 | 0900 |
| KC058 | FSDA-GW56-N-01 | 4/3/12 | 1115 |
| KC059 | FSDA-GW26-N-01 | 4/3/12 | 1430 |

COC# 35090 shipped 4/5/12
35089 " "



Location MCBH Date 4/3/12

Project / Client HC25 Fuel Farm Sludge Disposal RI

| Bottles (Pres) | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOA HCl | BTEX, TPH-GRO | QC | trip blank |
| 6-40ml VOA HCl | BTEX, TPH-GRO | N | slight odor |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | No sheen |
| 1-500ml $HNO_3$ | filtered Pb | | |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| 6-40ml VOA HCl | BTEX, TPH-GRO | N | no odor |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | no sheen |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| 1-500ml $HNO_3$ | filtered Pb | | |
| 6-40ml VOA HCl | BTEX, TPH-GRO | N | No odor |
| 4-1L Amber | PAHs, TPH-DRO/LRO | | No sheen |
| 1-500ml $HNO_3$ | unfiltered Pb | | |
| 1-500ml $HNO_3$ | filtered Pb | | |

[signature] 4/3/12

Location MCBH Date 4/4/12

Project / Client HC25 Fuel Farm Sludge Disposal RI

~~Sample~~

| COC ID | Sample ID | Date | Time | Bottles (Pks) | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC060 | ~~FSDA-GW22-N-01~~ FSDA-QW-T14 | 4/4/12 | 1015 | 3-40 ml VOA HCl | BTEX, TPH-GRO | QC | trip blank |
| KC061 | FSDA-GW22-N-01 | 4/4/12 | 1050 | 6-40 ml VOA HCl<br>4-1L Amber<br>1-500 ml HNO3 poly<br>1-500 ml HNO3 poly | BTEX, TPH-GRO<br>PAHs, TPH-DRO/LRO<br>unfiltered Pb<br>filtered Pb | N | petroleum odor |
| KC062 | FSDA-GW23-N-01 | 4/4/12 | 1400 | 6-40 ml VOA HCl<br>4-1L Amber<br>1-500 ml poly HNO3<br>1-500 ml poly HNO3 | BTEX, TPH-GRO<br>PAHs, TPH-DRO/LRO<br>unfiltered Pb<br>filtered Pb | N | |
| KC063 | FSDA-GW24-N-01 | 4/4/12 | 1620 | 6-40 ml VOA HCl<br>4-1L Amber<br>1-500 ml poly HNO3<br>1-500 ml poly HNO3 | BTEX, TPH-GRO<br>PAHs TPH-DRO/LRO<br>unfiltered Pb<br>filtered Pb | N | No odor |
| KC064 | FSDA-GW24-D-01 | 4/4/12 | 1625 | 6-40 ml VOA HCl<br>4-1L Amber<br>1-500 ml poly HNO3<br>1-500 ml poly HNO3 | BTEX, TPH-GRO<br>PAHs TPH-DRO/LRO<br>unfiltered Pb<br>filtered Pb. | QC | Dup. |

COC # 35091 4/5/12
35092 "

4/4/12



Location MCBH Date 4/4/12

Project / Client HC25 Fuel Farm Sludge Disposal RI

Location MCBH Date 4/5/12

Project / Client HC25 Fuel Farm Sludge Disposal RI

| QCFD | Sample ID | Date | Time |
|---|---|---|---|
| KC065 | FSDA-QW-T15 | 4/5/12 | ~~1019~~ 0950 |
| KC066 | FSDA-GW21-N-01 | 4/5/12 | 1050 |

COC # 35094 4/6/12



Location MCBH Date 4/5/12

Project / Client HC25 Fuel Farm Sludge Disposal RI

| Bottles (Pres) | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40 ml VOA HCl | BTEX, TPH/GRO | QC | trip blank |
| 6-40 ml VOA HCl | BTEX, ~~TPH DRO/LRO~~ TPH-GRO | N | petroleum odor |
| 3-1 L Amber | PAHs, TPH-DRO/LRO | | |
| 1-500 ml poly $HNO_3$ | unfiltered Pb | | sl. sheen |
| 1-500 ml poly $HNO_3$ | filtered Pb | | |

4/5/12

Location MCBH Date 4/9/12

Project / Client Fuel Farm Sludge Disposal RI
Soil Gas

| COC ID | Sample ID | Date | Time | Container (Pres) | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| ~~KC067~~ | ~~FSDA-SG24-N-01~~ CAN #31767 Failed to Complete | ~~4/9/12~~ | ~~1040~~ | ~~TO-15 1-L summa~~ | ~~BTEX & Naphthalene~~ | ~~N~~ | ~~Soil Gas~~ |
| | | | | ~~TO-3~~ | ~~TPH-GRO~~ | | Hev |
| | | | | ~~ASTM D1946~~ | ~~methane~~ | ~~N~~ | |
| KC068 | FSDA-SG23-N-01-DS.0 CAN # 35601 | 4/9/12 | 1045 | TO-15 | BTEX & Naphthalene | N | Hev |
| | | | | TO-3 | TPH-GRO | | |
| | | | | ASTM D1946 | methane | | |
| KC069 | FSDA-SG22-N-01-DS.0 CAN # 33723 | 4/9/12 | 1050 | TO-15 | BTEX & Naphthalene | N | Hev |
| | | | | TO-3 | TPH-GRO | | |
| | | | | ASTM D1946 | methane | | |
| KC070 | FSDA-SG21-N-01-DS.0 # 12040 | 4/9/12 | 1055 | TO-15 1-L summa | BTEX & Naphthalene | N | Hev |
| | | | | TO-3 | TPH-GRO | | |
| | | | | ASTM D1946 | methane | | |
| KC071 | FSDA-SG20-N-01-DS.0 # 34098 | 4/9/12 | 1100 | TO-15 | BTEX & Naphthalene | N | Hev |
| | | | | TO-3 | TPH-GRO | | |
| | | | | ASTM D1946 | methane | | |
| KC072 | FSDA-SG19-N-01-DS.0 # 37744 | 4/9/12 | 1355 | TO-15 | BTEX & Naphthalene | N | Hev |
| | | | | TO-3 | TPH-GRO | | |
| | | | | ASTM D1946 | methane | | |
| KC073 | FSDA-SG19-D-01-DS.0 # 35635 | 4/9/12 | 1400 | TO-15 | BTEX & Naphthalene | QC Dup | |
| | | | | TO-3 | TPH-GRO | | |
| | | | | ASTM D1946 | methane | | |



Location MCBH Date 4/9/12

Project / Client Fuel Farm Sludge Disposal RI
Soil Gas

Location MCBH Date 4/9/12

Project / Client Fuel Farm Sludge Disposal RI
Soil Gas

| COC ID | Sample ID | Date | Time | Containers | Analyses | Sample Type | Note |
|---|---|---|---|---|---|---|---|
| KC074 | FSDA-QA-A-01-~~DS0~~ #36376 | 4/9/12 | 1430 | TO-15 1-Lsumma<br>TO-3<br>ASTM D1946 | BTEX & Naphthalene<br>TPH-GRO<br>~~ASTM D1946~~ methane | QC | Ambient |
| KC075 | FSDA-SG18-N-01-DS.0 #2057 He✓ | 4/9/12 | 1440 | TO-15<br>TO-3<br>ASTM D1946 | BTEX & Naphthalene<br>TPH-GRO<br>methane | N | |
| KC076 | FSDA-SG17-N-01-DS0 #33709 He✓ | 4/9/12 | 1445 | TO-15<br>TO-3<br>ASTM D1946 | BTEX & Naphthalene<br>TPH-GRO<br>methane | N | |
| KC077 | FSDA-SG16-N-01-DS.0 #37294 He✓ | 4/9/12 | 1500 | TO-15<br>TO-3<br>ASTM D1946 | BTEX & Naphthalene<br>TPH-GRO<br>methane | N | |
| KC078 | FSDA-SG15-N-01-DS0 #23838 He✓ | 4/9/12 | 1505 | TO-15<br>TO-3<br>ASTM D1946 | BTEX & Naphthalene<br>TPH-GRO<br>methane | N | |
| KC079 | FSDA-QA-T16 #37337 He✓ | 4/9/12 | 1520 | TO-15<br>TO-3<br>ASTM D1946 | BTEX & Naphthalene<br>TPH-GRO<br>methane | QC | trip blank |

[signature] 4/9/12



Location MCBH Date ~~5~~ 4/9/12

Project / Client Fuel Farm Sludge Disposal RI
Soil Gas

Location MCBH Date 4/9/12

Project / Client Fuel Farm Study Disposal RI
Soil Gas

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC080 | FSDA-SG04-N-01 DS0 | 4/10/12 | ~~0853~~ 0905 |
| | #37355 | | |
| | 30 → 0 | He ✓ | |
| KC081 | FSDA-SG02-N-01-DS0 | 4/10/12 | ~~0810~~ 0910 |
| | #8007 | | |
| | 30 → 0 | He ✓ | |
| KC082 | FSDA-SG03-N-01-DS0 | 4/10/12 | 0912 |
| | #37410 | | |
| | 30 → 0 | He ✓ | |
| ~~KC083~~ | | | |
| KC083 | FSDA-SG~~06~~24-N-01-DS0 | 4/10/12 | 0915 |
| | #37346 | | |
| | 30 → 0 | He ✓ | |
| KC084 | FSDA-SG01-N-01 DS0 | 4/10/12 | 0920 |
| | #34630 4/4/12 | | |
| | 30 → 0 | | |
| | | He ✓ | |



Location MCBH Date 4/9/12

Project / Client Fuel Farm Study Disposal RI
Soil Gas

| Containers | Analyses | Sample Type | Notes |
|---|---|---|---|
| 1-L summa | | | |
| TO-15 | BTEX, Naphthalene | N | PID=0 |
| TO-3 | TPH GRO | | |
| ASTM D 1946 | methane | | |
| 1-L summa | | | |
| TO-15 | BTEX, Naphthalene | N | PID=0 |
| TO-3 | TPH-GRO | | |
| ASTM D 1946 | methane | | |
| 1-L summa | | | |
| TO-15 | BTEX, Napthalene | N | PID=0 |
| TO-3 | TPH-GRO | | |
| ASTM D 1946 | methane | | |
| 1-L summa | | | |
| TO-15 | BTEX, Napthalene | N | PID=0 |
| TO-3 | TPH GRO | | |
| ASTM D 1946 | methane | | |
| 1-L Summa | | | |
| TO-15 | BTEX, Napthalene | N | PID=0 |
| TO-3 | TPH GRO | | |
| ASTM D1946 | methane | | |

Location: MCBH  Date: 4/10/12

Project / Client: HC25 Fuel Farm Sludge Disposal RI
Soil Gas

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC085 | FSDA-SG07-N-01-DS0 #35677 -30 → 0 He✓ | 4/10/12 | 1100 |
| KC086 | FSDA-SG08-N-01-DS0 #34578 -30 → 1 He✓ | 4/10/12 | 1105 |
| KC087 | FSDA-SG05-N-01-DS0 #36484 -30 → 1 He✓ | 4/10/12 | 1110 |
| KC088 | FSDA-~~SG06~~ SG06-N-01-DS0 #2174 -30 → 0 He✓ | 4/10/12 | 1120 |
| KC089 | FSDA-SG09-N-01-DS0 #12807 -30 → 0 He✓ | 4/10/12 | 1130 |
| KC090 | FSDA-SG09-D-01-DS0 #35619 -30 → 0 He✓ | 4/10/12 | 1135 |



Location: MCBH  Date: 4/10/12

Project / Client: HC25 Fuel Farm Sludge Disposal RI
Soil Gas

| Containers | Analyses | Sample Type | Note |
|---|---|---|---|
| 1-L summa | TO-15 BTEX Naphthalene<br>TO-3 TPH-GRO<br>ASTM D1946 methane | N | PID=0<br>~~PID=0~~ |
| 1-L summa | TO-15 BTEX Naphthalene<br>TO-3 TPH-GRO<br>ASTM D1946 methane | N | PID=0 |
| 1-L summa | TO-15 BTEX Naphthalene<br>TO-3 TPH-GRO<br>ASTM D1946 methane | N | PID=0 |
| 1-L summa | TO-15 BTEX, Naphthalene<br>TO-3 TPH-GRO<br>ASTM D1946 methane | N | PID=0 |
| 1-L summa | TO-15 BTEX, Naphthalene<br>TO-3 TPH-GRO<br>ASTM D1946 methane | N | PID=0 |
| 1-L summa | TO-15 BTEX, Naphthalene<br>TO-3 TPH-GRO<br>ASTM D1946 methane | | QC duplicate |

Location: MCBH  Date: 4/10/12

Project / Client: HC25 Fuel Farm Sludge Disposal Soil Gas

| COCID | Sample ID | Date | Time | Container | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC091 | FSDA-QA-T17 #36486 30→30 | 4/10/12 | 1240 | 1-L summa | TO15 BTEX Naph HK TO-3 TPH-GRO ASTM D1946 methane | QC | Implosion |
| KC092 | FSDA-QA-A-02 #2154 He✓ 30→0 | 4/10/12 | 1410 | 1-L summa | | QC | Ambient |
| KC093 | FSDA-SG12-N-01-DS.0 #31792 He✓ 30→1 | 4/10/12 | 1413 | 1-L summa | | N | |
| KC094 | FSDA-SG14-N-01-DS.0 #35559 29→0 He✓ | 4/10/12 | 1415 | 1-L summa | | N | |
| KC095 | FSDA-SG13-N-01-DS.0 #36470 30→0 He✓ | 4/10/12 | 1416 | 1-L summa | | N | |
| KC096 | FSDA-SG10-N-01-DS.0 #34627 30→0 He✓ | 4/10/12 | 1420 | 1-L summa | | N | |



Location: MCBH  Date: 4/10/12

Project / Client: HC25 Fuel Farm Sludge Disposal Soil Gas

Location: MCBH Date: 4/10/12

Project / Client: HC25 Fuel Farm Sludge Disposal RI

| COC ID | Sample ID | Date | Time | Container | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC097 | FSDA-SG11-N-01-D50 #2187 29-1 | 4/10/12 | 1425 | 1-L summa | TO-15 BTEX, Naphth. TO-3 TPH-GRO ASTM D1946 Methane | N | |



Location: MCBH Date: 4/10/12

Project / Client: HC25 Fuel Farm Sludge Disposal RI

4/10/12

Location MCBH Date 4/11/12

Project / Client AC25 Fuel Farm Sludge Disposal Rt

| QCID | Sample ID | Date | Time | Container | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC098 | FSDA-QA-T18 #1352 -30-0 | 4/11/12 | 0915 | 1-L summa | TO-15 BTEX, Naph TO-3 TPH-GAS ASTM D1946 Methane | QC | triplicate |
| KC099 | FSDA-QA-A-03 #36550 -29-0 | 4/11/12 | 0940 | | | QC | Ambient Near SG33 |
| KC100 | FSDA-SG29-N-01-DS.0 #30818 -29-0 | 4/11/12 | 0945 | | | N | |
| KC101 | FSDA-SG32-N-01-DS.0 #37715 -30-1 | 4/11/12 | 0950 | | | N | |
| KC102 | FSDA-SG31-N-01-DS.0 #31774 -30-1 | 4/11/12 | 0955 | | | N | |
| KC103 | FSDA-SG33-N-01-DS.0 #37403 -29-0 | 4/11/12 | 1000 | | | N | |



Location MCBH Date 4/11/12

Project / Client AC25 Fuel Farm Sludge Disposal Rt

Location MCBH Date 4/11/12

Project / Client HC25 Fuel Farm Sludge Disposal

| COCID | SampleID | Date | Time | Container | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| ~~KCO~~KC104 | FSDA-SG33-D-01-DS.0 #36548 -29 - 0 | 4/11/12 | 1001 | 1-L Summa | TO-15 BTEX, Naph TO-3 TPH-GRO ASTM D1946 | QC | Duplicate |
| KC0105 | FSDA-SG36-N-01-DS0 ~~-29~~ #37659 -29 - 0 | 4/11/12 | 1005 | | | N | |
| KC0106 | FSDA-SG37-N-01-DS.0 # 20781 -29 - 0 | 4/11/12 | 1006 | | | N | |
| KC0107 | FSDA-SG35-N-01-DS.0 # 34579 -29 - 0 | 4/11/12 | 1007 | | | N | |
| KC108 | FSDA-SG34-N-01-DS.0 # 35626 -30 - 0 | 4/11/12 | 1008 | | | N | |
| KC109 | FSDA-SG27-N-01-DS.0 -30 - 0 #37695 | 4/11/12 | 1159 | | | | |



Location MCBH Date 4/11/12

Project / Client HC25 Fuel Farm Sludge Disposal

Location MCBH Date 4/11/12

Project / Client HC25 Fuel Farm Sludge Disposal RI

| COCID | Sample ID | Date | Time |
|---|---|---|---|
| KC110 | FSDA-SG25-N-01-DS-0<br>#35555<br>-29 → 0 | 4/11/12 | 1204 |
| KC111 | FSDA-SG26-N-01-DS-0<br>#2103<br>~~30~~-31 → 1 | 4/11/12 | 1210 |
| KC112 | FSDA-SG28-N-01-DS-0<br>#35655<br>-29 — 0 | 4/11/12 | 1229 |
| KC113 | FSDA-SG28-D-01-DS-0<br>#2180<br>-29 — 0 | 4/11/12 | 1230 |
| KC114 | FSDA-SG30-N-01-DS-0<br>#36387<br>-29 — 0 | 4/11/12 | 1233 |



Location MCBH Date 4/11/12

Project / Client HC25 Fuel Farm Sludge Disposal RI

| Container | Analyses | Sample Type | Notes |
|---|---|---|---|
| 1-L summa | TO-15 BTEX, Naphth<br>TO-3 TPH GRO<br>ASTM D 1946 Methane | N | |
| ↓ | ↓ | N | |
| | | N | |
| | | | QC Duplicate |
| | | N | |

R Kamally 4/11/12

Location MCBH Date 8/20/12

Project / Client HC25 Sludge Disposal Area

overcast Resample for Pb + TPH-GRO

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC0115 | FSDA-GW24-N-02 | 8/20/12 | 0930 |
| KC0116 | FSDA-GW24-D-02 | 8/20/12 | 0935 |
| KC0117 | FSDA-GW26-N-02 | 8/20/12 | 1120 |
| KC0118 | FSDA-GW22-N-02 | 8/20/12 | 1420 |

COC # 36207
Shipped 8/22/12



Location MCBH Date 8/20/12

Project / Client HC25 Sludge Disposal Area
Resample Wells

| Container | Analyses | Sample Type | Notes |
|---|---|---|---|
| 1-500ml poly $HNO_3$ | unfiltered Pb | N | No odor |
| 1-500ml poly $HNO_3$ | filtered Pb | | No sheen |
| 4-500ml poly $HNO_3$ | unfiltered Pb | QC | ms/msD |
| 4-500ml poly $HNO_3$ | filtered Pb | | |
| 1-500ml poly $HNO_3$ | unfiltered Pb | N | petrol sheen + odor |
| 1-500ml poly $HNO_3$ | filtered Pb | | |
| 1-500ml poly $HNO_3$ | unfiltered Pb | N | petrol odor + sheen. |
| 1-500ml poly $HNO_3$ | filtered Pb | | |

8/20/12

Location MCBH Date 8/21/12

Project / Client HC25 Sludge Disposal Area

Sunny Resample

| COC ID | Sample ID | Date | Time | Containers | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC0119 | FSDA-GW21-N-02 | 8/21/12 | 0935 | 1-500ml poly $HNO_3$<br>1-500 ml poly $HNO_3$ | unfiltered Pb<br>filtered Pb | N | sl petrol odor |
| KC0120 | FSDA-QW-~~2~~T01-02 | 8/21/12 | 1025 | 3-40 ml VOAs HCl | TPH-GRO | QC | trip blank |
| KC0121 | FSDA-GW58-N-02 | 8/21/12 | 1125 | 3-40ml VOA HCl | TPH-GRO | N | petrol odor |
| KC0122 | FSDA-GW58-D-02 | 8/21/12 | 1130 | 3-40ml VOA HCl | TPH-GRO | QC | dup. petrol odor |
| KC0123 | FSDA-GW10-N-02 | 8/21/12 | 1425 | 1-500ml poly $HNO_3$<br>1-500ml poly $HNO_3$ | unfiltered Pb<br>filtered Pb | N | No odor |
| KC0124 | FSDA-QW-~~E03~~ E01-02 | 8/21/12 | 1655 | 1-500 ml poly $HNO_3$<br>1-500 ml poly $HNO_3$ | unfiltered Pb<br>filtered Pb | QC | Eq. blank on pump |
| KC0125 | FSDA-QW-~~F03~~ F01-02 | 8/21/12 | 1700 | 1-500 ml poly $HNO_3$ | unfiltered Pb | QC | FB |

Membrane Water Distilled $H_2O$ #81533 44444 By 080813

COC# 36207



Location MCBH Date 8/21/12

Project / Client HC25 Sludge Disposal Area

J Hamnah 8/21/12

Location MCBH Date 1/29/14

Project / Client HC25 Supplemental RI

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC126 | FSDA-QW-T1-03 | 1/29/14 | 0820 |
| ~~KC127~~ KC127 | FSDA-BS64-~~S01-D4.0~~ N-01-D4.0 | 1/29/14 | 0825 |
| KC128 | FSDA-BS64-~~S02-D10.0~~ N-02-D10.0 | 1/29/14 | 0850 |



Location MCBH Date 1/29/14

Project / Client HC25 Supplemental RI

| Containers | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOA HCl | BTEX, TPH-GRO | trip blank | |
| 2-8oz<br>1-40ml VOA MeOH<br>2-40ml $H_2O$ | TPHDRO/LRO, PAHs, Pb<br>TPH-GRO, BTEX | N | |
| 2-8oz<br>1-40ml VOA MeOH<br>1-40ml VOA $H_2O$ | TPH-DRO/LRO, PAHs, Pb<br>TPH-GRO, BTEX | N | |

1/29/14

Location MCBH Date 1/30/14

Project / Client HC25 Supplemental RI

| COC ID | Sample ID | Date | Time | Containers | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC129 | FSDA-QW-T-02 | 1/30/14 | 1000 | 3-40ml VOA HCl | BTEX ~~TPHGRO~~ trip blank | | |
| KC130 | FSDA-BS65-N-01-D5.0 | 1/30/14 | 1020 | 2-8oz<br>1-40mVOA MeOH<br>2-40ml VOA $H_2O$ | TPHDRO/LRO, PAHs Pb<br>BTEX TPHGRO | N | No odor |
| KC131 | FSDA-BS65-N-02-D10.0 | 1/30/14 | 1040 | 2-8oz<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ | TPH DRO/LRO, PAHs Pb<br>BTEX, TPH-GRO | N | No odor |
| KC132 | FSDA-BS63-N-01-D5.0 | 1/30/14 | 1300 | 2-8oz<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ | TPH-DRO/LRO, PAHs, Pb<br>BTEX, TPH-GRO | N | No odor |
| KC133 | FSDA-BS63-N-02-D9.0 | 1/30/14 | 1310 | 2-8oz<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ | TPH-DRO/LRO, PAHs Pb<br>BTEX, TPH-GRO | N | No odor |
| KC134 | FSDA-BS63-D-02-D9.0 | 1/30/14 | 1315 | 2-8oz<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ | TPH-DRO/LRO, PAHs Pb<br>BTEX, TPH-GRO | dup | No odor |



Location MCBH Date 1/30/14

Project / Client HC25 Supplemental RI

Location: MCBH  Date: 1/30/14

Project / Client: CTO AC25 Supplemental RI

| COC ID | Sample ID | Date | Time | Containers | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC135 | PSDA-BS62-N-01-D50 | 1/30/14 | 1425 | 2-8oz<br>1-40ml VOA MeOH<br>2-40ml VOA $H_2O$ | TPH DRO/ORO, PAHs, Pb<br>BTEX, TPH-GRO | N | No odor |
| KC136 | PSDA-BS62-N-02-D10-12 | 1/30/14 | 1435 | 5-8oz<br>3-40ml VOA MeOH<br>6-40ml VOA $H_2O$ | TPH-DRO/ORO, PAHs, Pb<br>BTEX, TPH-GRO | MS/MSD | No odor |



Location: MCBH  Date: 1/30/14

Project / Client: CTO AC25 Supplemental RI

DKamal
1/30/14

Location MCBH Date 1/31/14

Project / Client CTO HC25 Supplemental RI

| ~~KC~~ COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC137 | FSDA-~~T~~ QW-T-03 | 1/31/14 | 0720 |
| KC138 | FSDA-BS61-N-01-D50 | | 0730 |
| KC139 | FSDA-BS61-N-02-D120 | | 0745 |
| KC140 | FSDA-BS60-N-01-D50 | | 0900 |
| KC141 | FSDA-BS60-N-02-D120 | | 0920 |



Location MCBH Date 1/31/14

Project / Client CTO HC25 Supplemental RI

| Containers | Analyses | Sample Type | Notes |
|---|---|---|---|
| 3-40ml VOA HCl | BTEX-TPHGRO | QC | trip blank |
| 2-8 oz | TPH DRO/LRO, ~~BTEX~~ PAHs, Pb | N | No odor |
| 1-40ml VOA MeOH, 2-40ml VOA $H_2O$ | TPHGRO-BTEX | | |
| 2-8 oz | TPH DRO/LRO, PAHs, Pb | N | No odor |
| 1-40ml VOA MeOH, 2-40ml VOA $H_2O$ | TPH-GRO, BTEX | | |
| 2-8 oz | TPH-DRO/LRO, PAHs, Pb | N | No odor |
| 1-40ml VOA MeOH, 2-40ml VOA $H_2O$ | TPH-GRO, BTEX | | |
| 2-8 oz | TPH-DRO/LRO, PAHs, Pb | N | No odor |
| 1-40ml VOA MeOH, 2-40ml VOA $H_2O$ | TPH-GRO, BTEX | | |

[illegible]
1/31/14

Location MCBH Date 2/5/14

Project / Client CTO HC25 Supplemental RI

| COC ID | Sample ID | Date | Time | Containers | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC142 | FSDA-QW-TB4 | 2/5/14 | 0830 | 3-40ml VOA HCl | BTEX, TPH-GRO | QC | trip blank |
| KC143 | FSDA-GW64-N-01 | 2/5/14 | 0935 | 6-40ml VOA HCl<br>4-1L Amber<br>1-500ml poly $HNO_3$<br>1-500 ml poly $HNO_3$ | BTEX, TPH-GRO<br>TPH-DRO/LRO, PAHs<br>~~total~~ total Pb<br>dissolved Pb filtered | N | No odor sheen MW64 |
| | | | ~~0945~~ | | | | |
| KC144 | FSDA-GW64-D-01 | 2/5/14 | 0945 | 6-40ml VOA HCl<br>4-1L Amber<br>1-500 ml poly $HNO_3$<br>1-500 ml poly $HNO_3$ | BTEX, TPH-GRO<br>TPH-DRO/LRO, PAHs<br>total Pb<br>dissolved Pb filtered | QC (dup) | No odor sheen MW64 |
| KC145 | FSDA-GW65-N-01 | 2/5/14 | 1320 | 6-40ml VOA HCl<br>4-1L Amber<br>1-500 ml poly $HNO_3$<br>1-500 ml poly $HNO_3$ | BTEX, TPH-GRO<br>TPH-DRO/LRO PAHs<br>Total Pb<br>dissolved Pb (filtered) | N | No odor MW65 |
| KC146 | FSDA-GW60-N-01 | 2/5/14 | 1530 | 6-40ml VOA HCl<br>4-1L Amber<br>1-500ml poly $HNO_3$<br>1-500 ml poly $HNO_3$ | BTEX, TPH-GRO<br>TPH-DRO/LRO, PAHs<br>Total Pb<br>Dissolved Pb | N | sulfur odor MW60 |

R Kamilow 2/5/14



Location MCBH Date 2/5/14

Project / Client CTO HC25 Supplemental RI

Location MCBH Date 2/6/14

Project / Client CTO HC25 Supplemental RI

| COC ID | Sample ID | Date | Time | Containers | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC147 | FSDA-QW-T05 | 2/6/14 | 0730 | 3-40 mL VOAs HCl | BTEX-TPH-GRO | QC | trip blank |
| KC148 | FSDA-GW63-N-01 | 2/6/14 | 0830 | 18-40 mL VOA HCl | BTEX-TPH-GRO | N/QC | MW63 |
| | | | | 17-1L Amber | TPH-DRO/LRO, PAHs | | MS/MSD |
| | | | | 3-500 mL poly HNO3 | Total Pb | | |
| | | | | 3-500 mL poly HNO3 | Dissolved Pb | | |
| KC149 | FSDA-GW62-N-01 | 2/6/14 | 1110 | 6-40 mL VOA HCl | BTEX, TPH-GRO | N | MW62 |
| | | | | 4-1L Amber | TPH-DRO/LRO, PAHs | | |
| | | | | 1-500 mL HNO3 | Total Pb | | |
| | | | | 1-500 mL HNO3 | Dissolved Pb | | |
| KC150 | FSDA-GW61-N-01 | 2/6/14 | 1325 | 6-40 mL VOA HCl | BTEX, TPH-GRO | N | MW61 |
| | | | | 4-1L Amber | TPH-DRO/LRO, PAHs | | |
| | | | | 1-500 mL poly HNO3 | Total Pb | | |
| | | | | 1-500 mL poly HNO3 | Dissolved Pb | | |



Location MCBH Date 2/6/14

Project / Client CTO HC25 Supplemental RI

2/6/14

Location ~~CTO HC~~ MCBH Date 2/6/14

Project / Client CTO HC25 Supplemental RI

| COC ID | Sample ID | Date | Time |
|---|---|---|---|
| KC151 | FSDA-GW-F-01 | 2/6/14 | 1400 |
| KC152 | FSDA-GW-E-01 | 2/6/14 | 1410 |



Location MCBH Date 2/6/14

Project / Client CTO HC25 Supplemental RI

Sample Notes

| Containers | Analyses | Type |
|---|---|---|
| 6-40ml VOA HCl<br>4-1L Amber<br>1-500ml poly HNO3 | BTEX, TPH-GRO<br>TPH-DRO/LRO, PAHs<br>Total Pb | QC Field blank |
| 6-40ml VOA HCl<br>4-1L Amber<br>1-500ml poly HNO3<br>1-500ml poly HNO3 | BTEX, TPH-GRO<br>TPH-DRO/LRO, PAHs<br>Total Pb<br>Dissolved Pb | QC Equip. blank |

2/6/14

Location MCBH Date 2/13/14

Project / Client CTO HC25 Supplemental RI

| COC ID | Sample ID | Date | Time | Containers | Analyses | Sample Type | Notes |
|---|---|---|---|---|---|---|---|
| KC153 | FSDA-WS-N-01 | 2/13/14 | 1345 | 2-8oz jar | TCLP-Pb | IDW | |



Location MCBH Date 2/13/14

Project / Client CTO HC25 Supplemental RI

2/13/14

# Appendix B
# Field Sampling Logs

# Appendix B.1
# Boring Logs

# WELL NUMBER MW60

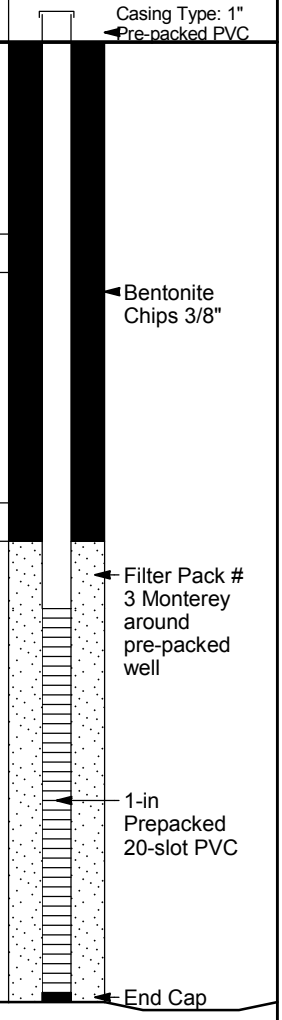


**CLIENT** NAVFAC Hawaii
**PROJECT NAME** Former Fuel Farm Sludge Disposal Area Supplemental RI
**PROJECT NUMBER** CTO HC25
**PROJECT LOCATION** Fuel Farm and Motor Pool Area, MCB Hawaii
**DATE STARTED** 1/31/14 **COMPLETED** 1/31/14
**GROUND ELEVATION** **HOLE SIZE** 6 inches
**DRILLING CONTRACTOR** Valley Well Drilling
**GROUND WATER LEVELS:**
**DRILLING METHOD** Direct-push/HSA
**AT TIME OF DRILLING** 16.12 ft
**LOGGED BY** R. Kaminaka **CHECKED BY**
**AT END OF DRILLING** ---
**NOTES** Temporary completion with capped well casing extending aboveground **AFTER DRILLING** ---

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION | Environmental Data |
|---|---|---|---|---|---|---|
| 0 | | | CL | | (CL) SILTY CLAY: reddish brown (5 YR 3/4), moist, low to moderate plasticity, approx. 10% gravel, 30% sand, 60% fines. No stain or odor. | |
| 4.5 | | | | | | |
| 5 | | | SP | | (SP) CORALLINE SAND: white, medium-grain, poorly graded, loose. Likely fill material for former USTs. | |
| 5.0 | KC140 | 50 | | | | PID = 0 |
| | | | CL | | (CL) SILTY CLAY: red (2.5 YR 4/6), moderate plasticity, moist, with corralline medium-grain sand. No stain or odor. | |
| 10 | | | | | | |
| 10.0 | | | IE | | (IE) WEATHERED TUFF: Grayish brown (10 YR 5/2), mottled black to brown, with medium-grain coralline sand and olivine crystals. Hard drilling but appears like sand in sample liner. Moist to wet at 12 ft bgs. | |
| | KC141 | 75 | | | | PID = 0 |
| 15 | | | | | | |
| 16.0 | | | | | (IE) Same as above. Bottom of boring at 25 ft bgs. Soil samples collected using direct-push, and boring is redrilled using 6" HSA to install monitoring well. | |
| 20 | | | IE | | | |
| 25 | | | | | | |
| 25.0 | | | | | | |

Bottom of borehole at 25.0 feet.

WELL DIAGRAM




GENERAL BH / TP / WELL - GINT STD US.GDT - 7/8/14 10:08 - D:\MY DOCUMENTS_CLEAN NAVY_HC25_SLUDGE DISPOSAL\FINAL SUPPL RI\APP B_FIELD LOGS\B.1 BORING LOGS\HC25 BORING LOGS_6-9-14.GPJ

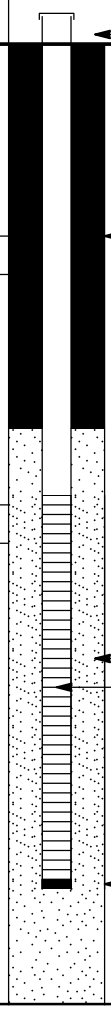
# WELL NUMBER MW61



**CLIENT** NAVFAC Hawaii
**PROJECT NAME** Former Fuel Farm Sludge Disposal Area Supplemental RI
**PROJECT NUMBER** CTO HC25
**PROJECT LOCATION** Fuel Farm and Motor Pool Area, MCB Hawaii
**DATE STARTED** 1/31/14 **COMPLETED** 1/31/14
**GROUND ELEVATION** **HOLE SIZE** 6 inches
**DRILLING CONTRACTOR** Valley Well Drilling
**GROUND WATER LEVELS:**
**DRILLING METHOD** Direct-push/HSA
**AT TIME OF DRILLING** 15.00 ft
**LOGGED BY** R. Kaminaka **CHECKED BY**
**AT END OF DRILLING** ---
**NOTES** Temporary completion with capped well casing extending aboveground **AFTER DRILLING** ---

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION | Environmental Data |
|---|---|---|---|---|---|---|
| 0 | | | | | (CL) SILTY CLAY: dark brown (7.5 YR 3/4), moist, low to moderate plasticity, firm, approx. 10% sand, 90% fines. No stain or odor. | |
| | | | CL | | 3.0 | |
| | | | | | (SP) CORALLINE SAND: white, medium-grain, poorly graded, loose. Likely fill material for former USTs. | |
| 5 | KC138 | 75 | SP | | | PID = 0 |
| | | | | | 7.0 | |
| | | | GW | | (GW) CORALLINE SANDY GRAVEL: strong brown (7.5 YR 4/6), loose, moist. No stain or odor. 8.0 | |
| | | | | | (IE) WEATHERED TUFF: Grayish brown (10 YR 5/2), mottled black to brown to white, with medium-grain coralline sand and olivine crystals. Hard layer but appears like sand in sample liner. Moist to wet at 12 ft bgs. No stain or odor. | |
| 10 | | | | | | |
| | KC139 | 75 | IE | | | PID = 0 |
| 15 | | | | | ∇ | |
| | | | | | 16.0 | |
| | | | | | (IE) Same as above. Bottom of boring at 25 ft bgs. | |
| | | | | | Soil samples collected using direct-push, and boring is redrilled using 6" HSA to install monitoring well. | |
| 20 | | | IE | | | |
| 25 | | | | | 25.0 | |

Bottom of borehole at 25.0 feet.




GENERAL BH / TP / WELL - GINT STD US.GDT - 7/8/14 10:08 - D:\MY DOCUMENTS_CLEAN NAVY_HC25_SLUDGE DISPOSAL\FINAL SUPPL RI\APP B_FIELD LOGS\B.1 BORING LOGS\HC25 BORING LOGS_6-9-14.GPJ

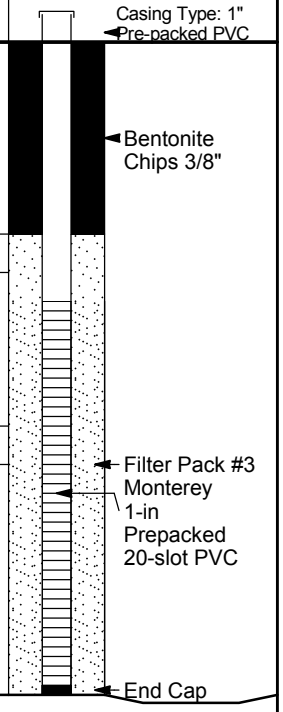
# WELL NUMBER MW62



**CLIENT** NAVFAC Hawaii
**PROJECT NAME** Former Fuel Farm Sludge Disposal Area Supplemental RI
**PROJECT NUMBER** CTO HC25
**PROJECT LOCATION** Fuel Farm and Motor Pool Area, MCB Hawaii
**DATE STARTED** 1/30/14 **COMPLETED** 1/30/14
**GROUND ELEVATION** **HOLE SIZE** 6 inches
**DRILLING CONTRACTOR** Valley Well Drilling
**GROUND WATER LEVELS:**
**DRILLING METHOD** Direct-push/HSA
**AT TIME OF DRILLING** 13.10 ft
**LOGGED BY** R. Kaminaka **CHECKED BY**
**AT END OF DRILLING** ---
**NOTES** Temporary completion with capped well casing extending aboveground **AFTER DRILLING** ---

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION | Environmental Data |
|---|---|---|---|---|---|---|
| 0 | | | CL | | (CL) SILTY CLAY: very dark brown (7.5 YR 2.5/3), moist, firm, low to moderate plasticity. Less than 5% sand, 10% gravel, 90% fines. No odor or staining. | |
| 3.0 | | | GW | | (GW) CORALLINE GRAVEL: pinkish white (7.5 YR 8/2), well graded, dry, up to 3 cm diameter. | |
| 5.0 | KC135 | 50 | IE | | (IE) WEATHERED TUFF: dark brown (7.5 YR 3/3), lithified tuff with medium grain coralline sand, moist. No odor or staining. | PID = 0 |
| 8.0 | | | IE | | (IE) Same as above. Wet at 10 ft bgs. No odor or staining. | |
| 10 | KC136 | 75 | IE | | | PID = 0 |
| 12.0 | | | IE | | (IE) Same as above. Bottom of boring at 20 ft bgs. Soil samples collected using direct-push, and boring was redrilled using 6" HSA to install monitoring well. | |
| 15 | | | | | | |
| 17.0 | | | | | | |

WELL DIAGRAM




Bottom of borehole at 17.0 feet.

GENERAL BH / TP / WELL - GINT STD US.GDT - 7/8/14 10:08 - D:\MY DOCUMENTS_CLEAN NAVY_HC25_SLUDGE DISPOSAL\FINAL SUPPL RI\APP B_FIELD LOGS\B.1 BORING LOGS\HC25 BORING LOGS_6-9-14.GPJ

# WELL NUMBER MW63

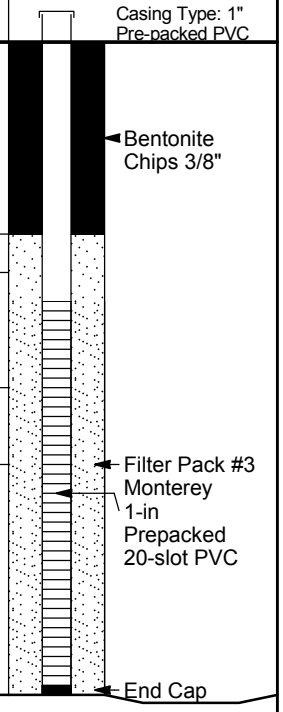


**CLIENT** NAVFAC Hawaii
**PROJECT NAME** Former Fuel Farm Sludge Disposal Area Supplemental RI
**PROJECT NUMBER** CTO HC25
**PROJECT LOCATION** Fuel Farm and Motor Pool Area, MCB Hawaii
**DATE STARTED** 1/30/14 **COMPLETED** 1/30/14
**GROUND ELEVATION** ____ **HOLE SIZE** 6 inches
**DRILLING CONTRACTOR** Valley Well Drilling
**GROUND WATER LEVELS:**
**DRILLING METHOD** Direct-push/HSA
**AT TIME OF DRILLING** 12.00 ft
**LOGGED BY** R. Kaminaka **CHECKED BY** ____
**AT END OF DRILLING** ---
**NOTES** Temporary completion with capped well casing extending aboveground **AFTER DRILLING** ---

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION | Environmental Data |
|---|---|---|---|---|---|---|
| 0 | | | CL | | (CL) SILTY CLAY: brown (7.5 YR 4/4), moist, firm, moderate plasticity. No odor and no staining. | PID = 0 |
| 5 | KC132 | 50 | IE | | (IE) WEATHERED TUFF: dark brown (7.5 YR 2.5/2), moist, | PID = 0 |
| | | | IE | | (IE) Same as above, intermixed with medium grain coralline sand. | |
| 10 | KC133/ KC134 | 50 | IE | | (IE) WEATHERED TUFF: black (2.5 YR 2.5/1), reworked tuff with medium grain coralline sand and brown and green olivine sand, moist to wet. Drilling through hard layer but the sample looks like sand. No odor or staining. | PID = 0 |
| 15 | | | IE | | (IE) Same as above. Bottom of boring at 17 ft bgs. Soil samples collected using direct-push, and boring is redrilled using 6" HSA to install monitoring well. | |

5.0 7.0 8.0 12.0 17.0

WELL DIAGRAM




Bottom of borehole at 17.0 feet.

GENERAL BH / TP / WELL - GINT STD US.GDT - 7/8/14 10:08 - D:\MY DOCUMENTS_CLEAN NAVY_HC25_SLUDGE DISPOSAL\FINAL SUPPL RI\APP B_FIELD LOGS\B.1 BORING LOGS\HC25 BORING LOGS_6-9-14.GPJ

# WELL NUMBER MW64

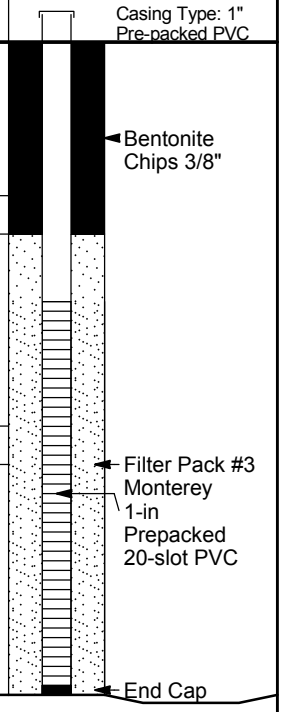


**CLIENT** NAVFAC Hawaii
**PROJECT NAME** Former Fuel Farm Sludge Disposal Area Supplemental RI
**PROJECT NUMBER** CTO HC25
**PROJECT LOCATION** Fuel Farm and Motor Pool Area, MCB Hawaii
**DATE STARTED** 1/29/14 **COMPLETED** 1/30/14
**GROUND ELEVATION** **HOLE SIZE** 6 inches
**DRILLING CONTRACTOR** Valley Well Drilling
**GROUND WATER LEVELS:**
**DRILLING METHOD** Direct-push/HSA
**AT TIME OF DRILLING** 9.00 ft
**LOGGED BY** R. Kaminaka **CHECKED BY**
**AT END OF DRILLING** ---
**NOTES** Temporary completion with capped well casing extending aboveground **AFTER DRILLING** ---

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION | Environmental Data |
|---|---|---|---|---|---|---|
| 0 | | | GW | | (GW) CORALLINE GRAVEL: well graded, dry. 1.0 | |
| | | | CL | | (CL) SILTY CLAY: dark reddish brown (5 YR 3/4), moist, firm, no odor or staining. | |
| 5 | KC127 | 75 | | | | PID = 0 |
| | | | SM | | (SM) SILTY SAND: Brown (7.5 YR 4/3), mottled, loose, moist. No odor or staining. 6.0 – 8.0 | |
| 10 | KC128 | 75 | IE | | (IE) WEATHERED TUFF: Brown (7.5 YR 4/3), mottled, reworked tuff with medium-grain coralline sand and olivine crystals. No staining or odor. | PID = 0 |
| 15 | | | IE | | (IE) Same as above. Bottom of boring at 17 ft bgs. Soil samples collected using direct-push, and boring is redrilled using 6" HSA to install monitoring well. 12.0 – 17.0 | |

Bottom of borehole at 17.0 feet.

WELL DIAGRAM




GENERAL BH / TP / WELL - GINT STD US.GDT - 7/8/14 10:08 - D:\MY DOCUMENTS_CLEAN NAVY_HC25_SLUDGE DISPOSAL\FINAL SUPPL RI\APP B_FIELD LOGS\B.1 BORING LOGS\HC25 BORING LOGS_6-9-14.GPJ

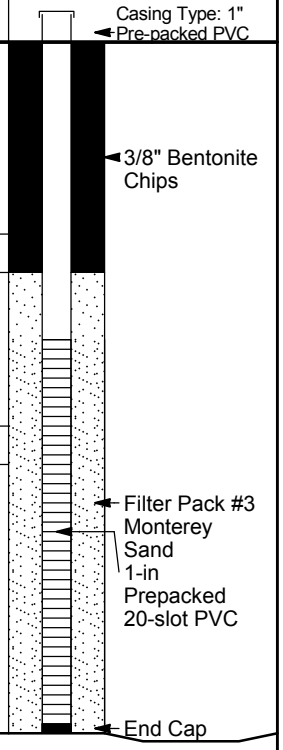
# WELL NUMBER MW65



**CLIENT** NAVFAC Hawaii
**PROJECT NAME** Former Fuel Farm Sludge Disposal Area Supplemental RI
**PROJECT NUMBER** CTO HC25
**PROJECT LOCATION** Fuel Farm and Motor Pool Area, MCB Hawaii
**DATE STARTED** 1/30/14 **COMPLETED** 1/30/14
**GROUND ELEVATION** **HOLE SIZE** 6 inches
**DRILLING CONTRACTOR** Valley Well Drilling
**GROUND WATER LEVELS:**
**DRILLING METHOD** Direct-push/HSA
**AT TIME OF DRILLING** 10.00 ft
**LOGGED BY** R. Kaminaka **CHECKED BY**
**AT END OF DRILLING** ---
**NOTES** Temporary completion with capped well casing extending aboveground **AFTER DRILLING** ---

| DEPTH (ft) | SAMPLE TYPE NUMBER | RECOVERY % | U.S.C.S. | GRAPHIC LOG | MATERIAL DESCRIPTION | Environmental Data |
|---|---|---|---|---|---|---|
| 0 | | | CL | | (CL) SILTY CLAY: Dark brown (7.5 YR 3/4), moist, moderate plasticity, firm, with light gray basalt gravel at surface and some coralline gravel (1-2 cm) at depth; 30% gravel, 10% sand, 60% fines. No odor or staining. | |
| 4.0 | | | IE | | (IE) WEATHERED TUFF: Reddish brown (7.5 YR 6/6) to dark brown (7.5 YR 3/4), reworked tuff with medium-grain coralline sand, moist, no odor or staining. | |
| 5 | KC130 | 75 | IE | | | PID = 0.3 |
| 8.0 | | | IE | | (IE) WEATHERED TUFF: Very dark gray (7.5 YR 3/1)A, reworked tuff with medium-grain, rounded coralline sand. Hard drilling but appearance of sand in sample liners. No odor or staining. | |
| 10 | KC131 | 75 | IE | | | PID = 0 |
| 12.0 | | | IE | | (IE) Same as above. Bottom of boring at 18 ft bgs. Soil samples collected using direct-push, and boring is redrilled using 6" HSA to install monitoring well. | |
| 15 | | | IE | | | |
| 18.0 | | | | | | |

WELL DIAGRAM




Bottom of borehole at 18.0 feet.

GENERAL BH / TP / WELL - GINT STD US.GDT - 7/8/14 10:08 - D:\MY DOCUMENTS_CLEAN NAVY_HC25_SLUDGE DISPOSAL\FINAL SUPPL RI\APP B_FIELD LOGS\B.1 BORING LOGS\HC25 BORING LOGS_6-9-14.GPJ

# Appendix B.2
# Well Development Logs

# WELL DEVELOPMENT LOG

| PROJECT | WELL NO. | PROJECT NO. | PREPARED BY |
|---|---|---|---|
| Supplemental RI, Former Fuel Farm Sludge Disposal Area | MW60 | CTO HC25 | R. Kaminaka |

METHOD
- OVERPUMPAGE [x]
- BAILER [x]
- SURGE BLOCK [ ]
- AIR LIFT [ ]
- OTHER _____

INITIAL WATER LEVEL 16.87

FINAL WATER LEVEL _____

REMARKS:

Water level measured to top of well casing. Surged with bailer for 5 minutes.

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

2" - 0.16
4" - 0.65
6" - 0.1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS/LINEAR FOOT) (ASSUMING 40% POROSITY)

2" CASING AND 6" HOLE - 0.52
2" CASING AND 8" HOLE - 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE - 2.09

**HOLE DIAMETER** $d_h$ = 6 inch

**WELL CASING INSIDE DIAMETER** $d_w ID$ = 1 inch

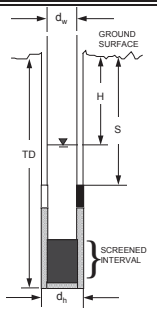
**OUTSIDE DIAMETER** $d_w OD$ = _____

**DEPTH TO: WATER LEVEL** H = 16.87

**BASE OF SEAL** S = _____

**BASE OF WELL** TD = 27.6

**EST. FILTER PACK POROSITY** P = _____




WELL VOLUME CALCULATION:

CASING VOLUME = $V_c = \Pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{____}{2}\right)^2 (____ - ____) = _____$

FILTER PACK PORE VOLUME = $V_f = \Pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H^*)(P) = _____$

(*if S > H, use S; if S < H, use H)

$= 3.14\left[\left(\frac{____}{2}\right)^2 - \left(\frac{____}{2}\right)^2\right](____ - ____)(____) = _____$

TOTAL WELL VOLUME = VT = Vc + Vf = ____ + ____ = _____ ft.$^3$ x 7.48 = _____ gal.

| DEVELOPMENT LOG: | | | | | CUMULATIVE WATER REMOVED | WATER QUALITY | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | TIME BEGIN/END | METHOD | ELAPSED TIME | FLOW RATE (gpm) | GALLONS | pH | Temp (deg F) | CONDUC-TIVITY (mS/cm) | D.O.* (mg/L) | REDOX (ORP) | TURBID-ITY (NTU) | |
| 2/3/14 | 1048 | peristaltic pump | | | | 8.02 | 79.32 | 1.473 | 0.86 | 173.5 | turbid | No odor |
| | | | | | 1 | 8.06 | 79.45 | 1.346 | 0.38 | 171.4 | | No sheen |
| | | | | | | 8.06 | 79.52 | 1.228 | 0.27 | 164.9 | | |
| | | | | | | 8.09 | 79.51 | 1.191 | 0.19 | 157.1 | 256 | |
| | | | | | | 8,18 | 79.55 | 1.122 | 0.64 | 134.0 | 87.6 | |
| | | | | | 8 | 8.20 | 79.25 | 1.157 | 0.35 | 119.5 | 55.7 | |
| | | | | | | 8.27 | 79.30 | 1.162 | 0.13 | 108.0 | 76.5 | |
| | | | | | | 8.31 | 79.28 | 1.132 | 0.32 | 98.6 | 22.0 | |
| | | | | | 14 | 8.31 | 79.30 | 1.116 | 0.11 | 94.1 | 17.6 | |
| | | | | | | 8.29 | 79.30 | 1.108 | 0.10 | 91.1 | 17.4 | |
| | | | | | | 8.29 | 79.28 | 1.100 | 0.09 | 89.3 | 16.7 | |
| | | | | | 18 | 8.29 | 79.31 | 1.097 | 0.10 | 87.9 | 16.0 | |
| | | | | | | | | | | | | |
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* = Dissolved Oxygen

# WELL DEVELOPMENT LOG

| PROJECT | WELL NO. | PROJECT NO. | PREPARED BY |
|---|---|---|---|
| Supplemental RI, Former Fuel Farm Sludge Disposal Area | MW61 | CTO HC25 | R. Kaminaka |

METHOD
- OVERPUMPAGE [x]
- BAILER [x]
- SURGE BLOCK [ ]
- AIR LIFT [ ]
- OTHER _____

INITIAL WATER LEVEL 15.55

FINAL WATER LEVEL _____

REMARKS:

Water level measured to top of well casing. Surged with bailer for 5 minutes.

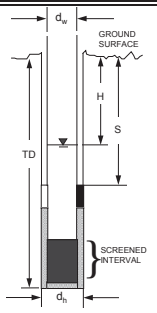
CAPACITY OF CASING (GALLONS/LINEAR FOOT)

2" - 0.16
4" - 0.65
6" - 0.1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS/LINEAR FOOT) (ASSUMING 40% POROSITY)

2" CASING AND 6" HOLE - 0.52
2" CASING AND 8" HOLE - 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE - 2.09

| | | | |
|---|---|---|---|
| HOLE DIAMETER | $d_h$ | = | 6 inch |
| WELL CASING INSIDE DIAMETER | $d_w$ID | = | 1 inch |
| OUTSIDE DIAMETER | $d_w$OD | = | _____ |
| DEPTH TO: WATER LEVEL | H | = | 15.55 |
| BASE OF SEAL | S | = | _____ |
| BASE OF WELL | TD | = | 25.05 |
| EST. FILTER PACK POROSITY | P | = | _____ |




WELL VOLUME CALCULATION:

CASING VOLUME = $V_c = \Pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{____}{2}\right)^2 (____ - ____) = _____$

FILTER PACK PORE VOLUME = $V_f = \Pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H^*)(P) = _____$

(*if S > H, use S; if S < H, use H)

$= 3.14\left[\left(\frac{____}{2}\right)^2 - \left(\frac{____}{2}\right)^2\right](____ - ____)(____) = _____$

TOTAL WELL VOLUME = VT = Vc + Vf = ____ + ____ = _____ ft.$^3$ x 7.48 = _____ gal.

| DEVELOPMENT LOG: | | | | | CUMULATIVE WATER REMOVED | WATER QUALITY | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | TIME BEGIN/END | METHOD | ELAPSED TIME | FLOW RATE (gpm) | GALLONS | pH | Temp (deg F) | CONDUC-TIVITY (mS/cm) | D.O.* (mg/L) | REDOX (ORP) | TURBID-ITY (NTU) | |
| 2/3/14 | 1345 | peristaltic pump | | | 3 | 8.24 | 79.50 | 1.047 | 0.69 | 172.8 | 916 | No odor |
| | | | | | | 8.26 | 79.56 | 1.003 | 0.67 | 167.8 | 317 | No sheen |
| | | | | | 4 | 8.29 | 79.66 | 0.970 | 0.67 | 161.7 | 147 | |
| | | | | | | 8.35 | 79.35 | 0.918 | 0-77 | 147.5 | 82.3 | |
| | | | | | | 8.44 | 79.45 | 0.887 | 1.09 | 134.4 | 77.3 | |
| | | | | | 9 | 8.45 | 79.32 | 0.849 | 1.37 | 121.1 | 48.0 | |
| | | | | | 11 | 8.49 | 79.29 | 0.832 | 1.33 | 113.7 | 26.5 | clear |
| | | | | | | 8.50 | 79.33 | 0.799 | 1.48 | 102.2 | 15.7 | |
| | | | | | | 8.49 | 79.30 | 0.796 | 1.88 | 101.1 | 13.9 | |
| | | | | | 18 | 8.49 | 79.31 | 0.795 | 1.82 | 100.8 | 14.5 | clear |
| | | | | | | | | | | | | |
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* = Dissolved Oxygen

# WELL DEVELOPMENT LOG

| PROJECT | WELL NO. | PROJECT NO. | PREPARED BY |
|---|---|---|---|
| Supplemental RI, Former Fuel Farm Sludge Disposal Area | MW62 | CTO HC25 | R. Kaminaka |

METHOD
- OVERPUMPAGE [x]
- BAILER [x]
- SURGE BLOCK [ ]
- AIR LIFT [ ]
- OTHER _____

INITIAL WATER LEVEL 12.25

FINAL WATER LEVEL 20.71

REMARKS:

Water level measured to top of well casing.
Surged with bailer for 5 minutes. Slow recovery.

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

2" - 0.16
4" - 0.65
6" - 0.1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS/LINEAR FOOT) (ASSUMING 40% POROSITY)

2" CASING AND 6" HOLE - 0.52
2" CASING AND 8" HOLE - 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE - 2.09

**HOLE DIAMETER** $d_h$ = 6 inch

**WELL CASING INSIDE DIAMETER** $d_wID$ = 1 inch

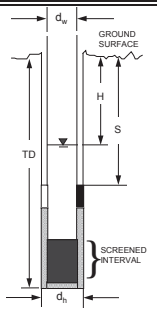
**OUTSIDE DIAMETER** $d_wOD$ = _____

**DEPTH TO: WATER LEVEL** H = 12.25

**BASE OF SEAL** S = _____

**BASE OF WELL** TD = 20.05

**EST. FILTER PACK POROSITY** P = _____




WELL VOLUME CALCULATION:

CASING VOLUME = $V_c = \Pi\left(\frac{d_wID}{2}\right)^2 (TD - H) = 3.14\left(\frac{____}{2}\right)^2 (____ - ____) = _____$

FILTER PACK PORE VOLUME = $V_f = \Pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_wOD}{2}\right)^2\right](TD - (S \text{ or } H^*)(P) = _____$

(*if S > H, use S; if S < H, use H)

$= 3.14\left[\left(\frac{____}{2}\right)^2 - \left(\frac{____}{2}\right)^2\right](____ - ____)(____) = _____$

TOTAL WELL VOLUME = VT = Vc + Vf = ____ + ____ = _____ ft.$^3$ x 7.48 = _____ gal.

| DEVELOPMENT LOG: | | | | | CUMULATIVE WATER REMOVED | WATER QUALITY | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | TIME BEGIN/END | METHOD | ELAPSED TIME | FLOW RATE (gpm) | GALLONS | pH | Temp (deg F) | CONDUC-TIVITY (mS/cm) | D.O.* (mg/L) | REDOX (ORP) | TURBID-ITY (NTU) | |
| 2/4/14 | 1019 | peristaltic pump | | | 2 | 8.11 | 77.48 | 2.102 | 4.55 | -190.4 | | No odor |
| | | | | | | 8.31 | 76.42 | 2.062 | 4.36 | -281.6 | | No sheen |
| | | | | | | 8.38 | 77.69 | 2.010 | 3.64 | -297.1 | 130 | sl. cloudy |
| | | | | | | | | | | | | Slow recovery |
| | | | | | | | | | | | | Drawdown 3X |
| | | | | | | | | | | | | |
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* = Dissolved Oxygen

# WELL DEVELOPMENT LOG

| PROJECT | WELL NO. | PROJECT NO. | PREPARED BY |
|---|---|---|---|
| Supplemental RI, Former Fuel Farm Sludge Disposal Area | MW63 | CTO HC25 | R. Kaminaka |

METHOD
- OVERPUMPAGE [x]
- BAILER [x]
- SURGE BLOCK [ ]
- AIR LIFT [ ]
- OTHER _____

INITIAL WATER LEVEL 11.55

FINAL WATER LEVEL _____

REMARKS:

Water level measured to top of well casing. Surged with bailer for 5 minutes.

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

2" - 0.16
4" - 0.65
6" - 0.1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS/LINEAR FOOT) (ASSUMING 40% POROSITY)

2" CASING AND 6" HOLE - 0.52
2" CASING AND 8" HOLE - 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE - 2.09

**HOLE DIAMETER** $d_h$ = 6 inch

**WELL CASING INSIDE DIAMETER** $d_wID$ = 1 inch

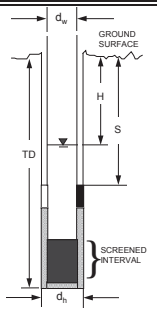
**OUTSIDE DIAMETER** $d_wOD$ = _____

**DEPTH TO: WATER LEVEL** H = 11.55

**BASE OF SEAL** S = _____

**BASE OF WELL** TD = 20.05

**EST. FILTER PACK POROSITY** P = _____




WELL VOLUME CALCULATION:

CASING VOLUME = $V_c = \Pi\left(\frac{d_wID}{2}\right)^2 (TD - H) = 3.14\left(\frac{____}{2}\right)^2 (____ - ____) = _____$

FILTER PACK PORE VOLUME = $V_f = \Pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_wOD}{2}\right)^2\right](TD - (S \text{ or } H^*)(P) = _____$

(*if S > H, use S; if S < H, use H)

$= 3.14\left[\left(\frac{____}{2}\right)^2 - \left(\frac{____}{2}\right)^2\right](____ - ____)(____) = _____$

TOTAL WELL VOLUME = VT = Vc + Vf = ____ + ____ = _____ $ft.^3$ x 7.48 = _____ gal.

| DEVELOPMENT LOG: | | | | | CUMULATIVE WATER REMOVED | WATER QUALITY | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | TIME BEGIN/END | METHOD | ELAPSED TIME | FLOW RATE (gpm) | GALLONS | pH | Temp (deg F) | CONDUC-TIVITY (mS/cm) | D.O.* (mg/L) | REDOX (ORP) | TURBID-ITY (NTU) | |
| 2/4/14 | 1048 | peristaltic pump | | | | 7.14 | 80.50 | 1.698 | 1.13 | 267.0 | turbid | No odor |
| | | | | | 3 | 7.18 | 80.61 | 1.481 | 1.49 | 251.9 | | No sheen |
| | | | | | | 7.18 | 80.45 | 1.426 | 1.73 | 240.0 | 690 | cloudy |
| | | | | | 8 | 7.18 | 80.65 | 1.397 | 1.81 | 234.1 | 72.8 | |
| | | | | | | 7.19 | 80.58 | 1.365 | 1.84 | 224.8 | 9.11 | |
| | | | | | 10 | 7.19 | 80.63 | 1.343 | 1.90 | 215.7 | 5.60 | |
| | | | | | | 7.19 | 80.64 | 1.335 | 1.91 | 213.0 | 5.13 | |
| | | | | | 12 | 7.19 | 80.63 | 1.333 | 1.91 | 210.6 | 4.27 | |
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* = Dissolved Oxygen

# WELL DEVELOPMENT LOG

| PROJECT | WELL NO. | PROJECT NO. | PREPARED BY |
|---|---|---|---|
| Supplemental RI, Former Fuel Farm Sludge Disposal Area | MW64 | CTO HC25 | R. Kaminaka |

METHOD
- OVERPUMPAGE [x]
- BAILER [x]
- SURGE BLOCK [ ]
- AIR LIFT [ ]
- OTHER _____

INITIAL WATER LEVEL 13.10

FINAL WATER LEVEL _____

REMARKS:

Water level measured to top of well casing. Surged with bailer for 5 minutes.

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

2" - 0.16
4" - 0.65
6" - 0.1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS/LINEAR FOOT) (ASSUMING 40% POROSITY)

2" CASING AND 6" HOLE - 0.52
2" CASING AND 8" HOLE - 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE - 2.09

**HOLE DIAMETER** $d_h$ = 6 inch

**WELL CASING INSIDE DIAMETER** $d_w ID$ = 1 inch

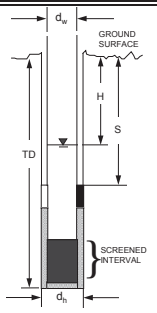
**OUTSIDE DIAMETER** $d_w OD$ = _____

**DEPTH TO: WATER LEVEL** H = 13.10

**BASE OF SEAL** S = _____

**BASE OF WELL** TD = 20.02

**EST. FILTER PACK POROSITY** P = _____




WELL VOLUME CALCULATION:

CASING VOLUME = $V_c = \Pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{____}{2}\right)^2 (____ - ____) = _____$

FILTER PACK PORE VOLUME = $V_f = \Pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H^*)(P) = _____$

(*if S > H, use S; if S < H, use H)

$= 3.14\left[\left(\frac{____}{2}\right)^2 - \left(\frac{____}{2}\right)^2\right](____ - ____)(____) = _____$

TOTAL WELL VOLUME = VT = Vc + Vf = ____ + ____ = _____ $ft.^3$ x 7.48 = _____ gal.

| DEVELOPMENT LOG: | | | | | CUMULATIVE WATER REMOVED | WATER QUALITY | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | TIME BEGIN/END | METHOD | ELAPSED TIME | FLOW RATE (gpm) | GALLONS | pH | Temp (deg F) | CONDUC-TIVITY (mS/cm) | D.O.* (mg/L) | REDOX (ORP) | TURBID-ITY (NTU) | |
| 1/31/14 | 1230 | peristaltic pump | | | 2 | 7.61 | 81.42 | 1.997 | 2.58 | 81.9 | 46.4 | No odor |
| | | | | | | 7.53 | 81.33 | 1.778 | 2.97 | 74.4 | 627 | No sheen |
| | | | | | | 7.55 | 81.75 | 1.723 | 3.03 | 67.2 | 315 | |
| | | | | | | 7.53 | 81.75 | 1.634 | 3.07 | 57.0 | 51.7 | |
| | | | | | | 7.50 | 81.68 | 1.573 | 3.11 | 47.3 | 172 | |
| | | | | | 4 | 7.49 | 81.75 | 1.535 | 3.11 | 40.5 | 73.2 | |
| | | | | | | 7.44 | 81.72 | 1.489 | 3.12 | 29.0 | 31.5 | |
| | | | | | | 7.49 | 81.35 | 1.418 | 4.05 | 12.7 | 15.5 | clear |
| | | | | | 7 | 7.44 | 81.21 | 1.390 | 3.08 | 8.8 | 16.4 | clear |
| | | | | | | 7.44 | 81.19 | 1.363 | 3.07 | 6.5 | 37.7 | |
| | | | | | | 7.45 | 81.27 | 1.325 | 3.01 | 4.5 | 37.7 | |
| | | | | | | 7.48 | 81.30 | 1.321 | 3.00 | 4.5 | 19.9 | |
| | | | | | | 7.48 | 81.29 | 1.319 | 3.00 | 4.5 | 20.6 | |
| | 1420 | | | | 12 | 7.46 | 81.26 | 1.317 | 3.00 | 4.7 | 19.1 | |
| | | | | | | | | | | | | |
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* = Dissolved Oxygen

# WELL DEVELOPMENT LOG

| PROJECT | WELL NO. | PROJECT NO. | PREPARED BY |
|---|---|---|---|
| Supplemental RI, Former Fuel Farm Sludge Disposal Area | MW65 | CTO HC25 | R. Kaminaka |

METHOD
- OVERPUMPAGE [x]
- BAILER [x]
- SURGE BLOCK [ ]
- AIR LIFT [ ]
- OTHER _____

INITIAL WATER LEVEL 12.37

FINAL WATER LEVEL _____

REMARKS:

Water level measured to top of well casing. Surged with bailer for 5 minutes.

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

2" - 0.16
4" - 0.65
6" - 0.1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS/LINEAR FOOT) (ASSUMING 40% POROSITY)

2" CASING AND 6" HOLE - 0.52
2" CASING AND 8" HOLE - 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE - 2.09

**HOLE DIAMETER** $d_h$ = 6 inch

**WELL CASING INSIDE DIAMETER** $d_wID$ = 1 inch

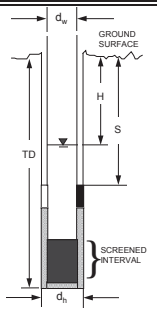
**OUTSIDE DIAMETER** $d_wOD$ = _____

**DEPTH TO: WATER LEVEL** H = 12.37

**BASE OF SEAL** S = _____

**BASE OF WELL** TD = 20.05

**EST. FILTER PACK POROSITY** P = _____




WELL VOLUME CALCULATION:

CASING VOLUME = $V_c = \Pi\left(\frac{d_wID}{2}\right)^2 (TD - H) = 3.14\left(\frac{____}{2}\right)^2 (____ - ____) = _____$

FILTER PACK PORE VOLUME = $V_f = \Pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_wOD}{2}\right)^2\right](TD - (S \text{ or } H^*)(P) = _____$

(*if S > H, use S; if S < H, use H)

$= 3.14\left[\left(\frac{____}{2}\right)^2 - \left(\frac{____}{2}\right)^2\right](____ - ____)(____) = _____$

TOTAL WELL VOLUME = VT = Vc + Vf = ____ + ____ = _____ $ft.^3$ x 7.48 = _____ gal.

| DEVELOPMENT LOG: | | | | | CUMULATIVE WATER REMOVED | WATER QUALITY | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DATE | TIME BEGIN/END | METHOD | ELAPSED TIME | FLOW RATE (gpm) | GALLONS | pH | Temp (deg F) | CONDUC-TIVITY (mS/cm) | D.O.* (mg/L) | REDOX (ORP) | TURBID-ITY (NTU) | |
| 2/3/14 | 0838 | peristaltic pump | | | 1 | 7.58 | 81.30 | 2.249 | 1.23 | 220.4 | turbid | No odor |
| | | | | | 3 | 7.66 | 81.49 | 1.632 | 3.00 | 192.9 | turbid | No sheen |
| | | | | | | 7.67 | 81.49 | 1.525 | 3.28 | 188.2 | 291 | |
| | | | | | 4 | 7.70 | 81.55 | 1.403 | 3.64 | 175.0 | 349 | |
| | | | | | | 7.71 | 81.56 | 1.321 | 3.75 | 166.7 | 48.3 | |
| | | | | | 7 | 7.72 | 81.55 | 1.252 | 3.87 | 154.4 | 15.9 | clear |
| | | | | | | 7.73 | 81.55 | 1.206 | 3.76 | 146.1 | 8.71 | |
| | | | | | 10 | 7.76 | 81.54 | 1.186 | 3.80 | 141.4 | 8.71 | |
| | | | | | | 7.73 | 81.56 | 1.171 | 3.86 | 138.3 | 6.85 | |
| | | | | | 13 | 7.76 | 81.56 | 1.167 | 3.87 | 136.9 | 6.87 | clear |
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* = Dissolved Oxygen

# Appendix B.3
# Groundwater Sampling Logs

# GROUNDWATER SAMPLING LOG

WELL NO. MW60 LOCATION: MCBH Fuel Farm PROJECT NO. HC25, Supplemental RI

DATE: 02/05/2014 TIME: 0929 CLIMATIC CONDITIONS: Overcast, breezy

STATIC WATER LEVEL: 16.12 TOTAL DEPTH: 27.4

WELL PURGING: LENGTH OF SATURATED ZONE: 11.28 LINEAR FT.

VOLUME OF WATER TO BE EVACUATED: 1.4 GALS. (Gals/Linear ft. X linear feet of saturation X 3-casing volumes)

METHOD OF REMOVAL: Bladder Pump PUMPING RATE: Low flow

WELL PURGE DATA:

| TIME | GALLONS REMOVED | Temp (F) | pH | SP. COND. (mS/cm) | D.O. (mg/L) | REDOX (ORP) | TURBIDITY (NTU) | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 1445 | | 80.50 | 7.72 | 0.593 | 0.63 | 120.0 | 1000 | v. cloudy |
| | | 80.30 | 7.72 | 0.594 | 0.49 | 117.8 | 1000 | |
| | | 80.04 | 7.73 | 0.601 | 0.37 | 105.1 | 534 | cloudy |
| | | 80.10 | 7.71 | 0.611 | 0.33 | 93.8 | 207 | cloudy |
| | | 80.04 | 7.66 | 0.612 | 0.33 | 87.3 | 141 | |
| | | 79.96 | 7.73 | 0.616 | 0.64 | 84.4 | 101 | Slightly cloudy |
| | | 79.92 | 7.65 | 0.615 | 0.33 | 80.4 | 69.8 | |
| | | 79.82 | 7.67 | 0.615 | 0.31 | 76.5 | 54.1 | clear |
| 1523 | 1.5 | 79.80 | 7.66 | 0.613 | 0.31 | 73.3 | 38.6 | clear |
| | | | | | | | | |
| | | | | | | | | |

SAMPLE WITHDRAWAL METHOD: Bladder Pump

APPEARANCE OF SAMPLE:
COLOR: Clear
TURBIDITY: none
SEDIMENT: none
OTHER: PID = 0

LABORATORY ANALYSIS PARAMETERS AND PRESERVATIVES: BTEX by 8260C, TPH-GRO/DRO/LRO by 8015C PAHs by 8270D-SIM, Lead by 6020A (total and dissolved)

NUMBER AND TYPES OF SAMPLE CONTAINERS USED: 4 x 1 Liter amber bottles, 6 x 40 mL VOA w/ HCl, 1 x 500 mL poly w/ $HNO_3$ (filtered), 1 x 500 mL poly w/ $HNO_3$ (unfiltered)

SAMPLE IDENTIFICATION NUMBER(S): KC146 at 1530

DECONTAMINATION PROCEDURES: Alconox and isopropyl alcohol double rinse.

TIDE/NOTES: Mokuoloe station, low tide (-0.7 ft MSL) at 1530

SAMPLED BY: Clayton Sugimoto, Rachel Kaminaka

SAMPLES DELIVERED TO: APPL, Inc. TRANSPORTER: Fed Ex

DATE: 02/06/2014 TIME: 1100

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

**1"-0.04**•2"-0.16•4"-0.65•6"-1.47•8"-2.61•10"-4.08•12"-5.87

# GROUNDWATER SAMPLING LOG

WELL NO. MW61 LOCATION: Fuel Farm, MCBH PROJECT NO. HC25, Supplemental RI

DATE: 02/06/2014 TIME: 1237 CLIMATIC CONDITIONS: Overcast, no wind

STATIC WATER LEVEL: 15.27 TOTAL DEPTH: 25.06

WELL PURGING: LENGTH OF SATURATED ZONE: 9.79 LINEAR FT.

VOLUME OF WATER TO BE EVACUATED: 1.2 GALS. (Gals/Linear ft. X linear feet of saturation X 3-casing volumes)

METHOD OF REMOVAL: Bladder Pump PUMPING RATE: Low flow

WELL PURGE DATA:

| TIME | GALLONS REMOVED | Temp (F) | pH | SP. COND. (mS/cm) | D.O. (mg/L) | REDOX (ORP) | TURBIDITY (NTU) | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 1300 | | 80.96 | 8.17 | 0.929 | 1.30 | 159.5 | 275 | cloudy |
| | | 80.76 | 8.18 | 0.944 | 0.82 | 158.6 | 293 | No odor/sheen |
| | | 80.49 | 8.20 | 0.981 | 0.61 | 154.5 | 107 | |
| | | 80.42 | 8.15 | 0.995 | 0.49 | 147.0 | 42.3 | clear |
| | | 80.40 | 8.18 | 0.991 | 0.43 | 141.7 | 25.7 | |
| | | 80.36 | 8.18 | 0.998 | 0.38 | 139.0 | 19.7 | |
| | | 80.35 | 8.13 | 0.987 | 0.37 | 134.9 | 16.8 | |
| | | 80.39 | 8.14 | 0.988 | 0.37 | 132.2 | 14.2 | |
| | 1.5 | 80.39 | 8.18 | 0.986 | 0.36 | 128.9 | 12.5 | clear |
| | | | | | | | | |
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SAMPLE WITHDRAWAL METHOD: Bladder Pump

APPEARANCE OF SAMPLE: COLOR Clear

TURBIDITY none

SEDIMENT none

OTHER PID = 0 ppm

LABORATORY ANALYSIS PARAMETERS AND PRESERVATIVES: BTEX by 8260C, TPH-GRO/DRO/LRO by 8015C PAHs by 8270D-SIM, Lead by 6020A (total and dissolved)

NUMBER AND TYPES OF SAMPLE CONTAINERS USED: 4 x 1 Liter amber bottles, 6 x 40 mL VOA w/ HCl, 1 x 500 mL poly w/ $HNO_3$ (filtered), 1 x 500 mL poly w/ $HNO_3$ (unfiltered)

SAMPLE IDENTIFICATION NUMBER(S): KC150 at 1325

DECONTAMINATION PROCEDURES: Alconox and isopropyl alcohol double rinse.

TIDE/NOTES: Mokuoloe station, low tide (-0.7 ft MSL) at 1300

SAMPLED BY: Clayton Sugimoto, Rachel Kaminaka

SAMPLES DELIVERED TO: APPL, Inc. TRANSPORTER: Fed Ex

DATE: 2/7/2014 TIME: 1200

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

**1"-0.04**•2"-0.16•4"-0.65•6"-1.47•8"-2.61•10"-4.08•12"-5.87

# GROUNDWATER SAMPLING LOG

WELL NO. MW62 LOCATION: MCBH Fuel Farm PROJECT NO. HC25, Supplemental RI

DATE: 02/06/2014 TIME: 1022 CLIMATIC CONDITIONS: Overcast, breezy

STATIC WATER LEVEL: 13.15 TOTAL DEPTH: 20.03

WELL PURGING: LENGTH OF SATURATED ZONE: 6.88 LINEAR FT.

VOLUME OF WATER TO BE EVACUATED: 0.8 GALS. (Gals/Linear ft. X linear feet of saturation X 3-casing volumes)

METHOD OF REMOVAL: Bladder Pump PUMPING RATE: Low flow

WELL PURGE DATA:

| TIME | GALLONS REMOVED | Temp (F) | pH | SP. COND. (mS/cm) | D.O. (mg/L) | REDOX (ORP) | TURBIDITY (NTU) | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 1044 | | 81.58 | 8.04 | 1.918 | 0.84 | 190.9 | 115 | cloudy |
| | | 81.59 | 8.01 | 1.890 | 0.67 | 186.5 | 61.5 | Sulfur odor |
| | | 81.61 | 8.09 | 1.820 | 0.71 | 176.5 | 24.0 | |
| | | 81.61 | 8.07 | 1.802 | 0.68 | 174.0 | 14.5 | |
| | | 81.61 | 8.07 | 1.770 | 0.65 | 169.7 | 11.2 | |
| | | 81.59 | 8.09 | 1.758 | 0.66 | 167.7 | 9.46 | |
| | | 81.65 | 8.06 | 1.740 | 0.67 | 165.8 | 9.12 | |
| 1100 | 1 | 81.62 | 8.05 | 1.729 | 0.68 | 163.1 | 7.33 | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

SAMPLE WITHDRAWAL METHOD: Bladder Pump

APPEARANCE OF SAMPLE: COLOR Clear

TURBIDITY none

SEDIMENT none

OTHER PID = 0 ppm

LABORATORY ANALYSIS PARAMETERS AND PRESERVATIVES: BTEX by 8260C, TPH-GRO/DRO/LRO by 8015C PAHs by 8270D-SIM, Lead by 6020A (total and dissolved)

NUMBER AND TYPES OF SAMPLE CONTAINERS USED: 4 x 1 Liter amber bottles, 6 x 40 mL VOA w/ HCl, 1 x 500 mL poly w/ $HNO_3$ (filtered), 1 x 500 mL poly w/ $HNO_3$ (unfiltered)

SAMPLE IDENTIFICATION NUMBER(S): KC149 at 1110

DECONTAMINATION PROCEDURES: Alconox and isopropyl alcohol double rinse.

TIDE/NOTES: Mokuoloe station, low tide (-0.4 ft MSL) at 1100

SAMPLED BY: Clayton Sugimoto, Rachel Kaminaka

SAMPLES DELIVERED TO: APPL, Inc. TRANSPORTER: Fed Ex

DATE: 2/7/2014 TIME: 1200

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

**1"-0.04**•2"-0.16•4"-0.65•6"-1.47•8"-2.61•10"-4.08•12"-5.87

# GROUNDWATER SAMPLING LOG

WELL NO. MW63 LOCATION: Bldg. 3081, MCBH PROJECT NO. HC25, Supplemental RI

DATE: 02/06/2014 TIME: 0750 CLIMATIC CONDITIONS: Overcast, no wind

STATIC WATER LEVEL: 11.30 TOTAL DEPTH: 20.04

WELL PURGING: LENGTH OF SATURATED ZONE: 8.74 LINEAR FT.

VOLUME OF WATER TO BE EVACUATED: 1 GALS. (Gals/Linear ft. X linear feet of saturation X 3-casing volumes)

METHOD OF REMOVAL: Bladder Pump PUMPING RATE: Low flow

WELL PURGE DATA:

| TIME | GALLONS REMOVED | Temp (F) | pH | SP. COND. (mS/cm) | D.O. (mg/L) | REDOX (ORP) | TURBIDITY (NTU) | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 0801 | | 80.14 | 7.00 | 1.287 | 1.08 | 231.3 | 289 | cloudy |
| | | 80.17 | 7.03 | 1.278 | 1.13 | 227.2 | 97.1 | No odor/sheen |
| | | 80.24 | 7.05 | 1.273 | 1.18 | 221.5 | 43.6 | |
| | | 80.32 | 7.08 | 1.271 | 1.51 | 217.2 | 30.3 | clear |
| | | 80.34 | 7.07 | 1.270 | 1.25 | 215.2 | 23.8 | |
| | | 80.36 | 7.08 | 1.270 | 1.24 | 213.3 | 19.2 | clear |
| | | 80.37 | 7.08 | 1.269 | 1.31 | 210.7 | 16.6 | |
| 0820 | 1 | 80.38 | 7.09 | 1.269 | 1.30 | 208.7 | 16.3 | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

SAMPLE WITHDRAWAL METHOD: Bladder Pump

APPEARANCE OF SAMPLE: COLOR Clear

TURBIDITY none

SEDIMENT none

OTHER PID = 0.20 ppm

LABORATORY ANALYSIS PARAMETERS AND PRESERVATIVES: BTEX by 8260C, TPH-GRO/DRO/LRO by 8015C PAHs by 8270D-SIM, Lead by 6020A (total and dissolved)

NUMBER AND TYPES OF SAMPLE CONTAINERS USED: 11 x 1 Liter amber bottles, 18 x 40 mL VOA w/ HCl, 3 x 500 mL poly w/ $HNO_3$ (filtered), 3 x 500 mL poly w/ $HNO_3$ (unfiltered)

SAMPLE IDENTIFICATION NUMBER(S): KC148 at 0830 (MS/MSD)

DECONTAMINATION PROCEDURES: Alconox and isopropyl alcohol double rinse.

TIDE/NOTES: Mokuoloe station, high tide (0.20 ft MSL) at 0800

SAMPLED BY: Clayton Sugimoto, Rachel Kaminaka

SAMPLES DELIVERED TO: APPL, Inc. TRANSPORTER: Fed Ex

DATE: 2/10/2014 TIME: 1200

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

**1"-0.04**•2"-0.16•4"-0.65•6"-1.47•8"-2.61•10"-4.08•12"-5.87

# GROUNDWATER SAMPLING LOG

WELL NO. MW64 LOCATION: Motor Pool, MCBH PROJECT NO. HC25, Supplemental RI

DATE: 02/05/2014 TIME: 0804 CLIMATIC CONDITIONS: Partly cloudy, breezy

STATIC WATER LEVEL: 12.79 TOTAL DEPTH: 20.02

WELL PURGING: LENGTH OF SATURATED ZONE: 7.23 LINEAR FT.

VOLUME OF WATER TO BE EVACUATED: 1 GALS. (Gals/Linear ft. X linear feet of saturation X 3-casing volumes)

METHOD OF REMOVAL: Bladder Pump PUMPING RATE: Low flow

WELL PURGE DATA:

| TIME | GALLONS REMOVED | Temp (F) | pH | SP. COND. (mS/cm) | D.O. (mg/L) | REDOX (ORP) | TURBIDITY (NTU) | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 0908 | | 80.19 | 7.89 | 1.277 | 2.97 | -3.2 | 16.2 | cloudy |
| | | 80.09 | 7.85 | 1.278 | 2.96 | -26.7 | 89.8 | No odor/sheen |
| | | 80.13 | 7.81 | 1.280 | 2.94 | -35-7 | 62.7 | |
| | 1 | 80.31 | 7.88 | 1.282 | 3.65 | -31.7 | 27.2 | |
| | | 80.36 | 7.86 | 1.283 | 2.91 | -43.4 | 19.6 | |
| | | 80.36 | 7.86 | 1.283 | 2.92 | -48.6 | 16.4 | |
| 0927 | 2 | 80.40 | 7.86 | 1.284 | 2.89 | -53.1 | 15.2 | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

SAMPLE WITHDRAWAL METHOD: Bladder Pump

APPEARANCE OF SAMPLE: COLOR Clear

TURBIDITY none

SEDIMENT none

OTHER PID = 0 ppm

LABORATORY ANALYSIS PARAMETERS AND PRESERVATIVES: BTEX by 8260C, TPH-GRO/DRO/LRO by 8015C PAHs by 8270D-SIM, Lead by 6020A (total and dissolved)

NUMBER AND TYPES OF SAMPLE CONTAINERS USED: 8 x 1 Liter amber bottles, 12 x 40 mL VOA w/ HCl, 2 x 500 mL poly w/ $HNO_3$ (filtered), 2 x 500 mL poly w/ $HNO_3$ (unfiltered)

SAMPLE IDENTIFICATION NUMBER(S): KC143 at 0935 and KC144 (duplicate) at 0945

DECONTAMINATION PROCEDURES: Alconox and isopropyl alcohol double rinse.

TIDE/NOTES: Mokuoloe station, high tide (0.0 ft MSL) at 0900

SAMPLED BY: Clayton Sugimoto, Rachel Kaminaka

SAMPLES DELIVERED TO: APPL, Inc. TRANSPORTER: Fed Ex

DATE: 02/06/2014 TIME: 1200

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

**1"-0.04**•2"-0.16•4"-0.65•6"-1.47•8"-2.61•10"-4.08•12"-5.87

# GROUNDWATER SAMPLING LOG

WELL NO. MW65 LOCATION: Motor Pool, MCBH PROJECT NO. HC25, Supplemental RI

DATE: 02/05/2014 TIME: 1214 CLIMATIC CONDITIONS: Overcast, windy

STATIC WATER LEVEL: 12.23 TOTAL DEPTH: 20.05

WELL PURGING: LENGTH OF SATURATED ZONE: 7.82 LINEAR FT.

VOLUME OF WATER TO BE EVACUATED: 1 GALS. (Gals/Linear ft. X linear feet of saturation X 3-casing volumes)

METHOD OF REMOVAL: Bladder Pump PUMPING RATE: Low flow

WELL PURGE DATA:

| TIME | GALLONS REMOVED | Temp (F) | pH | SP. COND. (mS/cm) | D.O. (mg/L) | REDOX (ORP) | TURBIDITY (NTU) | COMMENTS |
|---|---|---|---|---|---|---|---|---|
| 1240 | | 81.45 | 7.58 | 1.107 | 2.70 | 154.6 | 497 | cloudy |
| | | 81.49 | 7.63 | 1.084 | 3.61 | 150.4 | 292 | |
| | 1 | 81.48 | 7.64 | 1.067 | 3.15 | 134.8 | 77.5 | |
| | | 81.51 | 7.65 | 1.077 | 3.11 | 132.8 | 66.4 | |
| | | 81.64 | 7.67 | 1.078 | 3.13 | 126.2 | 36.4 | |
| | | 81.60 | 7.67 | 1.079 | 3.14 | 124.6 | 32.7 | clear |
| | 2 | 81.59 | 7.67 | 1.079 | 3.12 | 123.7 | 28.9 | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

SAMPLE WITHDRAWAL METHOD: Bladder Pump

APPEARANCE OF SAMPLE: COLOR Clear

TURBIDITY none

SEDIMENT none

OTHER PID = 0.20 ppm

LABORATORY ANALYSIS PARAMETERS AND PRESERVATIVES: BTEX by 8260C, TPH-GRO/DRO/LRO by 8015C PAHs by 8270D-SIM, Lead by 6020A (total and dissolved)

NUMBER AND TYPES OF SAMPLE CONTAINERS USED: 4 x 1 Liter amber bottles, 6 x 40 mL VOA w/ HCl, 1 x 500 mL poly w/ $HNO_3$ (filtered), 1 x 500 mL poly w/ $HNO_3$ (unfiltered)

SAMPLE IDENTIFICATION NUMBER(S): KC145 at 1320

DECONTAMINATION PROCEDURES: Alconox and isopropyl alcohol double rinse.

TIDE/NOTES: Mokuoloe station, low tide (-0.8 ft MSL) at 1300

SAMPLED BY: Clayton Sugimoto, Rachel Kaminaka

SAMPLES DELIVERED TO: APPL, Inc. TRANSPORTER: Fed Ex

DATE: 02/06/2014 TIME: 1200

CAPACITY OF CASING (GALLONS/LINEAR FOOT)

**1"-0.04**•2"-0.16•4"-0.65•6"-1.47•8"-2.61•10"-4.08•12"-5.87

# Appendix C
# Site Photographs

Photo 1. Geophysical survey using ground penetrating radar. Photo facing west.

Photo 2. Drilling and monitoring well installation at MW65 location. Photo facing west.

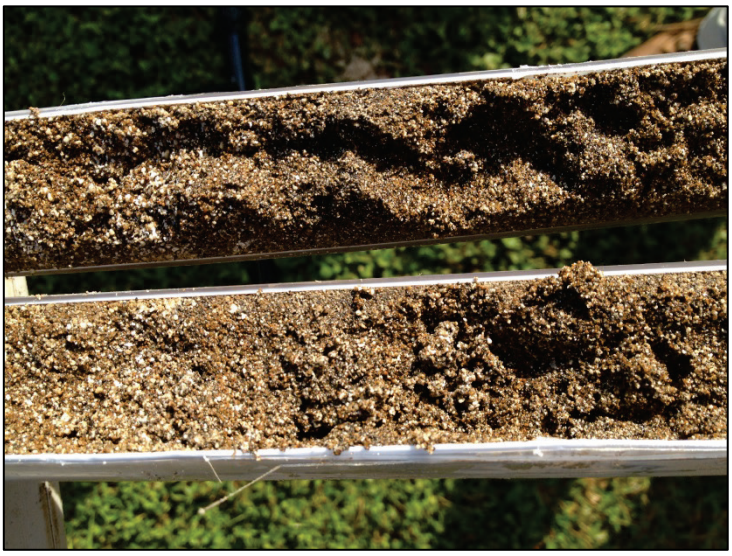


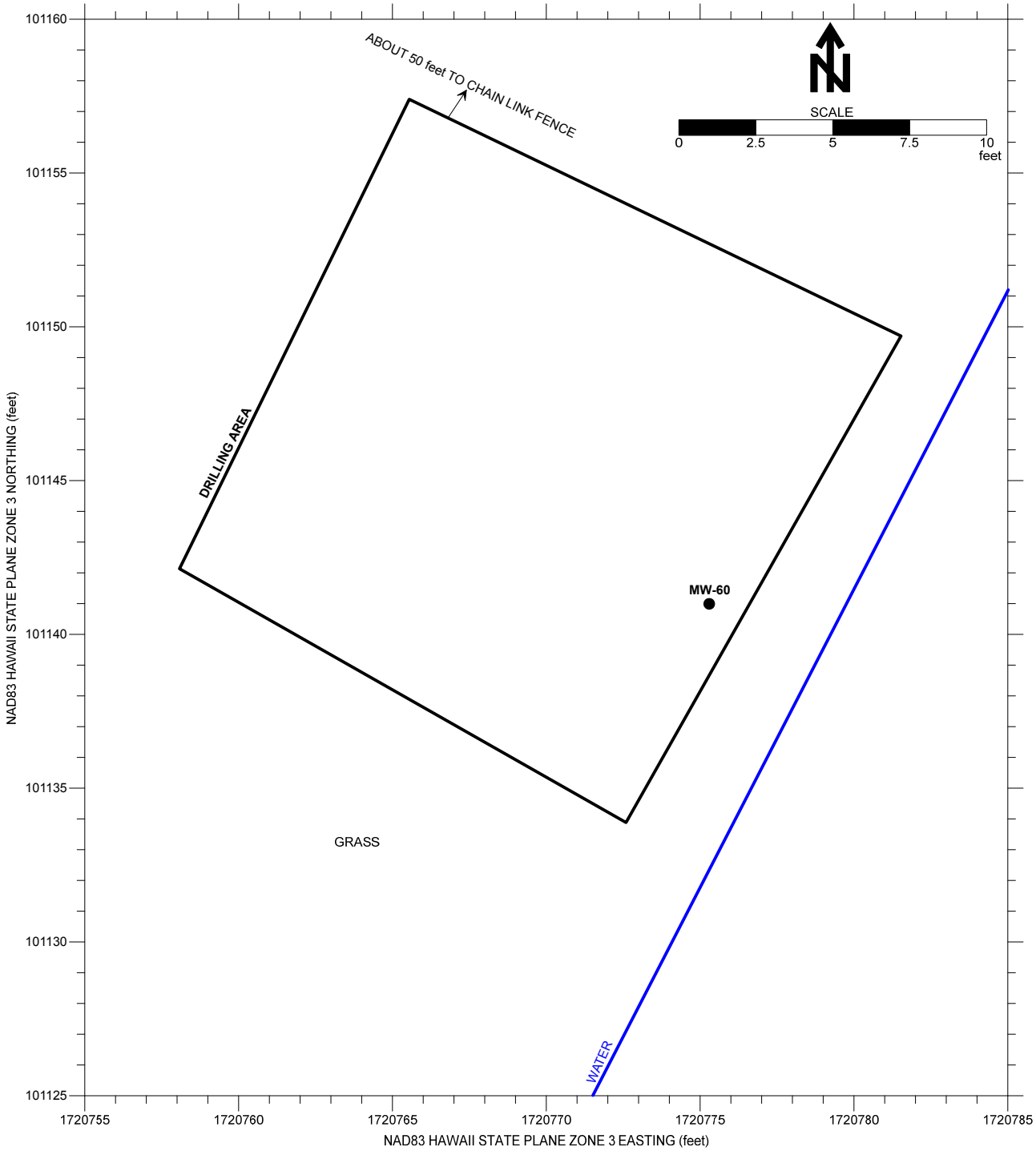
Photo 3. Detail of typical volcanic tuff lithology observed in soil borings.

Photo 4. Purging groundwater during well development using peristaltic pump.

Photo 5. Typical temporary barricade to protect each monitoring well.

Photo 6. Groundwater sampling at monitoring well MW60. Photo facing south.

# Appendix D
# Geophysical Survey



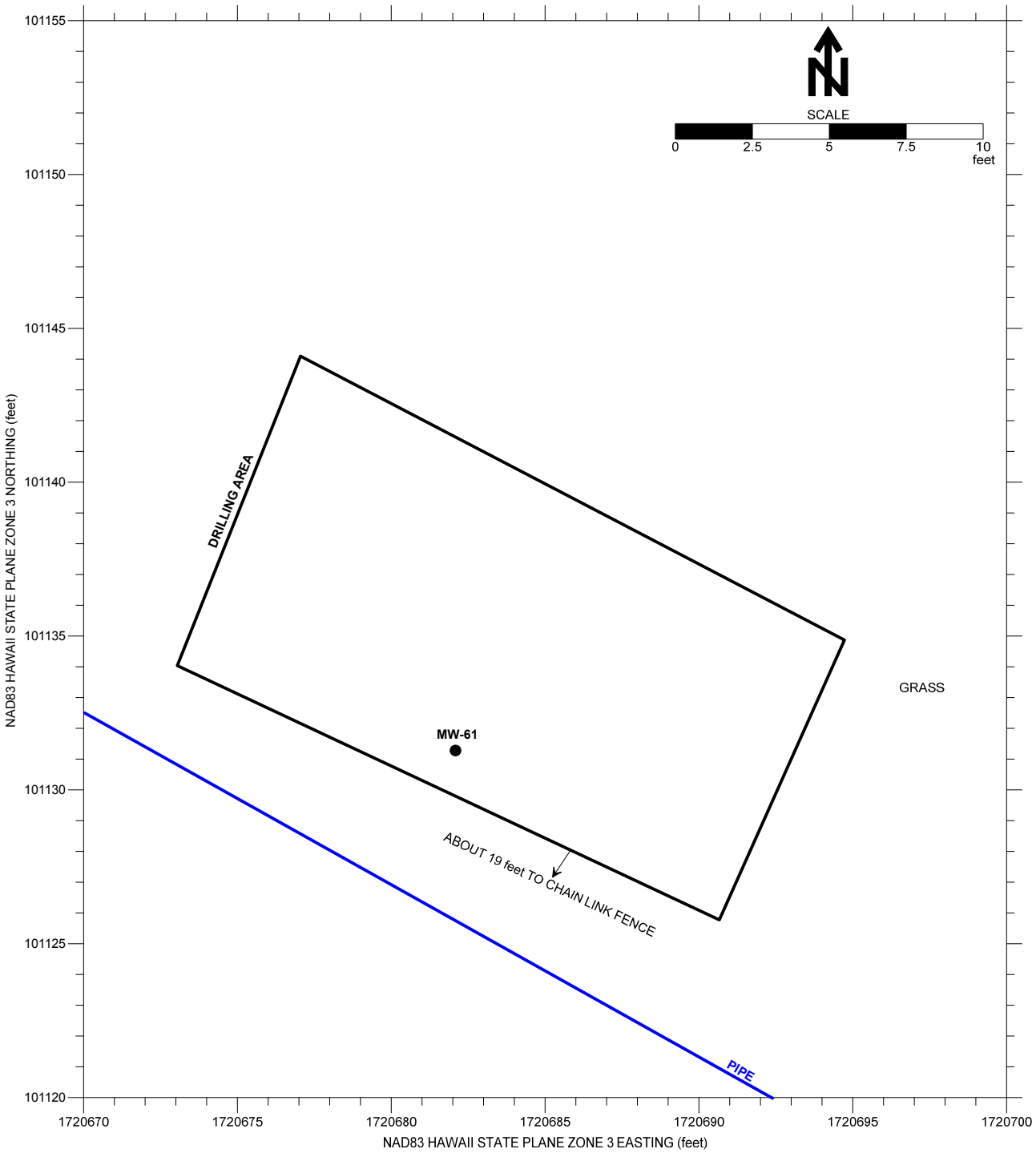

**EXPLANATION:**

UTILITY SEARCH WAS CONDUCTED ON JANUARY 28, 2014 IN ACCORDANCE WITH NAVY SOPs 1-A-6 AND I-B-2 (DON, 2007). Ms. RACHEL KAMINAKA STAKED EACH DRILLING LOCATION. A 18N x 17E feet MEASUREMENT GRID WITH PROFILES SPACED ABOUT 3-5 feet APART AND ORIENTED ROUGHLY PARALLEL WITH AND PERPENDICULAR TO THIRD STREET WERE CONSTRUCTED AT EACH DRILLING LOCATION. ALL PROFILES WERE SCANNED WITH A GSSI SIR-3000 GROUND PENETRATING RADAR (400 MHz ANTENNA), RADIO DETECTION RD-4000 EM LOCATOR, GEONICS EM-31 CONDUCTIVITY METER, AND A SCHONSTEDT GA-52 MAGNETIC LOCATOR. DETECTED UTILITIES WERE MARKED ON THE GROUND IN REAL TIME WITH PAINT AND STAKE CHASERS. DRILLING LOCATION, NEARBY INFRASTRUCTURE, AND DETECTED UTILITY LOCATIONS WERE MEASURED WITH A TRIMBLE AG-114 GLOBAL POSITIONING SYSTEM WITH REAL TIME DIFFERENTIAL CORRECTIONS SUPPLIED BY THE OMNISTAR SATELLITE. LOCATION UNCERTAINTY IS ESTIMATED AT +/-3 feet.

**WELL MW-60 UTILITY MAP**
**FORMER FUEL FARM**
**MCBH-KANEOHE BAY, OAHU, HI**

**WCP, INC. SUBCONTRACT HC25-03-01**

***TERRA PHYSICS***



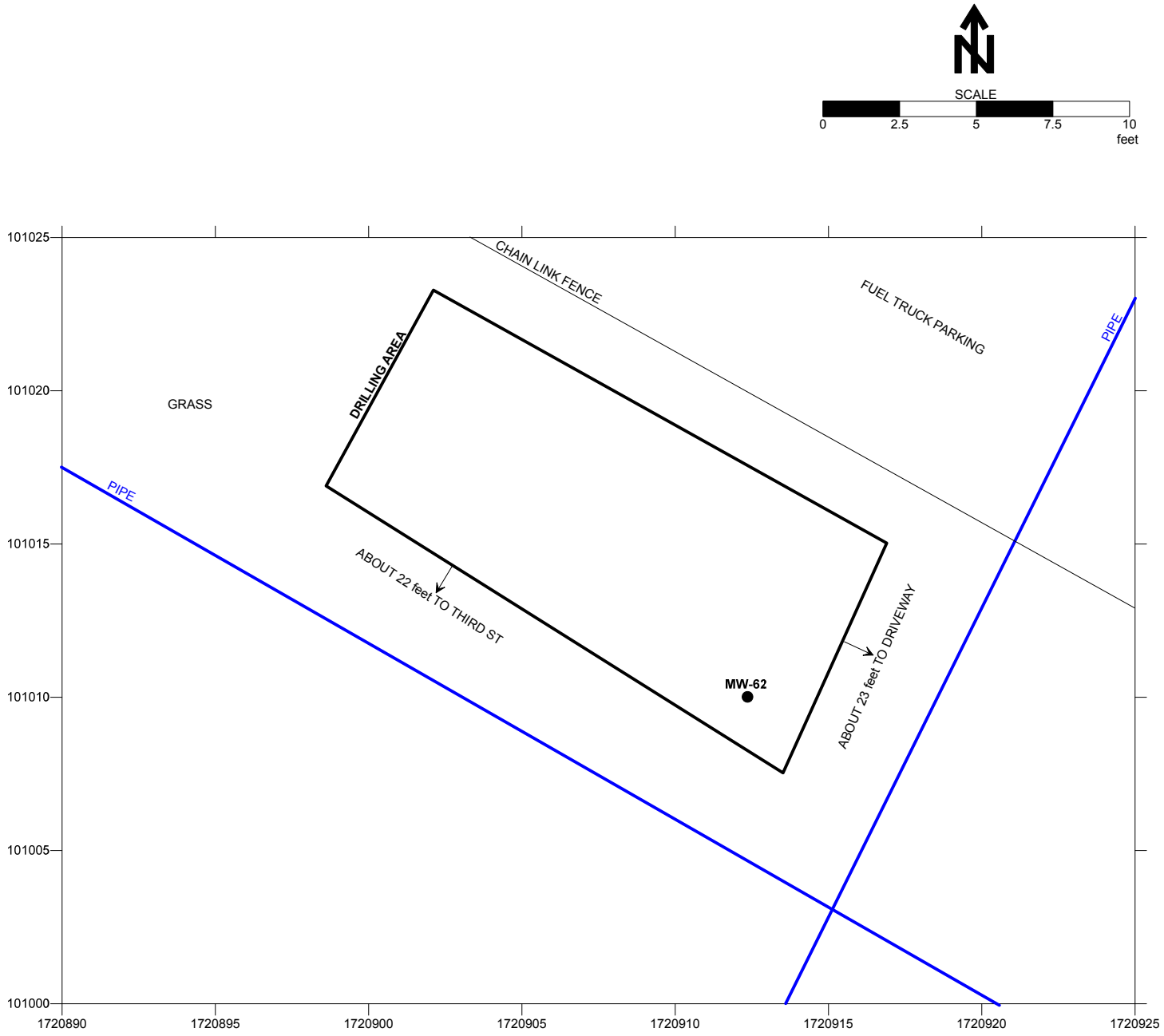

**EXPLANATION:**

UTILITY SEARCH WAS CONDUCTED ON JANUARY 28, 2014 IN ACCORDANCE WITH NAVY SOPs 1-A-6 AND I-B-2 (DON, 2007). Ms. RACHEL KAMINAKA STAKED EACH DRILLING LOCATION. A 12N x 20E feet MEASUREMENT GRID WITH PROFILES SPACED ABOUT 3-5 feet APART AND ORIENTED ROUGHLY PARALLEL WITH AND PERPENDICULAR TO THIRD STREET WERE CONSTRUCTED AT EACH DRILLING LOCATION. ALL PROFILES WERE SCANNED WITH A GSSI SIR-3000 GROUND PENETRATING RADAR (400 MHz ANTENNA), RADIO DETECTION RD-4000 EM LOCATOR, GEONICS EM-31 CONDUCTIVITY METER, AND A SCHONSTEDT GA-52 MAGNETIC LOCATOR. DETECTED UTILITIES WERE MARKED ON THE GROUND IN REAL TIME WITH PAINT AND STAKE CHASERS. DRILLING LOCATION, NEARBY INFRASTRUCTURE, AND DETECTED UTILITY LOCATIONS WERE MEASURED WITH A TRIMBLE AG-114 GLOBAL POSITIONING SYSTEM WITH REAL TIME DIFFERENTIAL CORRECTIONS SUPPLIED BY THE OMNISTAR SATELLITE. LOCATION UNCERTAINTY IS ESTIMATED AT +/-3 feet.

**WELL MW-61 UTILITY MAP**
**FORMER FUEL FARM**
**MCBH-KANEOHE BAY, OAHU, HI**

**WCP, INC. SUBCONTRACT HC25-03-01**

***TERRA PHYSICS***



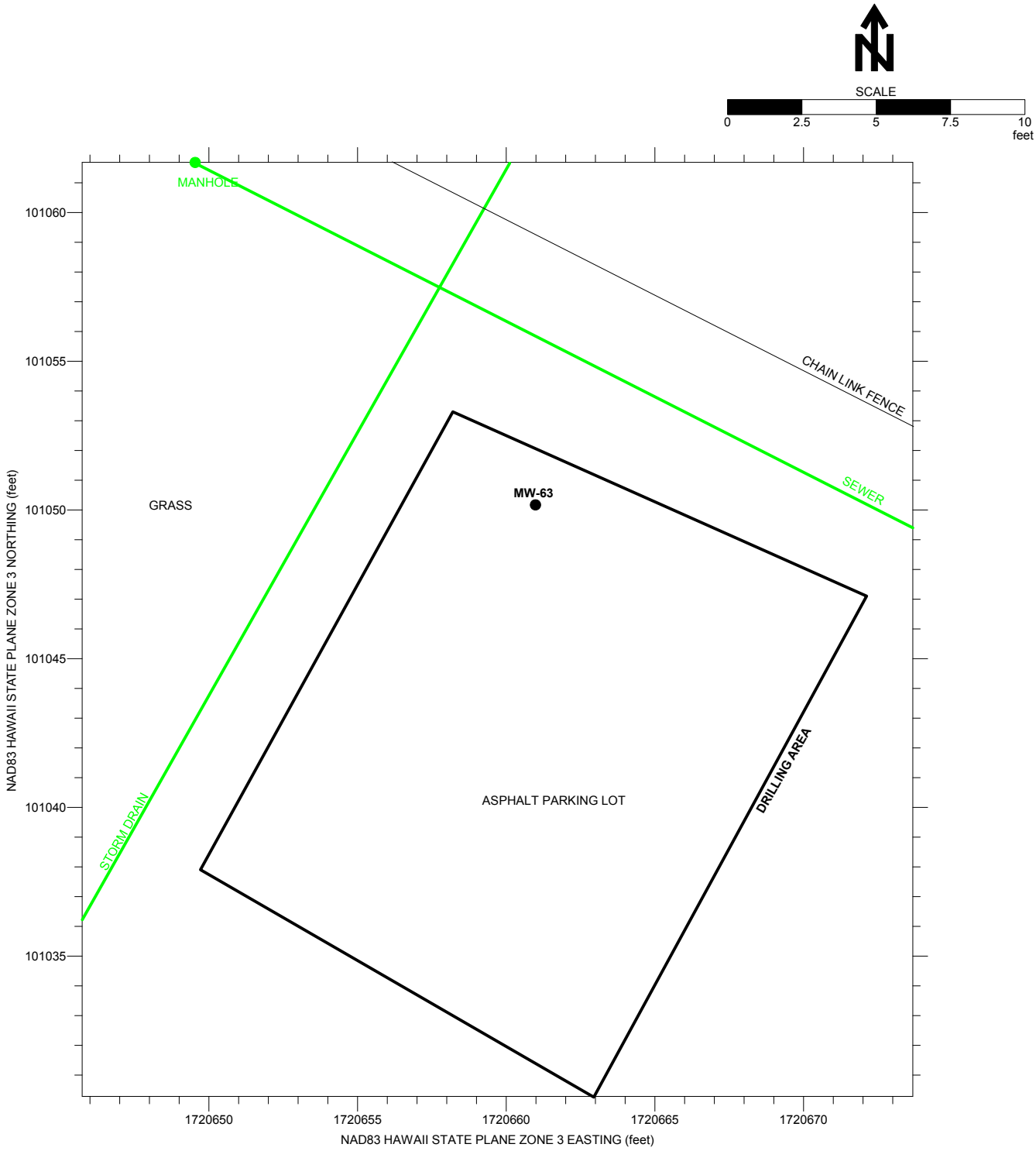

**EXPLANATION:**

UTILITY SEARCH WAS CONDUCTED ON JANUARY 28, 2014 IN ACCORDANCE WITH NAVY SOPs 1-A-6 AND I-B-2 (DON, 2007). Ms. RACHEL KAMINAKA STAKED EACH DRILLING LOCATION. A 8N x 20E feet MEASUREMENT GRID WITH PROFILES SPACED ABOUT 3-5 feet APART AND ORIENTED ROUGHLY PARALLEL WITH AND PERPENDICULAR TO THIRD STREET WERE CONSTRUCTED AT EACH DRILLING LOCATION. ALL PROFILES WERE SCANNED WITH A GSSI SIR-3000 GROUND PENETRATING RADAR (400 MHz ANTENNA), RADIO DETECTION RD-4000 EM LOCATOR, GEONICS EM-31 CONDUCTIVITY METER, AND A SCHONSTEDT GA-52 MAGNETIC LOCATOR. DETECTED UTILITIES WERE MARKED ON THE GROUND IN REAL TIME WITH PAINT AND STAKE CHASERS. DRILLING LOCATION, NEARBY INFRASTRUCTURE, AND DETECTED UTILITY LOCATIONS WERE MEASURED WITH A TRIMBLE AG-114 GLOBAL POSITIONING SYSTEM WITH REAL TIME DIFFERENTIAL CORRECTIONS SUPPLIED BY THE OMNISTAR SATELLITE. LOCATION UNCERTAINTY IS ESTIMATED AT +/-3 feet.

**WELL MW-62 UTILITY MAP**
**FORMER FUEL FARM**
**MCBH-KANEOHE BAY, OAHU, HI**

**WCP, INC. SUBCONTRACT HC25-03-01**

***TERRA PHYSICS***



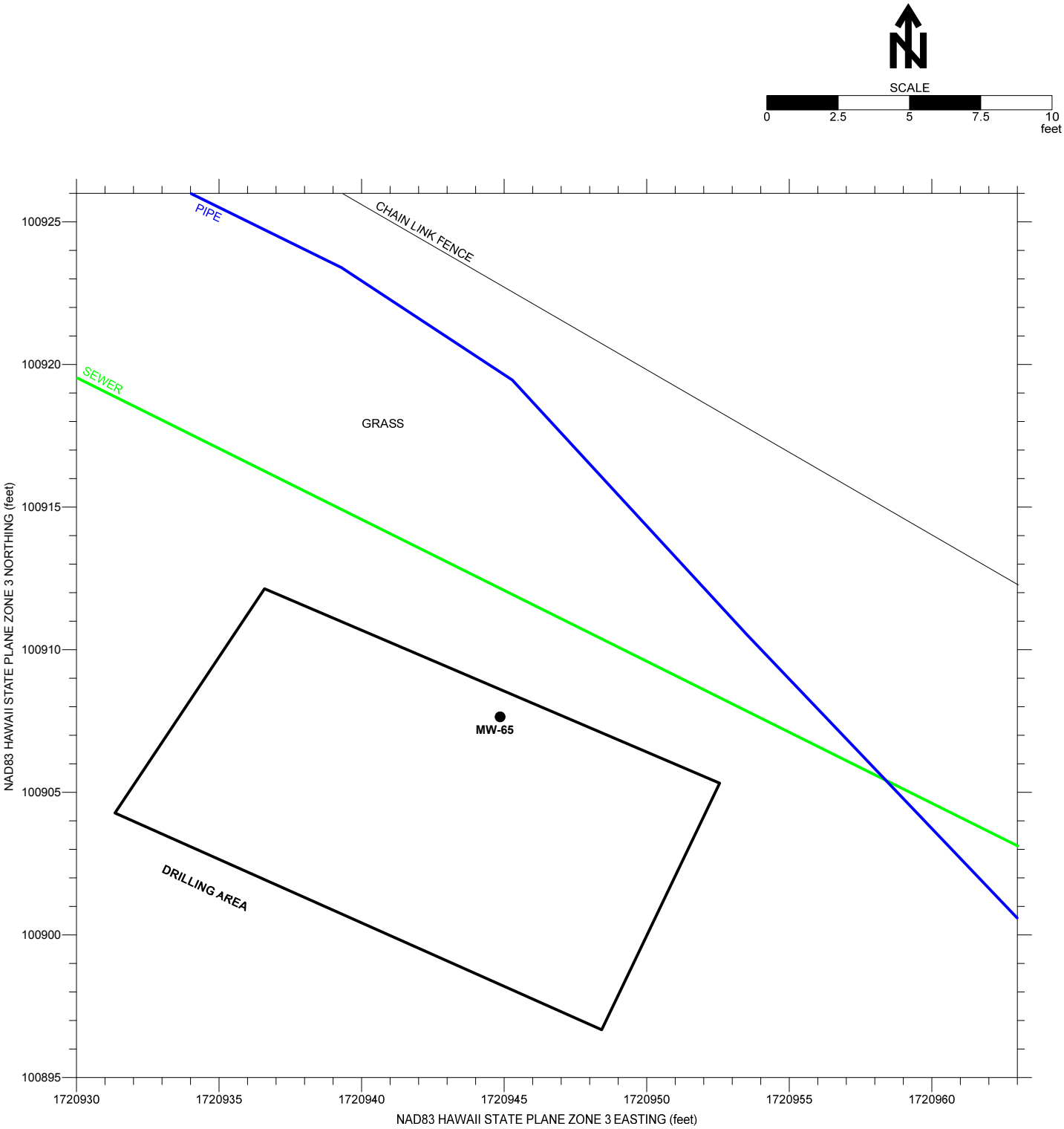

**EXPLANATION:**

UTILITY SEARCH WAS CONDUCTED ON JANUARY 28, 2014 IN ACCORDANCE WITH NAVY SOPs 1-A-6 AND I-B-2 (DON, 2007). Ms. RACHEL KAMINAKA STAKED EACH DRILLING LOCATION. A 15N x 20E feet MEASUREMENT GRID WITH PROFILES SPACED ABOUT 3-5 feet APART AND ORIENTED ROUGHLY PARALLEL WITH AND PERPENDICULAR TO THIRD STREET WERE CONSTRUCTED AT EACH DRILLING LOCATION. ALL PROFILES WERE SCANNED WITH A GSSI SIR-3000 GROUND PENETRATING RADAR (400 MHz ANTENNA), RADIO DETECTION RD-4000 EM LOCATOR, GEONICS EM-31 CONDUCTIVITY METER, AND A SCHONSTEDT GA-52 MAGNETIC LOCATOR. DETECTED UTILITIES WERE MARKED ON THE GROUND IN REAL TIME WITH PAINT AND STAKE CHASERS. DRILLING LOCATION, NEARBY INFRASTRUCTURE, AND DETECTED UTILITY LOCATIONS WERE MEASURED WITH A TRIMBLE AG-114 GLOBAL POSITIONING SYSTEM WITH REAL TIME DIFFERENTIAL CORRECTIONS SUPPLIED BY THE OMNISTAR SATELLITE. LOCATION UNCERTAINTY IS ESTIMATED AT +/-3 feet.

**WELL MW-63 UTILITY MAP**
**FORMER FUEL FARM**
**MCBH-KANEOHE BAY, OAHU, HI**

**WCP, INC. SUBCONTRACT HC25-03-01**

***TERRA PHYSICS***




**EXPLANATION:**

UTILITY SEARCH WAS CONDUCTED ON JANUARY 28, 2014 IN ACCORDANCE WITH NAVY SOPs 1-A-6 AND I-B-2 (DON, 2007). Ms. RACHEL KAMINAKA STAKED EACH DRILLING LOCATION. A 10N x 20E feet MEASUREMENT GRID WITH PROFILES SPACED ABOUT 3-5 feet APART AND ORIENTED ROUGHLY PARALLEL WITH AND PERPENDICULAR TO THIRD STREET WERE CONSTRUCTED AT EACH DRILLING LOCATION. ALL PROFILES WERE SCANNED WITH A GSSI SIR-3000 GROUND PENETRATING RADAR (400 MHz ANTENNA), RADIO DETECTION RD-4000 EM LOCATOR, GEONICS EM-31 CONDUCTIVITY METER, AND A SCHONSTEDT GA-52 MAGNETIC LOCATOR. DETECTED UTILITIES WERE MARKED ON THE GROUND IN REAL TIME WITH PAINT AND STAKE CHASERS. DRILLING LOCATION, NEARBY INFRASTRUCTURE, AND DETECTED UTILITY LOCATIONS WERE MEASURED WITH A TRIMBLE AG-114 GLOBAL POSITIONING SYSTEM WITH REAL TIME DIFFERENTIAL CORRECTIONS SUPPLIED BY THE OMNISTAR SATELLITE. LOCATION UNCERTAINTY IS ESTIMATED AT +/-3 feet.

**WELL MW-65 UTILITY MAP**
**FORMER FUEL FARM**
**MCBH-KANEOHE BAY, OAHU, HI**

**WCP, INC. SUBCONTRACT HC25-03-01**

***TERRA PHYSICS***

# Appendix E
# IDW Disposal Documentation

NV.
4/17

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: H I 6 1 7 0 0 2 2 7 6 2
2. Page 1 of 1
3. Emergency Response Phone: 1-800-645-8265
4. Waste Tracking Number: 000023581

5. Generator's Name and Mailing Address
MARINE CORPS BASE HAWAII
BOX 63062, ATTN: JEFFREY LARSON
KANEOHE BAY, HI 96863-3062
Generator's Phone: 808-257-6999

Generator's Site Address (if different than mailing address)
HIC8110-05
FORMER FUEL FARM SLUDGE DISPOSAL AREA
KANEOHE BAY, HI 96863

6. Transporter 1 Company Name: PACIFIC COMMERCIAL SERVICES, LLC. 808-545-4599
U.S. EPA ID Number: H I R 0 0 0 0 9 7 8 2 4

7. Transporter 2 Company Name: UNITEK SOLVENT SERVICES, INC.-OAHU 808-682-8284
U.S. EPA ID Number: H I D 9 8 2 4 4 3 7 1 5

8. Designated Facility Name and Site Address
UNITEK SOLVENT SERVICES, INC.
91-125 KAOMI LOOP
KAPOLEI, HI 96707
Facility's Phone: 808-682-8284
U.S. EPA ID Number: H I D 9 8 2 4 4 3 7 1 5

| | 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| | 1. MATERIAL NOT REGULATED BY DOT. (IDW WATER) | 002 | DM | 00100 | G | NON-RCRA |
| | 2. | | | | | |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
9b1: NR 2008 9b1: TOTAL HALOGEN:

GENERATOR'S CERTIFICATION: I HEREBY DECLARE THAT THE CONTENTS OF THIS CONSIGNMENT ARE FULLY AND ACCURATELY DESCRIBED ABOVE BY PROPER SHIPPING NAME (WHERE APPLICABLE) AND ARE CLASSIFIED, PACKED, MARKED , AND LABELED AND ARE IN ALL RESPECTS IN PROPER CONDITION FOR TRANSPORT BY HIGHWAY ACCORDING TO APPLICABLE GOVERNMNET REGULATIONS. I FURTHER CERTIFY THAT IF THIS IS USED OIL IT IS SUBJECT TO REGULATION UNDER 40 CFR PART 279; THAT IT DOES NOT CONTAIN PCBS GREATER THAN OR EQUAL TO 2 PPM; AND THAT IT HAS NOT BEEN CONTAMINATED WITH CARBURATOR CLEANERS, BRAKE SPRAY, FREON, HALOGENATED SOLVENTS, OR OTHER HAZARDOUS MATERIALS AND/OR HAZARDOUS WASTES.

**14. GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Rachel Gilhody
Signature: [signature]
Month 4 Day 11 Year 14

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Danny E Ichi
Signature: [signature]
Month 04 Day 11 Year 14

Transporter 2 Printed/Typed Name: MARION L. SBVAAETAI
Signature: [signature]
Month 4 Day 22 Year 14

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

PCS provided kit SEE CONSOLIDATED MANIFEST NW1388

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: R. ALLAMBRA
Signature: [signature]
Month 04 Day 24 Year 2014

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

169-BLC-O 6 10498 (Rev. 9/09) DESIGNATED FACILITY TO GENERATOR

N✓ 4/4

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: HI617002276 2
2. Page 1 of 1
3. Emergency Response Phone: 1-800-645-8265
4. Waste Tracking Number: 000023582

5. Generator's Name and Mailing Address
MARINE CORPS BASE HAWAII
BOX 63062, ATTN: JEFFREY LARSON
KANEOHE BAY, HI 96863-3062
Generator's Phone: 808-257-6999

Generator's Site Address (if different than mailing address)
HIC8110-06
FORMER FUEL FARM SLUDGE DISPOSAL AREA
KANEOHE BAY, HI 96863

6. Transporter 1 Company Name: PACIFIC COMMERCIAL SERVICES, LLC. 808-545-4599
U.S. EPA ID Number: HIR000097824

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
~~WAIMANALO GULCH SANITARY LANDFILL~~ PVT Land Company, Ltd.
~~92-460 FARRINGTON HWY.~~ 87-2020 Farrington Hwy
~~KAPOLEI, HI 96707~~ Waianae, HI 96792
Facility's Phone: ~~808-668-2985~~ 808-668-4561
U.S. EPA ID Number: NOT APPLICABLE

| 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|
| 1. MATERIAL NOT REGULATED BY DOT. (IDW SOIL CUTTING) | 003 | DM | 01500 | P | NON-RCRA |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |

13. Special Handling Instructions and Additional Information
9b1: NR ~~340926HI~~
9b2: * 89400
9b3: *
9b4: *

2008 9b1:
ERG# 9b2:
DO/JOE 9b3:
8110 9b4:

SEND COPY TO:
PCS LLC
P.O. BOX 235117
HONOLULU, HI 96823

**14. GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Rachel Gilhooly
Signature: RG
Month 4 Day 11 Year 14

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Danny G Ishii
Signature: Danny Ishii
Month 4 Day 11 Year 14
Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: R. Ishii
Signature: R. Ishii
Month 5 Day 30 Year 14

GENERATOR
INT'L
TRANSPORTER
DESIGNATED FACILITY

169-BLC-O 6 10498 (Rev. 9/09)

DESIGNATED FACILITY TO GENERATOR

# PVT Land Co. Ltd.
# NANAKULI LANDFILL FACILITY
# Soil Profile Sheet

**1. Soil Generator Information**

a. Generator Name: Marine Corps Base Hawaii

b. Generator Address: PO Box 63062, Kaneohe, HI c. Zip Code: 96863-3062

d. Address of Soil Generation: Former Fuel Farm Sludge Disposal Area, Kaneohe, HI 96863-3062

e. Address of Soil Storage (if different from source address)_____

f. Type of Facility Soil Has Been Generated From: fuel tank farm

g. State DOH Facility ID#: N/A

h. Contact: Jeff Larson i. Phone: (_____) 808-257-6999

**2. Soil Information**

a. Name of Contaminant(s): Petroleum hydrocarbons

b. Amount of Soil (tons and/or cubic yards) 3 Drums

c. Type of Soil: CLAY/CORAL

d. Soil Moisture: Wet:_____ Damp: ✓ Dry:_____

e. Soil Color (Munsell Color Chart Code if available) VARIOUS

f. Strong incidental odor ? No ✓ Yes_____ Describe:_____

g. pH N/A

h. Is the soil ignitable? Yes_____ No ✓

i. Describe the circumstances by which the soil has been generated.

Site investigation

**3. Transportation Information**

a. Method of Shipment: Bulk Solid_____ Drum/Box ✓ Other_____

b. Transportation Company: Pacific Commercial Services LLC

c. Is this a U. S. Department of Transportation (USDOT) Hazardous Material? Yes___ No ✓

**4. Chemical Contaminants** (Attach supplementary sheets if necessary)

| | | Range(Min-Max) |
|---|---|---|
| a. | See attached analytical reports | ____ - ____ ppm. |
| b. | | ____ - ____ ppm. |
| c. | | ____ - ____ ppm. |
| d. | | ____ - ____ ppm. |
| e. | | ____ - ____ ppm. |
| f. | | ____ - ____ ppm. |
| g. | | ____ - ____ ppm. |
| h. | | ____ - ____ ppm. |
| i. | | ____ - ____ ppm. |

Attach copies of analytical reports and chain of custody documentation.

Attach a description of the soil sampling procedures.

Attach a site plan showing where the soil originated, and where samples were collected.

Continued

j. Does the soil contain any of the following (provide concentration if known)

| | | | |
|---|---|---|---|
| PCBs | Yes _____ | No ✓ | _____ ppm |
| Cyanides | Yes _____ | No ✓ | _____ ppm |
| Sulfides | Yes _____ | No ✓ | _____ ppm |
| Asbestos | Yes _____ | No ✓ | _____ % |

k. Indicate method used to determine the presence or absence of items listed in section j.

Generator knowledge and testing

l. Sampling Source(e.g., Drum, Pit, Pile, Insitu, etc.) drum

m. Does the waste represented by this profile contain any of the carcinogens that require OSHA notification? Yes___ No ✓

n. Does the waste represented by this profile contain dioxins? Yes___ No ✓ (List in Section 4)

o. Does the waste represented by this profile contain asbestos? Yes___ No ✓ If yes, friable _____ non-friable _____.

p. Does the waste represented by this profile contain benzene? Yes___ No ✓

q. Is the waste subject to RCRA Subpart CC Controls? Yes___ No ✓

r. Does the waste contain any Class I or Class II ozone-depleting substances? (Freons) Yes___ No ✓

s. Does the waste contain debris? Yes___ No ✓ (List, if yes)_____

t. Personal Protective Equipment Requirements: gloves

u. Is this a state hazardous waste? Yes___ No ✓ (List, if yes)_____

v. Is the Waste from a CERCLA or state mandated clean-up? Yes___ No ✓ (if yes, provide relevant documentation.)

w. Does the waste represented by this waste profile contain concentrations of PCBs regulated by 40 CFR ? Yes___ No ✓

x. Does the waste represented by waste profile contain radioactive material or disposal regulated by the NRC? Yes___ No ✓

y. Does the waste profile and all attachments contain true and accurate descriptions of the waste material, and has all relevant information within the possession of the Generator regarding known or suspected hazards pertaining to the waste been disclosed to the contractor? Yes ✓ No___

**5. Generator's or Representative's Certification**

a. Print Sampler's Name: Rachel Kaminaka b. Sample Date: 2/13/14

c. Sampler's Title: Geologist/Field Manager

d. Sampler's Employer (if other than Generator): WCP Inc.

The sampler's signature certifies that any sample submitted is representative of the soil described above pursuant to the DOH Technical Guidance Manual for Underground Storage Tank Closure and Release Response (August 1992) and EPA SW-846.

e. Sampler's Signature: Rachel Kaminaka Digitally signed by Rachel Kaminaka DN: cn=Rachel Kaminaka, o=WCP, ou=Geologist, email=rkaminaka@wcphawaii.com, c=US Date: 2014.05.13 13:04:31 -10'00'

Continued

**6. Generator Certification**

By signing this soil profile sheet, the Generator certifies:

a. This soil is not a "Hazardous Waste" as defined by EPA or the State of Hawaii.

b. This waste does not contain regulated radioactive materials or regulated concentrations of PCBs (Polychlorinated Biphenyls).

c. The statements and attachments contain true and accurate descriptions of the soil. All relevant information regarding known or suspected hazards in the possession of the Generator has been disclosed.

d. The analytical data presented herein or attached hereto were derived from testing representative samples taken in accordance with the DOH Technical Guidance Manual for Underground Storage Tank Closure and Release Response (August 1992 and subsequent amendments/revisions) and EPA SW-846.

e. If any changes occur in the character of the soil, the Generator shall notify a Nanakuli Landfill representative immediately.

f. Signature Gilhooly, Rachel Digitally signed by Gilhooly, Rachel DN: dc=com, dc=aecomnet, dc=na, ou=AECOMUsers, ou=USWest, ou=USHNL1, cn=Gilhooly, Rachel Date: 2014.05.13 11:57:38 -10'00' As Agent for Navy

g. Company AECOM

h. Name and Title Rachel Gilhooly

i. Date 5-13-2014

**7. PVT Co. Ltd. Waste Disposal Decision (For PVT Use Only)**

a. Waste Disposal Decision _____ Accepted _____ Rejected

b. Disposal Method _____ Landfill _____ Asbestos Pit

c. Precautions, Special Handling Procedures, or Limitations on Approval: _____

d. Clearance No. _____ Date: _____

e. Reviewed by _____ Date: _____

f. Approved by _____ Date: _____

g. Forwarded to DOH: _____ Date: _____

## Additional Information for Contaminated Soil Reviews

1. Is this a hazardous waste (RCRA C)? ☐ Yes ☑ No
2. Does this waste contain heavy metals? ☐ Yes ☑ No
   If yes, explain & identify _____
3. Does the waste contain PCBs? ☐ Yes ☑ No
   If yes, explain _____
4. Is the waste a TSCA waste? ☐ Yes ☑ No
   If yes, explain & identify _____
5. Is the waste a CERCLA waste? ☐ Yes ☑ No
   If yes, explain & identify _____
6. Regulatory agency & Contact DOH Solid waste office, 586-4226
7. Generator Marine Corp Base Hawaii
8. Type of Contamination petroleum hydrocarbons
9. Consultant Name & Number AECOM
10. Review report attached ☑

If this certification is made by a broker, the undersigned signs as authorized agent of the generator and has confirmed the information contained in this Sheet and additionally attached sheets from information provided by the generator and additional information as it has determined to be reasonably necessary.

Certification Signature: Gilhooly, Rachel Digitally signed by Gilhooly, Rachel DN: dc=com, dc=aecomnet, dc=na, ou=AECOMUsers, ou=USWest, ou=USHNL1, cn=Gilhooly, Rachel Date: 2014.05.13 11:58:48 -10'00' As Agent for Navy Title: Geologist

Name (Type or Print): Rachel Gilhooly Company: AECOM Date: 5/13/14

## Submittal Instructions

The following are the items that should be in any review report, in the order noted.

1. List of regulatory agencies and regulations applicable to the project. Include Names and contact information (phone numbers) for all agencies involved for follow up.
2. Contact information: generator, type of contamination, and site history in narrative form.
3. Consultant information (i.e. Names, phone numbers) include the consultant that did the original investigation and subsequent investigations.
4. Report format for technical information.
   A. Background information for site and processes.
   B. Summary of investigative action. Including sampling and testing information pertinent to disposal.
   C. Summary of remedial actions and how material being disposed was generated.
   D. Rational for the determination that material is solid waste this should be based on applicable regulations.
   E. Site location maps and site drawings.
   F. Summary table of test data.
   G. Laboratory data.

## Actions Taken

Date _____

Accepted _____ Rejected _____

Reason for rejection _____

# PVT LAND COMPANY, LTD.

87-2020 Farrington Hwy.
Waianae, HI 96792

To Replace Clearance #72624

TEL. NO. (808) 668-4561 / FAX NO. (808) 668-1368

## REQUEST FOR CLEARANCE NUMBER

**PRINT CLEARLY**

JOBSITE ADDRESS: Former Fuel Farm Sludge Disposal Area, Kaneohe, HI ZIP CODE: 96863-3062
NAME OF PROPERTY OWNER: Marine Corps Base Hawaii
NAME OF DEMOLITION CONTRACTOR: Pacific Commercial Services LLC
ADDRESS: 91-254 Olai Street, Kapolei, HI ZIP CODE: 96707
PHONE: 808-545-4599 FAX: 808-845-9773 P.O.#: 8110-02 JOB#: 8110
* TRANSPORTER: PACIFIC COMMERCIAL SERVICES LLC PHONE: 545-4599 FAX: 845-9773

USE OF SITE: ☐ Residential ☐ Commercial ☐ Industrial ☐ Vacant Land ☐ City ☑ State ☐ Federal
JOB/PROJECT: ☐ Demo ☐ Renovation ☐ Roofing Only ☑ Other investigation
WASTE MATERIAL: ☐ Canec ☐ Concrete ☐ Grub ☐ Mixed Waste ☐ Paint Chips ☑ Rock/Dirt ☐ Liquid Waste/Sludge
☐ Transite ☐ Other _____
Does the waste material contain ***Lead Based Paint?*** ☐ Yes ☑ No
If "Yes" to the above, was TCLP performed? ☐ Yes ☐ No
TCLP required for all residential and commercial demolition and all commercial renovation projects that contain lead base paint. Residential renovations are exempt from TCLP requirements.
DATE READY FOR INSPECTION: 5/12/2014 DEMOLITION DATE: VARIOUS
Submit Additional Clearances as required: Asbestos Containing Material (ACM), Petroleum Contaminated Soil (PCS) Environmental Clearance Report, TCLP and check here ☐

**Certification**

By signing this Clearance Request sheet, the undersigned certify:

a. This waste is not a "Hazardous Waste" as defined by EPA or the State of Hawaii.
b. This waste does not contain regulated radioactive materials or regulated concentrations of PCBs (Polychlorinated Biphenyls).
c. The statements and attachments contain true and accurate descriptions of the waste. All relevant information regarding known or suspected hazards in the possession of the undersigned has been disclosed.
d. The analytical data presented herein or attached hereto were derived from testing representative samples taken in accordance with the DOH Technical Guidance Manual for Underground Storage Tank Closure and Release Response (August 1992 and subsequent amendments/revisions) and EPA SW-846.
e. If any changes occur in the character of the waste, the undersigned shall notify a Nanakuli Landfill representative immediately.
f. The waste is not generated from a CERCLA site.

**The undersigned hereby certify that the above information is true and correct:**

BILL CHARGES TO: PACIFIC COMMERCIAL SERVICES LLC DATE: 5/12/2014
AUTHORIZED SIGNATURE: [signature] TITLE: G. MANAGER

OWNER OF PROPERTY OR AUTHORIZED AGENT: Marine Corps Base Hawaii DATE: 5/13/2014
AUTHORIZED SIGNATURE: Gilhooly, Rachel Digitally signed by Gilhooly, Rachel DN: dc=com, dc=aecomnet, dc=na, ou=AECOMUsers, ou=USWest, ou=USHNL1, cn=Gilhooly, Rachel Date: 2014.05.13 09:01:09 -10'00' As Agent for Navy TITLE: Geologist

DEMOLITION CONTRACTOR: Pacific Commercial Services LLC DATE: 5/12/2014
AUTHORIZED SIGNATURE: [signature] TITLE: G. MANAGER

TRANSPORTER: Pacific Commercial Services LLC DATE: 5/12/2014
AUTHORIZED SIGNATURE: [signature] TITLE: G. MANAGER

**FOR OFFICE USE ONLY**

Clearance No: _____ Entered by: _____ Date: _____
Inspection Date: _____ ( ) Approved ( ) Declined Initials: _____ Date: _____
Compuweigh: Entered by: _____ Date: _____ Filed by: _____
Comments: _____

Additional Information:

A. All Clearance Numbers expire in 6 months; submit a new Clearance Form for approval prior to expiration date.
B. No Clearance Number will be issued or authorized during the weekend (Saturday/Sunday)
C. TCLP required for all demolition and renovation projects.
D. ONLY residential renovations do not require TCLP.
E. *For additional transporters please use the "Transporter Authorization Form"

Revised: 10/06/2011

# Appendix F
# COC Forms

# APPL - Analysis Request Form

72613

Client: WCP Inc.
Address: 99-061 Koaha Way, #208
Aiea, HI 96701
Attn: Rachel Kaminaka
Phone: 808-380-3853 Fax: 808-380-3849
Job: HC25 FSDA RI
PO #: HMAT-046
Chain of Custody (Y/N): Y # 51649, 46051
RAD Screen (Y/N): Y pH (Y/N): N
Turn Around Type: STD

Received by: YL
Date Received: 02/01/14 Time: 10:30
Delivered by: FED EX
Shuttle Custody Seals (Y/N): Y Time Zone: -10
Chest Temp(s): 4.0°C, 5.0°C
Color: VOA,E-BROWN
Samples Chilled until Placed in Refrig/Freezer: Y
Project Manager: Cynthia Clark
QC Report Type: DVP4/SEDD/HI
Due Date: 02/24/14

Comments:
*One Hard Copy to LDC, One labeled CD to Rachel*
*DOD QSM ver 4.2; DOD Forms (LOQ/LOD database/DL)*
*EDD: (EDD) ADR/DOD-version EDD, checked w/8.3a and Excel EDD to akong@lab-data.com, rkaminaka@wcphawaii.com*

Sample Distribution:
**GC: 9-$DROHC25S, 9-$SIM2HC40S**
**Extractions: 9-_SON004, 9-_SON009S**
**VOA: 2-$86CHC25W, 2-$GASHC25W, 9-$86CHC25S, 9-$GASHC12S**
**Metals: 9-$6020ADODS(Pb)**
**Wetlab: 9-MOIST**
**Other: 9-_M3050**

Charges:

Invoice To:
**Attn: Accounts Payable**

| | Client ID | APPL ID | Sampled | Analyses Requested |
|---|---|---|---|---|
| 1. | KC126 | AY92009W | 01/29/14 08:20 | $86CHC25W, $GASHC25W |
| 2. | KC127 | AY92010S | 01/29/14 08:25 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 3. | KC128 | AY92011S | 01/29/14 08:50 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 4. | KC129 | AY92012W | 01/30/14 10:00 | $86CHC25W, $GASHC25W |

Note: All times, excluding sample collection times, are Pacific Time Zone unless noted otherwise. Collection times are in: -10 UTC

| | | | | |
|---|---|---|---|---|
| 5. KC130 | AY92013S | 01/30/14 | 10:20 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 6. KC131 | AY92014S | 01/30/14 | 10:40 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 7. KC132 | AY92015S | 01/30/14 | 13:00 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 8. KC133 | AY92016S | 01/30/14 | 13:10 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 9. KC134 | AY92017S | 01/30/14 | 13:15 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 10. KC135 | AY92018S | 01/30/14 | 14:25 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 11. KC136 | AY92019S | 01/30/14 | 14:35 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |

# APPL Sample Receipt Form

ARF# **72613**

| Sample | Container Type | Count | pH |
|---|---|---|---|
| AY92009 | 13 VOAs - HCL | 3 | NA |
| AY92010 | 21 8oz Jar | 2 | NA |
| | 42 40mL VOA, MeOH prsvd | 1 | NA |
| | 44 40mL VOA, H2O w/stirbar | 2 | NA |
| AY92011 | 21 8oz Jar | 2 | NA |
| | 42 40mL VOA, MeOH prsvd | 1 | NA |
| | 44 40mL VOA, H2O w/stirbar | 2 | NA |
| AY92012 | 13 VOAs - HCL | 3 | NA |
| AY92013 | 21 8oz Jar | 2 | NA |
| | 42 40mL VOA, MeOH prsvd | 1 | NA |
| | 44 40mL VOA, H2O w/stirbar | 2 | NA |
| AY92014 | 21 8oz Jar | 2 | NA |
| | 42 40mL VOA, MeOH prsvd | 1 | NA |
| | 44 40mL VOA, H2O w/stirbar | 2 | NA |
| AY92015 | 21 8oz Jar | 2 | NA |
| | 42 40mL VOA, MeOH prsvd | 1 | NA |
| | 44 40mL VOA, H2O w/stirbar | 2 | NA |
| AY92016 | 21 8oz Jar | 2 | NA |
| | 42 40mL VOA, MeOH prsvd | 1 | NA |
| | 44 40mL VOA, H2O w/stirbar | 2 | NA |
| AY92017 | 21 8oz Jar | 2 | NA |
| | 42 40mL VOA, MeOH prsvd | 1 | NA |
| | 44 40mL VOA, H2O w/stirbar | 2 | NA |
| AY92018 | 21 8oz Jar | 2 | NA |
| | 42 40mL VOA, MeOH prsvd | 1 | NA |
| | 44 40mL VOA, H2O w/stirbar | 2 | NA |
| AY92019 | 21 8oz Jar | 5 | NA |
| | 42 40mL VOA, MeOH prsvd | 3 | NA |
| | 44 40mL VOA, H2O w/stirbar | 6 | NA |

| Sample | Container Type | Count | pH |
|---|---|---|---|

## APPL - Receiving

**From:** Cynthia Clark [cclark@applinc.com]
**Sent:** Monday, February 03, 2014 9:15 AM
**To:** 'APPL - Receiving'; 'Renee Patterson'
**Subject:** FW: WCP CTO HC25 Former Fuel Farm Sludge Disposal Area - Supplemental RI field investigation

per the email below, the request for "dissolved lead' can be removed from the soil samples on COC 51649

Sincerely,

Cynthia Clark, Project Manager

APPL, Inc.
908 North Temperance Ave., Clovis, CA 93611
Phone: 559-275-2175
Fax: 559-275-4422
cclark@applinc.com
www.applinc.com

This is a PRIVATE and CONFIDENTIAL message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind APPL, Inc. to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

---

**From:** Rachel Kaminaka [mailto:rkaminaka@wcphawaii.com]
**Sent:** Monday, February 03, 2014 8:42 AM
**To:** Cynthia Clark
**Subject:** Re: Read: CTO HC25 Former Fuel Farm Sludge Disposal Area - Supplemental RI field investigation

Hi Cynthia
I noticed that I asked for dissolved lead on COC 51649. Not sure what I was thinking. Please delete that analysis.

Thanks
Rachel

Sent from my iPhone

On Feb 3, 2014, at 6:03 AM, "Cynthia Clark" <cclark@applinc.com> wrote:

> Your message
>
> To: 'Cynthia Clark'
> Cc: Leonard Fong
> Subject: RE: CTO HC25 Former Fuel Farm Sludge Disposal Area - Supplemental RI field investigation
> Sent: 1/31/2014 6:39 PM
>
> was read on 2/3/2014 8:03 AM.
>
> <mime-attachment>

4°C

APPL LABS

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

# CHAIN OF CUSTODY RECORD

C.O.C. 46051

Report to: PLEASE PRINT
Company Name: WCP Inc
Phone: 808 380-3853
Address: 99-061 Koaha Way #208
Aiea, HI 96701
Fax: 808-380-3849
Attn: Rachel Kaminaka

Invoice to: PLEASE PRINT
Company Name: WCP Inc
Phone: 808 380-3856
Address: 99-061 Koaha Way #208
Aiea, HI 96701
Fax:
Attn: Derek Yasaka

Project Name/Number: CTO HC25
Sampler (Print): Rachel Kaminaka
Purchase Order Number: HMAT-046
Sampler (Signature): Rachel Kaminaka

Date Shipped: 1/31/14
Carrier: FedEx
Waybill No.: 804320646680
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Matrix: Sed. | Matrix: Soil | | Analysis Requested/Method Number: 8015C TPH-GRO | 8260C BTEX |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KC126 | trip blank | 1/29/14 | 0820 | | 3 | X | | | | X | X |
| KC127 | BS64 | ↓ | 0825 | | 3 | | | X | | X | X |
| KC128 | BS64 | ↓ | 0850 | | 3 | | | X | | X | X |
| KC129 | trip blank | 1/30/14 | 1000 | | 3 | X | | | | X | X |
| KC130 | BS65 | ↓ | 1020 | | 3 | | | X | | X | X |
| KC131 | BS65 | ↓ | 1040 | | 3 | | | X | | X | X |
| KC132 | BS63 | ↓ | 1300 | | 3 | | | X | | X | X |
| KC133 | BS63 | ↓ | 1310 | | 3 | | | X | | X | X |
| KC134 | BS63 | ↓ | 1315 | | 3 | | | X | | X | X |
| KC135 | BS62 | ↓ | 1425 | | 3 | | | X | | X | X |
| KC136 | BS62 | ↓ | 1435 | | 9 | | | X | | X | X |

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by sampler: | Date | Time | Received by: | Relinquished by: | Date | Time | Received by: |
|---|---|---|---|---|---|---|---|
| Rachel Kaminaka | 1/31/14 | 6:30 | Kelly Shoji | Kelly Shoji | 1/31/14 | 1100 | |
| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received at lab by: |
| | | | | | 2/1/14 | 1030 | GAguiera |

White: Return to client with report  Yellow: Laboratory Copy  Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

5°C

# CHAIN OF CUSTODY RECORD

72613

YL 2/3/14

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

C.O.C. 51649

**Report to:** PLEASE PRINT

Company Name: WCP Inc
Phone: 808 380-3853
Address: 99-061 Koaha Way #208
Aiea, HI 96701
Fax: 808-380-3849
Attn: Rachel Kaminaka

**Invoice to:** PLEASE PRINT

Company Name: WCP Inc
Phone: 808 380-3856
Address: Same
Fax:
Attn: Derek Yasaka

Project Name/Number: CTO HC25
Sampler (Print): Rachel Kaminaka
Purchase Order Number: HMAT-046
Sampler (Signature): R Kaminaka

Date Shipped: 1/31/14
Carrier: FedEx
Waybill No.: 8015 3206 4 6680
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Matrix: Sed. | Matrix: Soil | | 8015C TPH-GRO | 8260C BTEX | 8015C TPH DRO | 8270SIM PAHs | Pb total | Pb Dissolved | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KC 127 | BS64 | 1/29/14 | 0825 | | 2 | | | X | | X | X | X | X | X | X | | | | | | |
| KC 128 | BS64 | 1/29/14 | 0850 | | 2 | | | X | | X | X | X | X | X | X | | | | | | |
| KC 130 | BS65 | 1/30/14 | 1020 | | 2 | | | X | | X | X | X | X | X | X | | | | | | |
| KC 131 | BS65 | 1/30/14 | 1040 | | 2 | | | X | | X | X | X | X | X | X | | | | | | |
| KC 132 | BS 63 | 1/30/14 | 1300 | | 2 | | | X | | X | X | X | X | X | X | | | | | | |
| KC 133 | BS63 | 1/30/14 | 1310 | | 2 | | | X | | X | X | X | X | X | X | | | | | | |
| KC 134 | BS 63 | 1/30/14 | 1315 | | 2 | | | X | | X | X | X | X | X | X | | | | | | |
| KC 135 | BS 62 | 1/30/14 | 1425 | | 2 | | | X | | X | X | X | X | X | X | | | | | | |
| KC 136 | BS 62 | 1/30/14 | 1435 | | 5 | | | X | | X | X | X | X | X | X | | | | | | |

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received by: |
|---|---|---|---|---|---|---|---|
| R Kaminaka | 1/31/14 | 6:30 | Kelly Shoji | Kelly Shoji | 1/31/14 | 1100 | |
| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received at lab by: |
| | | | | | 2/1/14 | 1020 | Agnieza |

White: Return to client with report  Yellow: Laboratory Copy  Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

# COOLER RECEIPT FORM

**ARF: 72613**

1) Project: HC25 FSDA RI — Date Received: 02/01/14

**2) Coolers:** Number of Coolers: 2

3) YES Were custody seals present and intact?
How many? 4 — Name/Date on seal? See below

4) YES Was there a shipping slip? — Carrier name: FED EX

5) Type of packing in cooler: X bubble wrap, __ popcorn, __ foam, X plastic bags, X wet ice, __ dry ice, __ no ice, __ other

6) YES Were cooler temperatures acceptable?

7) Serial number of certified NIST thermometer use J5297

8) Cooler temp(s): In °C

| 1: 4.0 | 2: 5.0 | 3: | 4: | 5: | 6: |
|---|---|---|---|---|---|
| 7: | 8: | 9: | 10: | 11: | 12: |

**Chain of custody:**

9) YES Was a chain of custody received?

10) YES Were the custody papers complete/signed in the appropriate places?

**Sample Labels:**

11) YES Were all sample labels complete (sample ID, date/time of sampling, etc.)?

12) YES Did all container labels agree with custody papers?

**Sample Containers:**

13) YES Were all containers sealed in separate bags?

14) YES Did all containers arrive in good condition:(unbroken, no leakage, no cracked/broken lids)?

15) YES Were correct containers and preservatives used for the tests indicated?

16) YES Was a sufficient amount of sample sent for tests indicated?

17) YES Were bubbles present in volatile samples?
If yes, the following were received with air bubbles:
Larger than a pea: AY92009W03,AY92012W02-W03.
Smaller than a pea:

**Preservation Hold time:**

18) YES Was a sufficient amount of holding time remaining to analyze the samples?

19) NA Was the pH taken of all non-VOA preserved samples and written on the sample container?

20) NA Was the pH of acid preserved non-VOA samples < 2?

21) NA Was the pH of sodium hydroxide preserved samples for Cyanide > 12 and Sulfide >9?

22) YES Were unpreserved VOA Vials received? HW 2/3/14

23) NO Are unpreserved VOA vials noted in the ADD TEST FIELD on the ARF?
pH strip lot number:
Lab notified if pH was not adequate:

Notes/Deficiencies:

(559) 275-2175
APPL, Inc.
Date 1/31/14
KS

Personnel receiving samples: [signature] — Second reviewer: [signature]
Personnel labeling samples:
Project manager notified: — Date/Time of notification
Name of client notified: — Date/Time of notification

# APPL - Analysis Request Form

72621

Client: WCP Inc.
Address: 99-061 Koaha Way, #208
Aiea, HI 96701
Attn: Rachel Kaminaka
Phone: 808-380-3853 Fax: 808-380-3849
Job: HC25 FSDA RI
PO #: HMAT-046
Chain of Custody (Y/N): Y # 51650
RAD Screen (Y/N): Y pH (Y/N): N
Turn Around Type: STD

Received by: YL
Date Received: 02/05/14 Time: 11:05
Delivered by: FED EX
Shuttle Custody Seals (Y/N): Y Time Zone: -10
Chest Temp(s): 4.0°C
Color: VOA, A-GREEN
Samples Chilled until Placed in Refrig/Freezer: Y
Project Manager: Cynthia Clark
QC Report Type: DVP4/SEDD/HI
Due Date: 02/26/14

Comments:
*One Hard Copy to LDC, One labeled CD to Rachel*
*DOD QSM ver 4.2; DOD Forms (LOQ/LOD database/DL)*
*EDD: (EDD) ADR/DOD-version EDD, checked w/8.3a and Excel EDD to akong@lab-data.com, rkaminaka@wcphawaii.com*

Sample Distribution:
**GC: 4-$DROHC25S, 4-$SIM2HC40S**
**Extractions: 4-_SON004, 4-_SON009S**
**VOA: 1-$86CHC25W, 1-$GASHC25W, 4-$86CHC25S, 4-$GASHC12S**
**Metals: 4-$6020ADODS(Pb)**
**Wetlab: 4-MOIST**
**Other: 4-_M3050**

Charges:

Invoice To:
**Attn: Accounts Payable**

| | Client ID | APPL ID | Sampled | Analyses Requested |
|---|---|---|---|---|
| 1. | KC137 | AY92032W | 01/31/14 07:20 | $86CHC25W, $GASHC25W |
| 2. | KC138 | AY92033S | 01/31/14 07:30 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 3. | KC139 | AY92034S | 01/31/14 07:45 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |
| 4. | KC140 | AY92035S | 01/31/14 09:00 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |

Note: All times, excluding sample collection times, are Pacific Time Zone unless noted otherwise. Collection times are in: -10 UTC

| | | | | |
|---|---|---|---|---|
| 5. | KC141 | AY92036S | 01/31/14 09:20 | $6020ADODS(Pb), $86CHC25S, $DROHC25S, $GASHC12S, $SIM2HC40S, MOIST |

# APPL Sample Receipt Form

ARF# **72621**

| Sample | Container Type | Count | pH |
|---|---|---|---|
| **AY92032** | [13] VOAs - HCL | 3 | NA |
| **AY92033** | [21] 8oz Jar | 2 | NA |
| | [42] 40mL VOA, MeOH prsvd | 1 | NA |
| | [44] 40mL VOA, H2O w/stirbar | 2 | NA |
| **AY92034** | [21] 8oz Jar | 2 | NA |
| | [42] 40mL VOA, MeOH prsvd | 1 | NA |
| | [44] 40mL VOA, H2O w/stirbar | 2 | NA |
| **AY92035** | [21] 8oz Jar | 2 | NA |
| | [42] 40mL VOA, MeOH prsvd | 1 | NA |
| | [44] 40mL VOA, H2O w/stirbar | 2 | NA |
| **AY92036** | [21] 8oz Jar | 2 | NA |
| | [42] 40mL VOA, MeOH prsvd | 1 | NA |
| | [44] 40mL VOA, H2O w/stirbar | 2 | NA |

| Sample | Container Type | Count | pH |
|---|---|---|---|

72621
4.0°C
YC 2/5/14

APPL LABS

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

# CHAIN OF CUSTODY RECORD

C.O.C. 51650

**Report to:** PLEASE PRINT

Company Name: WCP Inc. Phone: 808 380-3853
Address: 99-061 Koaha Way Ste 208 Aiea, HI 96701 Fax: 808-380-3849
Attn: Rachel Kaminaka

**Invoice to:** PLEASE PRINT

Company Name: WCP Inc Phone: 808 380-3856
Address: Same Fax:
Attn: Derek Yasaka

Project Name/Number: CTO HC25
Purchase Order Number: HMAT-046
Sampler (Print): Rachel Kaminaka
Sampler (Signature): Rachel Kaminaka

Date Shipped: 2/3/14
Carrier: FedEx
Waybill No.: 8043206466 90
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Matrix: Sed. | Matrix: Soil | 8015C TPH-GRO | 8260C BTEX | 8015C TPH DRO/LRO | 8270SIM PAHs | Pb total | Pb dissolved |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KC137 | trip blank | 1/31/14 | 0720 | HI | 3 | X | | | X | X | | | | |
| KC138 | BS61 | | 0730 | HI | 5 | | | X | X | X | X | X | X | |
| KC139 | BS61 | | 0745 | HI | 5 | | | X | X | X | X | X | X | |
| KC140 | BS60 | | 0900 | HI | 5 | | | X | X | X | X | X | X | |
| KC141 | BS60 | | 0920 | HI | 5 | | | X | X | X | X | X | X | |

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by sampler: | Date | Time | Received by: | Relinquished by: | Date | Time | Received by: |
|---|---|---|---|---|---|---|---|
| Rachel Kaminaka | 1/31/14 | 1500 | Kelly Ahoji | Kelly Ahoji | 2/3/14 | 1115 | |
| **Relinquished by:** | **Date** | **Time** | **Received by:** | **Relinquished by:** | **Date** | **Time** | **Received at lab by:** |
| | | | | | 2/5/14 | 11:05 | Yang Zh |

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

**COOLER RECEIPT FORM** **ARF: 72621**

1) Project: CTO HC25 FSDA RI Date Received: 02/05/14

**2) Coolers:** Number of Coolers: 1

3) YES Were custody seals present and intact?
How many? 2 Name/Date on seal? See below

4) YES Was there a shipping slip? Carrier name: FED EX

5) Type of packing in cooler: X bubble wrap ___ popcorn ___ foam X plastic bags
X wet ice ___ dry ice ___ no ice ___ other

6) YES Were cooler temperatures acceptable?

7) Serial number of certified NIST thermometer use J5297

8) Cooler temp(s): In °C
1: 4.0 2: ___ 3: ___ 4: ___ 5: ___ 6: ___
7: ___ 8: ___ 9: ___ 10: ___ 11: ___ 12: ___

**Chain of custody:**

9) YES Was a chain of custody received?

10) YES Were the custody papers complete/signed in the appropriate places?

**Sample Labels:**

11) YES Were all sample labels complete (sample ID, date/time of sampling, etc.)?

12) YES Did all container labels agree with custody papers?

**Sample Containers:**

13) NO Were all containers sealed in separate bags?

14) YES Did all containers arrive in good condition:(unbroken, no leakage, no cracked/broken li

15) YES Were correct containers and preservatives used for the tests indicated?

16) YES Was a sufficient amount of sample sent for tests indicated?

17) NO Were bubbles present in volatile samples?
If yes, the following were received with air bubbles:
Larger than a pea: ___
Smaller than a pea: ___

**USTODY SEAL**
APPL, Inc.
(559) 275-2175
Is KS
Date 2/3/14

**Preservation Hold time:**

18) YES Was a sufficient amount of holding time remaining to analyze the samples?

19) NA Was the pH taken of all non-VOA preserved samples and written on the sample container?

20) NA Was the pH of acid preserved non-VOA samples < 2?

21) NA Was the pH of sodium hydroxide preserved samples for Cyanide > 12 and Sulfide >9?

22) NA ~~YES~~ Were unpreserved VOA Vials received? HW 2/5/14

23) YC 2/5/14 NA Are unpreserved VOA vials noted in the ADD TEST FIELD on the ARF?
pH strip lot number: ___
Lab notified if pH was not adequate: ___

Notes/Deficiencies:

Personnel receiving samples: [signature] Second reviewer: [signature]
Personnel labeling samples: ___
Project manager notified: ___ Date/Time of notification ___
Name of client notified: ___ Date/Time of notification ___

# APPL - Analysis Request Form

72650

Client: WCP Inc.
Address: 99-061 Koaha Way, #208
Aiea, HI 96701
Attn: Rachel Kaminaka
Phone: 808-380-3853 Fax: 808-380-3849
Job: HC25 FSDA RI
PO #: HMAT-046
Chain of Custody (Y/N): Y # 46053-5
RAD Screen (Y/N): Y pH (Y/N): Y
Turn Around Type: STD

Received by: YL
Date Received: 02/07/14 Time: 10:45
Delivered by: FED EX
Shuttle Custody Seals (Y/N): Y Time Zone: -10
Chest Temp(s): 3,3,3.5°C
Color: VOA,B-RED,R-GRNYELL
Samples Chilled until Placed in Refrig/Freezer: Y
Project Manager: Cynthia Clark
QC Report Type: DVP4/SEDD/HI
Due Date: 02/28/14

Comments:
*One Hard Copy to LDC, One labeled CD to Rachel*
*DOD QSM ver 4.2; DOD Forms (LOQ/LOD database/DL)*
*EDD: (EDD) ADR/DOD-version EDD, checked w/8.3a and Excel EDD to akong@lab-data.com, rkaminaka@wcphawaii.com*

Sample Distribution:
**GC: 4-$DROWCT008, 4-$SIMHC33W**
**Extractions: 4-_SEP004S, 4-_SEP011**
**VOA: 5-$86CHC25W, 5-$GASHC25W**
**Metals: 4-$6020ADODW(Pb), 4-$6020ADODWD(Pb)**
**Other: 4-_M3015, 4-_M3015F**

Charges:

Invoice To:
**Attn: Accounts Payable**

| | Client ID | APPL ID | Sampled | | Analyses Requested |
|---|---|---|---|---|---|
| 1. | KC 142 | AY92130W | 02/05/14 | 08:30 | $86CHC25W, $GASHC25W |
| 2. | KC 143 | AY92131W | 02/05/14 | 09:35 | $6020ADODW(Pb), $6020ADODWD(Pb), $86CHC25W, $DROWCT008, $GASHC25W, $SIMHC33W |
| 3. | KC 144 | AY92132W | 02/05/14 | 09:45 | $6020ADODW(Pb), $6020ADODWD(Pb), $86CHC25W, $DROWCT008, $GASHC25W, $SIMHC33W |
| 4. | KC 145 | AY92133W | 02/05/14 | 13:20 | $6020ADODW(Pb), $6020ADODWD(Pb), $86CHC25W, $DROWCT008, $GASHC25W, $SIMHC33W |

Note: All times, excluding sample collection times, are Pacific Time Zone unless noted otherwise. Collection times are in: -10 UTC

| | | | | |
|---|---|---|---|---|
| 5. | KC 146 | AY92134W | 02/05/14 15:30 | $6020ADODW(Pb), $6020ADODWD(Pb), $86CHC25W, $DROWCT008, $GASHC25W, $SIMHC33W |

# APPL Sample Receipt Form

ARF# **72650**

| Sample | Container Type | Count | pH |
|---|---|---|---|
| **AY92130** | 13 VOAs - HCL | 3 | NA |
| **AY92131** | 6 PL 500mL - HNO3 | 2 | 1.7 |
| | 13 VOAs - HCL | 6 | NA |
| | 17 Amber Liter | 4 | NA |
| **AY92132** | 6 PL 500mL - HNO3 | 2 | 1.7 |
| | 13 VOAs - HCL | 6 | NA |
| | 17 Amber Liter | 4 | NA |
| **AY92133** | 6 PL 500mL - HNO3 | 2 | 1.7 |
| | 13 VOAs - HCL | 6 | NA |
| | 17 Amber Liter | 4 | NA |
| **AY92134** | 6 PL 500mL - HNO3 | 2 | 1.7 |
| | 13 VOAs - HCL | 6 | NA |
| | 17 Amber Liter | 4 | NA |

| Sample | Container Type | Count | pH |
|---|---|---|---|

3.5 72650

YL 2/7/14

# CHAIN OF CUSTODY RECORD

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

C.O.C. 46055

**Report to:** PLEASE PRINT

Company Name: WCP Inc
Phone: (808)380-3853
Address: 99-061 Koaha Way #208
Aiea, HI 96701
Fax: (808)380-3849
Attn: Rachel Kaminaka

**Invoice to:** PLEASE PRINT

Company Name: WCP Inc
Phone: (808)380-3856
Address: Same
Fax:
Attn: Derek Yasaka

Project Name/Number: CTO HC25
Purchase Order Number: HMAT-0416
Sampler (Print): Rachel Kaminaka
Sampler (Signature):

Date Shipped: 02/06/14
Carrier: FedEX
Waybill No.: 8043 2064 6705
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Sed. | Soil | | 8015C TPH DRO | 8270D SVOC PAHs | Total Pb | Dissolved Pb | 8015C TPH-GRO | 8260C BTEX | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KC142 | TB | 2/5/14 | 0830 | HI | 3 | X | | | | | | | | X | X | | | | | | |
| KC143 | MW64 | ↓ | 0935 | ↓ | 8 | X | | | | | | X | X | X | X | | | | | | |
| KC144 | MW64 | | 0945 | | 8 | X | | | | | | X | X | X | X | | | | | | |
| KC145 | MW65 | | 1320 | | 8 | X | | | | | | X | X | X | X | | | | | | |
| KC146 | MW60 | ↓ | 1530 | ↓ | 8 | X | | | | | | X | X | X | X | | | | | | |

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received by: |
|---|---|---|---|---|---|---|---|
| [signature] | 2/5/14 | 1600 | Kelly Shoji | Kelly Shoji | 02/06/14 | 1100 | |
| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date 2/7/14 | Time 10:45 | Received at lab by: [signature] |

White: Return to client with report  Yellow: Laboratory Copy  Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

3.0

APPL LABS

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

# CHAIN OF CUSTODY RECORD

C.O.C. 46053

PLEASE PRINT

Report to:
Company Name: WCP Inc.
Phone: (808) 380-3853
Address: 99-061 Koaha Way #208
~~Ha~~ Aiea, HI 96701
Fax: (808) 380-3849
Attn: Rachel Kaminaka

Invoice to:
Company Name: WCP Inc.
Phone: (808) 380-3856
Address: Same
Fax:
Attn: Derek Yasaka

Project Name/Number: CTO HC25
Sampler (Print): Rachel Kaminaka
Purchase Order Number: HMAT-046
Sampler (Signature): R Kaminaka

Date Shipped: 02/06/14
Carrier: FedEx
Waybill No.: 8043 2064 6705
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Matrix: Sed. | Matrix: Soil | | Analysis Requested/Method Number: 8015C TPH-D EPH LRO | 8270 SIM PAHs | Total Pb | Dissolved Pb | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KC 143 | MW64 | 2/5/14 | 0935 | HI | 4 | X | | | | X | X | | | | | | | | | | |
| KC 144 | MW64 | 2/5/14 | 0945 | HI | 4 | X | | | | X | X | | | | | | | | | | |

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by sampler: | Date: 2/5/14 | Time: 1600 | Received by: Kelly Shoji | Relinquished by: Kelly Shoji | Date: 02/06/14 | Time: 1100 | Received by: |
|---|---|---|---|---|---|---|---|
| Relinquished by: | Date | Time | Received by | Relinquished by: | Date: 2/7/14 | Time: 10:45 | Received at lab by: |

White: Return to client with report  Yellow: Laboratory Copy  Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

3.0

# CHAIN OF CUSTODY RECORD

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

C.O.C. 46054

**Report to:** PLEASE PRINT

Company Name: WCP Inc. Phone: (808) 380-3853
Address: 99-061 Koaha Way #208 Fax: (808) 380-3849
Aiea, HI 96701
Attn: Rachel Kaminaka

**Invoice to:** PLEASE PRINT

Company Name: WCP Inc Phone: (808) 380-3856
Address: Same
Fax:
Attn: Derek Yasaka

Project Name/Number: CTO HC25
Sampler (Print): Rachel Kaminaka
Purchase Order Number: HMAT-046
Sampler (Signature): R Kaminaka

Date Shipped: 02/06/14
Carrier: FedEx
Waybill No.: 8043 2064 6705
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Matrix: Sed. | Matrix: Soil | | 8005C TPH DRO/EXTO | 8270 SIM PAHs | Total Pb | Dissolved Pb | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KC145 | MW65 | 2/5/14 | 1320 | HI | 4 | X | | | | X | X | | | | | | | | | | |
| KC146 | MW60 | 2/5/14 | 1530 | HI | 4 | X | | | | X | X | | | | | | | | | | |

Analysis Requested/Method Number

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by sampler: | Date | Time | Received by: | Relinquished by: | Date | Time | Received by: |
|---|---|---|---|---|---|---|---|
| R Kaminaka | 2/5/14 | 1600 | Kelly Ahoji | Kelly Ahoji | 02/06/14 | 1140 | |
| **Relinquished by:** | **Date** | **Time** | **Received by:** | **Relinquished by:** | **Date** | **Time** | **Received at lab by:** |
| | | | | | 2/7/14 | 10:45 | Jan M |

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

**COOLER RECEIPT FORM** **ARF: 72650**

1) Project: CTO HC25 FSDA RI Date Received: 02/07/14

**2) Coolers:** Number of Coolers: 3

3) YES Were custody seals present and intact?
How many? 6 Name/Date on seal? See Below

4) YES Was there a shipping slip? Carrier name: FED EX

5) Type of packing in cooler: X bubble wrap ___ popcorn ___ foam X plastic bags
X wet ice ___ dry ice ___ no ice ___ other

6) YES Were cooler temperatures acceptable?

7) Serial number of certified NIST thermometer use J5297

8) Cooler temp(s): In °C

| | | | | | |
|---|---|---|---|---|---|
| 1: 3.0 | 2: 3.0 | 3: 3.5 | 4: | 5: | 6: |
| 7: | 8: | 9: | 10: | 11: | 12: |

**Chain of custody:**

9) YES Was a chain of custody received?

10) YES Were the custody papers complete/signed in the appropriate places?

**Sample Labels:**

11) YES Were all sample labels complete (sample ID, date/time of sampling, etc.)?

12) YES Did all container labels agree with custody papers?

**Sample Containers:**

13) YES Were all containers sealed in separate bags?

14) YES Did all containers arrive in good condition:(unbroken, no leakage, no cracked/broken lids)?

15) YES Were correct containers and preservatives used for the tests indicated?

16) YES Was a sufficient amount of sample sent for tests indicated?

17) YES Were bubbles present in volatile samples?
If yes, the following were received with air bubbles:
Larger than a pea: AY92130W01-W03
Smaller than a pea:

**Preservation Hold time:**

18) YES Was a sufficient amount of holding time remaining to analyze the samples?

19) YES Was the pH taken of all non-VOA preserved samples and written on the sample container?

20) YES Was the pH of acid preserved non-VOA samples < 2?

21) NA Was the pH of sodium hydroxide preserved samples for Cyanide > 12 and Sulfide >9?

22) NO Were unpreserved VOA Vials received?

23) NA Are unpreserved VOA vials noted in the ADD TEST FIELD on the ARF?
pH strip lot number: HC378115
Lab notified if pH was not adequate:

Notes/Deficiencies:

APPL, Inc. (559) 275-2175
Date 2/6/14

Personnel receiving samples: Second reviewer:
Personnel labeling samples:
Project manager notified: Date/Time of notification
Name of client notified: Date/Time of notification

# APPL - Analysis Request Form

72662

Client: WCP Inc.
Address: 99-061 Koaha Way, #208
Aiea, HI 96701
Attn: Rachel Kaminaka
Phone: 808-380-3853 Fax: 808-380-3849
Job: HC25 FSDA RI
PO #: HMAT-046
Chain of Custody (Y/N): Y # 46049,50,56,57
RAD Screen (Y/N): Y pH (Y/N): Y
Turn Around Type: STD

Received by: YL
Date Received: 02/11/14 Time: 10:45
Delivered by: FED EX
Shuttle Custody Seals (Y/N): Y Time Zone: -10
Chest Temp(s): 2,2,2.5,2.5°C
Color: VOA,A-GRN,R-ORGYELL
Samples Chilled until Placed in Refrig/Freezer: Y
Project Manager: Cynthia Clark
QC Report Type: DVP4/SEDD/HI
Due Date: 03/04/14

Comments:
*One Hard Copy to LDC, One labeled CD to Rachel*
*DOD QSM ver 4.2; DOD Forms (LOQ/LOD database/DL)*
*EDD: (EDD) ADR/DOD-version EDD, checked w/8.3a and Excel EDD to akong@lab-data.com, rkaminaka@wcphawaii.com*

Sample Distribution:
**GC: 5-$DROWCT008, 5-$SIMHC33W**
**Extractions: 5-_SEP004S, 5-_SEP011**
**VOA: 6-$86CHC25W, 6-$GASHC25W**
**Metals: 5-$6020ADODW(Pb), 4-$6020ADODWD(Pb)**
**Other: 5-_M3015, 4-_M3015F**

Charges:

Invoice To:
**Attn: Accounts Payable**

| | Client ID | | APPL ID | Sampled | Analyses Requested |
|---|---|---|---|---|---|
| 1. | KC 147 | | AY92224W | 02/06/14 07:30 | $86CHC25W, $GASHC25W |
| 2. | KC 148 | ms/msd | AY92225W | 02/06/14 08:30 | $6020ADODW(Pb), $6020ADODWD(Pb), $86CHC25W, $DROWCT008, $GASHC25W, $SIMHC33W |
| 3. | KC 149 | | AY92226W | 02/06/14 11:10 | $6020ADODW(Pb), $6020ADODWD(Pb), $86CHC25W, $DROWCT008, $GASHC25W, $SIMHC33W |
| 4. | KC 150 | | AY92227W | 02/06/14 13:25 | $6020ADODW(Pb), $6020ADODWD(Pb), $86CHC25W, $DROWCT008, $GASHC25W, $SIMHC33W |

Note: All times, excluding sample collection times, are Pacific Time Zone unless noted otherwise. Collection times are in: -10 UTC

| | | | | |
|---|---|---|---|---|
| 5. | KC 151 | AY92228W | 02/06/14 14:00 | $6020ADODW(Pb), $86CHC25W, $DROWCT008, $GASHC25W, $SIMHC33W |
| 6. | KC 152 | AY92229W | 02/06/14 14:10 | $6020ADODW(Pb), $6020ADODWD(Pb), $86CHC25W, $DROWCT008, $GASHC25W, $SIMHC33W |

# APPL Sample Receipt Form

ARF# **72662**

| Sample | Container Type | Count | pH |
|---|---|---|---|
| **AY92224** | 13 VOAs - HCL | 3 | NA |
| **AY92225** | 6 PL 500mL - HNO3 | 6 | 1.7 |
| | 13 VOAs - HCL | 18 | NA |
| | 17 Amber Liter | 11 | NA |
| **AY92226** | 6 PL 500mL - HNO3 | 2 | 1.7 |
| | 13 VOAs - HCL | 6 | NA |
| | 17 Amber Liter | 4 | NA |
| **AY92227** | 6 PL 500mL - HNO3 | 2 | 1.7 |
| | 13 VOAs - HCL | 6 | NA |
| | 17 Amber Liter | 4 | NA |
| **AY92228** | 6 PL 500mL - HNO3 | 1 | 1.7 |
| | 13 VOAs - HCL | 6 | NA |
| | 17 Amber Liter | 4 | NA |
| **AY92229** | 6 PL 500mL - HNO3 | 2 | 1.7 |
| | 13 VOAs - HCL | 6 | NA |
| | 17 Amber Liter | 4 | NA |

| Sample | Container Type | Count | pH |
|---|---|---|---|

20
72662
YL 2/11/14

# CHAIN OF CUSTODY RECORD

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

C.O.C. 46056

**Report to:** PLEASE PRINT
Company Name: WCP Inc
Phone: (808) 380-3853
Address: 99-061 Koaha Way #208
Aiea, HI 96701
Fax: (808) 380-3849
Attn: Rachel Kaminaka

**Invoice to:** PLEASE PRINT
Company Name: WCP Inc.
Phone: (808) 380-3856
Address: Same
Fax:
Attn: Derek Yasuka

Project Name/Number: CTO HC25
Sampler (Print): Rachel Kaminaka
Purchase Order Number: HMAT-0416
Sampler (Signature): R Kaminaka

Date Shipped: 2/10/14
Carrier: FedEx
Waybill No.: 804320646716
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Sed. | Soil | | 8015C TPH-GRO | 8260C BTEX | total Pb | Dissolved Pb | | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KC147 | trip blank | 2/6/14 | 0730 | HI | 3 | X | | | | X | X | | | | | | | | | | | |
| KC148 | MW63 | ↓ | 0830 | ↓ | 18 | X | | | | X | X | | | | | | | | | | | MS/MSD |
| KC149 | MW62 | ↓ | 1110 | ↓ | 6 | X | | | | X | X | | | | | | | | | | | |
| KC150 | MW61 | ↓ | 1325 | ↓ | 6 | X | | | | X | X | | | | | | | | | | | |
| KC151 | FB | ↓ | 1400 | ↓ | 7 | X | | | | X | X | X | | | | | | | | | | |
| KC152 | EB | ↓ | 1410 | ↓ | 8 | X | | | | X | X | X | X | | | | | | | | | |

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received by: |
|---|---|---|---|---|---|---|---|
| R Kaminaka | 2/6/14 | 1000 | | | | | |
| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received at lab by: |
| | | | | | 2/11/14 | 10:45 | |

White: Return to client with report  Yellow: Laboratory Copy  Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

2.5

# CHAIN OF CUSTODY RECORD

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

C.O.C. 46057

**Report to:** PLEASE PRINT

Company Name: WCP Inc.
Phone: (808) 380-~~3853~~ 3853
Address: 99-061 Koaha Way #208
Aiea, HI 96701
Fax: (808) 380-3849
Attn: Rachel Kaminaka

**Invoice to:** PLEASE PRINT

Company Name: WCP Inc.
Phone: (808) 380-3856
Address: Same
Fax:
Attn: Derek Yasaka

Project Name/Number: CTO HC25
Purchase Order Number: HMAT-0446
Sampler (Print): Rachel Kaminaka
Sampler (Signature): R Kaminaka

Date Shipped: 2/10/14
Carrier: FedEx
Waybill No.: 804320646716
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Matrix: Sed. | Matrix: Soil | Analysis Requested/Method Number: 8270SIM PAHs | 8015C TPH PRO/LRO | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KC148 | mw63 | 2/6/14 | 0830 | HI | 10 | X | | | X | X | | | | | | | | | | | ms/msD |
| ~~KC149~~ RK | | | | | | | | | | | | | | | | | | | | | |
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Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received by: |
|---|---|---|---|---|---|---|---|
| R Kaminaka | 2/10/14 | 1000 | | | | | |
| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received at lab by: |
| | | | | | 2/11/14 | 10:45 | |

White: Return to client with report  Yellow: Laboratory Copy  Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

2.5

APPL LABS

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

# CHAIN OF CUSTODY RECORD

C.O.C. 46050

PLEASE PRINT

Report to:
Company Name: WCP Inc.
Phone: (808) 380-3853
Address: 99-061 Koaha Way #208
Aiea, HI 96701
Fax: (808) 380-3849
Attn: Rachel Kaminaka

Invoice to:
Company Name: WCP Inc.
Phone: (808) 380-3856
Address:
Fax:
Attn: Derek Yasaka

Project Name/Number: CTO HC25
Purchase Order Number: HMAT-046
Sampler (Print): Rachel Kaminaka
Sampler (Signature): RKaminaka

Date Shipped: 2/10/14
Carrier: FedEx
Waybill No.: 804320646716
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Matrix: Sed. | Matrix: Soil | | Analysis Requested/Method Number: 8270SIM PAHs | 8015C TPH DRO/LRO | Total Pb | Dissolved Pb | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KC148 | MW63 | 2/6/14 | 0830 | HI | 6 | X | | | | | | X | X | | | | | | | | | ms/msD |
| KC150 | MW61 | ↓ | 1325 | ↓ | 2 | X | | | | | | X | X | | | | | | | | | |
| KC151 | FB | | 1400 | | 4 | X | | | | X | X | | | | | | | | | | | |
| KC152 | EB | | 1410 | | 4 | X | | | | X | X | | | | | | | | | | | |

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received by: |
|---|---|---|---|---|---|---|---|
| RKaminaka | 2/10/14 | 1000 | | | | | |
| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received at lab by: |
| | | | | | 2/11/14 | 10:45 | |

White: Return to client with report  Yellow: Laboratory Copy  Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

2.0

# CHAIN OF CUSTODY RECORD

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

C.O.C. 46049

**Report to:** PLEASE PRINT

Company Name: WCP Inc.
Phone: (808) 380-3853
Address: 99-061 Koaha Way #208
Aiea, HI 96701
Fax: (808) 380-3849
Attn: Rachel Kaminaka

**Invoice to:** PLEASE PRINT

Company Name: WCP Inc.
Phone: (808) 380-3856
Address:
Fax:
Attn: Derek Yasaka

Project Name/Number: CTO HC25
Sampler (Print): Rachel Kaminaka
Purchase Order Number: HMAT-0246
Sampler (Signature): R Kaminaka

Date Shipped: 2/10/14
Carrier: FedEx
Waybill No. 804320646716
Comments:

| Sample Identification | Location | Date Collected | Time Collected | Time Zone | No. of Containers | Matrix: Aq | Matrix: Sed. | Matrix: Soil | 8270SIM PAHs | 8015C TPH-DRO | Total Pb | Dissolved Pb | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KC148 | MW63 | 2/6/14 | 0830 | HI | 1 | X | | | X | X | | | MS/MSD |
| KC149 | MW62 | ↓ | 1110 | ↓ | 6 | X | | | X | X | X | X | |
| KC150 | MW61 | ↓ | 1325 | ↓ | 4 | X | | | X | X | | | |

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3 wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received by: |
|---|---|---|---|---|---|---|---|
| R Kaminaka | 2/10/14 | 1006 | | | | | |
| Relinquished by: | Date | Time | Received by: | Relinquished by: | Date | Time | Received at lab by: |
| | | | | | 2/11/14 | 10:45 | |

White: Return to client with report  Yellow: Laboratory Copy  Pink: Sampler

*See reverse side for Container Preservative and Sampling Information*

**COOLER RECEIPT FORM** **ARF: 72662**

1) Project: CTO HC25 FSDA RI Date Received: 02/11/14

**2) Coolers:** Number of Coolers: 4

3) YES Were custody seals present and intact?
How many? 8 Name/Date on seal? See below

4) YES Was there a shipping slip? Carrier name: FED EX

5) Type of packing in cooler: X bubble wrap ___ popcorn ___ foam X plastic bags
X wet ice ___ dry ice ___ no ice ___ other

6) YES Were cooler temperatures acceptable?

7) Serial number of certified NIST thermometer use J5297

8) Cooler temp(s): In °C

| | | | | | |
|---|---|---|---|---|---|
| 1: 2.0 | 2: 2.0 | 3: 2.5 | 4: 2.5 | 5: | 6: |
| 7: | 8: | 9: | 10: | 11: | 12: |

**Chain of custody:**

9) YES Was a chain of custody received?

10) YES Were the custody papers complete/signed in the appropriate places?

**Sample Labels:**

11) YES Were all sample labels complete (sample ID, date/time of sampling, etc.)?

12) YES Did all container labels agree with custody papers?

**Sample Containers:**

13) NO Were all containers sealed in separate bags?

14) YES Did all containers arrive in good condition:(unbroken, no leakage, no cracked/broken lids)?

15) YES Were correct containers and preservatives used for the tests indicated?

16) YES Was a sufficient amount of sample sent for tests indicated?

17) YES Were bubbles present in volatile samples?
If yes, the following were received with air bubbles:
Larger than a pea: AY92224W01-W03.
Smaller than a pea:

**Preservation Hold time:**

18) YES Was a sufficient amount of holding time remaining to analyze the samples?

19) YES Was the pH taken of all non-VOA preserved samples and written on the sample container?

20) YES Was the pH of acid preserved non-VOA samples < 2?

21) NA Was the pH of sodium hydroxide preserved samples for Cyanide > 12 and Sulfide >9?

22) NO Were unpreserved VOA Vials received?

23) NA Are unpreserved VOA vials noted in the ADD TEST FIELD on the ARF?
pH strip lot number: HC389101
Lab notified if pH was not adequate:

Notes/Deficiencies:

CUSTODY SEAL
APPL, Inc.
(559) 275-2175
Initials
Date 2/10/14

Personnel receiving samples: Second reviewer:
Personnel labeling samples:
Project manager notified: Date/Time of notification
Name of client notified: Date/Time of notification

# Appendix G
# Analytical Results

**Table G-1: Supplemental RI Subsurface Soil and Field QC Analytical Results, Former Fuel Farm Sludge Disposal Area, MCB Hawaii**

| | Location ID | BS60 (MW60) | | | | BS61 (MW61) | | | | BS62 (MW62) | | | | BS63 (MW63) | | | | | | BS64 (MW64) | | | | BS65 (MW65) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | COC ID | KC140 | | KC141 | | KC138 | | KC139 | | KC135 | | KC136 | | KC132 | | KC133 | | KC134 | | KC127 | | KC128 | | KC130 | | KC131 | |
| | Sample Type | N | | N | | N | | N | | N | | N | | N | | N | | FD | | N | | N | | N | | N | |
| | Sample Depth | 5 to 6 feet bgs | | 12 to 13 feet bgs | | 5 to 6 feet bgs | | 12 to 13 feet bgs | | 5 to 6 feet bgs | | 10 to 11 feet bgs | | 5 to 6 feet bgs | | 9 to 10 feet bgs | | 9 to 10 feet bgs | | 4 to 5 feet bgs | | 10 to 11 feet bgs | | 5 to 6 feet bgs | | 10 to 11 feet bgs | |
| Analyte | DOH EALs [a] | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual |
| **Total Petroleum Hydrocarbons by SW-846 Method 8015C** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TPH-GRO | 100 | 1 | U | 0.9 | U | 0.9 | U | 1 | U | 0.9 | U | 0.9 | U | 0.9 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| TPH-DRO (C10-C24) | 500 | 1.2 | U | 1.1 | U | 2.3 | J | 1.3 | U | 1.2 | U | 1.1 | U | 1.2 | U | 1.3 | U | 1.2 | U | 1.3 | U | 1.2 | U | 1.3 | U | 1.2 | U |
| TPH-LRO (C24-C36) | 500 | 12 | U | 11 | U | 6.2 | J | 13 | U | 12 | U | 11 | U | 12 | U | 13 | U | 12 | U | 13 | U | 12 | U | 13 | U | 12 | U |
| **BTEX by SW-846 Method 8260C** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 0.67 | 0.0025 | U | 0.0023 | U | 0.0022 | U | 0.0025 | U | 0.0023 | U | 0.0023 | U | 0.0023 | U | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0024 | U | 0.0026 | U | 0.0024 | U |
| Ethylbenzene | 21 | 0.0025 | U | 0.0023 | U | 0.0022 | U | 0.0025 | U | 0.0023 | U | 0.0023 | U | 0.0023 | U | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0024 | U | 0.0026 | U | 0.0024 | U |
| Toluene | 32 | 0.0025 | U | 0.0023 | U | 0.0022 | U | 0.0025 | U | 0.0023 | U | 0.0023 | U | 0.0023 | U | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0024 | U | 0.0026 | U | 0.0024 | U |
| Xylenes (Total) | 45 | 0.0025 | U | 0.0023 | U | 0.0022 | U | 0.0025 | U | 0.0023 | U | 0.0023 | U | 0.0023 | U | 0.0025 | U | 0.0025 | U | 0.0026 | U | 0.0024 | U | 0.0026 | U | 0.0024 | U |
| **PAHs by SW-846 Method 8270D-SIM** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Methylnaphthalene | 26 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| 2-Methylnaphthalene | 28 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Acenaphthene | 120 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Acenaphthylene | 130 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Anthracene | 4.3 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(a)anthracene | 1.5 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(a)pyrene | 0.15 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(b)fluoranthene | 1.5 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(g,h,i)perylene | 35 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Benzo(k)fluoranthene | 15 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Chrysene | 30 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Dibenzo(a,h)anthracene | 0.15 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Fluoranthene | 460 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Fluorene | 100 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Indeno(1,2,3-cd)pyrene | 1.5 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Naphthalene | 4.5 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Phenanthrene | 440 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| Pyrene | 44 | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0019 | U | 0.0019 | U | 0.0019 | U | 0.0021 | U | 0.0021 | U | 0.0021 | U | 0.002 | U | 0.0022 | U | 0.002 | U |
| **Total Metals by SW-846 Method 6020A** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Lead | 200 | 11.8 | | 2.2 | | 1.7 | | 1.8 | | 1.6 | | 1.0 | | 2.0 | | 1.5 | | 1.6 | | 4.6 | | 0.97 | | 2.1 | | 1.3 | |

Note: All units are in mg/kg.
- = not analyzed for
COC = chain-of-custody
DOH = Department of Health, State of Hawaii
DRO = diesel range organics
EAL = environmental action level
FD = field duplicate
GRO = gasoline range organics
ID = identification
J = laboratory-estimated qualifier
LRO = lube oil range organics
N = primary or normal sample
QC = quality control
Qual = qualifier
TB = trip blank
TPH = total petroleum hydrocarbons
U = non-detect qualifier
[a] EAL is for unrestricted land use, where drinking water is not threatened, and the distance to surface water is greater than 150 meters from the site (DOH 2011).

(cont'd)

| | Location ID | Field QC | | | | | |
|---|---|---|---|---|---|---|---|
| | COC ID | KC126 | | KC129 | | KC137 | |
| | Sample Type | TB | | TB | | TB | |
| | Sample Date | 1/29/2014 | | 1/30/2014 | | 1/31/2014 | |
| Analyte | Units | Result | Qual | Result | Qual | Result | Qual |
| **Total Petroleum Hydrocarbons by SW-846 Method 8015C** | | | | | | | |
| TPH-GRO | µg/L | 18 | U | 18 | U | 18 | U |
| TPH-DRO (C10-C24) | | - | | - | | - | |
| TPH-LRO (C24-C36) | | - | | - | | - | |
| **BTEX by SW-846 Method 8260C** | | | | | | | |
| Benzene | µg/L | 0.3 | U | 0.3 | U | 0.3 | U |
| Ethylbenzene | µg/L | 0.5 | U | 0.5 | U | 0.5 | U |
| Toluene | µg/L | 0.3 | U | 0.3 | U | 0.3 | U |
| Xylenes (Total) | µg/L | 0.3 | U | 0.3 | U | 0.3 | U |
| **PAHs by SW-846 Method 8270D-SIM** | | | | | | | |
| 1-Methylnaphthalene | | - | | - | | - | |
| 2-Methylnaphthalene | | - | | - | | - | |
| Acenaphthene | | - | | - | | - | |
| Acenaphthylene | | - | | - | | - | |
| Anthracene | | - | | - | | - | |
| Benzo(a)anthracene | | - | | - | | - | |
| Benzo(a)pyrene | | - | | - | | - | |
| Benzo(b)fluoranthene | | - | | - | | - | |
| Benzo(g,h,i)perylene | | - | | - | | - | |
| Benzo(k)fluoranthene | | - | | - | | - | |
| Chrysene | | - | | - | | - | |
| Dibenzo(a,h)anthracene | | - | | - | | - | |
| Fluoranthene | | - | | - | | - | |
| Fluorene | | - | | - | | - | |
| Indeno(1,2,3-cd)pyrene | | - | | - | | - | |
| Naphthalene | | - | | - | | - | |
| Phenanthrene | | - | | - | | - | |
| Pyrene | | - | | - | | - | |
| **Total Metals by SW-846 Method 6010C/6020A/7471B** | | | | | | | |
| Total Lead | | - | | - | | - | |

**Table G-2: Supplemental RI Groundwater Analytical Results, Former Fuel Farm Sludge Disposal Area, MCB Hawaii**

| | Location ID | MW60 | | MW61 | | MW62 | | MW63 | | MW64 | | | | MW65 | | Field QC | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | COC ID | KC146 | | KC150 | | KC149 | | KC148 | | KC143 | | KC144 | | KC145 | | KC142 | | KC147 | | KC151 | | KC152 | |
| | Date Sampled | 2/5/2014 | | 2/6/2014 | | 2/6/2014 | | 2/6/2014 | | 2/5/2014 | | 2/5/2014 | | 2/5/2014 | | 2/5/2014 | | 2/6/2014 | | 2/6/2014 | | 2/6/2014 | |
| | Sample Type | N | | N | | N | | N | | N | | FD | | N | | TB | | TB | | FB | | EB | |
| Analyte | 2011 DOH EALs [a] | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual |
| **Total Petroleum Hydrocarbons by SW-846 Method 8015C** | | | | | | | | | | | | | | | | | | | | | | | |
| TPH-GRO | 5,000 | 360 | | 18 | U | 18 | U | 18 | U | 18 | U | 18 | U | 18 | U | 18 | U | 18 | U | 18 | U | 18 | U |
| TPH-DRO (C10-C24) | 2,500 | 50 | U | 50 | U | 50 | U | 50 | U | 50 | U | 50 | U | 50 | U | - | | - | | 50 | U | 50 | U |
| TPH-LRO (C24-C36) | 2,500 | 500 | U | 500 | U | 500 | U | 500 | U | 500 | U | 500 | U | 500 | U | - | | - | | 500 | U | 500 | U |
| **BTEX by SW-846 Method 8260C** | | | | | | | | | | | | | | | | | | | | | | | |
| Benzene | 1,700 | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| Ethylbenzene | 300 | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U |
| Toluene | 400 | 0.3 | U | 0.3 | U | 0.17 | J | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| Xylenes (Total) | 1,000 | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| **PAHs by SW-846 Method 8270D-SIM** | | | | | | | | | | | | | | | | | | | | | | | |
| 1-Methylnaphthalene | 100 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| 2-Methylnaphthalene | 100 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Acenaphthene | 200 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Acenaphthylene | 300 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Anthracene | 22 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Benzo(a)anthracene | 4.7 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Benzo(a)pyrene | 0.81 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Benzo(b)fluoranthene | 0.75 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Benzo(g,h,i)perylene | 0.13 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Benzo(k)fluoranthene | 0.4 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Chrysene | 1 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Dibenzo(a,h)anthracene | 0.52 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Fluoranthene | 130 | 0.36 | | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Fluorene | 300 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Indeno(1,2,3-cd)pyrene | 0.2 [b] | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Naphthalene | 210 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Phenanthrene | 300 | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| Pyrene | 68 | 0.29 | | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | 0.1 | U | - | | - | | 0.1 | U | 0.1 | U |
| **Metals by SW-846 Method 6020A** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Lead | 29 | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U | 0.51 | | 0.19 | U | 0.19 | U | - | | - | | 0.19 | U | 0.19 | U |
| Dissolved Lead | 29 | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U | 0.19 | U | - | | - | | - | | 0.19 | J |

Note: All units are in µg/L.
µg/L = micrograms per liter
COC = chain-of-custody
DOH = Department of Health, State of Hawaii
EAL = environmental action level
FD = field duplicate
GRO = gasoline range organics
ID = identification
J = estimated qualifier
LOQ = laboratory limit of quantitation
N = normal sample
TPH = total petroleum hydrocarbons
U = non-detect qualifier
[a] EAL is for unrestricted land use, where drinking water is not threatened, and the distance to surface water is greater than 150 meters from the site (DOH 2011).

# Appendix H
# Data Validation and
# Data Quality Assessment Reports

# Appendix H.1
# Data Validation Reports

# LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099


WCP, Inc.
99-061 Koaha Way, Suite 208
Aiea, HI 96701-5626
ATTN: Ms. Rachel Kaminaka

March 17, 2014

SUBJECT: MCBH Kaneohe, Fuel Farms, CTO HC25, Data Validation

Dear Ms. Kaminaka,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on February 24, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 31376:**

| SDG # | Fraction |
|---|---|
| 72613, 72621 | Volatiles, Polynuclear Aromatic Hydrocarbons, Lead, Total Petroleum Hydrocarbons as Gasoline, Total Petroleum Hydrocarbons as Extractables |

The data validation was performed under Standard & Full guidelines. The analyses were validated using the following documents, as applicable to each method:

- Technical Memorandum, Supplemental Remedial Investigation Work Pla, Former Fuel Farm Sludge Disposal Area, Marine Corps Base, Hawaii, Kaneohe Bay, Oahu, Hawaii, December 2013
- U.S. NAVFAC Pacific Environmental Restoration, ER, Program, February 2007
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2, October 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Andrew Kong
Project Manager/Senior Chemist

L:\WILCHEE\Kaneohe\31376COV.wpd

EDD 90/10

# LDC #31376 (Wil Chee Planning, Inc. HI / MCBH Kaneohe, Fuel Farms, CTO HC25)

| LDC | SDG# | DATE REC'D | (3) DATE DUE | BTEX (8260C) | | PAH (8270D-SIM) | | Pb (6020A) | | TPH-G (8015C) | | TPH-E (8015C) | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: | Water/Soil | | | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | 72613 | 02/24/14 | 03/17/14 | 2 | 8 | 0 | 8 | 0 | 8 | 2 | 8 | 0 | 8 | | | | | | | | | | | | | | | | | | | | | | | | |
| A | 72613 | 02/24/14 | 03/17/14 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| B | 72621 | 02/24/14 | 03/17/14 | 1 | 3 | 0 | 3 | 0 | 3 | 1 | 3 | 0 | 3 | | | | | | | | | | | | | | | | | | | | | | | | |
| B | 72621 | 02/24/14 | 03/17/14 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | A/AK | | | 3 | 13 | 0 | 13 | 0 | 13 | 3 | 13 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 71 |

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | January 29 through January 30, 2014 |
| **LDC Report Date:** | March 11, 2014 |
| **Matrix:** | Soil/Water |
| **Parameters:** | Volatiles |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72613 |

**Sample Identification**

KC126
KC127
KC128
KC129
KC130**
KC131
KC132
KC133
KC134
KC135
KC136

**Indicates sample underwent Full review

## Introduction

This data review covers 9 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260C for Volatiles which are Benzene, Toluene, Ethylbenzene and Xylenes (BTEX).

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

All samples were received in good condition with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|---|---|---|---|---|---|
| KC129 | All TCL compounds | A headspace was apparent in the sample containers. | There should be no headspace in the sample containers. | J (all detects)<br>UJ (all non-detects) | A |

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Samples KC126 and KC129 were identified as trip blanks. No volatile contaminants were found.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No volatile contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No volatile contaminants were found.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XII. Compound Quantitation

All compound quantitations were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

Samples KC133 and KC134 were identified as field duplicates. No volatiles were detected in any of the samples.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Data Qualification Summary - SDG 72613**

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|---|---|---|---|---|---|
| 72613 | KC129 | All TCL compounds | J (all detects)<br>UJ (all non-detects) | A | Sample condition (headspace) (*I) |

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Laboratory Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Field Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

LDC #: 31376A1
SDG #: 72613
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/3/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC/MS Volatiles (BTEX)(EPA SW 846 Method 8260C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | SW | Sampling dates: 1/29/14 - 1/30/14 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | RCD ≤ 15? |
| IV. | Continuing calibration/ICV | A | ICV/CCV ≤ 20? ICV ≤ 25% |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VIII. | Laboratory control samples | A | LCS |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | Not reviewed for Level III validation. |
| XII. | Compound quantitation/RLs/LOQs/LODs | A | Not reviewed for Level III validation. |
| XIII. | Tentitatively identified compounds (TICs) | N | Not reviewed for Level III validation. |
| XIV. | System performance | A | Not reviewed for Level III validation. |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | ND | FD = 8 + 9 |
| XVII. | Field blanks | ND | TB = 1, 4 FB = KC151 EB = KC152 (SDG # 72662) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Soil + Water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC126 W | 11 | KC136 | 21 | | 311 | 140204AT-BLK |
| 2 | KC127 | 12 | | 22 | | 322 | 140204AT1-BLK |
| 3 | KC128 | 13 | | 23 | | 33 | |
| 4 | KC129 W | 14 | | 24 | | 34 | |
| 5 | KC130** | 15 | | 25 | | 35 | |
| 6 | KC131 | 16 | | 26 | | 36 | |
| 7 | KC132 | 17 | | 27 | | 37 | |
| 8 | KC133 D | 18 | | 28 | | 38 | |
| 9 | KC134 D | 19 | | 29 | | 39 | |
| 10 | KC135 | 20 | | 30 | | 40 | |

LDC #: 31376A1

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: C

**Method:** Volatiles (EPA SW 846 Method 8260C)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. GC/MS Instrument performance check | | | | |
| Were the BFB performance results reviewed and found to be within the specified criteria? | ✓ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | ✓ | | | |
| III. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) within the method criteria? | ✓ | | | |
| Was a curve fit used for evaluation? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990? | | | ✓ | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) ≤ 20% and relative response factors (RRF) within the method criteria? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed at least once every 12 hours for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per analytical batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31376A1

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: C

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Internal standards | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | ✓ | | | |
| Were retention times within ± 30 seconds of the associated calibration standard? | ✓ | | | |
| XI. Target compound identification | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | ✓ | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | ✓ | | | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| XII. Compound quantitation/RLs | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XIII. Tentatively identified compounds (TICs) | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | ✓ | | |
| XIV. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XV. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XVI. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| XVII. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

# TARGET COMPOUND WORKSHEET

## METHOD: VOA

| | | | | |
|---|---|---|---|---|
| A. Chloromethane | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF. Acrolein |
| E. Methylene chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene | BB. 1,1,2,2-Tetrachloroethane | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane | CC. Toluene | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform | EE. Ethylbenzene | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. Iodomethane |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | OOOO.1,1-Difluoroethane |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | PPPP. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | QQQQ. |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane | KK. Trichlorofluoromethane | EEE. sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene | AAAA. Ethyl tert-butyl ether | UUUU. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | VVVV. |

LDC #: 31376A1

# VALIDATION FINDINGS WORKSHEET
## Technical Holding Times

Page: 1 of 1
Reviewer: KH
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?
(Y) N N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

**METHOD** : GC/MS VOA (EPA SW 846 Method 8260C)

| Sample ID | Matrix | Preserved | Sampling Date | Extraction date | Analysis date | Total # of Days | * #1 Qualifier |
|---|---|---|---|---|---|---|---|
| 4 | W | Headspace was | | present in the | vials. | | J/UJ/A |

**TECHNICAL HOLDING TIME CRITERIA**

| | |
|---|---|
| Water unpreserved: | Aromatic within 7 days, non-aromatic within 14 days of sample collection. |
| Water preserved: | Within 14 days of sample collection. |
| Soil: | Within 14 days of sample collection. |

LDC #: 31376A1

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ — $A_x$ = Area of Compound — $A_{is}$ = Area of associated internal standard

average RRF = sum of the RRFs/number of standards — $C_x$ = Concentration of compound, — $C_{is}$ = Concentration of internal standard

%RSD = 100 * (S/X) — S= Standard deviation of the RRFs, — X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (IS) | Reported RRF (RRF 5 std) | Recalculated RRF (RRF 5 std) | Reported Average RRF (Initial) | Recalculated Average RRF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL | 2/4/2014 | Benzene (IS1) | 1.3750 | 1.3750 | 1.5 | 1.5 | 5.6 | 5.6 |
| | Thor | | Ethylbenzene (IS2) | 1.9840 | 1.9836 | 2.1 | 2.1 | 6 | 6 |
| | | | | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376A1

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification


Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 5

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | 50.128 | 53.47200 | 107 | 107 | 0 |
| Toluene-d8 | 59.271 | 59.24520 | 100.0 | 100.0 | 0 |
| Bromofluorobenzene | 56.688 | 57.48683 | 101 | 101 | 0 |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

LDC #: 31376A1

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Sample Results Verification


Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA  Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)  LCSC = Laboraotry control sample concentration  LCSDC = Laboratory control sample duplicate concentration

LCS ID: 140204AT1 - LCS

| Compound | Spike Added (mg/kg) | | Spiked Sample Concentration (mg/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalculated |
| 1,1-Dichloroethene | | | | | | | | | | |
| Trichloroethene | | | | | | | | | | |
| Benzene | 0.050 | — | 0.0503 | — | 101 | 101 | — | — | — | — |
| Toluene | ↓ | ↓ | 0.0496 | — | 99.2 | 99.2 | — | — | — | — |
| Chlorobenzene | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376K1

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: BR
2nd reviewer: A

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

$A_x$ = Area of the characteristic ion (EICP) for the compound to be measured

$A_{is}$ = Area of the characteristic ion (EICP) for the specific internal standard

$I_s$ = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

$V_o$ = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 5, All:

Conc. = (ND)(____)(____)(____) / (____)(____)(____)(____)

140204AT1 - LCS

V = 0.0503 mg/kg

$= \frac{(736906)(50)(5)}{(499328)(1.466)(5)(100)} = 0.0503341$ mg/kg

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
| | | | | | |
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# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | January 29 through January 30, 2014 |
| **LDC Report Date:** | March 11, 2014 |
| **Matrix:** | Soil |
| **Parameters:** | Polynuclear Aromatic Hydrocarbons |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72613 |

**Sample Identification**

KC127
KC128
KC130**
KC131
KC132
KC133
KC134
KC135
KC136
KC136MS
KC136MSD

**Indicates sample underwent Full review

## Introduction

This data review covers 11 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270D using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No polynuclear aromatic hydrocarbon contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No polynuclear aromatic hydrocarbon contaminants were found.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XII. Compound Quantitation

All compound quantitation were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

Samples KC133 and KC134 were identified as field duplicates. No polynuclear aromatic hydrocarbons were detected in any of the samples.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

LDC #: 31376A2b
SDG #: 72613
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/3/14
Page: 1 of 1
Reviewer: KR
2nd Reviewer: [illegible]

**METHOD:** GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 1/29/14 - 1/30/14 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | RSD ≤ 15% |
| IV. | Continuing calibration/ICV | A | ~~ICV~~ CCV ≤ 20% ICV ≤ 25% |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | A | |
| VIII. | Laboratory control samples | A | LCS |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | Not reviewed for Level III validation. |
| XII. | Compound quantitation/RLs/LOQs/LODs | A | Not reviewed for Level III validation. |
| XIII. | Tentitatively identified compounds (TICs) | N | Not reviewed for Level III validation. |
| XIV. | System performance | A | Not reviewed for Level III validation. |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | ND | FD = 6 + 7 |
| XVII. | Field blanks | ND | FB = KC151 (SDG # 72662) EB = KC152 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Soil

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC127 | 11 | KC136MSD | 21 | | 31 | 140210A-BLK |
| 2 | KC128 | 12 | | 22 | | 32 | |
| 3 | KC130** | 13 | | 23 | | 33 | |
| 4 | KC131 | 14 | | 24 | | 34 | |
| 5 | KC132 | 15 | | 25 | | 35 | |
| 6 | KC133 | 16 | | 26 | | 36 | |
| 7 | KC134 | 17 | | 27 | | 37 | |
| 8 | KC135 | 18 | | 28 | | 38 | |
| 9 | KC136 | 19 | | 29 | | 39 | |
| 10 | KC136MS | 20 | | 30 | | 40 | |

LDC #: 31376A26

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: C

**Method:** Semivolatiles (EPA SW 846 Method 8270D)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. GC/MS Instrument performance check | | | | |
| Were the DFTPP performance results reviewed and found to be within the specified criteria? | ✓ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | ✓ | | | |
| III. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) within the method criteria? | ✓ | | | |
| Was a curve fit used for evaluation? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990? | | | ✓ | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | ✓ | | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | ✓ | | | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31376A26

# VALIDATION FINDINGS CHECKLIST


Reviewer: KK
2nd Reviewer: A

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Internal standards | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | ✓ | | | |
| Were retention times within ± 30 seconds from the associated calibration standard? | ✓ | | | |
| XI. Target compound identification | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | ✓ | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | ✓ | | | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| XII. Compound quantitation/RLs | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XIII. Tentatively identified compounds (TICs) | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | ✓ | | |
| XIV. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XV. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XVI. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field duplicates. | | ✓ | | |
| XVII. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

# VALIDATION FINDINGS WORKSHEET

**METHOD:** GC/MS SVOA

| | | | | |
|---|---|---|---|---|
| A. Phenol | T. 4-Chloroaniline | MM. 4-Chlorophenyl-phenyl ether | FFF. Di-n-octylphthalate | YYY. 2,3,5-Trimethylnaphthalene |
| B. Bis (2-chloroethyl) ether | U. Hexachlorobutadiene | NN. Fluorene | GGG. Benzo(b)fluoranthene | ZZZ. Perylene |
| C. 2-Chlorophenol | V. 4-Chloro-3-methylphenol | OO. 4-Nitroaniline | HHH. Benzo(k)fluoranthene | AAAA. Dibenzothiophene |
| D. 1,3-Dichlorobenzene | W. 2-Methylnaphthalene | PP. 4,6-Dinitro-2-methylphenol | III. Benzo(a)pyrene | BBBB. Benzo(a)fluoranthene |
| E. 1,4-Dichlorobenzene | X. Hexachlorocyclopentadiene | QQ. N-Nitrosodiphenylamine | JJJ. Indeno(1,2,3-cd)pyrene | CCCC. Benzo(b)fluorene |
| F. 1,2-Dichlorobenzene | Y. 2,4,6-Trichlorophenol | RR. 4-Bromophenyl-phenylether | KKK. Dibenz(a,h)anthracene | DDDD. cis/trans-Decalin |
| G. 2-Methylphenol | Z. 2,4,5-Trichlorophenol | SS. Hexachlorobenzene | LLL. Benzo(g,h,i)perylene | EEEE. Biphenyl |
| H. 2,2'-Oxybis(1-chloropropane) | AA. 2-Chloronaphthalene | TT. Pentachlorophenol | MMM. Bis(2-Chloroisopropyl)ether | FFFF. Retene |
| I. 4-Methylphenol | BB. 2-Nitroaniline | UU. Phenanthrene | NNN. Aniline | GGGG. C30-Hopane |
| J. N-Nitroso-di-n-propylamine | CC. Dimethylphthalate | VV. Anthracene | OOO. N-Nitrosodimethylamine | HHHH. 1-Methylphenanthrene |
| K. Hexachloroethane | DD. Acenaphthylene | WW. Carbazole | PPP. Benzoic Acid | IIII. 1,4-Dioxane |
| L. Nitrobenzene | EE. 2,6-Dinitrotoluene | XX. Di-n-butylphthalate | QQQ. Benzyl alcohol | JJJJ. Acetophenone |
| M. Isophorone | FF. 3-Nitroaniline | YY. Fluoranthene | RRR. Pyridine | KKKK. Atrazine |
| N. 2-Nitrophenol | GG. Acenaphthene | ZZ. Pyrene | SSS. Benzidine | LLLL. Benzaldehyde |
| O. 2,4-Dimethylphenol | HH. 2,4-Dinitrophenol | AAA. Butylbenzylphthalate | TTT. 1-Methylnaphthalene | MMMM. Caprolactam |
| P. Bis(2-chloroethoxy)methane | II. 4-Nitrophenol | BBB. 3,3'-Dichlorobenzidine | UUU.Benzo(b)thiophene | NNNN. |
| Q. 2,4-Dichlorophenol | JJ. Dibenzofuran | CCC. Benzo(a)anthracene | VVV.Benzonaphthothiophene | OOOO. |
| R. 1,2,4-Trichlorobenzene | KK. 2,4-Dinitrotoluene | DDD. Chrysene | WWW.Benzo(e)pyrene | PPPP. |
| S. Naphthalene | LL. Diethylphthalate | EEE. Bis(2-ethylhexyl)phthalate | XXX. 2,6-Dimethylnaphthalene | QQQQ. |

LDC #: 31376A2b

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: BR
2nd Reviewer:

METHOD: GC/MS PAH (EPA SW 846 Method 8270D-SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ — $A_x$ = Area of Compound — $A_{is}$ = Area of associated internal standard

average RRF = sum of the RRFs/number of standards — $C_x$ = Concentration of compound, — $C_{is}$ = Concentration of internal standard

%RSD = 100 * (S/X) — S= Standard deviation of the RRFs, — X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (IS) | Reported RRF (RRF 5 std) | Recalculated RRF (RRF 5 std) | Reported Average RRF (Initial) | Recalculated Average RRF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL Linus | 2/4/2014 | Naphthalene (IS1) | 1.773 | 1.773 | 1.7 | 1.7 | 12 | 12 |
| | | | Fluorene (IS2) | 2.364 | 2.364 | 2.1 | 2.1 | 11 | 11 |
| | | | Phenanthrene (IS3) | 2.144 | 2.144 | 1.8 | 1.8 | 13 | 13 |
| | | | Chrysene (IS4) | 2.084 | 2.084 | 2.0 | 2.0 | 9.0 | 9.0 |
| | | | Benzo(a)pyrene (IS5) | 2.871 | 2.871 | 2.6 | 2.6 | 14 | 14 |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 31376A2b

# VALIDATION FINDINGS WORSHEET
## Continuing Calibration Results Verification


Reviewer: BR
2nd Reviewer:

METHOD: GC/MS PAH (EPA SW 846 Method 8270D-SIM)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound

Cx = Concentration of compound
Ais = Area of associated internal standard
Cis = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (IS) | Average RRF (Initial RRF) | Reported (CC RRF) | Recalculated (CC RRF) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 0212L002 | 02/12/14 | Naphthalene (IS1 | 1.656 | 1.755 | 1.755 | 6.0 | 6.0 |
| | | | Fluorene (IS2) | 2.132 | 2.472 | 2.472 | 16 | 16 |
| | | | Phenanthrene (IS3 | 1.843 | 2.216 | 2.216 | 20 | 20 |
| | | | Chrysene (IS4) | 2.036 | 2.074 | 2.074 | 1.9 | 1.9 |
| | | | Benzo(a)pyrene (IS5 | 2.581 | 3.007 | 3.007 | 16 | 16 |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

# Surrogate Results Verification

Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270D)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 3

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | 64.725 | 49.46724 | 76.4 | 76.4 | 0 |
| 2-Fluorobiphenyl | ↓ | 38.29425 | 59.2 | 59.2 | 0 |
| Terphenyl-d14 | ↓ | 40.24018 | 62.2 | 62.2 | 0 |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

LDC #: 31376A26

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike/Matrix Spike Duplicates Results Verification


Reviewer: BR
2nd Reviewer:

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270D)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified belc using the following calculation:

% Recovery = 100 * (SSC - SC)/SA  Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC)  MSC = Matrix spike concentration  MSDC = Matrix spike duplicate concentration

MS/MSD samples: 10/11

| Compound | Spike Added (mg/kg) | | Sample Concentration (mg/kg) | Spiked Sample Concentration (mg/kg) | | Matrix Spike Percent Recovery | | Matrix Spike Duplicate Percent Recovery | | MS/MSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MS | MSD | ------ | MS | MSD | Reported | Recalc | Reported | Recalc | Reported | Recalculatec |
| Phenol | | | | | | | | | | | |
| N-Nitroso-di-n-propylamine | | | | | | | | | | | |
| 4-Chloro-3-methylphenol | | | | | | | | | | | |
| Acenaphthene | 0.131 | 0.131 | 0 | 0.105 | 0.0984 | 80.2 | 80.2 | 75.1 | 75.1 | 6.5 | 6.5 |
| Pentachlorophenol | | | | | | | | | | | |
| Pyrene | 0.131 | 0.131 | 0 | 0.108 | 0.103 | 82.4 | 82.4 | 78.6 | 78.6 | 4.7 | 4.7 |
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Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376A26

# VALIDATION FINDINGS WORKSHEET

## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification



Reviewer: BR

2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270D)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for tl compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 1402010A – LCS

| Compound | Spike Added (mg/kg) | | Spike Concentration (mg/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalculatec |
| Phenol | | | | | | | | | | |
| N-Nitroso-di-n-propylamine | | | | | | | | | | |
| 4-Chloro-3-methylphenol | | | | | | | | | | |
| Acenaphthene | 0.132 | – | 0.113 | – | 85.6 | 85.6 | – | – | – | – |
| Pentachlorophenol | | | | | | | | | | |
| Pyrene | 0.132 | – | 0.105 | – | 79.5 | 79.5 | – | – | – | – |
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Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reporte results do not agree within 10.0% of the recalculated results.

LDC #: 31376A26

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification



Reviewer: BR
2nd reviewer: A

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270D)

X N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| $V_i$ | = | Volume of extract injected in microliters (ul) |
| $V_t$ | = | Volume of the concentrated extract in microliters (ul) |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |
| 2.0 | = | Factor of 2 to account for GPC cleanup |

Example:

Sample I.D. 3, AN:

Conc. = (ND)(___)(___)(___)(___)(___) / (___)(___)(___)(___)(___)(___)

140210A-LCS

S = 0.098 mg/kg

$= \frac{(5204)(2.5)(1)}{(2644)(1.656)(30.32)}$

$= 0.098000054$ mg/kg

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
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# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | January 29 through January 30, 2014 |
| **LDC Report Date:** | March 11, 2014 |
| **Matrix:** | Soil |
| **Parameters:** | Lead |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72613 |

**Sample Identification**

KC127
KC128
KC130**
KC131
KC132
KC133
KC134
KC135
KC136

**Indicates sample underwent Full review

## Introduction

This data review covers 9 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020A for Lead.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | The sequence or number of standards used for the calibration was incorrect. |
| C | Correlation coefficient is <0.995. |
| R | %R for calibration is not within control limits |
| B | Presumed contamination from preparation (method) blank or calibration blank |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor. |
| E | MS/MSD or Duplicate RPD or difference was high. |
| I | ICP ICS results were unsatisfactory. |
| A | ICP Serial Dilution %D were not within control limits |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Post Digestion Spike recovery was not within control limits |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

## III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No lead contaminants were found in the initial, continuing and preparation blanks.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No lead contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No lead contaminants were found.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XI. Sample Result Verification

All sample result verifications were acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIII. Field Duplicates

Samples KC133 and KC134 were identified as field duplicates. No lead was detected in any of the samples with the following exceptions:

| Analyte | Concentration (mg/Kg) | | RPD (Limits) |
|---|---|---|---|
| | KC133 | KC134 | |
| Lead | 1.5 | 1.6 | 6 (≤100) |

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Laboratory Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Field Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

LDC #: 31376A4
SDG #: 72613
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET

~~Level III/IV~~ Standard / Full

Date: 3/3/14
Page: 1 of 1
Reviewer:
2nd Reviewer:

**METHOD:** Lead (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 1/29/14 - 1/30/14 |
| II. | ICP/MS Tune | A | |
| III. | Calibration | A | |
| IV. | Blanks | A | |
| V. | ICP Interference Check Sample (ICS) Analysis | A | |
| VI. | Matrix Spike Analysis | A | Low spk (7x6x) |
| VII. | Duplicate Sample Analysis | N | |
| VIII. | Laboratory Control Samples (LCS) | A | LCS/P |
| IX. | Internal Standard (ICP-MS) | A | Not reviewed for Standard review! |
| ~~X.~~ | ~~Furnace Atomic Absorption QC~~ | | |
| XI. | ICP Serial Dilution | A | |
| XII. | Sample Result Verification | A | Not reviewed for Level III validation. |
| XIII. | Overall Assessment of Data | A | |
| XIV. | Field Duplicates | SW | (6,7) |
| XV | Field Blanks | ND | FB = KC151 TB = KC152 (7x66) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC127 | 11 | MB | 21 | | 31 | |
| 2 | KC128 | 12 | | 22 | | 32 | |
| 3 | KC130** | 13 | | 23 | | 33 | |
| 4 | KC131 | 14 | | 24 | | 34 | |
| 5 | KC132 | 15 | | 25 | | 35 | |
| 6 | KC133 | 16 | | 26 | | 36 | |
| 7 | KC134 | 17 | | 27 | | 37 | |
| 8 | KC135 | 18 | | 28 | | 38 | |
| 9 | KC136 | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

LDC #: 31376A4

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

**Method:** Metals (EPA SW 846 Method 6010B/7000/6020)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| ***I. Technical holding times*** | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| ***II. ICP/MS Tune*** | | | | |
| Were all isotopes in the tuning solution mass resolution within 0.1 amu? | ✓ | | | |
| Were %RSD of isotopes in the tuning solution ≤5%? | ✓ | | | |
| ***III. Calibration*** | | | | |
| Were all instruments calibrated daily, each set-up time? | ✓ | | | |
| Were the proper number of standards used? | ✓ | | | |
| Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits? | ✓ | | | |
| Were all initial calibration correlation coefficients ≥ 0.995? | ✓ | | | |
| ***IV. Blanks*** | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| ***V. ICP Interference Check Sample*** | | | | |
| Were ICP interference check samples performed daily? | ✓ | | | |
| Were the AB solution percent recoveries (%R) with the 80-120% QC limits? | ✓ | | | |
| ***VI. Matrix spike/Matrix spike duplicates*** | | | | |
| Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. | ✓ | | | |
| Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL. | ✓ | | | |
| ***VII. Laboratory control samples*** | | | | |
| Was an LCS anaylzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils? | ✓ | | | |

LDC #: 21326 B4

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| ***VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)*** | | | | |
| Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration? | ✓ | | | |
| If the %Rs were outside the criteria, was a reanalysis performed? | | | ✓ | |
| ***IX. ICP Serial Dilution*** | | | | |
| Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)? | ✓ | | | |
| Were all percent differences (%Ds) < 10%? | ✓ | | | |
| Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data. | | | ✓ | |
| ***X. Sample Result Verification*** | | | | |
| Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| ***XI. Overall assessment of data*** | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| ***XII. Field duplicates*** | | | | |
| Field duplicate pairs were identified in this SDG. | ✓ | | | |
| Target analytes were detected in the field duplicates. | ✓ | | | |
| ***XIII. Field blanks*** | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target analytes were detected in the field blanks. | | ✓ | | |

LDC: 31376A4

**VALIDATION FINDINGS WORKSHEET**
**Field Duplicates**


Reviewer:
2nd Reviewer:

**Method:** Metals

| Analyte | Concentration (mg/Kg) | | RPD (≤ 100) | |
|---|---|---|---|---|
| | 6 | 7 | | |
| Lead | 1.5 | 1.6 | 6 | |

LDC #: 31376B4

# VALIDATION FINDINGS WORKSHEET
## Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

| Standard ID | Type of Analysis | Element | Found (ug/L) | True (ug/L) | Recalculated %R | Reported %R | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| | ICP (Initial calibration) | | | | | | |
| ICV | ICP/MS (Initial calibration) | pb | 101.2 | 100 | 101 | 101 | Y |
| | CVAA (Initial calibration) | | | | | | |
| | ICP (Continuing calibration) | | | | | | |
| CCV | ICP/MS (Continuing calibration) | pb | 49.45 | 50 | 98.9 | 98.9 | N |
| | CVAA (Continuing calibration) | | | | | | |
| | GFAA (Initial calibration) | | | | | | |
| | GFAA (Continuing calibation) | | | | | | |

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376 A4

# VALIDATION FINDINGS WORKSHEET
## Level IV Recalculation Worksheet


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

| Sample ID | Type of Analysis | Element | Found / S / I (units) | True / D / SDR (units) | Recalculated %R / RPD / %D | Reported %R / RPD / %D | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| ICSAB | ICP interference check | Pb | 93.1 | 100 | 93.1 | 93.1 | Y |
| LCS | Laboratory control sample | | 23.46 | 25.0 | 94 | 94.0 | |
| KC14) | Matrix spike | | (SSR-SR) 41.3 | 50.0 | 82.6 | 82.6 | |
| | Duplicate | | 42.258 | 45.154 | 2.1 | 2.1 | |
| | ICP serial dilution | | 3.94 | 3.712 | 6.14 | 6.21 | |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31326A4

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for 3 were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

#3 Pb = 3.197 mg/L x 0.1 L x 5 / 1.0 g x 0.768 = 2.04 mg/kg

| # | Sample ID | Analyte | Reported Concentration (mg/kg) | Calculated Concentration (mg/kg) | Acceptable (Y/N) |
|---|---|---|---|---|---|
| 1 | 3 | Pb | 2.1 | 2.0 | Y |
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Note:

RECALC.4SW

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | January 29 through January 30, 2014 |
| **LDC Report Date:** | March 11, 2014 |
| **Matrix:** | Soil/Water |
| **Parameters:** | Total Petroleum Hydrocarbons as Gasoline |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72613 |

**Sample Identification**

KC126
KC127
KC128
KC129
KC130**
KC131
KC132
KC133
KC134
KC135
KC136

**Indicates sample underwent Full review

## Introduction

This data review covers 9 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015C for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

All samples were received in good condition with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|---|---|---|---|---|---|
| KC129 | All TCL compounds | A headspace was apparent in the sample containers. | There should be no headspace in the sample containers. | J (all detects)<br>UJ (all non-detects) | A |

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

## III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Samples KC126 and KC129 were identified as trip blanks. No total petroleum hydrocarbons as gasoline contaminants were found.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No total petroleum hydrocarbons as gasoline contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No total petroleum hydrocarbons as gasoline contaminants were found.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## IX. Compound Quantitation

All compound quantitations were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## X. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

Samples KC133 and KC134 were identified as field duplicates. No total petroleum hydrocarbons as gasoline were detected in any of the samples.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 72613**

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 72613 | KC129 | All TCL compounds | J (all detects)<br>UJ (all non-detects) | A | Sample condition (headspace) (*I) |

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

LDC #: 31376A7
SDG #: 72613
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/3/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC TPH as Gasoline (EPA SW846 Method 8015~~B~~ C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 1/29/14 - 1/30/14 |
| II | Initial calibration | A | RSD ≤ 20% |
| III. | Calibration verification/ICV | A | 1 w/ CCV ≤ 20% |
| IV. | Blanks | A | |
| V | Surrogate recovery | A | |
| VI. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VII. | Laboratory control samples | A | LCS |
| VIII. | Target compound identification | A | Not reviewed for Level III validation. |
| IX. | Compound quantitation/RL/LOQ/LODs | A | Not reviewed for Level III validation. |
| X. | System Performance | A | Not reviewed for Level III validation. |
| XI. | Overall assessment of data | A | |
| XII. | Field duplicates | ND | FD = 8 + 9 |
| XIII. | Field blanks | ND | TB = 1, 4 FB = KC151 EB = KC152 (SDG # 72662) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Soil + Water

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | KC126 | W | 11 | KC136 | 21 | | 31 | 1 | 1402 04A-RL |
| 2 | KC127 | | 12 | | 22 | | 32 | 2 | 1402 04 AS-BLK |
| 3 | KC128 | | 13 | | 23 | | 33 | | |
| 4 | KC129 | W | 14 | | 24 | | 34 | | |
| 5 | KC130** | | 15 | | 25 | | 35 | | |
| 6 | KC131 | | 16 | | 26 | | 36 | | |
| 7 | KC132 | | 17 | | 27 | | 37 | | |
| 8 | KC133 | | 18 | | 28 | | 38 | | |
| 9 | KC134 | | 19 | | 29 | | 39 | | |
| 10 | KC135 | | 20 | | 30 | | 40 | | |

Notes:

LDC #: 31376A7

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: 

**Method:** X GC ____ HPLC

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%? | ✓ | | | |
| Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria? | | | ✓ | |
| Were the RT windows properly established? | ✓ | | | |
| IV. Continuing calibration | | | | |
| What type of continuing calibration calculation was performed? X %D or __%R | ✓ | | | |
| Was a continuing calibration analyzed daily? | ✓ | | | |
| Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%? | ✓ | | | |
| Were all the retention times within the acceptance windows? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within the QC limits? | ✓ | | | |
| If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31376A7

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: A

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Target compound identification | | | | |
| Were the retention times of reported detects within the RT windows? | ✓ | | | |
| XI. Compound quantitation/CRQLs | | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XII. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XIII. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XIV. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field duplicates. | | ✓ | | |
| XV. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

LDC #: 31376A7

# VALIDATION FINDINGS WORKSHEET
## Technical Holding Times


Reviewer: KR
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?

METHOD : X GC __ HPLC

| Sample ID | Matrix | Preserved | Sampling Date | Extraction date | Analysis date | Total # of Days | * #1 Qualifier |
|---|---|---|---|---|---|---|---|
| 4 | w) | Headspace was present in the vials | | | | | J/UJ/A |

**TECHNICAL HOLDING TIME CRITERIA**

VOLATILES: Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved: Both within 14 days of sample collection.
Soils: Both within 14 days of sample collection.

EXTRACTABLES:
Water: Extracted within 7 days, analyzed within 40 days.
Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 31376A7

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC X HPLC _____

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where:
A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

| # | Standard ID | Calibration Date | Compound | Reported CF (100 std) | Recalculated CF (100 std) | Reported Average CF (Initial) | Recalculated Average CF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL Harpo | 10/15/2013 | Gasoline | 19564 | 19564 | 20334 | 20334 | 17 | 17 |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376A7

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC X HPLC

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) = 100 * (N - C)/N

Where:
N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

| # | Standard ID | Calibration Date | Compound | CF | Reported CCV CF | Recalculated CCV CF | Reported % D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 0204H07 | 2/4/2014 13:51 | Gasoline | 20334 | 21669 | 21669 | 6.6 | 6.6 |
| 2 | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376A7

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification



Reviewer: BR

2nd reviewer: [illegible]

**METHOD:** X **GC** __ **HPLC**

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 5

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| BFB - PID | DB-624 | 30.000 | 32.702 | 109 | 109 | 0 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

LDC #: 31376A7

# VALIDATION FINDINGS WORKSHEET



## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: BR

2nd Reviewer: [illegible]

**METHOD:** X GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

**LCS/LCSD** samples: 140204A5-LCS

| Compound | Spike Added (ug/kg) | | Spike Sample Concentration (ug/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | ~~300~~ 15.0 | — | 16.7 | — | 111 | 111 | — | — | — | — |
| Diesel (8015) | | | | | | | | | | |
| Benzene (8021B) | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376A7

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** X GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 5 Compound Name Gasoline Range Organics

Concentration = ND

140204AS - LCS
GRO = 14.7 mg/kg

$= \frac{(33847034)(50)}{(20334)(5)(1.509)} = 16.6701254$ mg/kg

| # | Sample ID | Compound | Reported Concentrations ( ) | Recalculated Results Concentrations ( ) | Qualifications |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Comments:

SAMPCALCnew.wpd

# LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099


WCP, Inc.
99-061 Koaha Way, Suite 208
Aiea, HI 96701-5626
ATTN: Ms. Rachel Kaminaka

April 3, 2014

SUBJECT: Revised MCBH Kaneohe Sludge Disposal Area, CTO HC25, Data Validation

Dear Ms. Kaminaka,

Enclosed is the revised validation report for the fraction listed below. Please replace the previously submitted report with the enclosed revised report.

**LDC Project # 31376:**

| **SDG #** | **Fraction** |
|---|---|
| 72613 | Total Petroleum Hydrocarbons as Extractables |

- Added field duplicate text.

Please feel free to contact us if you have any questions.

Sincerely,

Andrew Kong
Project Manager/Senior Chemist

L:\Accord\Moffett\31376_RV1.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe Sludge Disposal Area, CTO HC25 |
| **Collection Date:** | January 29 through January 30, 2014 |
| **LDC Report Date:** | April 3, 2014 |
| **Matrix:** | Soil |
| **Parameters:** | Total Petroleum Hydrocarbons as Extractables |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72613 |

**Sample Identification**

KC127
KC128
KC130**
KC131
KC132
KC133
KC134
KC135
KC136
KC136MS
KC136MSD

**Indicates sample underwent Full review

## Introduction

This data review covers 11 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015C for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

## III. Continuing Calibration

Continuing calibration was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## IX. Compound Quantitation

All compound quantitation were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## X. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

Samples KC133 and KC134 were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples.

**MCBH Kaneohe Sludge Disposal Area, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

**MCBH Kaneohe Sludge Disposal Area, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

**MCBH Kaneohe Sludge Disposal Area, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 72613**

No Sample Data Qualified in this SDG

LDC #: 31376A8
SDG #: 72613
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/3/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC TPH as Extractables (EPA SW846 Method 8015~~B~~C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 1/29/14 - 1/30/14 |
| II | Initial calibration | A | RSD ≤ 20% |
| III. | Calibration verification/ICV | A | ICV/CCV ≤ 20% |
| IV. | Blanks | A | |
| V | Surrogate recovery | A | |
| VI. | Matrix spike/Matrix spike duplicates | A | |
| VII. | Laboratory control samples | A | LCS |
| VIII. | Target compound identification | A | Not reviewed for Level III validation. |
| IX. | Compound quantitation/RL/LOQ/LODs | A | Not reviewed for Level III validation. |
| X. | System Performance | A | Not reviewed for Level III validation. |
| XI. | Overall assessment of data | A | |
| XII. | Field duplicates | ND | FD = 6 + 7 |
| XIII. | Field blanks | ND | FB = KC151 ( SDG # 72682 ) EB = KC152 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC127 | 11 | KC136MSD | 21 | | 31 | 140210A-BZK |
| 2 | KC128 | 12 | | 22 | | 32 | |
| 3 | KC130** | 13 | | 23 | | 33 | |
| 4 | KC131 | 14 | | 24 | | 34 | |
| 5 | KC132 | 15 | | 25 | | 35 | |
| 6 | KC133 D | 16 | | 26 | | 36 | |
| 7 | KC134 D | 17 | | 27 | | 37 | |
| 8 | KC135 | 18 | | 28 | | 38 | |
| 9 | KC136 | 19 | | 29 | | 39 | |
| 10 | KC136MS | 20 | | 30 | | 40 | |

Notes:

LDC #: 31376A8

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: [illegible]

**Method:** X GC ____ HPLC

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| **I. Technical holding times** | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| **II. Initial calibration** | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%? | ✓ | | | |
| Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria? | | | ✓ | |
| Were the RT windows properly established? | ✓ | | | |
| **IV. Continuing calibration** | | | | |
| What type of continuing calibration calculation was performed? X %D or __ %R | ✓ | | | |
| Was a continuing calibration analyzed daily? | ✓ | | | |
| Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%? | ✓ | | | |
| Were all the retention times within the acceptance windows? | ✓ | | | |
| **V. Blanks** | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| **VI. Surrogate spikes** | | | | |
| Were all surrogate %R within the QC limits? | ✓ | | | |
| If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| **VII. Matrix spike/Matrix spike duplicates** | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | ✓ | | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | ✓ | | | |
| **VIII. Laboratory control samples** | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31376 A8

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Target compound identification | | | | |
| Were the retention times of reported detects within the RT windows? | ✓ | | | |
| XI. Compound quantitation/CRQLs | | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XII. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XIII. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XIV. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field duplicates. | | ✓ | | |
| XV. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

LDC #: 31376A8

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC X HPLC _____

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where:
A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

| # | Standard ID | Calibration Date | Compound | Reported CF (200 std) | Recalculated CF (200 std) | Reported Average CF (Initial) | Recalculated Average CF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL Apollo | 11/14/2013 | Diesel (C10-C24) | 1152965 | 1152965 | 1139258 | 1139258.5 | 10 | 10 |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376A8

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer:

METHOD: GC X HPLC

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) = 100 * (N - C)/N

Where: N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

| # | Standard ID | Calibration Date | Compound | CCV Conc/CF | Reported Conc/CF | Recalculated Conc/CF | Reported % D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 211103 | 2/18/2014 9:19 | Diesel (C10-C24) | 1139258 | 1095410 | 1296175 | 14 | 14 |
| | | | | | | | | |
| 2 | | | | | | | | |
| | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

LDC #: 31376B8

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification


Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** X GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 3

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| Octacosane | DB-5 / FID | 2949.273 | 1879.304 | 63.7 | 63.7 | 0 |
| Ortho-terphenyl | ↓ | ↓ | 2313.150 | 78.4 | 78.4 | 0 |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

LDC #: 31376A8

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike/Matrix Spike Duplicates Results Verification


Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** X GC __ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

Where SSC = Spiked sample concentration; SC = Sample concentration; SA = Spike added; MS = Matrix spike; MSD = Matrix spike duplicate

**MS/MSD** samples: 10/11

| Compound | Spike Added (mg/kg) | | Sample Conc. (mg/kg) | Spike Sample Concentration (mg/kg) | | Matrix spike Percent Recovery | | Matrix Spike Duplicate Percent Recovery | | MS/MSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MS | MSD | --- | MS | MSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | | | | | | | | | | | |
| Diesel (8015) | 40 | 40 | 0 | 37.9 | 34.4 | 94.8 ~~98m~~ | 94.8 | 86.0 | 86.0 | 9.7 | 9.7 |
| Benzene (8021B) | | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376A8

# VALIDATION FINDINGS WORKSHEET



## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: BR

2nd Reviewer: [illegible]

**METHOD:** X GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 140210A-LCS

| Compound | Spike Added (mg/kg) | | Spike Sample Concentration (mg/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | | | | | | | | | | |
| Diesel (8015) | 40.0 | — | 37.6 | — | 94.0 | 94.0 | — | — | — | — |
| Benzene (8021B) | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 313

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** X GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

~~DRO~~ [illegible]

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 3 Compound Name TPH-DRO (C10-C24)

Concentration = ND

140210A-LCS
DRO = 37.6 mg/kg

$= \frac{(8686\,12724)(5)}{(1139258)(50.74)(2)} = 37.565887 \frac{mg}{kg}$

| # | Sample ID | Compound | Reported Concentrations ( ) | Recalculated Results Concentrations ( ) | Qualifications |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Comments:

SAMPCALCnew.wpd

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **6020A** | | | | | | | | | | | | |
| KC127 | AY92010 | 5 | Lead | 01/29/2014 08:25 | 02/13/2014 19:07 | Std | 4.6 | mg/Kg | | 0.64 | 0.320 | | |
| KC128 | AY92011 | 5 | Lead | 01/29/2014 08:50 | 02/13/2014 19:13 | Std | 0.97 | mg/Kg | | 0.60 | 0.300 | | |
| KC130 | AY92013 | 5 | Lead | 01/30/2014 10:20 | 02/13/2014 19:18 | Full | 2.1 | mg/Kg | | 0.65 | 0.330 | | |
| KC131 | AY92014 | 5 | Lead | 01/30/2014 10:40 | 02/13/2014 19:24 | Std | 1.3 | mg/Kg | | 0.60 | 0.300 | | |
| KC132 | AY92015 | 5 | Lead | 01/30/2014 13:00 | 02/13/2014 19:30 | Std | 2.0 | mg/Kg | | 0.58 | 0.290 | | |
| KC133 | AY92016 | 5 | Lead | 01/30/2014 13:10 | 02/13/2014 19:36 | Std | 1.5 | mg/Kg | | 0.63 | 0.310 | | |
| KC134 | AY92017 | 5 | Lead | 01/30/2014 13:15 | 02/13/2014 19:42 | Std | 1.6 | mg/Kg | | 0.62 | 0.310 | | |
| KC135 | AY92018 | 5 | Lead | 01/30/2014 14:25 | 02/13/2014 19:48 | Std | 1.6 | mg/Kg | | 0.58 | 0.290 | | |
| KC136 | AY92019 | 5 | Lead | 01/30/2014 14:35 | 02/13/2014 19:54 | Std | 1.0 | mg/Kg | | 0.57 | 0.280 | | |
| | METHOD: **8015C DRO** | | | | | | | | | | | | |
| KC127 | AY92010 | 1 | TPH-DRO (C10-C24) | 01/29/2014 08:25 | 02/18/2014 12:18 | Std | 1.3 | mg/Kg | U | 6 | 1.3 | U | |
| KC127 | AY92010 | 1 | TPH-LRO (C24-C36) | 01/29/2014 08:25 | 02/18/2014 12:18 | Std | 13.0 | mg/Kg | U | 13 | 13.0 | U | |
| KC128 | AY92011 | 1 | TPH-DRO (C10-C24) | 01/29/2014 08:50 | 02/18/2014 12:44 | Std | 1.2 | mg/Kg | U | 6 | 1.2 | U | |
| KC128 | AY92011 | 1 | TPH-LRO (C24-C36) | 01/29/2014 08:50 | 02/18/2014 12:44 | Std | 12.0 | mg/Kg | U | 12 | 12.0 | U | |
| KC130 | AY92013 | 1 | TPH-DRO (C10-C24) | 01/30/2014 10:20 | 02/18/2014 13:10 | Full | 1.3 | mg/Kg | U | 7 | 1.3 | U | |
| KC130 | AY92013 | 1 | TPH-LRO (C24-C36) | 01/30/2014 10:20 | 02/18/2014 13:10 | Full | 13.0 | mg/Kg | U | 13 | 13.0 | U | |
| KC131 | AY92014 | 1 | TPH-DRO (C10-C24) | 01/30/2014 10:40 | 02/18/2014 13:37 | Std | 1.2 | mg/Kg | U | 6 | 1.2 | U | |
| KC131 | AY92014 | 1 | TPH-LRO (C24-C36) | 01/30/2014 10:40 | 02/18/2014 13:37 | Std | 12.0 | mg/Kg | U | 12 | 12.0 | U | |
| KC132 | AY92015 | 1 | TPH-DRO (C10-C24) | 01/30/2014 13:00 | 02/18/2014 14:03 | Std | 1.2 | mg/Kg | U | 6 | 1.2 | U | |
| KC132 | AY92015 | 1 | TPH-LRO (C24-C36) | 01/30/2014 13:00 | 02/18/2014 14:03 | Std | 12.0 | mg/Kg | U | 12 | 12.0 | U | |
| KC133 | AY92016 | 1 | TPH-DRO (C10-C24) | 01/30/2014 13:10 | 02/18/2014 14:30 | Std | 1.3 | mg/Kg | U | 6 | 1.3 | U | |
| KC133 | AY92016 | 1 | TPH-LRO (C24-C36) | 01/30/2014 13:10 | 02/18/2014 14:30 | Std | 13.0 | mg/Kg | U | 13 | 13.0 | U | |
| KC134 | AY92017 | 1 | TPH-DRO (C10-C24) | 01/30/2014 13:15 | 02/18/2014 14:56 | Std | 1.2 | mg/Kg | U | 6 | 1.2 | U | |
| KC134 | AY92017 | 1 | TPH-LRO (C24-C36) | 01/30/2014 13:15 | 02/18/2014 14:56 | Std | 12.0 | mg/Kg | U | 12 | 12.0 | U | |
| KC135 | AY92018 | 1 | TPH-DRO (C10-C24) | 01/30/2014 14:25 | 02/18/2014 15:23 | Std | 1.2 | mg/Kg | U | 6 | 1.2 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8015C DRO** | | | | | | | | | | | | |
| KC135 | AY92018 | 1 | TPH-LRO (C24-C36) | 01/30/2014 14:25 | 02/18/2014 15:23 | Std | 12.0 | mg/Kg | U | 12 | 12.0 | U | |
| KC136 | AY92019 | 1 | TPH-DRO (C10-C24) | 01/30/2014 14:35 | 02/18/2014 18:28 | Std | 1.1 | mg/Kg | U | 6 | 1.1 | U | |
| KC136 | AY92019 | 1 | TPH-LRO (C24-C36) | 01/30/2014 14:35 | 02/18/2014 18:28 | Std | 11.0 | mg/Kg | U | 11 | 11.0 | U | |
| | METHOD: **8015C GRO** | | | | | | | | | | | | |
| KC126 | AY92009 | 1 | Gasoline Range Organics | 01/29/2014 08:20 | 02/04/2014 12:39 | Std | 18.0 | ug/L | U | 50 | 18.0 | U | |
| KC127 | AY92010 | 1 | Gasoline Range Organics | 01/29/2014 08:25 | 02/04/2014 15:40 | Std | 1.0 | mg/Kg | U | 3 | 1.0 | U | |
| KC128 | AY92011 | 1 | Gasoline Range Organics | 01/29/2014 08:50 | 02/04/2014 16:16 | Std | 1.0 | mg/Kg | U | 2 | 1.0 | U | |
| KC129 | AY92012 | 1 | Gasoline Range Organics | 01/30/2014 10:00 | 02/04/2014 13:15 | Std | 18.0 | ug/L | U | 50 | 18.0 | UJ | *I |
| KC130 | AY92013 | 1 | Gasoline Range Organics | 01/30/2014 10:20 | 02/04/2014 16:52 | Full | 1.0 | mg/Kg | U | 3 | 1.0 | U | |
| KC131 | AY92014 | 1 | Gasoline Range Organics | 01/30/2014 10:40 | 02/04/2014 17:28 | Std | 1.0 | mg/Kg | U | 2 | 1.0 | U | |
| KC132 | AY92015 | 1 | Gasoline Range Organics | 01/30/2014 13:00 | 02/04/2014 18:04 | Std | 0.9 | mg/Kg | U | 2 | 0.9 | U | |
| KC133 | AY92016 | 1 | Gasoline Range Organics | 01/30/2014 13:10 | 02/04/2014 18:41 | Std | 1.0 | mg/Kg | U | 3 | 1.0 | U | |
| KC134 | AY92017 | 1 | Gasoline Range Organics | 01/30/2014 13:15 | 02/04/2014 19:17 | Std | 1.0 | mg/Kg | U | 3 | 1.0 | U | |
| KC135 | AY92018 | 1 | Gasoline Range Organics | 01/30/2014 14:25 | 02/04/2014 19:53 | Std | 0.9 | mg/Kg | U | 2 | 0.9 | U | |
| KC136 | AY92019 | 1 | Gasoline Range Organics | 01/30/2014 14:35 | 02/04/2014 20:29 | Std | 0.9 | mg/Kg | U | 2 | 0.9 | U | |
| | METHOD: **8260C** | | | | | | | | | | | | |
| KC126 | AY92009 | 1 | Benzene | 01/29/2014 08:20 | 02/04/2014 11:44 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC126 | AY92009 | 1 | Ethylbenzene | 01/29/2014 08:20 | 02/04/2014 11:44 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC126 | AY92009 | 1 | Toluene | 01/29/2014 08:20 | 02/04/2014 11:44 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC126 | AY92009 | 1 | Total Xylenes | 01/29/2014 08:20 | 02/04/2014 11:44 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC127 | AY92010 | 1 | Benzene | 01/29/2014 08:25 | 02/04/2014 22:18 | Std | 0.0026 | mg/Kg | U | 0.006 | 0.0026 | U | |
| KC127 | AY92010 | 1 | Ethylbenzene | 01/29/2014 08:25 | 02/04/2014 22:18 | Std | 0.0026 | mg/Kg | U | 0.006 | 0.0026 | U | |
| KC127 | AY92010 | 1 | Toluene | 01/29/2014 08:25 | 02/04/2014 22:18 | Std | 0.0026 | mg/Kg | U | 0.006 | 0.0026 | U | |
| KC127 | AY92010 | 1 | Total Xylenes | 01/29/2014 08:25 | 02/04/2014 22:18 | Std | 0.0026 | mg/Kg | U | 0.006 | 0.0026 | U | |
| KC128 | AY92011 | 1 | Benzene | 01/29/2014 08:50 | 02/04/2014 22:39 | Std | 0.0024 | mg/Kg | U | 0.006 | 0.0024 | U | |
| KC128 | AY92011 | 1 | Ethylbenzene | 01/29/2014 08:50 | 02/04/2014 22:39 | Std | 0.0024 | mg/Kg | U | 0.006 | 0.0024 | U | |
| KC128 | AY92011 | 1 | Toluene | 01/29/2014 08:50 | 02/04/2014 22:39 | Std | 0.0024 | mg/Kg | U | 0.006 | 0.0024 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **8260C** | | | | | | | | | | | | | |
| KC128 | AY92011 | 1 | Total Xylenes | 01/29/2014 08:50 | 02/04/2014 22:39 | Std | 0.0024 | mg/Kg | U | 0.006 | 0.0024 | U | |
| KC129 | AY92012 | 1 | Benzene | 01/30/2014 10:00 | 02/04/2014 12:11 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | UJ | *I |
| KC129 | AY92012 | 1 | Ethylbenzene | 01/30/2014 10:00 | 02/04/2014 12:11 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | UJ | *I |
| KC129 | AY92012 | 1 | Toluene | 01/30/2014 10:00 | 02/04/2014 12:11 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | UJ | *I |
| KC129 | AY92012 | 1 | Total Xylenes | 01/30/2014 10:00 | 02/04/2014 12:11 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | UJ | *I |
| KC130 | AY92013 | 1 | Benzene | 01/30/2014 10:20 | 02/04/2014 23:01 | Full | 0.0026 | mg/Kg | U | 0.006 | 0.0026 | U | |
| KC130 | AY92013 | 1 | Ethylbenzene | 01/30/2014 10:20 | 02/04/2014 23:01 | Full | 0.0026 | mg/Kg | U | 0.006 | 0.0026 | U | |
| KC130 | AY92013 | 1 | Toluene | 01/30/2014 10:20 | 02/04/2014 23:01 | Full | 0.0026 | mg/Kg | U | 0.006 | 0.0026 | U | |
| KC130 | AY92013 | 1 | Total Xylenes | 01/30/2014 10:20 | 02/04/2014 23:01 | Full | 0.0026 | mg/Kg | U | 0.006 | 0.0026 | U | |
| KC131 | AY92014 | 1 | Benzene | 01/30/2014 10:40 | 02/04/2014 23:23 | Std | 0.0024 | mg/Kg | U | 0.006 | 0.0024 | U | |
| KC131 | AY92014 | 1 | Ethylbenzene | 01/30/2014 10:40 | 02/04/2014 23:23 | Std | 0.0024 | mg/Kg | U | 0.006 | 0.0024 | U | |
| KC131 | AY92014 | 1 | Toluene | 01/30/2014 10:40 | 02/04/2014 23:23 | Std | 0.0024 | mg/Kg | U | 0.006 | 0.0024 | U | |
| KC131 | AY92014 | 1 | Total Xylenes | 01/30/2014 10:40 | 02/04/2014 23:23 | Std | 0.0024 | mg/Kg | U | 0.006 | 0.0024 | U | |
| KC132 | AY92015 | 1 | Benzene | 01/30/2014 13:00 | 02/04/2014 23:44 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC132 | AY92015 | 1 | Ethylbenzene | 01/30/2014 13:00 | 02/04/2014 23:44 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC132 | AY92015 | 1 | Toluene | 01/30/2014 13:00 | 02/04/2014 23:44 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC132 | AY92015 | 1 | Total Xylenes | 01/30/2014 13:00 | 02/04/2014 23:44 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC133 | AY92016 | 1 | Benzene | 01/30/2014 13:10 | 02/05/2014 00:06 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC133 | AY92016 | 1 | Ethylbenzene | 01/30/2014 13:10 | 02/05/2014 00:06 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC133 | AY92016 | 1 | Toluene | 01/30/2014 13:10 | 02/05/2014 00:06 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC133 | AY92016 | 1 | Total Xylenes | 01/30/2014 13:10 | 02/05/2014 00:06 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC134 | AY92017 | 1 | Benzene | 01/30/2014 13:15 | 02/05/2014 00:28 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC134 | AY92017 | 1 | Ethylbenzene | 01/30/2014 13:15 | 02/05/2014 00:28 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC134 | AY92017 | 1 | Toluene | 01/30/2014 13:15 | 02/05/2014 00:28 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC134 | AY92017 | 1 | Total Xylenes | 01/30/2014 13:15 | 02/05/2014 00:28 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC135 | AY92018 | 1 | Benzene | 01/30/2014 14:25 | 02/05/2014 00:49 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC135 | AY92018 | 1 | Ethylbenzene | 01/30/2014 14:25 | 02/05/2014 00:49 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8260C** | | | | | | | | | | | | |
| KC135 | AY92018 | 1 | Toluene | 01/30/2014 14:25 | 02/05/2014 00:49 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC135 | AY92018 | 1 | Total Xylenes | 01/30/2014 14:25 | 02/05/2014 00:49 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC136 | AY92019 | 1 | Benzene | 01/30/2014 14:35 | 02/05/2014 01:11 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC136 | AY92019 | 1 | Ethylbenzene | 01/30/2014 14:35 | 02/05/2014 01:11 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC136 | AY92019 | 1 | Toluene | 01/30/2014 14:35 | 02/05/2014 01:11 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC136 | AY92019 | 1 | Total Xylenes | 01/30/2014 14:35 | 02/05/2014 01:11 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC127 | AY92010 | 1 | 1-Methylnaphthalene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | 2-Methylnaphthalene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Acenaphthene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Acenaphthylene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Anthracene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Benzo(a)anthracene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Benzo(a)pyrene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Benzo(b)fluoranthene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Benzo(g,h,i)perylene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Benzo(k)fluoranthene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Chrysene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | DIBENZO(A,H)ANTHRACENE | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Fluoranthene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Fluorene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Indeno(1,2,3-cd)pyrene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Naphthalene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Phenanthrene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC127 | AY92010 | 1 | Pyrene | 01/29/2014 08:25 | 02/12/2014 13:29 | Std | 0.00210 | mg/Kg | U | 0.0064 | 0.00210 | U | |
| KC128 | AY92011 | 1 | 1-Methylnaphthalene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | 2-Methylnaphthalene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **8270D-SIM** | | | | | | | | | | | | | |
| KC128 | AY92011 | 1 | Acenaphthene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Acenaphthylene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Anthracene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Benzo(a)anthracene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Benzo(a)pyrene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Benzo(b)fluoranthene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Benzo(g,h,i)perylene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Benzo(k)fluoranthene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Chrysene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | DIBENZO(A,H)ANTHRACENE | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Fluoranthene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Fluorene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Indeno(1,2,3-cd)pyrene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Naphthalene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Phenanthrene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC128 | AY92011 | 1 | Pyrene | 01/29/2014 08:50 | 02/12/2014 13:57 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC130 | AY92013 | 1 | 1-Methylnaphthalene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | 2-Methylnaphthalene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Acenaphthene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Acenaphthylene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Anthracene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Benzo(a)anthracene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Benzo(a)pyrene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Benzo(b)fluoranthene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Benzo(g,h,i)perylene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Benzo(k)fluoranthene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Chrysene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC130 | AY92013 | 1 | DIBENZO(A,H)ANTHRACENE | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Fluoranthene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Fluorene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Indeno(1,2,3-cd)pyrene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Naphthalene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Phenanthrene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC130 | AY92013 | 1 | Pyrene | 01/30/2014 10:20 | 02/12/2014 14:25 | Full | 0.00220 | mg/Kg | U | 0.0065 | 0.00220 | U | |
| KC131 | AY92014 | 1 | 1-Methylnaphthalene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | 2-Methylnaphthalene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Acenaphthene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Acenaphthylene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Anthracene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Benzo(a)anthracene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Benzo(a)pyrene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Benzo(b)fluoranthene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Benzo(g,h,i)perylene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Benzo(k)fluoranthene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Chrysene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | DIBENZO(A,H)ANTHRACENE | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Fluoranthene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Fluorene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Indeno(1,2,3-cd)pyrene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Naphthalene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Phenanthrene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC131 | AY92014 | 1 | Pyrene | 01/30/2014 10:40 | 02/12/2014 14:53 | Std | 0.00200 | mg/Kg | U | 0.0060 | 0.00200 | U | |
| KC132 | AY92015 | 1 | 1-Methylnaphthalene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | 2-Methylnaphthalene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **8270D-SIM** | | | | | | | | | | | | | |
| KC132 | AY92015 | 1 | Acenaphthene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Acenaphthylene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Anthracene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Benzo(a)anthracene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Benzo(a)pyrene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Benzo(b)fluoranthene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Benzo(g,h,i)perylene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Benzo(k)fluoranthene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Chrysene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | DIBENZO(A,H)ANTHRACENE | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Fluoranthene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Fluorene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Indeno(1,2,3-cd)pyrene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Naphthalene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Phenanthrene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC132 | AY92015 | 1 | Pyrene | 01/30/2014 13:00 | 02/12/2014 15:21 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC133 | AY92016 | 1 | 1-Methylnaphthalene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | 2-Methylnaphthalene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Acenaphthene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Acenaphthylene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Anthracene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Benzo(a)anthracene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Benzo(a)pyrene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Benzo(b)fluoranthene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Benzo(g,h,i)perylene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Benzo(k)fluoranthene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Chrysene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **8270D-SIM** | | | | | | | | | | | | | |
| KC133 | AY92016 | 1 | DIBENZO(A,H)ANTHRACENE | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Fluoranthene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Fluorene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Indeno(1,2,3-cd)pyrene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Naphthalene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Phenanthrene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC133 | AY92016 | 1 | Pyrene | 01/30/2014 13:10 | 02/12/2014 15:49 | Std | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC134 | AY92017 | 1 | 1-Methylnaphthalene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | 2-Methylnaphthalene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Acenaphthene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Acenaphthylene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Anthracene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Benzo(a)anthracene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Benzo(a)pyrene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Benzo(b)fluoranthene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Benzo(g,h,i)perylene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Benzo(k)fluoranthene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Chrysene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | DIBENZO(A,H)ANTHRACENE | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Fluoranthene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Fluorene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Indeno(1,2,3-cd)pyrene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Naphthalene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Phenanthrene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC134 | AY92017 | 1 | Pyrene | 01/30/2014 13:15 | 02/12/2014 16:17 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC135 | AY92018 | 1 | 1-Methylnaphthalene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | 2-Methylnaphthalene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC135 | AY92018 | 1 | Acenaphthene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Acenaphthylene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Anthracene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Benzo(a)anthracene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Benzo(a)pyrene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Benzo(b)fluoranthene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Benzo(g,h,i)perylene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Benzo(k)fluoranthene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Chrysene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | DIBENZO(A,H)ANTHRACENE | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Fluoranthene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Fluorene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Indeno(1,2,3-cd)pyrene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Naphthalene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Phenanthrene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC135 | AY92018 | 1 | Pyrene | 01/30/2014 14:25 | 02/12/2014 16:45 | Std | 0.00190 | mg/Kg | U | 0.0058 | 0.00190 | U | |
| KC136 | AY92019 | 1 | 1-Methylnaphthalene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | 2-Methylnaphthalene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Acenaphthene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Acenaphthylene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Anthracene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Benzo(a)anthracene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Benzo(a)pyrene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Benzo(b)fluoranthene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Benzo(g,h,i)perylene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Benzo(k)fluoranthene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Chrysene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC136 | AY92019 | 1 | DIBENZO(A,H)ANTHRACENE | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Fluoranthene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Fluorene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Indeno(1,2,3-cd)pyrene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Naphthalene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Phenanthrene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC136 | AY92019 | 1 | Pyrene | 01/30/2014 14:35 | 02/12/2014 18:09 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | January 31, 2014 |
| **LDC Report Date:** | March 11, 2014 |
| **Matrix:** | Soil/Water |
| **Parameters:** | Volatiles |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72621 |

**Sample Identification**

KC137
KC138
KC139**
KC140
KC141

**Indicates sample underwent Full review

## Introduction

This data review covers 4 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260C for Volatiles which are Benzene, Toluene, Ethylbenzene and Xylenes (BTEX).

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Sample KC137 was identified as a trip blank. No volatile contaminants were found.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No volatile contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No volatile contaminants were found.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XII. Compound Quantitation

All compound quantitations were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Laboratory Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Field Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

LDC #: 31376B1
SDG #: 72621
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/4/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC/MS Volatiles (BTEX)(EPA SW 846 Method 8260C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 1/31/14 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | RSD ≤ 15% |
| IV. | Continuing calibration/ICV | A | ~~[illegible]~~ (CCV ≤ 20%) ICV ≤ 25% |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VIII. | Laboratory control samples | A | LCS |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | Not reviewed for Level III validation. |
| XII. | Compound quantitation/RLs/LOQs/LODs | A | Not reviewed for Level III validation. |
| XIII. | Tentitatively identified compounds (TICs) | N | Not reviewed for Level III validation. |
| XIV. | System performance | A | Not reviewed for Level III validation. |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | ND | TB = 1 FB = KC151 } SDG A<br>EB = KC152 } 72662 |

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation
Soil + Water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC137 W | 11 | | 21 | | 31 | 140205AT-BLK |
| 2 | KC138 | 12 | | 22 | | 32 | 140205AM-BLK |
| 3 | KC139** | 13 | | 23 | | 33 | |
| 4 | KC140 | 14 | | 24 | | 34 | |
| 5 | KC141 | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

LDC #: 31376B1

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: C

**Method:** Volatiles (EPA SW 846 Method 8260C)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. GC/MS Instrument performance check | | | | |
| Were the BFB performance results reviewed and found to be within the specified criteria? | ✓ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | ✓ | | | |
| III. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) within the method criteria? | ✓ | | | |
| Was a curve fit used for evaluation? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990? | | | ✓ | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) ≤ 20% and relative response factors (RRF) within the method criteria? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed at least once every 12 hours for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per analytical batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31378B1

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: C

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Internal standards | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | ✓ | | | |
| Were retention times within ± 30 seconds of the associated calibration standard? | ✓ | | | |
| XI. Target compound identification | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | ✓ | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | ✓ | | | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| XII. Compound quantitation/RLs | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XIII. Tentatively identified compounds (TICs) | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | ✓ | | |
| XIV. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XV. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XVI. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| XVII. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

# TARGET COMPOUND WORKSHEET

## METHOD: VOA

| | | | | |
|---|---|---|---|---|
| A. Chloromethane | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF. Acrolein |
| E. Methylene chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene | BB. 1,1,2,2-Tetrachloroethane | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane | CC. Toluene | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform | EE. Ethylbenzene | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. Iodomethane |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | OOOO.1,1-Difluoroethane |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | PPPP. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | QQQQ. |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane | KK. Trichlorofluoromethane | EEE. sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene | AAAA. Ethyl tert-butyl ether | UUUU. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | VVVV. |

LDC #: 31376B1

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

$A_x$ = Area of Compound
$C_x$ = Concentration of compound,
S= Standard deviation of the RRFs,

$A_{is}$ = Area of associated internal standard
$C_{is}$ = Concentration of internal standard
X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (IS) | Reported RRF (RRF 5 std) | Recalculated RRF (RRF 5 std) | Reported Average RRF (Initial) | Recalculated Average RRF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL | 2/4/2014 | Benzene (IS1) | 1.3750 | 1.3750 | 1.5 | 1.5 | 5.6 | 5.6 |
| | Thor | | Ethylbenzene (IS2) | 1.9840 | 1.9836 | 2.1 | 2.1 | 6 | 6 |
| | | | | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 31376B1

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound,
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (IS) | Average RRF (Initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported % D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 0205T03 | 2/5/2014 | Benzene (IS1) | 1.466 | 1.308 | 1.308 | 11 | 11 |
| | | | Ethylbenzene (IS2) | 2.099 | 1.965 | 1.965 | 6.4 | 6.4 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 3137681

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification


Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 3

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | 50.128 | 56.62253 | 113 | 113 | 0 |
| Toluene-d8 | 59.271 | 57.82939 | 97.6 | 97.6 | 0 |
| Bromofluorobenzene | 56.688 | 57.05199 | 101 | 101 | 0 |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

LDC #: 31376B1

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Sample Results Verification


Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA  Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)  LCSC = Laboraotry control sample concentration  LCSDC = Laboratory control sample duplicate concentration

LCS ID: 140205AT-LCS

| Compound | Spike Added (mg/kg) | | Spiked Sample Concentration (mg/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalculated |
| 1,1-Dichloroethene | | | | | | | | | | |
| Trichloroethene | | | | | | | | | | |
| Benzene | 0.050 | — | 0.0415 | — | 83.0 | 83.0 | — | | — | |
| Toluene | ↓ | ↓ | 0.0431 | ↓ | 86.2 | 86.2 | — | | — | |
| Chlorobenzene | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376B1

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| RRF | = | Relative response factor of the calibration standard. |
| $V_o$ | = | Volume or weight of sample pruged in milliliters (ml) or grams (g). |
| Df | = | Dilution factor. |
| %S | = | Percent solids, applicable to soils and solid matrices only. |

Example:

Sample I.D. 3, ~~F~~ A11:

Conc. = ( ND )( )( )
( )( )( )( )

140205A-LCS
V = 0.0415 mg/kg
$= \frac{(588847)(50)(5)}{(483648)(1.466)(5)(10\%)} = 0.04152495$ mg/kg

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
| | | | | | |
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# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | January 31, 2014 |
| **LDC Report Date:** | March 11, 2014 |
| **Matrix:** | Soil |
| **Parameters:** | Polynuclear Aromatic Hydrocarbons |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72621 |

**Sample Identification**

KC138
KC139**
KC140
KC141

**Indicates sample underwent Full review

## Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270D using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No polynuclear aromatic hydrocarbon contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No polynuclear aromatic hydrocarbon contaminants were found.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XII. Compound Quantitation

All compound quantitation were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

LDC #: 31376B2b
SDG #: 72621
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/4/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 1/31/14 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | RSD ≤ 15% |
| IV. | Continuing calibration/ICV | A | ~~ICV~~ CCV ≤ 20% ICV ≤ 25% |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VIII. | Laboratory control samples | A | LCS |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | Not reviewed for Level III validation. |
| XII. | Compound quantitation/RLs/LOQs/LODs | A | Not reviewed for Level III validation. |
| XIII. | Tentitatively identified compounds (TICs) | N | Not reviewed for Level III validation. |
| XIV. | System performance | A | Not reviewed for Level III validation. |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | ND | FB = KC151 (SDG # 72682) EB = KC152 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Soil

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC138 | 11 | | 21 | | 31 | 140210A-LCS |
| 2 | KC139** | 12 | | 22 | | 32 | |
| 3 | KC140 | 13 | | 23 | | 33 | |
| 4 | KC141 | 14 | | 24 | | 34 | |
| 5 | | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

LDC #: 31376B26

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: A

**Method:** Semivolatiles (EPA SW 846 Method 8270D)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. GC/MS Instrument performance check | | | | |
| Were the DFTPP performance results reviewed and found to be within the specified criteria? | ✓ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | ✓ | | | |
| III. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) within the method criteria? | ✓ | | | |
| Was a curve fit used for evaluation? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990? | | | ✓ | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31376B26

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: A

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Internal standards | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | ✓ | | | |
| Were retention times within ± 30 seconds from the associated calibration standard? | ✓ | | | |
| XI. Target compound identification | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | ✓ | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | ✓ | | | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| XII. Compound quantitation/RLs | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XIII. Tentatively identified compounds (TICs) | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | ✓ | | |
| XIV. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XV. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XVI. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| XVII. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

# VALIDATION FINDINGS WORKSHEET

**METHOD:** GC/MS SVOA

| | | | | |
|---|---|---|---|---|
| A. Phenol | T. 4-Chloroaniline | MM. 4-Chlorophenyl-phenyl ether | FFF. Di-n-octylphthalate | YYY. 2,3,5-Trimethylnaphthalene |
| B. Bis (2-chloroethyl) ether | U. Hexachlorobutadiene | NN. Fluorene | GGG. Benzo(b)fluoranthene | ZZZ. Perylene |
| C. 2-Chlorophenol | V. 4-Chloro-3-methylphenol | OO. 4-Nitroaniline | HHH. Benzo(k)fluoranthene | AAAA. Dibenzothiophene |
| D. 1,3-Dichlorobenzene | W. 2-Methylnaphthalene | PP. 4,6-Dinitro-2-methylphenol | III. Benzo(a)pyrene | BBBB. Benzo(a)fluoranthene |
| E. 1,4-Dichlorobenzene | X. Hexachlorocyclopentadiene | QQ. N-Nitrosodiphenylamine | JJJ. Indeno(1,2,3-cd)pyrene | CCCC. Benzo(b)fluorene |
| F. 1,2-Dichlorobenzene | Y. 2,4,6-Trichlorophenol | RR. 4-Bromophenyl-phenylether | KKK. Dibenz(a,h)anthracene | DDDD. cis/trans-Decalin |
| G. 2-Methylphenol | Z. 2,4,5-Trichlorophenol | SS. Hexachlorobenzene | LLL. Benzo(g,h,i)perylene | EEEE. Biphenyl |
| H. 2,2'-Oxybis(1-chloropropane) | AA. 2-Chloronaphthalene | TT. Pentachlorophenol | MMM. Bis(2-Chloroisopropyl)ether | FFFF. Retene |
| I. 4-Methylphenol | BB. 2-Nitroaniline | UU. Phenanthrene | NNN. Aniline | GGGG. C30-Hopane |
| J. N-Nitroso-di-n-propylamine | CC. Dimethylphthalate | VV. Anthracene | OOO. N-Nitrosodimethylamine | HHHH. 1-Methylphenanthrene |
| K. Hexachloroethane | DD. Acenaphthylene | WW. Carbazole | PPP. Benzoic Acid | IIII. 1,4-Dioxane |
| L. Nitrobenzene | EE. 2,6-Dinitrotoluene | XX. Di-n-butylphthalate | QQQ. Benzyl alcohol | JJJJ. Acetophenone |
| M. Isophorone | FF. 3-Nitroaniline | YY. Fluoranthene | RRR. Pyridine | KKKK. Atrazine |
| N. 2-Nitrophenol | GG. Acenaphthene | ZZ. Pyrene | SSS. Benzidine | LLLL. Benzaldehyde |
| O. 2,4-Dimethylphenol | HH. 2,4-Dinitrophenol | AAA. Butylbenzylphthalate | TTT. 1-Methylnaphthalene | MMMM. Caprolactam |
| P. Bis(2-chloroethoxy)methane | II. 4-Nitrophenol | BBB. 3,3'-Dichlorobenzidine | UUU.Benzo(b)thiophene | NNNN. |
| Q. 2,4-Dichlorophenol | JJ. Dibenzofuran | CCC. Benzo(a)anthracene | VVV.Benzonaphthothiophene | OOOO. |
| R. 1,2,4-Trichlorobenzene | KK. 2,4-Dinitrotoluene | DDD. Chrysene | WWW.Benzo(e)pyrene | PPPP. |
| S. Naphthalene | LL. Diethylphthalate | EEE. Bis(2-ethylhexyl)phthalate | XXX. 2,6-Dimethylnaphthalene | QQQQ. |

LDC #: 31376B2b

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS PAH (EPA SW 846 Method 8270D-SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

$A_x$ = Area of Compound
$C_x$ = Concentration of compound,
S= Standard deviation of the RRFs,

$A_{is}$ = Area of associated internal standard
$C_{is}$ = Concentration of internal standard
X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (IS) | Reported RRF (RRF 5 std) | Recalculated RRF (RRF 5 std) | Reported Average RRF (Initial) | Recalculated Average RRF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL Linus | 2/4/2014 | Naphthalene (IS1) | 1.773 | 1.773 | 1.7 | 1.7 | 12 | 12 |
| | | | Fluorene (IS2) | 2.364 | 2.364 | 2.1 | 2.1 | 11 | 11 |
| | | | Phenanthrene (IS3) | 2.144 | 2.144 | 1.8 | 1.8 | 13 | 13 |
| | | | Chrysene (IS4) | 2.084 | 2.084 | 2.0 | 2.0 | 9.0 | 9.0 |
| | | | Benzo(a)pyrene (IS5) | 2.871 | 2.871 | 2.6 | 2.6 | 14 | 14 |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 31376B2b

# VALIDATION FINDINGS WORSHEET
## Continuing Calibration Results Verification


Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS PAH (EPA SW 846 Method 8270D-SIM)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound

Cx = Concentration of compound
Ais = Area of associated internal standard
Cis = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (IS) | Average RRF (Initial RRF) | Reported (CC RRF) | Recalculated (CC RRF) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 0212L002 | 02/12/14 | Naphthalene (IS1 | 1.656 | 1.755 | 1.755 | 6.0 | 6.0 |
| | | | Fluorene (IS2 | 2.132 | 2.472 | 2.472 | 16 | 16 |
| | | | Phenanthrene (IS3 | 1.843 | 2.216 | 2.216 | 20 | 20 |
| | | | Chrysene (IS4 | 2.036 | 2.074 | 2.074 | 1.9 | 1.9 |
| | | | Benzo(a)pyrene (IS5 | 2.581 | 3.007 | 3.007 | 16 | 16 |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

# Surrogate Results Verification

Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270D)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 2

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | 66.335 | 50.00332 | 75.4 | 75.4 | 0 |
| 2-Fluorobiphenyl | ↓ | 46.73828 | 70.5 | 70.5 | 0 |
| Terphenyl-d14 | | 45.39245 | 68.4 | 68.4 | 0 |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

LDC #: 31376B26

# VALIDATION FINDINGS WORKSHEET

## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification



Reviewer: BR

2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270D)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for th compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 140210A-LCS

| Compound | Spike Added (mg/kg) | | Spike Concentration (mg/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc | Reported | Recalc | Reported | Recalculated |
| Phenol | | | | | | | | | | |
| N-Nitroso-di-n-propylamine | | | | | | | | | | |
| 4-Chloro-3-methylphenol | | | | | | | | | | |
| Acenaphthene | 0.132 | — | 0.113 | — | 85.6 | 85.6 | — | — | — | — |
| Pentachlorophenol | | | | | | | | | | |
| Pyrene | 0.132 | — | 0.105 | — | 79.5 | 79.5 | — | — | — | — |
| | | | | | | | | | | |
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Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reporte results do not agree within 10.0% of the recalculated results.

LDC #: 31376B26

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification



Reviewer: BR

2nd reviewer: E

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270D)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| $V_i$ | = | Volume of extract injected in microliters (ul) |
| $V_t$ | = | Volume of the concentrated extract in microliters (ul) |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |
| 2.0 | = | Factor of 2 to account for GPC cleanup |

Example:

Sample I.D. 2, ~~S~~ All:

Conc. = ( ND )( )( )( )( )
( )( )( )( )( )

140210A-LCS

S = 0.098 mg/kg

$= \frac{(5204)(2.5)(1)}{(2644)(1.656)(30.32)} = 0.0980$ mg/kg

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
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# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | January 31, 2014 |
| **LDC Report Date:** | March 11, 2014 |
| **Matrix:** | Soil |
| **Parameters:** | Lead |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72621 |

**Sample Identification**

KC138
KC139**
KC140
KC141
KC141MS
KC141MSD

**Indicates sample underwent Full review

## Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020A for Lead.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | The sequence or number of standards used for the calibration was incorrect. |
| C | Correlation coefficient is <0.995. |
| R | %R for calibration is not within control limits |
| B | Presumed contamination from preparation (method) blank or calibration blank |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor. |
| E | MS/MSD or Duplicate RPD or difference was high. |
| I | ICP ICS results were unsatisfactory. |
| A | ICP Serial Dilution %D were not within control limits |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Post Digestion Spike recovery was not within control limits |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

## III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No lead contaminants were found in the initial, continuing and preparation blanks.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No lead contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No lead contaminants were found.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XI. Sample Result Verification

All sample result verifications were acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIII. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Laboratory Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Field Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

LDC #: 31376B4
SDG #: 72621
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET

~~Level III/IV~~ Standard / Full

Date: 3/3/14
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Lead (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 1/31/14 |
| II. | ICP/MS Tune | A | |
| III. | Calibration | A | |
| IV. | Blanks | A | |
| V. | ICP Interference Check Sample (ICS) Analysis | A | |
| VI. | Matrix Spike Analysis | A | |
| VII. | Duplicate Sample Analysis | N | |
| VIII. | Laboratory Control Samples (LCS) | A | LCS |
| IX. | Internal Standard (ICP-MS) | A | Not reviewed for Level III validation. |
| ~~X.~~ | ~~Furnace Atomic Absorption QC~~ | | |
| XI. | ICP Serial Dilution | A | |
| XII. | Sample Result Verification | A | Not reviewed for Level III validation. |
| XIII. | Overall Assessment of Data | A | |
| XIV. | Field Duplicates | N | |
| XV | Field Blanks | ND | FB = KC151, TB = KC152 (72662) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC138 | 11 | MB | 21 | | 31 | |
| 2 | KC139** | 12 | | 22 | | 32 | |
| 3 | KC140 | 13 | | 23 | | 33 | |
| 4 | KC141 | 14 | | 24 | | 34 | |
| 5 | KC141MS | 15 | | 25 | | 35 | |
| 6 | KC141MSD | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

LDC #: 31376B4

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

**Method:** Metals (EPA SW 846 Method 6010B/7000/6020)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| ***I. Technical holding times*** | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| ***II. ICP/MS Tune*** | | | | |
| Were all isotopes in the tuning solution mass resolution within 0.1 amu? | ✓ | | | |
| Were %RSD of isotopes in the tuning solution ≤5%? | ✓ | | | |
| ***III. Calibration*** | | | | |
| Were all instruments calibrated daily, each set-up time? | ✓ | | | |
| Were the proper number of standards used? | ✓ | | | |
| Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits? | ✓ | | | |
| Were all initial calibration correlation coefficients ≥ 0.995? | ✓ | | | |
| ***IV. Blanks*** | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| ***V. ICP Interference Check Sample*** | | | | |
| Were ICP interference check samples performed daily? | ✓ | | | |
| Were the AB solution percent recoveries (%R) with the 80-120% QC limits? | ✓ | | | |
| ***VI. Matrix spike/Matrix spike duplicates*** | | | | |
| Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. | ✓ | | | |
| Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL. | ✓ | | | |
| ***VII. Laboratory control samples*** | | | | |
| Was an LCS anaylzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils? | ✓ | | | |

LDC #: 21326B4

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| ***VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)*** | | | | |
| Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration? | ✓ | | | |
| If the %Rs were outside the criteria, was a reanalysis performed? | | | ✓ | |
| ***IX. ICP Serial Dilution*** | | | | |
| Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)? | ✓ | | | |
| Were all percent differences (%Ds) < 10%? | ✓ | | | |
| Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data. | | | ✓ | |
| ***X. Sample Result Verification*** | | | | |
| Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| ***XI. Overall assessment of data*** | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| ***XII. Field duplicates*** | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target analytes were detected in the field duplicates. | | | ✓ | |
| ***XIII. Field blanks*** | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target analytes were detected in the field blanks. | | ✓ | | |

LDC #: 31376B4

# VALIDATION FINDINGS WORKSHEET
## Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

| Standard ID | Type of Analysis | Element | Found (ug/L) | True (ug/L) | Recalculated %R | Reported %R | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| | ICP (Initial calibration) | | | | | | |
| ICV | ICP/MS (Initial calibration) | pb | 101.22 | 100 | 101 | 101 | Y |
| | CVAA (Initial calibration) | | | | | | |
| | ICP (Continuing calibration) | | | | | | |
| CCV | ICP/MS (Continuing calibration) | pb | 49.12 | 50 | 98.4 | 98.4 | Y |
| | CVAA (Continuing calibration) | | | | | | |
| | GFAA (Initial calibration) | | | | | | |
| | GFAA (Continuing calibation) | | | | | | |

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376B4

# VALIDATION FINDINGS WORKSHEET
## Level IV Recalculation Worksheet


Reviewer: 
2nd Reviewer: 

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

| Sample ID | Type of Analysis | Element | Found / S / I (units) | True / D / SDR (units) | Recalculated %R / RPD / %D | Reported %R / RPD / %D | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| ICSAB | ICP interference check | Pb | 93.1 | 100 | 93.1 | 93.1 | Y |
| LCS | Laboratory control sample | | 23.46 | 25.0 | 94 | 94.0 | |
| + | Matrix spike | | (SSR-SR) 41.3 | 50.0 | 82.6 | 82.6 | |
| 5/6 | Duplicate | | 42.258 | 43.154 | 2.1 | 2.1 | |
| 4 | ICP serial dilution | | 3.94 | 3.71 | 6.14 | 6.21 | |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31326B4

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for 2 were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$Pb = \frac{2.796\ mg/L \times 0.1\ L \times 5}{1g \times 0.80} = 1.7475\ mg/g$$

| # | Sample ID | Analyte | Reported Concentration (mg/kg) | Calculated Concentration (mg/kg) | Acceptable (Y/N) |
|---|---|---|---|---|---|
| 1 | 2 | Pb | 1.6 | 1.7 | Y |
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Note:

RECALC.4SW

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | January 31, 2014 |
| **LDC Report Date:** | March 11, 2014 |
| **Matrix:** | Soil/Water |
| **Parameters:** | Total Petroleum Hydrocarbons as Gasoline |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72621 |

**Sample Identification**

KC137
KC138
KC139**
KC140
KC141

**Indicates sample underwent Full review

## Introduction

This data review covers 4 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015C for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

## III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Sample KC137 was identified as a trip blank. No total petroleum hydrocarbons as gasoline contaminants were found.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No total petroleum hydrocarbons as gasoline contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No total petroleum hydrocarbons as gasoline contaminants were found.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## IX. Compound Quantitation

All compound quantitations were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## X. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

LDC #: 31376B7
SDG #: 72621
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/4/14
Page: 1 of 1
Reviewer: BX
2nd Reviewer: C

**METHOD:** GC TPH as Gasoline (EPA SW846 Method 8015~~B~~C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 1/31/14 |
| II | Initial calibration | A | RSD ≤20% |
| III. | Calibration verification/ICV | A | ICV/CCV ≤20% |
| IV. | Blanks | A | |
| V | Surrogate recovery | A | |
| VI. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VII. | Laboratory control samples | A | LCS |
| VIII. | Target compound identification | A | Not reviewed for Level III validation. |
| IX. | Compound quantitation/RL/LOQ/LODs | A | Not reviewed for Level III validation. |
| X. | System Performance | A | Not reviewed for Level III validation. |
| XI. | Overall assessment of data | A | |
| XII. | Field duplicates | N | |
| XIII. | Field blanks | ND | TB=1 FB=KC151 EB=KC152 (SDG A 72662) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water + Soil

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC137 W | 11 | | 21 | | 31 | 140206A-B2K |
| 2 | KC138 | 12 | | 22 | | 32 | 140206AS-BLK |
| 3 | KC139** | 13 | | 23 | | 33 | |
| 4 | KC140 | 14 | | 24 | | 34 | |
| 5 | KC141 | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

LDC #: 31376B7

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: C

**Method:** ✓ GC ____ HPLC

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%? | ✓ | | | |
| Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria? | | | ✓ | |
| Were the RT windows properly established? | ✓ | | | |
| IV. Continuing calibration | | | | |
| What type of continuing calibration calculation was performed? ✓ %D or __ %R | ✓ | | | |
| Was a continuing calibration analyzed daily? | ✓ | | | |
| Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%? | ✓ | | | |
| Were all the retention times within the acceptance windows? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within the QC limits? | ✓ | | | |
| If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31376B7

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: A

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Target compound identification | | | | |
| Were the retention times of reported detects within the RT windows? | ✓ | | | |
| XI. Compound quantitation/CRQLs | | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XII. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XIII. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XIV. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| XV. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

LDC #: 31376B7

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC X HPLC _____

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where:
A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

| # | Standard ID | Calibration Date | Compound | Reported CF (100 std) | Recalculated CF (100 std) | Reported Average CF (Initial) | Recalculated Average CF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL Harpo | 10/15/2013 | Gasoline | 19564 | 19564 | 20334 | 20334 | 17 | 17 |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376B7

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC X HPLC

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) = 100 * (N - C)/N

Where:
N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

| # | Standard ID | Calibration Date | Compound | CF | Reported CCV CF | Recalculated CCV CF | Reported % D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 0206H09 | 2/6/2014 15:40 | Gasoline | 20334 | 18150 | 18150 | 11 | 11 |
| 2 | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376B7

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification



Reviewer: BR

2nd reviewer: [illegible]

**METHOD:** X **GC** ___ **HPLC**

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 3

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| BFB-FID | DB-624 | 30.00 | 30.419 | 101 | 101 | 0 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
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**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
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| | | | | | | |

LDC #: 31376B7

# VALIDATION FINDINGS WORKSHEET



## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: BR

2nd Reviewer: [illegible]

**METHOD:** X GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

**LCS/LCSD** samples: 140206AS

| Compound | Spike Added (mg/kg) | | Spike Sample Concentration (mg/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | 15.0 | — | 16.3 | — | 109 | 109 | — | — | — | — |
| Diesel (8015) | | | | | | | | | | |
| Benzene (8021B) | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
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Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376B7

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** X GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 3 Compound Name Gasoline Range Organics

Concentration = ND

14D206AS-LCS = 16.3 mg/kg

$GRO = \frac{(33190853)(50)}{(20334)(5)(1000)} = 16.32283515$ mg/kg

| # | Sample ID | Compound | Reported Concentrations ( ) | Recalculated Results Concentrations ( ) | Qualifications |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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Comments:

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe Sludge Disposal Area, CTO HC25 |
| **Collection Date:** | January 31, 2014 |
| **LDC Report Date:** | March 6, 2014 |
| **Matrix:** | Soil |
| **Parameters:** | Total Petroleum Hydrocarbons as Extractables |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72621 |

**Sample Identification**

KC138
KC139**
KC140
KC141

**Indicates sample underwent Full review

## Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015C for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

## III. Continuing Calibration

Continuing calibration was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## IX. Compound Quantitation

All compound quantitation were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## X. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe Sludge Disposal Area, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe Sludge Disposal Area, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

**MCBH Kaneohe Sludge Disposal Area, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 72621**

No Sample Data Qualified in this SDG

LDC #: 31376B8
SDG #: 72621
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/4/14
Page: 1 of 1
Reviewer: KR
2nd Reviewer: A

**METHOD:** GC TPH as Extractables (EPA SW846 Method 8015~~B~~C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 1/31/14 |
| II | Initial calibration | A | RSD ≤ 20% |
| III. | Calibration verification/ICV | A | 1CV ICV ≤ 20% |
| IV. | Blanks | A | |
| V | Surrogate recovery | A | |
| VI. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VII. | Laboratory control samples | A | LCS |
| VIII. | Target compound identification | A | Not reviewed for Level III validation. |
| IX. | Compound quantitation/RL/LOQ/LODs | A | Not reviewed for Level III validation. |
| X. | System Performance | A | Not reviewed for Level III validation. |
| XI. | Overall assessment of data | A | |
| XII. | Field duplicates | N | |
| XIII. | Field blanks | ND | FB = KC151 } SDG # 72662<br>EB = KC152 } |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC138 | 11 | | 21 | | 31 | 140210A-BLK |
| 2 | KC139** | 12 | | 22 | | 32 | |
| 3 | KC140 | 13 | | 23 | | 33 | |
| 4 | KC141 | 14 | | 24 | | 34 | |
| 5 | | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

LDC #: 31376B8

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: [illegible]

**Method:** X GC _____ HPLC

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%? | ✓ | | | |
| Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria? | | | ✓ | |
| Were the RT windows properly established? | ✓ | | | |
| IV. Continuing calibration | | | | |
| What type of continuing calibration calculation was performed? X %D or __%R | ✓ | | | |
| Was a continuing calibration analyzed daily? | ✓ | | | |
| Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%? | ✓ | | | |
| Were all the retention times within the acceptance windows? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within the QC limits? | ✓ | | | |
| If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31376B8

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Target compound identification | | | | |
| Were the retention times of reported detects within the RT windows? | ✓ | | | |
| XI. Compound quantitation/CRQLs | | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XII. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XIII. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XIV. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| XV. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

LDC #: 31376B8

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification



Reviewer: BR

2nd Reviewer: A

METHOD: GC X HPLC _____

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where:
A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

| # | Standard ID | Calibration Date | Compound | Reported CF (200 std) | Recalculated CF (200 std) | Reported Average CF (Initial) | Recalculated Average CF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL Apollo | 11/14/2013 | Diesel (C10-C24) | 1152965 | 1152965 | 1139258 | 1139258.5 | 10 | 10 |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376B8

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer:

METHOD: GC X HPLC

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) = 100 * (N - C)/N

Where: N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

| # | Standard ID | Calibration Date | Compound | CCV Conc/CF | Reported Conc/CF | Recalculated Conc/CF | Reported % D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 211103 | 2/18/2014 9:19 | Diesel (C10-C24) | 1139258 | 1296170 | 1296175 | 14 | 14 |
| 2 | 211118 | 2/18/2014 16:43 | Diesel (C10-C24) | 1139258 | 1318110 | 1318110 | 16 | 16 |
| 3 | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31376B8

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification



Reviewer: BR

2nd reviewer: [illegible]

**METHOD:** X **GC** __ **HPLC**

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 2

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| Octacosane | DB-5 / FID | 2964.427 | 2021.908 | 68.2 | 68.2 | 0 |
| Ortho-terphenyl | ↓ | ↓ | 2460.363 | 83.0 | 83.0 | 0 |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

LDC #: 31376B8

# VALIDATION FINDINGS WORKSHEET



## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: BR

2nd Reviewer: [illegible]

**METHOD:** X GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration; SA = Spike added; LCS = Laboratory Control Sample; SC = Sample concentration; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 140210A-LCS

| Compound | Spike Added (mg/kg) | | Spike Sample Concentration (mg/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | | | | | | | | | | |
| Diesel (8015) | 40.0 | — | 37.6 | — | 94.0 | 94.0 | — | — | — | — |
| Benzene (8021B) | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 3137688

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** X GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 2 Compound Name All

Concentration = ND

140210A - LCS 37.6
TPH-DRO (C10-C24) = ~~94.0~~ mg/kg

DRO = (868612724)(5) / (1139258)(50.74)(2)
= 37.56588682 mg/kg

| # | Sample ID | Compound | Reported Concentrations ( ) | Recalculated Results Concentrations ( ) | Qualifications |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Comments:

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **6020A** | | | | | | | | | | | | | |
| KC138 | AY92033 | 5 | Lead | 01/31/2014 07:30 | 02/13/2014 20:29 | Std | 1.7 | mg/Kg | | 0.56 | 0.280 | | |
| KC139 | AY92034 | 5 | Lead | 01/31/2014 07:45 | 02/13/2014 20:35 | Full | 1.8 | mg/Kg | | 0.63 | 0.310 | | |
| KC140 | AY92035 | 5 | Lead | 01/31/2014 09:00 | 02/13/2014 20:41 | Std | 11.8 | mg/Kg | | 0.62 | 0.310 | | |
| KC141 | AY92036 | 5 | Lead | 01/31/2014 09:20 | 02/13/2014 20:47 | Std | 2.2 | mg/Kg | | 0.57 | 0.290 | | |
| METHOD: **8015C DRO** | | | | | | | | | | | | | |
| KC138 | AY92033 | 1 | TPH-DRO (C10-C24) | 01/31/2014 07:30 | 02/18/2014 18:55 | Std | 2.3 | mg/Kg | JT3M | 6 | 1.1 | J | |
| KC138 | AY92033 | 1 | TPH-LRO (C24-C36) | 01/31/2014 07:30 | 02/18/2014 18:55 | Std | 6.2 | mg/Kg | J | 11 | 11.0 | J | |
| KC139 | AY92034 | 1 | TPH-DRO (C10-C24) | 01/31/2014 07:45 | 02/18/2014 19:21 | Full | 1.3 | mg/Kg | U | 6 | 1.3 | U | |
| KC139 | AY92034 | 1 | TPH-LRO (C24-C36) | 01/31/2014 07:45 | 02/18/2014 19:21 | Full | 13.0 | mg/Kg | U | 13 | 13.0 | U | |
| KC140 | AY92035 | 1 | TPH-DRO (C10-C24) | 01/31/2014 09:00 | 02/18/2014 19:46 | Std | 1.2 | mg/Kg | U | 6 | 1.2 | U | |
| KC140 | AY92035 | 1 | TPH-LRO (C24-C36) | 01/31/2014 09:00 | 02/18/2014 19:46 | Std | 12.0 | mg/Kg | U | 12 | 12.0 | U | |
| KC141 | AY92036 | 1 | TPH-DRO (C10-C24) | 01/31/2014 09:20 | 02/18/2014 20:12 | Std | 1.1 | mg/Kg | U | 6 | 1.1 | U | |
| KC141 | AY92036 | 1 | TPH-LRO (C24-C36) | 01/31/2014 09:20 | 02/18/2014 20:12 | Std | 11.0 | mg/Kg | U | 11 | 11.0 | U | |
| METHOD: **8015C GRO** | | | | | | | | | | | | | |
| KC137 | AY92032 | 1 | Gasoline Range Organics | 01/31/2014 07:20 | 02/06/2014 13:16 | Std | 18.0 | ug/L | U | 50 | 18.0 | U | |
| KC138 | AY92033 | 1 | Gasoline Range Organics | 01/31/2014 07:30 | 02/06/2014 18:41 | Std | 0.9 | mg/Kg | U | 2 | 0.9 | U | |
| KC139 | AY92034 | 1 | Gasoline Range Organics | 01/31/2014 07:45 | 02/06/2014 19:17 | Full | 1.0 | mg/Kg | U | 3 | 1.0 | U | |
| KC140 | AY92035 | 1 | Gasoline Range Organics | 01/31/2014 09:00 | 02/06/2014 19:53 | Std | 1.0 | mg/Kg | U | 3 | 1.0 | U | |
| KC141 | AY92036 | 1 | Gasoline Range Organics | 01/31/2014 09:20 | 02/06/2014 20:29 | Std | 0.9 | mg/Kg | U | 2 | 0.9 | U | |
| METHOD: **8260C** | | | | | | | | | | | | | |
| KC137 | AY92032 | 1 | Benzene | 01/31/2014 07:20 | 02/05/2014 15:34 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC137 | AY92032 | 1 | Ethylbenzene | 01/31/2014 07:20 | 02/05/2014 15:34 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC137 | AY92032 | 1 | Toluene | 01/31/2014 07:20 | 02/05/2014 15:34 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC137 | AY92032 | 1 | Total Xylenes | 01/31/2014 07:20 | 02/05/2014 15:34 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC138 | AY92033 | 1 | Benzene | 01/31/2014 07:30 | 02/05/2014 14:11 | Std | 0.0022 | mg/Kg | U | 0.006 | 0.0022 | U | |
| KC138 | AY92033 | 1 | Ethylbenzene | 01/31/2014 07:30 | 02/05/2014 14:11 | Std | 0.0022 | mg/Kg | U | 0.006 | 0.0022 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8260C** | | | | | | | | | | | | |
| KC138 | AY92033 | 1 | Toluene | 01/31/2014 07:30 | 02/05/2014 14:11 | Std | 0.0022 | mg/Kg | U | 0.006 | 0.0022 | U | |
| KC138 | AY92033 | 1 | Total Xylenes | 01/31/2014 07:30 | 02/05/2014 14:11 | Std | 0.0022 | mg/Kg | U | 0.006 | 0.0022 | U | |
| KC139 | AY92034 | 1 | Benzene | 01/31/2014 07:45 | 02/05/2014 14:33 | Full | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC139 | AY92034 | 1 | Ethylbenzene | 01/31/2014 07:45 | 02/05/2014 14:33 | Full | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC139 | AY92034 | 1 | Toluene | 01/31/2014 07:45 | 02/05/2014 14:33 | Full | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC139 | AY92034 | 1 | Total Xylenes | 01/31/2014 07:45 | 02/05/2014 14:33 | Full | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC140 | AY92035 | 1 | Benzene | 01/31/2014 09:00 | 02/05/2014 14:54 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC140 | AY92035 | 1 | Ethylbenzene | 01/31/2014 09:00 | 02/05/2014 14:54 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC140 | AY92035 | 1 | Toluene | 01/31/2014 09:00 | 02/05/2014 14:54 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC140 | AY92035 | 1 | Total Xylenes | 01/31/2014 09:00 | 02/05/2014 14:54 | Std | 0.0025 | mg/Kg | U | 0.006 | 0.0025 | U | |
| KC141 | AY92036 | 1 | Benzene | 01/31/2014 09:20 | 02/05/2014 15:16 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC141 | AY92036 | 1 | Ethylbenzene | 01/31/2014 09:20 | 02/05/2014 15:16 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC141 | AY92036 | 1 | Toluene | 01/31/2014 09:20 | 02/05/2014 15:16 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| KC141 | AY92036 | 1 | Total Xylenes | 01/31/2014 09:20 | 02/05/2014 15:16 | Std | 0.0023 | mg/Kg | U | 0.006 | 0.0023 | U | |
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC138 | AY92033 | 1 | 1-Methylnaphthalene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | 2-Methylnaphthalene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Acenaphthene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Acenaphthylene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Anthracene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Benzo(a)anthracene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Benzo(a)pyrene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Benzo(b)fluoranthene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Benzo(g,h,i)perylene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Benzo(k)fluoranthene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Chrysene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | DIBENZO(A,H)ANTHRACENE | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **8270D-SIM** | | | | | | | | | | | | | |
| KC138 | AY92033 | 1 | Fluoranthene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Fluorene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Indeno(1,2,3-cd)pyrene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Naphthalene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Phenanthrene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC138 | AY92033 | 1 | Pyrene | 01/31/2014 07:30 | 02/12/2014 18:36 | Std | 0.00190 | mg/Kg | U | 0.0056 | 0.00190 | U | |
| KC139 | AY92034 | 1 | 1-Methylnaphthalene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | 2-Methylnaphthalene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Acenaphthene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Acenaphthylene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Anthracene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Benzo(a)anthracene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Benzo(a)pyrene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Benzo(b)fluoranthene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Benzo(g,h,i)perylene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Benzo(k)fluoranthene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Chrysene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | DIBENZO(A,H)ANTHRACENE | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Fluoranthene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Fluorene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Indeno(1,2,3-cd)pyrene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Naphthalene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Phenanthrene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC139 | AY92034 | 1 | Pyrene | 01/31/2014 07:45 | 02/12/2014 19:04 | Full | 0.00210 | mg/Kg | U | 0.0063 | 0.00210 | U | |
| KC140 | AY92035 | 1 | 1-Methylnaphthalene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | 2-Methylnaphthalene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Acenaphthene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **8270D-SIM** | | | | | | | | | | | | | |
| KC140 | AY92035 | 1 | Acenaphthylene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Anthracene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Benzo(a)anthracene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Benzo(a)pyrene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Benzo(b)fluoranthene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Benzo(g,h,i)perylene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Benzo(k)fluoranthene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Chrysene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | DIBENZO(A,H)ANTHRACENE | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Fluoranthene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Fluorene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Indeno(1,2,3-cd)pyrene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Naphthalene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Phenanthrene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC140 | AY92035 | 1 | Pyrene | 01/31/2014 09:00 | 02/12/2014 19:31 | Std | 0.00210 | mg/Kg | U | 0.0062 | 0.00210 | U | |
| KC141 | AY92036 | 1 | 1-Methylnaphthalene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | 2-Methylnaphthalene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Acenaphthene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Acenaphthylene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Anthracene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Benzo(a)anthracene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Benzo(a)pyrene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Benzo(b)fluoranthene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Benzo(g,h,i)perylene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Benzo(k)fluoranthene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Chrysene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | DIBENZO(A,H)ANTHRACENE | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC141 | AY92036 | 1 | Fluoranthene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Fluorene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Indeno(1,2,3-cd)pyrene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Naphthalene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Phenanthrene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |
| KC141 | AY92036 | 1 | Pyrene | 01/31/2014 09:20 | 02/12/2014 19:58 | Std | 0.00190 | mg/Kg | U | 0.0057 | 0.00190 | U | |

**LABORATORY DATA CONSULTANTS, INC.**
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

WCP, Inc.
99-061 Koaha Way, Suite 208
Aiea, HI 96701-5626
ATTN: Ms. Rachel Kaminaka

March 17, 2014

SUBJECT: MCBH Kaneohe, Fuel Farms, CTO HC25, Data Validation

Dear Ms. Kaminaka,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on February 26, 2014. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 31387:**

| SDG # | Fraction |
|---|---|
| 72650, 72662 | Volatiles, Polynuclear Aromatic Hydrocarbons, Lead, Total Petroleum Hydrocarbons as Gasoline, Total Petroleum Hydrocarbons as Extractables |

The data validation was performed under Standard & Full guidelines. The analyses were validated using the following documents, as applicable to each method:

- Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base, Hawaii, Kaneohe Bay, Oahu, Hawaii, December 2013
- U.S. NAVFAC Pacific Environmental Restoration, ER, Program, February 2007
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2, October 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Andrew Kong
Project Manager/Senior Chemist

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EDD 90/10

# LDC #31387 (Wil Chee Planning, Inc. HI / MCBH Kaneohe, Fuel Farms, CTO HC25)

| LDC | SDG# | DATE REC'D | (3) DATE DUE | BTEX (8260C) | | PAH (8270D-SIM) | | Pb (6020A) | | Diss. Pb (6020A) | | TPH-G (8015C) | | TPH-E (8015C) | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: | Water/Soil | | | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | 72650 | 02/26/14 | 03/19/14 | 4 | 0 | 3 | 0 | 3 | 0 | 3 | 0 | 4 | 0 | 3 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| A | 72650 | 02/26/14 | 03/19/14 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| B | 72662 | 02/26/14 | 03/19/14 | 6 | 0 | 5 | 0 | 5 | 0 | 4 | 0 | 6 | 0 | 5 | 0 | | | | | | | | | | | | | | | | | | | | | | |
| Total | A/AK | | | 11 | 0 | 9 | 0 | 9 | 0 | 8 | 0 | 11 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 |

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

# LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099


WCP, Inc.
99-061 Koaha Way, Suite 208
Aiea, HI 96701-5626
ATTN: Ms. Rachel Kaminaka

April 16, 2014

SUBJECT: Revised MCBH Kaneohe Fuel Farms, CTO HC25, Data Validation

Dear Ms. Kaminaka,

Enclosed is the revised validation report for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

**LDC Project # 31387:**

| SDG # | Fraction |
|---|---|
| 72650 | Volatiles, Polynuclear Aromatic Hydrocarbons, Lead, Total Petroleum Hydrocarbons as Gasoline, Total Petroleum Hydrocarbons as Extractables |

- **Revision: Added field duplicate KC143 & KC144**

Please feel free to contact us if you have any questions.

Sincerely,

Andrew Kong
Project Manager/Senior Chemist

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | February 5, 2014 |
| **LDC Report Date:** | April 16, 2014 |
| **Matrix:** | Water |
| **Parameters:** | Volatiles |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72650 |

**Sample Identification**

KC142
KC143**
KC144
KC145
KC146

**Indicates sample underwent Full review

## Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260C for Volatiles which are Benzene, Toluene, Ethylbenzene and Xylenes (BTEX).

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

All samples were received in good condition with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|---|---|---|---|---|---|
| KC142 | All TCL compounds | A headspace was apparent in the sample containers. | There should be no headspace in the sample containers. | J (all detects)<br>UJ (all non-detects) | A |

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Sample KC142 was identified as a trip blank. No volatile contaminants were found.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No volatile contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No volatile contaminants were found.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XII. Compound Quantitation

All compound quantitations were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

Samples KC143** and KC144 were identified as field duplicates. No volatiles were detected in any of the samples.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Data Qualification Summary - SDG 72650**

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|---|---|---|---|---|---|
| 72650 | KC142 | All TCL compounds | J (all detects)<br>UJ (all non-detects) | A | Sample condition (headspace) (*I) |

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Laboratory Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Field Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

LDC #: 31387A1
SDG #: 72650
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/4/14
Page: 1 of 1
Reviewer: KR
2nd Reviewer: [illegible]

**METHOD:** GC/MS Volatiles (BTEX)(EPA SW 846 Method 8260C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | SW | Sampling dates: 2/5/14 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | RSD ≤ 15% |
| IV. | Continuing calibration/ICV | A | RRF / CCV ≤ 20% ICV ≤ 25%. |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VIII. | Laboratory control samples | A | LCS |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | Not reviewed for Level III validation. |
| XII. | Compound quantitation/RLs/LOQs/LODs | A | Not reviewed for Level III validation. |
| XIII. | Tentitatively identified compounds (TICs) | N | Not reviewed for Level III validation. |
| XIV. | System performance | A | Not reviewed for Level III validation. |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | ND | D: 2 + 3 |
| XVII. | Field blanks | ND | TB = 1 FB = KC151 / SD6 EB = KC152 / 72662 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

~~Soil~~ Water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC142 | 11 | | 21 | | 31 | 140210AM-BZK |
| 2 | KC143** | 12 | | 22 | | 32 | |
| 3 | KC144 | 13 | | 23 | | 33 | |
| 4 | KC145 | 14 | | 24 | | 34 | |
| 5 | KC146 | 15 | | 25 | | 35 | |
| 6 | no spike | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

LDC #: 31387A1

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: [illegible]

**Method:** Volatiles (EPA SW 846 Method 8260C)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. GC/MS instrument performance check | | | | |
| Were the BFB performance results reviewed and found to be within the specified criteria? | ✓ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | ✓ | | | |
| III. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) within the method criteria? | ✓ | | | |
| Was a curve fit used for evaluation? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990? | | | ✓ | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) ≤ 20% and relative response factors (RRF) within the method criteria? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed at least once every 12 hours for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per analytical batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31387A1

# VALIDATION FINDINGS CHECKLIST


Reviewer: SK
2nd Reviewer: C

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| **IX. Regional Quality Assurance and Quality Control** | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| **X. Internal standards** | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | ✓ | | | |
| Were retention times within ± 30 seconds of the associated calibration standard? | ✓ | | | |
| **XI. Target compound identification** | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | ✓ | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | ✓ | | | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| **XII. Compound quantitation/RLs** | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| **XIII. Tentatively identified compounds (TICs)** | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | ✓ | | |
| **XIV. System performance** | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| **XV. Overall assessment of data** | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| **XVI. Field duplicates** | | | | |
| Field duplicate pairs were identified in this SDG. | ✓ | NA | NA | |
| Target compounds were detected in the field duplicates. | | ✓ | NA | |
| **XVII. Field blanks** | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

# TARGET COMPOUND WORKSHEET

## METHOD: VOA

| | | | | |
|---|---|---|---|---|
| A. Chloromethane | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF. Acrolein |
| E. Methylene chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene | BB. 1,1,2,2-Tetrachloroethane | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane | CC. Toluene | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform | EE. Ethylbenzene | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. Iodomethane |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | OOOO.1,1-Difluoroethane |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | PPPP. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | QQQQ. |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane | KK. Trichlorofluoromethane | EEE. sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene | AAAA. Ethyl tert-butyl ether | UUUU. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | VVVV. |

LDC #: 31387A1

# VALIDATION FINDINGS WORKSHEET
## Technical Holding Times

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?
Y N N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

**METHOD :** GC/MS VOA (EPA SW 846 Method 8260C)

| Sample ID | Matrix | Preserved | Sampling Date | Extraction date | Analysis date | Total # of Days | Code #1 Qualifier |
|---|---|---|---|---|---|---|---|
| 1 | W | Headspace was present in the vials. | | | | | J/UJ/A |

**TECHNICAL HOLDING TIME CRITERIA**

| | |
|---|---|
| Water unpreserved: | Aromatic within 7 days, non-aromatic within 14 days of sample collection. |
| Water preserved: | Within 14 days of sample collection. |
| Soil: | Within 14 days of sample collection. |

LDC #: 31387A1

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

$A_x$ = Area of Compound
$C_x$ = Concentration of compound,
S= Standard deviation of the RRFs,

$A_{is}$ = Area of associated internal standard
$C_{is}$ = Concentration of internal standard
X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (IS) | Reported RRF (RRF 5 std) | Recalculated RRF (RRF 5 std) | Reported Average RRF (Initial) | Recalculated Average RRF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL | 2/3/2014 | Benzene (IS1) | 0.9660 | 0.9660 | 1.1 | 1.1 | 5.5 | 5.5 |
| | MAX | | Ethylbenzene (IS2) | 1.7230 | 1.7232 | 1.8 | 1.8 | 6.9 | 6.9 |
| | | | | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 31387A1

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound,
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (IS) | Average RRF (Initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported % D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 0210M02 | 2/10/2014 | Benzene (IS1) | 1.057 | 1.027 | 1.027 | 2.9 | 2.9 |
| | | | Ethylbenzene (IS2) | 1.807 | 1.847 | 1.847 | 2.2 | 2.2 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

## Surrogate Results Verification

Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 2

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | 18.242 | 20.27454 | 111 | 111 | 0 |
| 1,2-Dichloroethane-d4 | 18.324 | 21.18498 | 116 | 116 | 0 |
| Toluene-d8 | 18.203 | 18.74564 | 103 | 103 | 0 |
| Bromofluorobenzene | 19.185 | 20.18055 | 105 | 105 | 0 |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Dibromofluoromethane | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |

LDC #: 31387A1

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Sample Results Verification


Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA  Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)  LCSC = Laboraotry control sample concentration  LCSDC = Laboratory control sample duplicate concentration

LCS ID: 140210AM-LCS

| Compound | Spike Added (ug/L) | | Spiked Sample Concentration (ug/L) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalculated |
| 1,1-Dichloroethene | | | | | | | | | | |
| Trichloroethene | | | | | | | | | | |
| Benzene | 10.00 | — | 9.60 | — | 96.0 | 96.0 | | | | |
| Toluene | ↓ | ↓ | 9.79 | ↓ | 97.9 | 97.9 | | | | |
| Chlorobenzene | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31387A1

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| RRF | = | Relative response response factor of the calibration standard. |
| $V_o$ | = | Volume or weight of sample pruged in milliliters (ml) or grams (g). |
| Df | = | Dilution factor. |
| %S | = | Percent solids, applicable to soils and solid matrices only. |

Example:

Sample I.D. 2, A11:

Conc. = ( ND )( )( ) / ( )( )( )( )

140210 AM-LCS
V = 9.60 ng/L
$= \frac{(257832)(25)}{(625339)(1.057)} = 9.598344285$ ng

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
| | | | | | |
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# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | February 5, 2014 |
| **LDC Report Date:** | April 16, 2014 |
| **Matrix:** | Water |
| **Parameters:** | Polynuclear Aromatic Hydrocarbons |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72650 |

**Sample Identification**

KC143**
KC144
KC145
KC146

**Indicates sample underwent Full review

## Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270D using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No polynuclear aromatic hydrocarbon contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No polynuclear aromatic hydrocarbon contaminants were found.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XII. Compound Quantitation

All compound quantitation were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

Samples KC143** and KC144 were identified as field duplicates. No polynuclear aromatic hydrocarbons were detected in any of the samples.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

LDC #: 31387A2b
SDG #: 72650
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/4/14
Page: 1 of 1
Reviewer: SR
2nd Reviewer: [illegible]

**METHOD:** GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 2/5/14 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | RSD ≤ 15% |
| IV. | Continuing calibration/ICV | A | ~~ICV~~ / CCV ≤ 20% ICV ≤ 25% |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VIII. | Laboratory control samples | A | LCS |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | Not reviewed for Level III validation. |
| XII. | Compound quantitation/RLs/LOQs/LODs | A | Not reviewed for Level III validation. |
| XIII. | Tentitatively identified compounds (TICs) | N | Not reviewed for Level III validation. |
| XIV. | System performance | A | Not reviewed for Level III validation. |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | ND | D: 1 & 2 |
| XVII. | Field blanks | ND | FB = KC151 2, SDG # 72662 EB = KC152 5 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC143** | 11 | | 21 | | 31 | 140212A-BLK |
| 2 | KC144 | 12 | | 22 | | 32 | |
| 3 | KC145 | 13 | | 23 | | 33 | |
| 4 | KC146 | 14 | | 24 | | 34 | |
| 5 | no space | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

LDC #: 31387A2b

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: A

**Method:** Semivolatiles (EPA SW 846 Method 8270D)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. GC/MS instrument performance check | | | | |
| Were the DFTPP performance results reviewed and found to be within the specified criteria? | ✓ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | ✓ | | | |
| III. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) within the method criteria? | ✓ | | | |
| Was a curve fit used for evaluation? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria of > 0.990? | | | ✓ | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31387A26

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: C

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| **IX. Regional Quality Assurance and Quality Control** | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| **X. Internal standards** | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | ✓ | | | |
| Were retention times within ± 30 seconds from the associated calibration standard? | ✓ | | | |
| **XI. Target compound identification** | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | ✓ | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | ✓ | | | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| **XII. Compound quantitation/RLs** | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| **XIII. Tentatively identified compounds (TICs)** | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | ✓ | | |
| **XIV. System performance** | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| **XV. Overall assessment of data** | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| **XVI. Field duplicates** | | | | |
| Field duplicate pairs were identified in this SDG. | ✓ | ~~✓~~ | ~~✓~~ | |
| Target compounds were detected in the field duplicates. | | ✓ | ~~✓~~ | |
| **XVII. Field blanks** | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

# VALIDATION FINDINGS WORKSHEET

**METHOD:** GC/MS SVOA

| | | | | |
|---|---|---|---|---|
| A. Phenol | T. 4-Chloroaniline | MM. 4-Chlorophenyl-phenyl ether | FFF. Di-n-octylphthalate | YYY. 2,3,5-Trimethylnaphthalene |
| B. Bis (2-chloroethyl) ether | U. Hexachlorobutadiene | NN. Fluorene | GGG. Benzo(b)fluoranthene | ZZZ. Perylene |
| C. 2-Chlorophenol | V. 4-Chloro-3-methylphenol | OO. 4-Nitroaniline | HHH. Benzo(k)fluoranthene | AAAA. Dibenzothiophene |
| D. 1,3-Dichlorobenzene | W. 2-Methylnaphthalene | PP. 4,6-Dinitro-2-methylphenol | III. Benzo(a)pyrene | BBBB. Benzo(a)fluoranthene |
| E. 1,4-Dichlorobenzene | X. Hexachlorocyclopentadiene | QQ. N-Nitrosodiphenylamine | JJJ. Indeno(1,2,3-cd)pyrene | CCCC. Benzo(b)fluorene |
| F. 1,2-Dichlorobenzene | Y. 2,4,6-Trichlorophenol | RR. 4-Bromophenyl-phenylether | KKK. Dibenz(a,h)anthracene | DDDD. cis/trans-Decalin |
| G. 2-Methylphenol | Z. 2,4,5-Trichlorophenol | SS. Hexachlorobenzene | LLL. Benzo(g,h,i)perylene | EEEE. Biphenyl |
| H. 2,2'-Oxybis(1-chloropropane) | AA. 2-Chloronaphthalene | TT. Pentachlorophenol | MMM. Bis(2-Chloroisopropyl)ether | FFFF. Retene |
| I. 4-Methylphenol | BB. 2-Nitroaniline | UU. Phenanthrene | NNN. Aniline | GGGG. C30-Hopane |
| J. N-Nitroso-di-n-propylamine | CC. Dimethylphthalate | VV. Anthracene | OOO. N-Nitrosodimethylamine | HHHH. 1-Methylphenanthrene |
| K. Hexachloroethane | DD. Acenaphthylene | WW. Carbazole | PPP. Benzoic Acid | IIII. 1,4-Dioxane |
| L. Nitrobenzene | EE. 2,6-Dinitrotoluene | XX. Di-n-butylphthalate | QQQ. Benzyl alcohol | JJJJ. Acetophenone |
| M. Isophorone | FF. 3-Nitroaniline | YY. Fluoranthene | RRR. Pyridine | KKKK. Atrazine |
| N. 2-Nitrophenol | GG. Acenaphthene | ZZ. Pyrene | SSS. Benzidine | LLLL. Benzaldehyde |
| O. 2,4-Dimethylphenol | HH. 2,4-Dinitrophenol | AAA. Butylbenzylphthalate | TTT. 1-Methylnaphthalene | MMMM. Caprolactam |
| P. Bis(2-chloroethoxy)methane | II. 4-Nitrophenol | BBB. 3,3'-Dichlorobenzidine | UUU.Benzo(b)thiophene | NNNN. |
| Q. 2,4-Dichlorophenol | JJ. Dibenzofuran | CCC. Benzo(a)anthracene | VVV.Benzonaphthothiophene | OOOO. |
| R. 1,2,4-Trichlorobenzene | KK. 2,4-Dinitrotoluene | DDD. Chrysene | WWW.Benzo(e)pyrene | PPPP. |
| S. Naphthalene | LL. Diethylphthalate | EEE. Bis(2-ethylhexyl)phthalate | XXX. 2,6-Dimethylnaphthalene | QQQQ. |

LDC #: 31387A2b

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer:

METHOD: GC/MS PAH (EPA SW 846 Method 8270D-SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ — $A_x$ = Area of Compound — $A_{is}$ = Area of associated internal standard

average RRF = sum of the RRFs/number of standards — $C_x$ = Concentration of compound, — $C_{is}$ = Concentration of internal standard

%RSD = 100 * (S/X) — S= Standard deviation of the RRFs, — X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (IS) | Reported RRF (RRF 5 std) | Recalculated RRF (RRF 5 std) | Reported Average RRF (Initial) | Recalculated Average RRF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL Linus | 2/4/2014 | Naphthalene (IS1) | 1.773 | 1.773 | 1.7 | 1.7 | 12 | 12 |
| | | | Fluorene (IS2) | 2.364 | 2.364 | 2.1 | 2.1 | 11 | 11 |
| | | | Phenanthrene (IS3) | 2.144 | 2.144 | 1.8 | 1.8 | 13 | 13 |
| | | | Chrysene (IS4) | 2.084 | 2.084 | 2.0 | 2.0 | 9.0 | 9.0 |
| | | | Benzo(a)pyrene (IS5) | 2.871 | 2.871 | 2.6 | 2.6 | 14 | 14 |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 31387A2b

# VALIDATION FINDINGS WORSHEET
## Continuing Calibration Results Verification


Reviewer: BR
2nd Reviewer: ✓

METHOD: GC/MS PAH (EPA SW 846 Method 8270D-SIM)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound

Cx = Concentration of compound
Ais = Area of associated internal standard
Cis = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (IS) | Average RRF (Initial RRF) | Reported (CC RRF) | Recalculated (CC RRF) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 0218L002 | 02/18/14 | Naphthalene (IS1 | 1.656 | 1.707 | 1.707 | 3.0 | 3.1 |
| | | | Fluorene (IS2 | 2.132 | 2.312 | 2.312 | 8.5 | 8.5 |
| | | | Phenanthrene (IS3 | 1.843 | 2.209 | 2.209 | 20 | 20 |
| | | | Chrysene (IS4 | 2.036 | 2.191 | 2.191 | 7.6 | 7.6 |
| | | | Benzo(a)pyrene (IS5 | 2.581 | 2.902 | 2.902 | 12 | 12 |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

# Surrogate Results Verification

Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270D)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 1

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | 2.000 | 1.69827 | 84.9 | 84.9 | 0 |
| 2-Fluorobiphenyl | ↓ | 1.18271 | 59.2 | 59.14 | 0.1 |
| Terphenyl-d14 | | 1.20363 | 60.2 | 60.2 | 0 |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

LDC #: 31387A2b

# VALIDATION FINDINGS WORKSHEET

## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of

Reviewer: BR

2nd Reviewer:

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270D)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for th compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 148212A-LCS

| Compound | Spike Added (ug/L) | | Spike Concentration (ug/L) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc | Reported | Recalc | Reported | Recalculated |
| Phenol | | | | | | | | | | |
| N-Nitroso-di-n-propylamine | | | | | | | | | | |
| 4-Chloro-3-methylphenol | | | | | | | | | | |
| Acenaphthene | 4.00 | — | 3.15 | — | 78.8 | 78.8 | — | — | — | — |
| Pentachlorophenol | | | | | | | | | | |
| Pyrene | 4.00 | — | 3.65 | — | 91.3 | 91.3 | — | — | — | — |
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Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reporte results do not agree within 10.0% of the recalculated results.

LDC #: 31387A2

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification



Reviewer: BR

2nd reviewer: A

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270D)

A N N/A Were all reported results recalculated and verified for all level IV samples?

N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| $V_i$ | = | Volume of extract injected in microliters (ul) |
| $V_t$ | = | Volume of the concentrated extract in microliters (ul) |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |
| 2.0 | = | Factor of 2 to account for GPC cleanup |

Example:

Sample I.D. 1, A11:

Conc. = ( ND )( )( )( )( )
( )( )( )( )( )

140212A-2 GS

S = 2.58 ug/L

$= \frac{(8677)(1)(2.5)(1000)}{(5075)(1.656)(1000)}$

= 2.58 1149901 ug/L

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
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# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | February 5, 2014 |
| **LDC Report Date:** | April 16, 2014 |
| **Matrix:** | Water |
| **Parameters:** | Lead |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72650 |

**Sample Identification**

KC143**
KC144
KC145
KC146
KC143F**
KC144F
KC145F
KC146F
KC146MS
KC146MSD
KC146FMS
KC146FMSD

Samples appended with "F" were analyzed for dissolved lead
**Indicates sample underwent Full review

## Introduction

This data review covers 12 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020A for Lead.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | The sequence or number of standards used for the calibration was incorrect. |
| C | Correlation coefficient is <0.995. |
| R | %R for calibration is not within control limits |
| B | Presumed contamination from preparation (method) blank or calibration blank |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor. |
| E | MS/MSD or Duplicate RPD or difference was high. |
| I | ICP ICS results were unsatisfactory. |
| A | ICP Serial Dilution %D were not within control limits |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Post Digestion Spike recovery was not within control limits |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

## III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No lead contaminants were found in the initial, continuing and preparation blanks.

Samples KC152 and KC152F (both from SDG 72662) were identified as equipment blanks. No lead contaminants were found with the following exceptions:

| Blank ID | Sampling Date | Analyte | Concentration | Associated Samples |
|---|---|---|---|---|
| KC152F | 2/6/14 | Lead | 0.19 ug/L | KC143F**<br>KC144F<br>KC145F<br>KC146F |

Sample KC151 (from SDG 72662) was identified as a field blank. No lead contaminants were found.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XI. Sample Result Verification

All sample result verifications were acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIII. Field Duplicates

Samples KC143** and KC144 and samples KC143F** and KC144F were identified as field duplicates. No lead was detected in any of the samples with the following exceptions:

| Analyte | Concentration (ug/L) | | RPD (Limits) |
|---|---|---|---|
| | KC143** | KC144 | |
| Lead | 0.51 | 0.40U | 200 (≤50) |

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Laboratory Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Field Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

LDC #: 31387A4
SDG #: 72650
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET

~~Level III/IV~~ Standard / Full

Date: 3/3/14
Page: 1 of 1
Reviewer:
2nd Reviewer:

**METHOD:** Lead (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: ~~2/15~~ 2/15/14 |
| II. | ICP/MS Tune | A | |
| III. | Calibration | A | |
| IV. | Blanks | A | |
| V. | ICP Interference Check Sample (ICS) Analysis | A | |
| VI. | Matrix Spike Analysis | A | |
| VII. | Duplicate Sample Analysis | N | |
| VIII. | Laboratory Control Samples (LCS) | A | LCS |
| IX. | Internal Standard (ICP-MS) | A | Not reviewed for standard review |
| ~~X.~~ | ~~Furnace Atomic Absorption QC~~ | | |
| XI. | ICP Serial Dilution | N | Not performed |
| XII. | Sample Result Verification | A | Not reviewed for Level III validation. |
| XIII. | Overall Assessment of Data | A | |
| XIV. | Field Duplicates | SW | 1, 2 (1-6) |
| XV | Field Blanks | SW | FB = KC151, EB = KC152, KC152F |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

(72662)

Validated Samples: ** Indicates sample underwent Level IV validation

No spike AO

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC143** | 11 | #8 MS | 21 | MS | 31 | |
| 2 | KC144 | 12 | ↓ MSD | 22 | | 32 | |
| 3 | KC145 | 13 | | 23 | | 33 | |
| 4 | KC146 | 14 | | 24 | | 34 | |
| 5 | KC143F** | 15 | | 25 | | 35 | |
| 6 | KC144F | 16 | | 26 | | 36 | |
| 7 | KC145F | 17 | | 27 | | 37 | |
| 8 | KC146F | 18 | | 28 | | 38 | |
| 9 | #4 MS | 19 | | 29 | | 39 | |
| 10 | ↓ MSD | 20 | | 30 | | 40 | |

Notes:

LDC #: 31387 A4

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

**Method:** Metals (EPA SW 846 Method 6010B/7000/6020)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| ***I. Technical holding times*** | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| ***II. ICP/MS Tune*** | | | | |
| Were all isotopes in the tuning solution mass resolution within 0.1 amu? | ✓ | | | |
| Were %RSD of isotopes in the tuning solution ≤5%? | ✓ | | | |
| ***III. Calibration*** | | | | |
| Were all instruments calibrated daily, each set-up time? | ✓ | | | |
| Were the proper number of standards used? | ✓ | | | |
| Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits? | ✓ | | | |
| Were all initial calibration correlation coefficients ≥ 0.995? | ✓ | | | |
| ***IV. Blanks*** | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| ***V. ICP Interference Check Sample*** | | | | |
| Were ICP interference check samples performed daily? | ✓ | | | |
| Were the AB solution percent recoveries (%R) with the 80-120% QC limits? | ✓ | | | |
| ***VI. Matrix spike/Matrix spike duplicates*** | | | | |
| Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. | ✓ | | | |
| Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL. | ✓ | | | |
| ***VII. Laboratory control samples*** | | | | |
| Was an LCS anaylzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils? | ✓ | | | |

LDC #: 31387 A4

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| ***VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)*** | | | | |
| Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration? | ✓ | | | |
| If the %Rs were outside the criteria, was a reanalysis performed? | | | ✓ | |
| ***IX. ICP Serial Dilution*** | | | | |
| Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)? | | ✓ | | |
| Were all percent differences (%Ds) < 10%? | | | ✓ | |
| Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data. | | | ✓ | |
| ***X. Sample Result Verification*** | | | | |
| Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| ***XI. Overall assessment of data*** | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| ***XII. Field duplicates*** | | | | |
| Field duplicate pairs were identified in this SDG. | ✓ | | | |
| Target analytes were detected in the field duplicates. | ✓ | | | |
| ***XIII. Field blanks*** | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target analytes were detected in the field blanks. | ✓ | | | |

LDC #: 31387A4

# VALIDATION FINDINGS WORKSHEET
## Field Blanks


Reviewer:
2nd Reviewer:

**METHOD:** Trace Metals (EPA SW846 6020A)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
**Blank units:** ug/L **Associated sample units:** ug/L
**Sampling date:** 2/6/14 Soil factor applied EB
**Field blank type:** (circle one) Field Blank / Rinsate / Other: Associated Samples: 5-8 (ND)

| Analyte | Blank ID | Blank ID | | Sample Identification | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | KC152F | | Action Level ug/L | | | | | | | | | | | |
| Pb | 0.19 | | 0.95 | | | | | | | | | | | |

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC: 31387A4

**VALIDATION FINDINGS WORKSHEET**
**Field Duplicates**


Reviewer:
2nd Reviewer:

**Method:** Metals

| Analyte | Concentration (ug/L) | | RPD (≤ 50) | |
|---|---|---|---|---|
| | 1 | 2 | | |
| Lead | 0.51 | 0.40U | 200 | |

LDC #: 31387A4

# VALIDATION FINDINGS WORKSHEET
## Initial and Continuing Calibration Calculation Verification


Reviewer: 
2nd Reviewer: 

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100  Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

| Standard ID | Type of Analysis | Element | Found (ug/L) | True (ug/L) | Recalculated %R | Reported %R | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| | ICP (Initial calibration) | | | | | | |
| ICV | ICP/MS (Initial calibration) | Pb | 105.1 | 100 | 105 | 105 | Y |
| | CVAA (Initial calibration) | | | | | | |
| | ICP (Continuing calibration) | | | | | | |
| CCV | ICP/MS (Continuing calibration) | Pb | 51.4 | 50 | 103 | 103 | Y |
| | CVAA (Continuing calibration) | | | | | | |
| | GFAA (Initial calibration) | | | | | | |
| | GFAA (Continuing calibation) | | | | | | |

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31387A4

# VALIDATION FINDINGS WORKSHEET
## Level IV Recalculation Worksheet


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

| Sample ID | Type of Analysis | Element | Found / S / I (units) | True / D / SDR (units) | Recalculated %R / RPD / %D | Reported %R / RPD / %D | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| ICSAB | ICP interference check | Pb | 97.159 | 100 | 97.2 | 97.2 | Y |
| LCS | Laboratory control sample | ↓ | 50.1 | 50 | 100 | 100 | ↓ |
| ✓ 911 | Matrix spike | ↓ | (SSR-SR) 46.6 | 50 | 93.2 | 93.2 | ↓ |
| 910 | Duplicate | ↓ | 49.9 | 49.4 | 1.0 | 1.0 | ↓ |
| Mb | ICP serial dilution | | | | | | ↓ |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31387 [illegible]

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for 1 were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

#1 Pb – 0.457 ug/L X 50ml / 45 ml = 0.508 ug/L

| # | Sample ID | Analyte | Reported Concentration (ug/L) | Calculated Concentration (ug/L) | Acceptable (Y/N) |
|---|---|---|---|---|---|
| 1 | 1 | Pb | 0.51 | 0.51 | Y |
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Note:

RECALC.4SW

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | February 5, 2014 |
| **LDC Report Date:** | April 16, 2014 |
| **Matrix:** | Water |
| **Parameters:** | Total Petroleum Hydrocarbons as Gasoline |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72650 |

**Sample Identification**

KC142
KC143**
KC144
KC145
KC146

**Indicates sample underwent Full review

## Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015C for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. A Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

All samples were received in good condition with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|---|---|---|---|---|---|
| KC142 | All TCL compounds | A headspace was apparent in the sample containers. | There should be no headspace in the sample containers. | J (all detects)<br>UJ (all non-detects) | A |

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

## III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Sample KC142 was identified as a trip blank. No total petroleum hydrocarbons as gasoline contaminants were found.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No total petroleum hydrocarbons as gasoline contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No total petroleum hydrocarbons as gasoline contaminants were found.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## IX. Compound Quantitation

All compound quantitations were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## X. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

Samples KC143** and KC144 were identified as field duplicates. No total petroleum hydrocarbons as gasoline were detected in any of the samples.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 72650**

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|---|---|---|---|---|---|
| 72650 | KC142 | All TCL compounds | J (all detects)<br>UJ (all non-detects) | A | Sample condition (headspace) (*I) |

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

LDC #: 31387A7
SDG #: 72650
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/4/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: A

**METHOD:** GC TPH as Gasoline (EPA SW846 Method 8015~~B~~ C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | ~~SW~~ A | Sampling dates: 2/5/14 |
| II | Initial calibration | A | RSD≤20? |
| III. | Calibration verification/ICV | A | ICV/CCV≤20? |
| IV. | Blanks | A | |
| V | Surrogate recovery | A | |
| VI. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VII. | Laboratory control samples | A | LCS |
| VIII. | Target compound identification | A | Not reviewed for Level III validation. |
| IX. | Compound quantitation/RL/LOQ/LODs | A | Not reviewed for Level III validation. |
| X. | System Performance | A | Not reviewed for Level III validation. |
| XI. | Overall assessment of data | A | |
| XII. | Field duplicates | ND | D: 1 & 2 |
| XIII. | Field blanks | ND | TB=1 EB=KC152 FB=KC151 } ~~SDG A~~ 72662 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC142 | 11 | | 21 | | 31 | 140211A-BLK |
| 2 | KC143** | 12 | | 22 | | 32 | |
| 3 | KC144 | 13 | | 23 | | 33 | |
| 4 | KC145 | 14 | | 24 | | 34 | |
| 5 | KC146 | 15 | | 25 | | 35 | |
| 6 | no spare | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

LDC #: 31387A7

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: A

**Method:** X GC ___ HPLC

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| **I. Technical holding times** | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| **II. Initial calibration** | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%? | ✓ | | | |
| Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria? | | | ✓ | |
| Were the RT windows properly established? | ✓ | | | |
| **IV. Continuing calibration** | | | | |
| What type of continuing calibration calculation was performed? X %D or __ %R | ✓ | | | |
| Was a continuing calibration analyzed daily? | ✓ | | | |
| Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%? | ✓ | | | |
| Were all the retention times within the acceptance windows? | ✓ | | | |
| **V. Blanks** | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| **VI. Surrogate spikes** | | | | |
| Were all surrogate %R within the QC limits? | ✓ | | | |
| If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| **VII. Matrix spike/Matrix spike duplicates** | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| **VIII. Laboratory control samples** | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 3138747

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Target compound identification | | | | |
| Were the retention times of reported detects within the RT windows? | ✓ | | | |
| XI. Compound quantitation/CRQLs | | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XII. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XIII. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XIV. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | ✓ | ~~✓~~ | ~~✓~~ | |
| Target compounds were detected in the field duplicates. | | ✓ | ~~✓~~ | |
| XV. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

LDC #: 31387A1

# VALIDATION FINDINGS WORKSHEET
## Technical Holding Times

Page: 1 of 1
Reviewer: BR
2nd Reviewer: A

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

METHOD: X GC HPLC

| Sample ID | Matrix | Preserved | Sampling Date | Extraction date | Analysis date | Total # of Days | Lab #1 Qualifier |
|---|---|---|---|---|---|---|---|
| 1 | Headspace was present in the vials. | | | | | | J/UJ/A |
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**TECHNICAL HOLDING TIME CRITERIA**

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 31387A7

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: BR
2nd Reviewer: L

METHOD: GC X HPLC _____

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where:
A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

| # | Standard ID | Calibration Date | Compound | Reported CF (100 std) | Recalculated CF (100 std) | Reported Average CF (Initial) | Recalculated Average CF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL Harpo | 10/15/2013 | Gasoline | 19564 | 19564 | 20334 | 20334 | 17 | 17 |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31387A7

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Calculation Verification

Page: (of )
Reviewer: BR
2nd Reviewer: A

METHOD: GC X HPLC

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) = 100 * (N - C)/N

Where:
N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

| # | Standard ID | Calibration Date | Compound | CF | Reported CCV CF | Recalculated CCV CF | Reported % D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 0211H02 | 2/11/2014 15:49 | Gasoline | 20334 | 23006 | 23006 | 13 | 13 |
| 2 | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 3138707

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification


Reviewer: BR
2nd reviewer: [illegible]

**METHOD:** X GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 2

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| BFB-FID | DB-624/FID | 30.000 | 30.423 | 101 | 101 | 0 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
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**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
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LDC #: 31387A7

# VALIDATION FINDINGS WORKSHEET



## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: BR

2nd Reviewer: [illegible]

**METHOD:** X GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration; SA = Spike added; LCS = Laboratory Control Sample; SC = Sample concentration; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: ~~31387A~~ 140211A-LCS

| Compound | Spike Added (ug/L) | | Spike Sample Concentration (ug/L) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | 300 | — | 340 | — | 113 | 113 | — | — | — | — |
| Diesel (8015) | | | | | | | | | | |
| Benzene (8021B) | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | |
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Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 3138747

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: BR
2nd Reviewer: A

**METHOD:** X GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 2 Compound Name Gasoline Range Organics

Concentration = ND

1402114-2 CS
GRO = 340 ug/L

$= \frac{(34605840)}{(20334)(5)} = 340.374517$ ug/L

| # | Sample ID | Compound | Reported Concentrations ( ) | Recalculated Results Concentrations ( ) | Qualifications |
|---|---|---|---|---|---|
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Comments:

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | February 5, 2014 |
| **LDC Report Date:** | April 16, 2014 |
| **Matrix:** | Water |
| **Parameters:** | Total Petroleum Hydrocarbons as Extractables |
| **Validation Level:** | Standard & Full |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72650 |

**Sample Identification**

KC143**
KC144
KC145
KC146

**Indicates sample underwent Full review

## Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015C for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Samples indicated by a double asterisk on the front cover underwent a Full review. Standard review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Standard criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

## III. Continuing Calibration

Continuing calibration was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample KC152 (from SDG 72662) was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found.

Sample KC151 (from SDG 72662) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## IX. Compound Quantitation

All compound quantitation were within validation criteria for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## X. System Performance

The system performance was acceptable for samples on which a Full review was performed. Raw data were not evaluated for the samples reviewed by Standard criteria.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

Samples KC143** and KC144 were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 72650**

No Sample Data Qualified in this SDG

LDC #: 31387A8
SDG #: 72650
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 3/4/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC TPH as Extractables (EPA SW846 Method 8015~~B~~C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 2/5/14 |
| II | Initial calibration | A | RSD ≤20% |
| III. | Calibration verification/ICV | A | 1 ICV 1 CCV ≤20% |
| IV. | Blanks | A | |
| V | Surrogate recovery | A | |
| VI. | Matrix spike/Matrix spike duplicates | N | Client spec. |
| VII. | Laboratory control samples | A | LCS |
| VIII. | Target compound identification | A | Not reviewed for Level III validation. |
| IX. | Compound quantitation/RL/LOQ/LODs | A | Not reviewed for Level III validation. |
| X. | System Performance | A | Not reviewed for Level III validation. |
| XI. | Overall assessment of data | A | |
| XII. | Field duplicates | ND | D: 1+2 |
| XIII. | Field blanks | ND | FB = KC151 } SDG # 72662<br>EB = KC152 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC143** | 11 | | 21 | | 31 | 1402 11A-B2K |
| 2 | KC144 | 12 | | 22 | | 32 | |
| 3 | KC145 | 13 | | 23 | | 33 | |
| 4 | KC146 | 14 | | 24 | | 34 | |
| 5 | no spun | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

LDC #: 31387A8

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: C

**Method:** X GC ____ HPLC

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| **I. Technical holding times** | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| **II. Initial calibration** | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%? | ✓ | | | |
| Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria? | | | ✓ | |
| Were the RT windows properly established? | ✓ | | | |
| **IV. Continuing calibration** | | | | |
| What type of continuing calibration calculation was performed? X %D or __ %R | ✓ | | | |
| Was a continuing calibration analyzed daily? | ✓ | | | |
| Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%? | ✓ | | | |
| Were all the retention times within the acceptance windows? | ✓ | | | |
| **V. Blanks** | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| **VI. Surrogate spikes** | | | | |
| Were all surrogate %R within the QC limits? | ✓ | | | |
| If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| **VII. Matrix spike/Matrix spike duplicates** | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| **VIII. Laboratory control samples** | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 31387A8

# VALIDATION FINDINGS CHECKLIST


Reviewer: BR
2nd Reviewer: C

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Target compound identification | | | | |
| Were the retention times of reported detects within the RT windows? | ✓ | | | |
| XI. Compound quantitation/CRQLs | | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XII. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XIII. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XIV. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | ✓ | ~~✓~~ | C | |
| Target compounds were detected in the field duplicates. | | ✓ | ~~✓~~ | |
| XV. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

LDC #: 31387A8

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification



Reviewer: BR

2nd Reviewer: [illegible]

METHOD: GC X HPLC _____

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where:
A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

| # | Standard ID | Calibration Date | Compound | Reported CF (200 std) | Recalculated CF (200 std) | Reported Average CF (Initial) | Recalculated Average CF (Initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL Apollo | 11/14/2013 | Diesel (C10-C24) | 1152965 | 1152965 | 1139258 | 1139258.5 | 10 | 10 |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31387A8

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Calculation Verification


Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC X HPLC

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

Percent difference (%D) = 100 * (N - C)/N

Where:
N = Initial Calibration Factor or Nominal Amount
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

| # | Standard ID | Calibration Date | Compound | CCV Conc/CF | Reported Conc/CF | Recalculated Conc/CF | Reported % D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 211153 | 2/21/2014 10:07 | Diesel (C10-C24) | 1139258 | 1222330 | 1222330 | 7.3 | 7.3 |
| 2 | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

LDC #: 31387A8

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification



Reviewer: BR

2nd reviewer: [illegible]

**METHOD:** X GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 1

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| Octacosane | DB-5/FID | 140.187 | 83.057 | 59.3 | 59.3 | 0 |
| Ortho-terphenyl | ↓ | ↓ | 118.161 | 84.3 | 84.3 | 0 |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

LDC #: 31387A8

# VALIDATION FINDINGS WORKSHEET



## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: BR

2nd Reviewer: [illegible]

**METHOD:** K GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration; SA = Spike added; LCS = Laboratory Control Sample; SC = Sample concentration; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 1402117-LCS

| Compound | Spike Added (µg/L) | | Spike Sample Concentration (µg/L) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | | | | | | | | | | |
| Diesel (8015) | 2000 | — | 1590 | — | 79.5 | 79.5 | — | — | — | — |
| Benzene (8021B) | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 31387A8

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** X GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1 Compound Name A11

Concentration = ND

1402114-LCS
DRO = 1590 µg/L

$= \frac{(726399733)(5)(1000)}{(1139260)(1000)(2)} = 1.594.01583$ µg/L

| # | Sample ID | Compound | Reported Concentrations ( ) | Recalculated Results Concentrations ( ) | Qualifications |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Comments:

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **6020A** | | | | | | | | | | | | |
| KC143 | AY92131 | 1 | Lead | 02/05/2014 09:35 | 02/11/2014 16:54 | Full | 0.51 | ug/L | | 0.5 | 0.40 | | |
| KC143 | AY92131 | 1 | Lead | 02/05/2014 09:35 | 02/11/2014 16:48 | Full | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC144 | AY92132 | 1 | Lead | 02/05/2014 09:45 | 02/11/2014 17:05 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC144 | AY92132 | 1 | Lead | 02/05/2014 09:45 | 02/11/2014 16:59 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC145 | AY92133 | 1 | Lead | 02/05/2014 13:20 | 02/11/2014 17:17 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC145 | AY92133 | 1 | Lead | 02/05/2014 13:20 | 02/11/2014 17:11 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC146 | AY92134 | 1 | Lead | 02/05/2014 15:30 | 02/11/2014 17:29 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC146 | AY92134 | 1 | Lead | 02/05/2014 15:30 | 02/11/2014 17:23 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| | METHOD: **8015C DRO** | | | | | | | | | | | | |
| KC143 | AY92131 | 1 | TPH-DRO (C10-C24) | 02/05/2014 09:35 | 02/21/2014 12:20 | Full | 50.0 | ug/L | U | 150 | 50.0 | U | |
| KC143 | AY92131 | 1 | TPH-LRO (C24-C36) | 02/05/2014 09:35 | 02/21/2014 12:20 | Full | 500.0 | ug/L | U | 500 | 500.0 | U | |
| KC144 | AY92132 | 1 | TPH-DRO (C10-C24) | 02/05/2014 09:45 | 02/21/2014 12:46 | Std | 50.0 | ug/L | U | 150 | 50.0 | U | |
| KC144 | AY92132 | 1 | TPH-LRO (C24-C36) | 02/05/2014 09:45 | 02/21/2014 12:46 | Std | 500.0 | ug/L | U | 500 | 500.0 | U | |
| KC145 | AY92133 | 1 | TPH-DRO (C10-C24) | 02/05/2014 13:20 | 02/21/2014 13:13 | Std | 50.0 | ug/L | U | 150 | 50.0 | U | |
| KC145 | AY92133 | 1 | TPH-LRO (C24-C36) | 02/05/2014 13:20 | 02/21/2014 13:13 | Std | 500.0 | ug/L | U | 500 | 500.0 | U | |
| KC146 | AY92134 | 1 | TPH-DRO (C10-C24) | 02/05/2014 15:30 | 02/21/2014 13:40 | Std | 50.0 | ug/L | U | 150 | 50.0 | U | |
| KC146 | AY92134 | 1 | TPH-LRO (C24-C36) | 02/05/2014 15:30 | 02/21/2014 13:40 | Std | 500.0 | ug/L | U | 500 | 500.0 | U | |
| | METHOD: **8015C GRO** | | | | | | | | | | | | |
| KC142 | AY92130 | 1 | Gasoline Range Organics | 02/05/2014 08:30 | 02/11/2014 17:38 | Std | 18.0 | ug/L | U | 50 | 18.0 | UJ | *I |
| KC143 | AY92131 | 1 | Gasoline Range Organics | 02/05/2014 09:35 | 02/11/2014 18:51 | Full | 18.0 | ug/L | U | 50 | 18.0 | U | |
| KC144 | AY92132 | 1 | Gasoline Range Organics | 02/05/2014 09:45 | 02/11/2014 19:27 | Std | 18.0 | ug/L | U | 50 | 18.0 | U | |
| KC145 | AY92133 | 1 | Gasoline Range Organics | 02/05/2014 13:20 | 02/11/2014 20:03 | Std | 18.0 | ug/L | U | 50 | 18.0 | U | |
| KC146 | AY92134 | 1 | Gasoline Range Organics | 02/05/2014 15:30 | 02/11/2014 20:39 | Std | 360 | ug/L | G1 | 50 | 18.0 | | |
| | METHOD: **8260C** | | | | | | | | | | | | |
| KC142 | AY92130 | 1 | Benzene | 02/05/2014 08:30 | 02/10/2014 13:54 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | UJ | *I |
| KC142 | AY92130 | 1 | Ethylbenzene | 02/05/2014 08:30 | 02/10/2014 13:54 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | UJ | *I |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8260C** | | | | | | | | | | | | |
| KC142 | AY92130 | 1 | Toluene | 02/05/2014 08:30 | 02/10/2014 13:54 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | UJ | *I |
| KC142 | AY92130 | 1 | Total Xylenes | 02/05/2014 08:30 | 02/10/2014 13:54 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | UJ | *I |
| KC143 | AY92131 | 1 | Benzene | 02/05/2014 09:35 | 02/10/2014 14:22 | Full | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC143 | AY92131 | 1 | Ethylbenzene | 02/05/2014 09:35 | 02/10/2014 14:22 | Full | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC143 | AY92131 | 1 | Toluene | 02/05/2014 09:35 | 02/10/2014 14:22 | Full | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC143 | AY92131 | 1 | Total Xylenes | 02/05/2014 09:35 | 02/10/2014 14:22 | Full | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC144 | AY92132 | 1 | Benzene | 02/05/2014 09:45 | 02/10/2014 14:50 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC144 | AY92132 | 1 | Ethylbenzene | 02/05/2014 09:45 | 02/10/2014 14:50 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC144 | AY92132 | 1 | Toluene | 02/05/2014 09:45 | 02/10/2014 14:50 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC144 | AY92132 | 1 | Total Xylenes | 02/05/2014 09:45 | 02/10/2014 14:50 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC145 | AY92133 | 1 | Benzene | 02/05/2014 13:20 | 02/10/2014 15:18 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC145 | AY92133 | 1 | Ethylbenzene | 02/05/2014 13:20 | 02/10/2014 15:18 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC145 | AY92133 | 1 | Toluene | 02/05/2014 13:20 | 02/10/2014 15:18 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC145 | AY92133 | 1 | Total Xylenes | 02/05/2014 13:20 | 02/10/2014 15:18 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC146 | AY92134 | 1 | Benzene | 02/05/2014 15:30 | 02/10/2014 15:46 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC146 | AY92134 | 1 | Ethylbenzene | 02/05/2014 15:30 | 02/10/2014 15:46 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC146 | AY92134 | 1 | Toluene | 02/05/2014 15:30 | 02/10/2014 15:46 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC146 | AY92134 | 1 | Total Xylenes | 02/05/2014 15:30 | 02/10/2014 15:46 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC143 | AY92131 | 1 | 1-Methylnaphthalene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | 2-Methylnaphthalene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Acenaphthene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Acenaphthylene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Anthracene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Benzo(a)anthracene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Benzo(a)pyrene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Benzo(b)fluoranthene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: 8270D-SIM | | | | | | | | | | | | |
| KC143 | AY92131 | 1 | Benzo(g,h,i)perylene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Benzo(k)fluoranthene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Chrysene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | DIBENZO(A,H)ANTHRACENE | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Fluoranthene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Fluorene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Indeno(1,2,3-cd)pyrene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Naphthalene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Phenanthrene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC143 | AY92131 | 1 | Pyrene | 02/05/2014 09:35 | 02/18/2014 14:18 | Full | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | 1-Methylnaphthalene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | 2-Methylnaphthalene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Acenaphthene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Acenaphthylene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Anthracene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Benzo(a)anthracene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Benzo(a)pyrene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Benzo(b)fluoranthene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Benzo(g,h,i)perylene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Benzo(k)fluoranthene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Chrysene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | DIBENZO(A,H)ANTHRACENE | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Fluoranthene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Fluorene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Indeno(1,2,3-cd)pyrene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Naphthalene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC144 | AY92132 | 1 | Phenanthrene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC144 | AY92132 | 1 | Pyrene | 02/05/2014 09:45 | 02/18/2014 14:46 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | 1-Methylnaphthalene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | 2-Methylnaphthalene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Acenaphthene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Acenaphthylene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Anthracene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Benzo(a)anthracene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Benzo(a)pyrene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Benzo(b)fluoranthene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Benzo(g,h,i)perylene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Benzo(k)fluoranthene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Chrysene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | DIBENZO(A,H)ANTHRACENE | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Fluoranthene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Fluorene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Indeno(1,2,3-cd)pyrene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Naphthalene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Phenanthrene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC145 | AY92133 | 1 | Pyrene | 02/05/2014 13:20 | 02/18/2014 15:14 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | 1-Methylnaphthalene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | 2-Methylnaphthalene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Acenaphthene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Acenaphthylene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Anthracene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Benzo(a)anthracene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Benzo(a)pyrene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Benzo(b)fluoranthene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC146 | AY92134 | 1 | Benzo(g,h,i)perylene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Benzo(k)fluoranthene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Chrysene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | DIBENZO(A,H)ANTHRACENE | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Fluoranthene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.36 | ug/L | | 0.200 | 0.1000 | | |
| KC146 | AY92134 | 1 | Fluorene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Indeno(1,2,3-cd)pyrene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Naphthalene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Phenanthrene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC146 | AY92134 | 1 | Pyrene | 02/05/2014 15:30 | 02/18/2014 15:42 | Std | 0.29 | ug/L | | 0.200 | 0.1000 | | |

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** MCBH Kaneohe, Fuel Farms, CTO HC25

**Collection Date:** February 6, 2014

**LDC Report Date:** March 12, 2014

**Matrix:** Water

**Parameters:** Volatiles

**Validation Level:** Standard

**Laboratory:** APPL, Inc.

**Sample Delivery Group (SDG):** 72662

**Sample Identification**

KC147
KC148
KC149
KC150
KC151
KC152
KC148MS
KC148MSD

## Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260C for Volatiles which are Benzene, Toluene, Ethylbenzene and Xylenes (BTEX).

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

All samples were received in good condition with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|---|---|---|---|---|---|
| KC147 | All TCL compounds | A headspace was apparent in the sample containers. | There should be no headspace in the sample containers. | J (all detects)<br>UJ (all non-detects) | A |

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Sample KC147 was identified as a trip blank. No volatile contaminants were found.

Sample KC152 was identified as an equipment blank. No volatile contaminants were found.

Sample KC151 was identified as a field blank. No volatile contaminants were found.

**VI. Surrogate Spikes**

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

**VII. Matrix Spike/Matrix Spike Duplicates**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

**VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

**IX. Regional Quality Assurance and Quality Control**

Not applicable.

**X. Internal Standards**

All internal standard areas and retention times were within QC limits.

**XI. Target Compound Identifications**

Raw data were not reviewed for this SDG.

**XII. Compound Quantitation**

Raw data were not reviewed for this SDG.

**XIII. Tentatively Identified Compounds (TICs)**

Raw data were not reviewed for this SDG.

**XIV. System Performance**

Raw data were not reviewed for this SDG.

## XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Data Qualification Summary - SDG 72662**

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|---|---|---|---|---|---|
| 72662 | KC147 | All TCL compounds | J (all detects)<br>UJ (all non-detects) | A | Sample condition (headspace) (*I) |

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Laboratory Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Volatiles - Field Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

LDC #: 31387B1
SDG #: 72662
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 3/5/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: ✓

**METHOD:** GC/MS Volatiles (BTEX)(EPA SW 846 Method 8260C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | SW ~~A~~ | Sampling dates: 2/6/14 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | RSD ≤ 15% |
| IV. | Continuing calibration/ICV | A | ICV / CCV ≤ 20% ICV ≤ 25% |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | A | |
| VIII. | Laboratory control samples | A | LCS |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/RLs/LOQs/LODs | N | |
| XIII. | Tentitatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | ND | FB = 5 EB = 6 TB = 1 |

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC 147 | 11 | | 21 | | 31 | 140213AL-BLK |
| 2 | KC 148 | 12 | | 22 | | 32 | |
| 3 | KC 149 | 13 | | 23 | | 33 | |
| 4 | KC 150 | 14 | | 24 | | 34 | |
| 5 | KC 151 | 15 | | 25 | | 35 | |
| 6 | KC 152 | 16 | | 26 | | 36 | |
| 7 | KC 148MS | 17 | | 27 | | 37 | |
| 8 | KC 148MSD | 18 | | 28 | | 38 | |
| 9 | no spkn | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

# TARGET COMPOUND WORKSHEET

## METHOD: VOA

| | | | | |
|---|---|---|---|---|
| A. Chloromethane | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF. Acrolein |
| E. Methylene chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene | BB. 1,1,2,2-Tetrachloroethane | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane | CC. Toluene | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform | EE. Ethylbenzene | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. Iodomethane |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | OOOO.1,1-Difluoroethane |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | PPPP. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | QQQQ. |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane | KK. Trichlorofluoromethane | EEE. sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene | AAAA. Ethyl tert-butyl ether | UUUU. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | VVVV. |

LDC #: 31387R1

# VALIDATION FINDINGS WORKSHEET
## Technical Holding Times

Page: 1 of 1
Reviewer: BK
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?
Y N N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

**METHOD** : GC/MS VOA (EPA SW 846 Method 8260C)

| Sample ID | Matrix | Preserved | Sampling Date | Extraction date | Analysis date | Total # of Days | Qualifier |
|---|---|---|---|---|---|---|---|
| 1 | W | Headspace was | present in the | vials. | | | J/UJ/A |

**TECHNICAL HOLDING TIME CRITERIA**

Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved: Within 14 days of sample collection.
Soil: Within 14 days of sample collection.

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | February 6, 2014 |
| **LDC Report Date:** | March 12, 2014 |
| **Matrix:** | Water |
| **Parameters:** | Polynuclear Aromatic Hydrocarbons |
| **Validation Level:** | Standard |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72662 |

**Sample Identification**

KC148
KC149
KC150
KC151
KC152
KC148MS
KC148MSD

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270D using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks.

Sample KC152 was identified as an equipment blank. No polynuclear aromatic hydrocarbon contaminants were found.

Sample KC151 was identified as a field blank. No polynuclear aromatic hydrocarbon contaminants were found.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

## XII. Compound Quantitation

Raw data were not reviewed for this SDG.

## XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

## XIV. System Performance

Raw data were not reviewed for this SDG.

## XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

LDC #: 31387B2b
SDG #: 72662
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 3/5/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 2/6/14 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | RSD ≤ 15% |
| IV. | Continuing calibration/ICV | A | ICV/CCV ≤ 20% ICV ≤ 25% |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | A | |
| VIII. | Laboratory control samples | A | LCS |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/RLs/LOQs/LODs | N | |
| XIII. | Tentitatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | ND | FB = 4 EB = 5 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC 148 | 11 | | 21 | | 31 | 140212A-BLK |
| 2 | KC 149 | 12 | | 22 | | 32 | |
| 3 | KC 150 | 13 | | 23 | | 33 | |
| 4 | KC 151 | 14 | | 24 | | 34 | |
| 5 | KC 152 | 15 | | 25 | | 35 | |
| 6 | KC 148MS | 16 | | 26 | | 36 | |
| 7 | KC 148MSD | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** MCBH Kaneohe, Fuel Farms, CTO HC25

**Collection Date:** February 6, 2014

**LDC Report Date:** March 12, 2014

**Matrix:** Water

**Parameters:** Lead

**Validation Level:** Standard

**Laboratory:** APPL, Inc.

**Sample Delivery Group (SDG):** 72662

**Sample Identification**

KC148
KC149
KC150
KC151
KC152
KC148F
KC149F
KC150F
KC152F
KC148MS
KC148MSD
KC148FMS
KC148FMSD

Samples appended with "F" were analyzed for dissolved lead

## Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020A for Lead.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | The sequence or number of standards used for the calibration was incorrect. |
| C | Correlation coefficient is <0.995. |
| R | %R for calibration is not within control limits |
| B | Presumed contamination from preparation (method) blank or calibration blank |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor. |
| E | MS/MSD or Duplicate RPD or difference was high. |
| I | ICP ICS results were unsatisfactory. |
| A | ICP Serial Dilution %D were not within control limits |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Post Digestion Spike recovery was not within control limits |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

## III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No lead contaminants were found in the initial, continuing and preparation blanks.

Samples KC152 and KC152F were identified as equipment blanks. No lead contaminants were found with the following exceptions:

| Blank ID | Sampling Date | Analyte | Concentration | Associated Samples |
|---|---|---|---|---|
| KC152F | 2/6/14 | Lead | 0.19 ug/L | KC148F<br>KC149F<br>KC150F |

Sample KC151 was identified as a field blank. No lead contaminants were found.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Internal Standards (ICP-MS)

Raw data were not reviewed for this SDG.

## X. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

## XI. Sample Result Verification

Raw data were not reviewed for this SDG.

## XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIII. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Laboratory Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Lead - Field Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

LDC #: 31387B4
SDG #: 72662
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET

~~Level III~~ Stage 2

Date: 3/3/14
Page: 1 of 1
Reviewer:
2nd Reviewer:

**METHOD:** Lead (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 2/6/14 |
| II. | ICP/MS Tune | A | |
| III. | Calibration | A | |
| IV. | Blanks | A | |
| V. | ICP Interference Check Sample (ICS) Analysis | A | |
| VI. | Matrix Spike Analysis | A | |
| VII. | Duplicate Sample Analysis | N | |
| VIII. | Laboratory Control Samples (LCS) | A | Ly |
| IX. | Internal Standard (ICP-MS) | N | Not reviewed |
| ~~X.~~ | ~~Furnace Atomic Absorption QC~~ | | |
| XI. | ICP Serial Dilution | N | Not performed |
| XII. | Sample Result Verification | N | |
| XIII. | Overall Assessment of Data | A | |
| XIV. | Field Duplicates | N | |
| XV | Field Blanks | SW | FB = 4, TB = 5, 10 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

No Spike

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC 148 | 11 | KC 148MS | 21 | MB | 31 | |
| 2 | KC 149 | 12 | KC 148MSD | 22 | | 32 | |
| 3 | KC 150 | 13 | KC 148FMS | 23 | | 33 | |
| 4 | KC 151 FB | 14 | KC 148FMSD | 24 | | 34 | |
| 5 | KC 152 TB | 15 | | 25 | | 35 | |
| 6 | KC 148F | 16 | | 26 | | 36 | |
| 7 | KC 149F | 17 | | 27 | | 37 | |
| 8 | KC 150F | 18 | | 28 | | 38 | |
| ~~9~~ | ~~KC 151F~~ | 19 | | 29 | | 39 | |
| 10 | KC 152F | 20 | | 30 | | 40 | |

Notes:

LDC #: 31387B4

# VALIDATION FINDINGS WORKSHEET
## Field Blanks


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW846 6020A)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
**Blank units:** ug/L **Associated sample units:** ug/L
**Sampling date:** 2/6/14 Soil factor applied EB
**Field blank type:** (circle one) Field Blank / Rinsate / Other: Associated Samples: 6-8 (ND)

| Analyte | Blank ID | Blank ID | | Sample Identification | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10 | | Action Level ug/L | | | | | | | | | | | |
| Pb | 0.19 | | 0.95 | | | | | | | | | | | |

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | February 6, 2014 |
| **LDC Report Date:** | March 12, 2014 |
| **Matrix:** | Water |
| **Parameters:** | Total Petroleum Hydrocarbons as Gasoline |
| **Validation Level:** | Standard |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72662 |

**Sample Identification**

KC147
KC148
KC149
KC150
KC151
KC152
KC148MS
KC148MSD

## Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015C for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

All samples were received in good condition with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|---|---|---|---|---|---|
| KC147 | All TCL compounds | A headspace was apparent in the sample containers. | There should be no headspace in the sample containers. | J (all detects)<br>UJ (all non-detects) | A |

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

## III. Continuing Calibration

Continuing calibration was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Sample KC147 was identified as a trip blank. No total petroleum hydrocarbons as gasoline contaminants were found.

Sample KC152 was identified as an equipment blank. No total petroleum hydrocarbons as gasoline contaminants were found.

Sample KC151 was identified as a field blank. No total petroleum hydrocarbons as gasoline contaminants were found.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

## IX. Compound Quantitation

Raw data were not reviewed for this SDG.

## X. System Performance

Raw data were not reviewed for this SDG.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 72662**

| SDG | Sample | Compound | Flag | A or P | Reason (Code) |
|---|---|---|---|---|---|
| 72662 | KC147 | All TCL compounds | J (all detects)<br>UJ (all non-detects) | A | Sample condition (headspace) (*I) |

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

LDC #: 31387B7
SDG #: 72662
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 3/5/14
Page: 1 of 1
Reviewer: BK
2nd Reviewer: A

**METHOD:** GC TPH as Gasoline (EPA SW846 Method 8015~~B~~C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | SW A | Sampling dates: 2/6/14 |
| II | Initial calibration | A | RSD ≤ 20% |
| III. | Calibration verification/ICV | A | ICV/CCV ≤ 20% |
| IV. | Blanks | A | |
| V | Surrogate recovery | A | |
| VI. | Matrix spike/Matrix spike duplicates | A | |
| VII. | Laboratory control samples | A | LCS |
| VIII. | Target compound identification | N | |
| IX. | Compound quantitation/RL/LOQ/LODs | N | |
| X. | System Performance | N | |
| XI. | Overall assessment of data | A | |
| XII. | Field duplicates | N | |
| XIII. | Field blanks | ND | FB = 5 EB = 6 TB = 1 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC147 | 11 | | 21 | | 31 | 140211A-BLK |
| 2 | KC148 | 12 | | 22 | | 32 | |
| 3 | KC149 | 13 | | 23 | | 33 | |
| 4 | KC150 | 14 | | 24 | | 34 | |
| 5 | KC151 | 15 | | 25 | | 35 | |
| 6 | KC152 | 16 | | 26 | | 36 | |
| 7 | KC148MS | 17 | | 27 | | 37 | |
| 8 | KC148MSD | 18 | | 28 | | 38 | |
| 9 | no spam | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

LDC #: 3138787

# VALIDATION FINDINGS WORKSHEET
## Technical Holding Times

Page: 1 of 1
Reviewer: BK
2nd Reviewer: C

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

METHOD: GC HPLC

| Sample ID | Matrix | Preserved | Sampling Date | Extraction date | Analysis date | Total # of Days | Code #1 Qualifier |
|---|---|---|---|---|---|---|---|
| 1 | W | Headspace uses | present in the | vials. | | | J/UJ/R |
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**TECHNICAL HOLDING TIME CRITERIA**

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | MCBH Kaneohe, Fuel Farms, CTO HC25 |
| **Collection Date:** | February 6, 2014 |
| **LDC Report Date:** | March 12, 2014 |
| **Matrix:** | Water |
| **Parameters:** | Total Petroleum Hydrocarbons as Extractables |
| **Validation Level:** | Standard |
| **Laboratory:** | APPL, Inc. |
| **Sample Delivery Group (SDG):** | 72662 |

**Sample Identification**

KC148
KC149
KC150
KC151
KC152
KC148MS
KC148MSD

## Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015C for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Technical Memorandum, Supplemental Remedial Investigation Work Plan, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013), the U.S. NAVFAC Pacific Environmental Restoration (ER) Program, February 2007, and the U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Code Reference

| | |
|---|---|
| H | Holding times were exceeded. |
| S | Surrogate recovery was outside QC limits. |
| C | Calibration %RSD, r, $r^2$ or %D were noncompliant |
| R | Calibration RRF was <0.05. |
| B | Presumed contamination from preparation (method blank) |
| L | Laboratory Control Sample/Laboratory Control Sample Duplicate %R or RPD was not within control limits |
| Q | MS/MSD recovery was poor |
| E | MS/MSD or Duplicate RPD was high. |
| I | Internal standard performance was unsatisfactory |
| M | Instrument Performance Check (BFB or DFTPP) was noncompliant |
| T | Presumed contamination from trip blank. |
| F | Presumed contamination from FB or ER. |
| D | The analysis with this flag should not be used because another more technically sound analysis is available. |
| P | Instrument performance for pesticides was poor |
| *# | Unusual problems found with the data. The number following the asterisk (*) will indicate the section in the validation report where a description of the problem can be found. |

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0%.

## III. Continuing Calibration

Continuing calibration was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample KC152 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found.

Sample KC151 was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

## IX. Compound Quantitation

Raw data were not reviewed for this SDG.

## X. System Performance

Raw data were not reviewed for this SDG.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

No field duplicates were identified in this SDG.

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

**MCBH Kaneohe, Fuel Farms, CTO HC25**
**Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 72662**

No Sample Data Qualified in this SDG

LDC #: 31387B8
SDG #: 72662
Laboratory: APPL, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 3/5/14
Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

**METHOD:** GC TPH as Extractables (EPA SW846 Method 8015~~B~~C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 2/6/14 |
| II | Initial calibration | A | RSD ≤ 20% |
| III. | Calibration verification/ICV | A | ICV/CCV ≤ 20% |
| IV. | Blanks | A | |
| V | Surrogate recovery | A | |
| VI. | Matrix spike/Matrix spike duplicates | A | |
| VII. | Laboratory control samples | A | LCS |
| VIII. | Target compound identification | N | |
| IX. | Compound quantitation/RL/LOQ/LODs | N | |
| X. | System Performance | N | |
| XI. | Overall assessment of data | A | |
| XII. | Field duplicates | N | |
| XIII. | Field blanks | ND | FB = 4 EB = 5 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | KC148 | 11 | | 21 | | 31 | 140212A-BLK |
| 2 | KC149 | 12 | | 22 | | 32 | |
| 3 | KC150 | 13 | | 23 | | 33 | |
| 4 | KC151 | 14 | | 24 | | 34 | |
| 5 | KC152 | 15 | | 25 | | 35 | |
| 6 | KC148MS | 16 | | 26 | | 36 | |
| 7 | KC148MSD | 17 | | 27 | | 37 | |
| 8 | no spike | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **6020A** | | | | | | | | | | | | |
| KC148 | AY92225 | 1 | Lead | 02/06/2014 08:30 | 02/18/2014 18:31 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC148 | AY92225 | 1 | Lead | 02/06/2014 08:30 | 02/18/2014 18:37 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC149 | AY92226 | 1 | Lead | 02/06/2014 11:10 | 02/18/2014 18:43 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC149 | AY92226 | 1 | Lead | 02/06/2014 11:10 | 02/18/2014 18:48 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC150 | AY92227 | 1 | Lead | 02/06/2014 13:25 | 02/18/2014 18:54 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC150 | AY92227 | 1 | Lead | 02/06/2014 13:25 | 02/18/2014 19:00 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC151 | AY92228 | 1 | Lead | 02/06/2014 14:00 | 02/18/2014 18:13 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| KC152 | AY92229 | 1 | Lead | 02/06/2014 14:10 | 02/18/2014 19:06 | Std | 0.19 | ug/L | J | 0.5 | 0.40 | J | |
| KC152 | AY92229 | 1 | Lead | 02/06/2014 14:10 | 02/18/2014 19:12 | Std | 0.40 | ug/L | U | 0.5 | 0.40 | U | |
| | METHOD: **8015C DRO** | | | | | | | | | | | | |
| KC148 | AY92225 | 1 | TPH-DRO (C10-C24) | 02/06/2014 08:30 | 02/14/2014 16:38 | Std | 50.0 | ug/L | U | 150 | 50.0 | U | |
| KC148 | AY92225 | 1 | TPH-LRO (C24-C36) | 02/06/2014 08:30 | 02/14/2014 16:38 | Std | 500.0 | ug/L | U | 500 | 500.0 | U | |
| KC149 | AY92226 | 1 | TPH-DRO (C10-C24) | 02/06/2014 11:10 | 02/14/2014 17:06 | Std | 50.0 | ug/L | U | 150 | 50.0 | U | |
| KC149 | AY92226 | 1 | TPH-LRO (C24-C36) | 02/06/2014 11:10 | 02/14/2014 17:06 | Std | 500.0 | ug/L | U | 500 | 500.0 | U | |
| KC150 | AY92227 | 1 | TPH-DRO (C10-C24) | 02/06/2014 13:25 | 02/14/2014 18:28 | Std | 50.0 | ug/L | U | 150 | 50.0 | U | |
| KC150 | AY92227 | 1 | TPH-LRO (C24-C36) | 02/06/2014 13:25 | 02/14/2014 18:28 | Std | 500.0 | ug/L | U | 500 | 500.0 | U | |
| KC151 | AY92228 | 1 | TPH-DRO (C10-C24) | 02/06/2014 14:00 | 02/14/2014 18:54 | Std | 50.0 | ug/L | U | 150 | 50.0 | U | |
| KC151 | AY92228 | 1 | TPH-LRO (C24-C36) | 02/06/2014 14:00 | 02/14/2014 18:54 | Std | 500.0 | ug/L | U | 500 | 500.0 | U | |
| KC152 | AY92229 | 1 | TPH-DRO (C10-C24) | 02/06/2014 14:10 | 02/14/2014 19:21 | Std | 50.0 | ug/L | U | 150 | 50.0 | U | |
| KC152 | AY92229 | 1 | TPH-LRO (C24-C36) | 02/06/2014 14:10 | 02/14/2014 19:21 | Std | 500.0 | ug/L | U | 500 | 500.0 | U | |
| | METHOD: **8015C GRO** | | | | | | | | | | | | |
| KC147 | AY92224 | 1 | Gasoline Range Organics | 02/06/2014 07:30 | 02/11/2014 18:14 | Std | 18.0 | ug/L | U | 50 | 18.0 | UJ | *I |
| KC148 | AY92225 | 1 | Gasoline Range Organics | 02/06/2014 08:30 | 02/11/2014 21:51 | Std | 18.0 | ug/L | U | 50 | 18.0 | U | |
| KC149 | AY92226 | 1 | Gasoline Range Organics | 02/06/2014 11:10 | 02/11/2014 22:27 | Std | 18.0 | ug/L | U | 50 | 18.0 | U | |
| KC150 | AY92227 | 1 | Gasoline Range Organics | 02/06/2014 13:25 | 02/11/2014 23:04 | Std | 18.0 | ug/L | U | 50 | 18.0 | U | |
| KC151 | AY92228 | 1 | Gasoline Range Organics | 02/06/2014 14:00 | 02/11/2014 23:40 | Std | 18.0 | ug/L | U | 50 | 18.0 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8015C GRO** | | | | | | | | | | | | |
| KC152 | AY92229 | 1 | Gasoline Range Organics | 02/06/2014 14:10 | 02/12/2014 00:16 | Std | 18.0 | ug/L | U | 50 | 18.0 | U | |
| | METHOD: **8260C** | | | | | | | | | | | | |
| KC147 | AY92224 | 1 | Benzene | 02/06/2014 07:30 | 02/13/2014 11:18 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | UJ | *I |
| KC147 | AY92224 | 1 | Ethylbenzene | 02/06/2014 07:30 | 02/13/2014 11:18 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | UJ | *I |
| KC147 | AY92224 | 1 | Toluene | 02/06/2014 07:30 | 02/13/2014 11:18 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | UJ | *I |
| KC147 | AY92224 | 1 | Total Xylenes | 02/06/2014 07:30 | 02/13/2014 11:18 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | UJ | *I |
| KC148 | AY92225 | 1 | Benzene | 02/06/2014 08:30 | 02/13/2014 13:09 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC148 | AY92225 | 1 | Ethylbenzene | 02/06/2014 08:30 | 02/13/2014 13:09 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC148 | AY92225 | 1 | Toluene | 02/06/2014 08:30 | 02/13/2014 13:09 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC148 | AY92225 | 1 | Total Xylenes | 02/06/2014 08:30 | 02/13/2014 13:09 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC149 | AY92226 | 1 | Benzene | 02/06/2014 11:10 | 02/13/2014 13:36 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC149 | AY92226 | 1 | Ethylbenzene | 02/06/2014 11:10 | 02/13/2014 13:36 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC149 | AY92226 | 1 | Toluene | 02/06/2014 11:10 | 02/13/2014 13:36 | Std | 0.17 | ug/L | J | 1.0 | 0.30 | J | |
| KC149 | AY92226 | 1 | Total Xylenes | 02/06/2014 11:10 | 02/13/2014 13:36 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC150 | AY92227 | 1 | Benzene | 02/06/2014 13:25 | 02/13/2014 14:04 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC150 | AY92227 | 1 | Ethylbenzene | 02/06/2014 13:25 | 02/13/2014 14:04 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC150 | AY92227 | 1 | Toluene | 02/06/2014 13:25 | 02/13/2014 14:04 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC150 | AY92227 | 1 | Total Xylenes | 02/06/2014 13:25 | 02/13/2014 14:04 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC151 | AY92228 | 1 | Benzene | 02/06/2014 14:00 | 02/13/2014 14:32 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC151 | AY92228 | 1 | Ethylbenzene | 02/06/2014 14:00 | 02/13/2014 14:32 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC151 | AY92228 | 1 | Toluene | 02/06/2014 14:00 | 02/13/2014 14:32 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC151 | AY92228 | 1 | Total Xylenes | 02/06/2014 14:00 | 02/13/2014 14:32 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC152 | AY92229 | 1 | Benzene | 02/06/2014 14:10 | 02/13/2014 14:59 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC152 | AY92229 | 1 | Ethylbenzene | 02/06/2014 14:10 | 02/13/2014 14:59 | Std | 0.50 | ug/L | U | 1.0 | 0.50 | U | |
| KC152 | AY92229 | 1 | Toluene | 02/06/2014 14:10 | 02/13/2014 14:59 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| KC152 | AY92229 | 1 | Total Xylenes | 02/06/2014 14:10 | 02/13/2014 14:59 | Std | 0.30 | ug/L | U | 1.0 | 0.30 | U | |
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **8270D-SIM** | | | | | | | | | | | | | |
| KC148 | AY92225 | 1 | 1-Methylnaphthalene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | 2-Methylnaphthalene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Acenaphthene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Acenaphthylene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Anthracene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Benzo(a)anthracene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Benzo(a)pyrene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Benzo(b)fluoranthene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Benzo(g,h,i)perylene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Benzo(k)fluoranthene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Chrysene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | DIBENZO(A,H)ANTHRACENE | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Fluoranthene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Fluorene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Indeno(1,2,3-cd)pyrene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Naphthalene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Phenanthrene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC148 | AY92225 | 1 | Pyrene | 02/06/2014 08:30 | 02/18/2014 17:05 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | 1-Methylnaphthalene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | 2-Methylnaphthalene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Acenaphthene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Acenaphthylene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Anthracene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Benzo(a)anthracene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Benzo(a)pyrene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Benzo(b)fluoranthene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Benzo(g,h,i)perylene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **8270D-SIM** | | | | | | | | | | | | | |
| KC149 | AY92226 | 1 | Benzo(k)fluoranthene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Chrysene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | DIBENZO(A,H)ANTHRACENE | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Fluoranthene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Fluorene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Indeno(1,2,3-cd)pyrene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Naphthalene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Phenanthrene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC149 | AY92226 | 1 | Pyrene | 02/06/2014 11:10 | 02/18/2014 17:32 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | 1-Methylnaphthalene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | 2-Methylnaphthalene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Acenaphthene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Acenaphthylene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Anthracene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Benzo(a)anthracene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Benzo(a)pyrene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Benzo(b)fluoranthene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Benzo(g,h,i)perylene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Benzo(k)fluoranthene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Chrysene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | DIBENZO(A,H)ANTHRACENE | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Fluoranthene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Fluorene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Indeno(1,2,3-cd)pyrene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Naphthalene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Phenanthrene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC150 | AY92227 | 1 | Pyrene | 02/06/2014 13:25 | 02/18/2014 18:00 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METHOD: **8270D-SIM** | | | | | | | | | | | | | |
| KC151 | AY92228 | 1 | 1-Methylnaphthalene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | 2-Methylnaphthalene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Acenaphthene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Acenaphthylene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Anthracene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Benzo(a)anthracene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Benzo(a)pyrene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Benzo(b)fluoranthene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Benzo(g,h,i)perylene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Benzo(k)fluoranthene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Chrysene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | DIBENZO(A,H)ANTHRACENE | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Fluoranthene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Fluorene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Indeno(1,2,3-cd)pyrene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Naphthalene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Phenanthrene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC151 | AY92228 | 1 | Pyrene | 02/06/2014 14:00 | 02/18/2014 18:27 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | 1-Methylnaphthalene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | 2-Methylnaphthalene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Acenaphthene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Acenaphthylene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Anthracene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Benzo(a)anthracene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Benzo(a)pyrene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Benzo(b)fluoranthene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Benzo(g,h,i)perylene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |

| EPA_NO | LAB_SAMPLE | DF | ANALYTE | COLL_DATE | ANAL_DATE | QCLev | RESULT | UNITS | LAB_Q | LOQ | LOD | REV | Q_C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | METHOD: **8270D-SIM** | | | | | | | | | | | | |
| KC152 | AY92229 | 1 | Benzo(k)fluoranthene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Chrysene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | DIBENZO(A,H)ANTHRACENE | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Fluoranthene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Fluorene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Indeno(1,2,3-cd)pyrene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Naphthalene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Phenanthrene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |
| KC152 | AY92229 | 1 | Pyrene | 02/06/2014 14:10 | 02/18/2014 18:55 | Std | 0.1000 | ug/L | U | 0.200 | 0.1000 | U | |

# Appendix H.2
# Data Quality Assessment Report

**LABORATORY DATA CONSULTANTS, INC.**
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

WCP, Inc.
99-061 Koaha Way, Suite 208
Aiea, HI 96701-5626
ATTN: Ms. Rachel Kaminaka

April 17, 2014

SUBJECT: **Data Quality Assessment Report**
**Supplemental Remedial Investigation**
**Former Fuel Farm Sludge Disposal Area**
**Marine Corps Base Hawaii, Kaneohe Bay**
**Oahu, Hawaii**
**CTO HC25**

Dear Ms. Kaminaka,

Enclosed is the Data Quality Assessment Report, Supplemental Remedial Investigation, Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii, CTO HC25.

We appreciate this opportunity to support WCP Inc. in the performance of this project.

Please feel free to call me at (760) 827-1100 if you have any questions

Sincerely,

Andrew Kong
Project Manager/Senior Chemist

# DATA QUALITY ASSESSMENT REPORT

## SUPPLEMENTAL REMEDIAL INVESTIGATION
## FORMER FUEL FARM SLUDGE DISPOSAL AREA

## MARINE CORPS BASE HAWAII, KANEOHE BAY
## OAHU, HAWAII

## CTO HC25

**April 16, 2014**

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## GLOSSARY

| | |
|---|---|
| BTEX | Benzene, Toluene, Ethylbenzene, and Total Xylenes |
| CTO | Contract Task Order |
| DL | Detection Limit |
| DOD | Department of Defense |
| DQAR | Data Quality Assessment Report |
| DRO | Diesel Range Organics |
| DUP | Duplicate |
| EB | Equipment Blank |
| FB | Field Blank |
| FD | Field Duplicate |
| ICB/CCB | Initial and Continuing Calibration Blanks |
| LCS/LCSD | Laboratory Control Sample / Laboratory Control Sample Duplicate |
| LDC | Laboratory Data Consultants, Inc |
| LOD | Limit of Detection |
| LOQ | Limit of Quantitation |
| LRO | Lubricant Oil Range Organics |
| MS/MSD | Matrix Spike / Matrix Spike Duplicate |
| PAH | Polynuclear Aromatic Hydrocarbon |
| PARCCS | Precision, Accuracy, Representativeness, Comparability, Completeness, Sensitivity |
| PQO | Project Quality Objectives |
| PT | Proficiency Testing sample |
| QAPP | Quality Assurance Project Plan |
| QA/QC | Quality Assurance/Quality Control |
| QSM | Quality Systems Manual |
| RPD | Relative Percent Difference |
| RRF | Relative Response Factor |
| SDG | Sample Delivery Group |
| TB | Trip Blank |
| TPH | Total Petroleum Hydrocarbons |
| VOC | Volatile Organic Compound |
| WP | Work Plan |
| %D | Percent Difference |
| %R | Percent Recovery |
| %RSD | Percent Relative Standard Deviation |
| mg/Kg | Milligrams per Kilogram |
| ug/L | Micrograms per Liter |

# 1.0 INTRODUCTION

A supplemental remedial investigation was conducted at the Former Fuel Farm Sludge Disposal Area at Marine Corps Base Hawaii, Kaneohe Bay on Oahu, Hawaii. This part of the supplemental remedial investigation included the collection and analyses of 27 environmental and quality control (QC) samples. The analyses were performed by the following methods:

Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) by United States Environmental Protection Agency (EPA) SW-846 Method 8260C
Polynuclear Aromatic Hydrocarbons (PAHs) by EPA SW-846 Method 8270D-SIM
Total Petroleum Hydrocarbons (TPH) as Gasoline by EPA SW-846 Method 8015C
TPH as Extractables by EPA SW-846 Method 8015C
Lead by EPA SW-846 Method 6010C and 6020A

Analytical services were provided by APPL, Inc. whom performed analyses on the soil and water samples. The samples were grouped into sample delivery groups (SDGs) of up to 20 field samples received by the laboratory. The environmental samples are associated with QA/QC samples designed to document the data quality of the entire SDG or a sub-group of samples within a SDG. Table I is a cross-reference table listing each sample, analysis, SDG, collection date, laboratory sample number, matrix, and validation level.

Approximately ten percent of the analytical data were validated according to Naval Facilities Engineering Command (NAVFAC) Pacific Full data validation procedures and ninety percent of the analytical data were validated according to NAVFAC Pacific Standard data validation procedures. The analytical data were evaluated for quality assurance and quality control (QA/QC) based on the *Technical Memorandum, Supplemental Remedial Investigation Work Plan (WP), Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (December 2013),* the *WP for the Remedial Investigation for Former Fuel Farm Sludge Disposal Area, Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii (April 2011), the NAVFAC Pacific Environmental Restoration (ER) Program Data Validation Procedures (2007), the Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (DoD 2010)*, and the *EPA SW, Third Edition, Test Methods for Evaluating Solid Waste, update1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007.*

This data quality assessment report (DQAR) summarizes the QA/QC evaluation of the data according to precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) relative to the project quality objectives (PQOs). This report provides a quantitative and qualitative assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability.

The DQAR evaluates and summarizes the results of QA/QC data validation for the entire sampling program. Each analytical fraction has a separate section for each of the PARCCS criteria. These sections interpret specific QC deviations and their effects on both individual data points and the analyses as a whole. Section 8 presents a summary of the PARCCS criteria by comparing quantitative parameters with acceptability criteria defined in the PQOs. Qualitative PARCCS criteria are also summarized in this section.

**Precision and Accuracy of Environmental Data**
Environmental data quality depends on sample collection procedures, analytical methods and instrumentation, documentation, and sample matrix properties. Both sampling procedures and laboratory analyses contain potential sources of uncertainty, error, and/or bias, which affect the overall quality of a

measurement. Errors in sample data may result from incomplete equipment decontamination, inappropriate sampling techniques, sample heterogeneity, improper filtering, and improper preservation. The accuracy of analytical results is dependent on selecting appropriate analytical methods, maintaining equipment properly, and complying with QC requirements. The sample matrix also is an important factor in the ability to obtain precise and accurate results within a given media.

Environmental and laboratory QA/QC samples assess the effects of sampling procedures and evaluate laboratory contamination, laboratory performance, and matrix effects. QA/QC samples include: equipment blanks (EB), field blanks (FB), trip blanks (TB), method blanks, field duplicates (FD), laboratory control sample/laboratory control sample duplicates (LCS/LCSDs), surrogate spikes, internal standards, and matrix spike/matrix spike duplicates (MS/MSDs).

Before conducting the PARCCS evaluation, the analytical data were validated according to the WP, NAVFAC procedures, and DoD QSM. Samples not meeting the WP, NAVFAC procedures, and DoD QSM acceptance criteria were qualified with a flag, an abbreviation indicating a deficiency with the data. The following are flags used in data validation.

J — Estimated The associated numerical value is an estimated quantity. The analyte was detected but the reported value may not be accurate or precise. The "J" qualification indicates the data fell outside the QC limits, but the exceedance was not sufficient to cause rejection of the data.

R — Rejected The data is unusable (the compound or analyte may or may not be present). Use of the "R" qualifier indicates a significant variance from functional guideline acceptance criteria. Either resampling or reanalysis is necessary to determine the presence or absence of the rejected analyte.

U — Nondetected Analyses were performed for the compound or analyte, but it was not detected. The "U" designation is also applied to suspected blank contamination. The "U" flag is used to qualify any result detected in an environmental sample at a concentration less than 10 times the value of the concentration in any associated blank for common laboratory contaminants and less than 5 times the concentration in any associated blank for all other contaminants.

UJ — Estimated/Nondetected Analyses were performed for the compound or analyte, but it was not detected and the limit of detection (LOD) is an estimated quantity due to poor accuracy or precision. This qualification is also used to flag possible false negative results in the case where low bias in the analytical system is indicated by low calibration response, surrogate, internal standard, or other spike recovery.

Once the data are reviewed and qualified according to the WP, NAVFAC procedures, and DoD QSM, the data set is then evaluated using PARCCS criteria. PARCCS criteria provide an evaluation of overall data usability. The following is a discussion of PARCCS criteria as related to the PQOs.

**Precision** is a measure of the agreement or reproducibility of analytical results under a given set of conditions. It is a quantity that cannot be measured directly but is calculated from percent recovery data.

Precision is expressed as the relative percent difference (RPD) or percent relative standard deviation (%RSD):

$$RPD = (D1-D2)/\{1/2(D1+D2)\} \times 100$$

$$\%RSD = SD/\{1/3(D1+D2+D3)\} \times 100$$

Where:
D1= the reported concentration for sample analyses.
D2= the reported concentrations for duplicate analyses.
D3 = the reported concentrations for triplicate analyses.
SD = the standard deviation for sample, duplicate and triplicate analyses.

Precision is primarily assessed by calculating a RPD from the percent recoveries of the spiked compounds for each sample in the MS/MSD pair. In the absence of a MS/MSD pair, a laboratory duplicate, laboratory triplicate or LCS/LCSD pair can be analyzed as an alternative means of assessing precision. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. An additional measure of sampling precision was obtained by collecting and analyzing field duplicate samples, which were compared using the RPD as the evaluation criteria.

MS and MSD samples are field samples spiked by the laboratory with target analytes prior to preparation and analysis. These samples measure the overall efficiency of the analytical method in recovering target analytes from an environmental matrix. A LCS is similar to a MS/MSD sample in that the LCS is spiked with the same target analytes prior to preparation and analysis. However, the LCS is prepared using a controlled interference-free matrix instead of a field sample aliquot. Laboratory reagent water is used to prepare aqueous LCS. Non-aqueous LCSs are prepared using solid media approved by the American Society for Testing and Materials (ASTM) for their homogeneity. The LCS measures laboratory efficiency in recovering target analytes from either a solid or aqueous matrix in the absence of matrix interferences.

Laboratory and field sampling precision are further evaluated by calculating RPDs for field sample duplicate pairs. The sampler collects two field samples at the same location and under identically controlled conditions. The laboratory then analyzes the samples under identical conditions.

An RPD outside the numerical QC limit in MS/MSD samples, LCS/LCSD, or field duplicates indicates imprecision. Imprecision is the variance in the consistency with which the laboratory arrives at a particular reported result. Thus, the actual analyte concentration may be higher or lower than the reported result.

Possible causes of poor precision include sample matrix interference, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability. In some field duplicates, results maybe reported in either the primary or duplicate samples at levels below the limit of quantitation (LOQ) or non-detected. Since these values are considered to be estimates, RPD exceedances from these duplicates do not suggest a significant impact on the data quality.

**Accuracy** is a measure of the agreement of an experimental determination and the true value of the parameter being measured. It is used to identify bias in a given measurement system. Recoveries outside acceptable QC limits may be caused by factors such as instrumentation, analyst error, or matrix interference. Accuracy is assessed through the analysis of MS, MSD, LCS, LCSD and samples containing surrogate spikes. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. Surrogate spikes are either isotopically labeled compounds or compounds that are not typically detected in the samples. Surrogate spikes are added to every blank, environmental sample, MS/MSD, LCS/LCSD and standard, for all applicable organic analyses. Accuracy of inorganic analyses is determined using the percent recoveries of MS and LCS analyses.

Percent recovery (%R) is calculated using the following equation:

$$\%R = (A-B)/C \times 100$$

Where:
A = measured concentration in the spiked sample
B = measured concentration of the spike compound in the unspiked sample
C = concentration of the spike

The percent recovery of each analyte spiked in MS/MSD samples, LCS/LCSD, and surrogate compounds added to environmental samples is evaluated against the acceptance criteria specified by the previously noted documents. Spike recoveries outside the acceptable QC accuracy limits provide an indication of bias, where the reported data may overestimate or underestimate the actual concentration of compounds detected or LODs reported for environmental samples.

**Representativeness** is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population and is evaluated by reviewing the QC results of blank samples and holding times. Positive detects of compounds in the blank samples identify compounds that may have been introduced into the samples during sample collection, transport, preparation, or analysis. The QA/QC blanks collected and analyzed are method blanks, TBs, EBs, and FBs.

A method blank is a laboratory grade water or solid matrix that contains the method reagents and has undergone the same preparation and analysis as the environmental samples. The method blank provides a measure of the combined contamination derived from the laboratory source water, glassware, instruments, reagents, and sample preparation steps. Method blanks are prepared for each sample of a similar matrix extracted by the same method at a similar concentration level.

For inorganic analyses, initial and continuing calibration blanks (ICB/CCB) consist of acidified laboratory grade water, which are injected at the beginning and at a regular frequency during each 12 - hour sample analysis run. These blanks estimate residual contaminants from the previous sample or standards analysis and measure baseline shifts that commonly occur in emission and absorption spectroscopy.

Trip blanks are used to identify possible volatile organic contamination introduced into the sample during transport. A trip blank is a sample bottle filled in the laboratory with reagent-grade water and preserved to a pH less than 2 with hydrochloric acid. It is transported to the site, stored with the sample containers, and returned unopened to the laboratory for analysis.

Equipment blanks consist of analyte-free water poured over or through the sample collection equipment. The water is collected in a sample container for laboratory analysis. These blanks are collected after the sampling equipment is decontaminated and measure efficiency of the decontamination procedure.

Field blanks consist of analyte-free source water stored at the sample collection site. The water is collected from each source water used during each sampling event.

Contaminants found in both the environmental sample and a blank sample are assumed to be laboratory artifacts if the concentration in the environmental sample is less than 5 times the blank value laboratory contaminants.

Holding times are evaluated to assure that the sample integrity is intact for accurate sample preparation and analysis. Holding times will be specific for each method and matrix analyzed. Holding time exceedances can cause loss of sample constituents due to biodegradation, precipitation, volatization, and chemical degradation.

**Comparability** is a qualitative expression of the confidence with which one data set may be compared to another. It provides an assessment of the equivalence of the analytical results to data obtained from other analyses. It is important that data sets be comparable if they are used in conjunction with other data sets. The factors affecting comparability include the following: sample collection and handling techniques, matrix type, and analytical method. If these aspects of sampling and analysis are carried out according to standard analytical procedures, the data are considered comparable. Comparability is also dependent upon other PARCCS criteria, because only when precision, accuracy, and representativeness are known can data sets be compared with confidence.

**Completeness** is defined as the percentage of acceptable sample results compared to the total number of sample results. Completeness is evaluated to determine if an acceptable amount of usable data were obtained so that a valid scientific site assessment can be completed. Completeness equals the total number of sample results for each fraction minus the total number of rejected sample results divided by the total number of sample results multiplied by 100. As specified in the PQOs, the goal for completeness for target analytes in each analytical fraction is 90 percent.
Percent completeness is calculated using the following equation:

$$\%C = (T - R)/T \times 100$$

Where:
%C = percent completeness
T = total number of sample results
R = total number of rejected sample results

Completeness is also determined by comparing the planned number of samples per method and matrix as specified in the project planning document, with the number determined above.

**Sensitivity** is the ability of an analytical method or instrument to discriminate between measurement responses representing different concentrations. This capability is established during the planning phase to meet the DQOs. It is important that calibration requirements, detection limits (DLs), and LOQs presented in the QAPP are achieved and that target analytes can be detected at concentrations necessary to support the DQOs. In addition, sample results are compared to method blank and field blank results to identify potential effects of laboratory background and field procedures on sensitivity.

The following sections present a review of QC data for each analytical method.

## 2.0 BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

A total of 13 soil and 14 water samples were analyzed for BTEX by EPA SW-846 Method 8260C. All VOC data were assessed to be valid since none of the 108 total results were rejected based on holding time or QC exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCCS criteria and evaluated based on the PQOs.

### 2.1 Precision and Accuracy

#### 2.1.1 Instrument Calibration

Initial and continuing calibration results provide a means of evaluating accuracy within a particular SDG. Relative response factor (RRF), %RSD, and percent difference (%D) are the three major parameters used to measure the effectiveness of instrument calibration. RRF is a measure of the relative spectral response of an analyte compared to its internal standard. %RSD is an expression of the linearity of instrument response. %D is a comparison of a continuing calibration instrumental response with its initial response.

%RSD and %D exceedances suggest routine instrumental anomalies, which typically impact all sample results for the affected compounds.

The %RSDs in the initial calibrations met the acceptance criteria of 15 percent. The %Ds in the initial calibration verifications met the acceptance criteria of 25 percent. The %Ds in the continuing calibration verifications met the acceptance criteria of 20 percent. The relative response factors met the acceptance criteria of $\geq$ 0.05 in the initial and continuing calibration standards.

### 2.1.2 Surrogates

All surrogate %Rs were within the acceptance criteria.

### 2.1.3 MS/MSD Samples

All MS/MSD %Rs and RPDs were within the acceptance criteria.

### 2.1.4 LCS Samples

All LCS %Rs were within the acceptance criteria.

### 2.1.5 Internal Standards

All internal standard areas and retention times were within the acceptance criteria.

### 2.1.6 FD Samples

No BTEX was detected in the field duplicates. The field duplicates are identified in the data validation reports.

### 2.1.7 Proficiency Testing Samples

Proficiency testing (PT) samples were not performed for the sampling event.

### 2.1.8 Compound Quantitation and Target Identification

All compound quantitation and target compound identifications were found to be acceptable.

## 2.2 Representativeness

### 2.2.1 Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All holding times were met.

Due to sample condition non-conformances (i.e. presence of headspace in the containers), 12 results for samples KC129, KC142, and KC147 were qualified as non-detected estimated (UJ). The presence of the headspace may introduce a low bias. The details regarding the qualification of results are provided in the data validation reports.

### 2.2.2 Blanks

Method blanks, TBs, EBs, and FBs were collected and analyzed to evaluate representativeness. The concentration for an individual target compound in any of the types of QA/QC blanks was used for data qualification.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation. The corrective action consisted of amending the laboratory reported results based on the following criteria.

> Results Below or Above the LOQ If a sample result for the blank contaminant was less than the LOQ or greater than the sample LOQ and less than 5 times the blank value for contaminants, the sample result for the blank contaminant was amended as an estimated non-detect at the concentration reported in the sample results.
>
> No Action If a sample result for the blank contaminant was greater than 5 times the blank value for contaminants, the result was not amended.

#### 2.2.2.1 Method Blanks

No contaminants were detected in the method blanks for this analysis.

#### 2.2.2.2 TBs

No contaminants were detected in the trip blanks for this analysis.

#### 2.2.2.3 EBs and FBs

No contaminants were detected in the equipment or field blanks for this analysis.

## 2.3 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the detection limits (DLs) attained were below the LOQs. Target compounds detected below the LOQs flagged (J) by the laboratory should be considered estimated. The comparability of the data is regarded as acceptable.

## 2.4 Completeness

The completeness level attained for BTEX field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

## 2.5 Sensitivity

The calibration was evaluated for instrument sensitivity and was determined to be technically acceptable. All laboratory DLs and LOQs met the specified requirements described in the QAPP.

# 3.0 POLYNUCLEAR AROMATIC HYDROCARBONS

A total of 13 soil and 9 water samples were analyzed for PAHs by EPA SW-846 Method 8270D-SIM. All PAH data were assessed to be valid since none of the 396 total results were rejected due to holding time or QC exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCCS criteria and evaluated based on the PQOs.

## 3.1 Precision and Accuracy

### 3.1.1 Instrument Calibration

The %RSDs met the acceptance criteria of 15 percent in the initial calibration. The %Ds in the initial calibration verifications met the acceptance criteria of 25 percent. The %Ds in the continuing calibration verifications met the acceptance criteria of 20 percent. The relative response factors met the acceptance criteria of $\geq$ 0.05 in the initial and continuing calibration standards.

### 3.1.2 Surrogates

All surrogate %Rs were within the acceptance criteria.

### 3.1.3 MS/MSD Samples

All MS/MSD %Rs and RPDs were within the acceptance criteria.

### 3.1.4 LCS Samples

All LCS %Rs were within the acceptance criteria.

### 3.1.5 Internal Standards

All internal standard areas and retention times were within the acceptance criteria.

### 3.1.6 FD Samples

No PAHs were detected in the field duplicates. The field duplicates are identified in the data validation reports.

### 3.1.7 Proficiency Testing Samples

PT samples were not performed for the sampling event.

### 3.1.8 Compound Quantitation and Target Identification

All compound quantitation and target compound identifications were found to be acceptable.

## 3.2 Representativeness

### 3.2.1 Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All holding times were met.

### 3.2.2 Blanks

Method blanks, EBs, and FBs were analyzed to evaluate representativeness.

#### 3.2.2.1 Method Blanks

No contaminants were detected in the method blanks for this analysis.

#### 3.2.2.2 EBs and FBs

No contaminants were detected in the equipment or field blanks for this analysis.

### 3.3 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the DLs attained were below the specified LOQs. The comparability of the data is regarded as acceptable.

### 3.4 Completeness

The completeness level attained for PAH field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

### 3.5 Sensitivity

The calibration was evaluated for instrument sensitivity and was determined to be technically acceptable. All laboratory DLs and LOQs met the specified requirements described in the QAPP.

## 4.0 TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

A total of 13 soil and 14 water samples were analyzed for TPH as Gasoline by EPA SW-846 Method 8015C. All TPH as gasoline data were assessed to be valid since none of the 27 total results were rejected due to holding time or QC exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCCS criteria and evaluated based on the PQOs.

### 4.1 Precision and Accuracy

#### 4.1.1 Instrument Calibration

The %RSDs in the initial calibration and the %Ds in the initial and continuing calibration verifications met the acceptance criteria of 20 percent.

#### 4.1.2 Surrogates

All surrogate %Rs were within the acceptance criteria.

#### 4.1.3 MS/MSD Samples

All MS/MSD %Rs and RPDs were within the acceptance criteria.

#### 4.1.4 LCS Samples

All LCS %Rs were within the acceptance criteria.

#### 4.1.5 FD Samples

No TPH as gasoline was detected in the field duplicates. The field duplicates are identified in the data validation reports.

#### 4.1.6 Proficiency Testing Samples

PT samples were not performed for the sampling event.

#### 4.1.7 Compound Quantitation and Target Identification

All compound quantitation and target identification were found to be acceptable.

### 4.2 Representativeness

#### 4.2.1 Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All holding times were met.

Due to sample condition non-conformances (i.e. presence of headspace in the containers), the TPH as gasoline results for samples KC129, KC142, and KC147 were qualified as non-detected estimated (UJ). The presence of the headspace may introduce a low bias. The details regarding the qualification of results are provided in the data validation reports.

#### 4.2.2 Blanks

Method blanks, TBs, EBs, and FBs were analyzed to evaluate representativeness.

##### 4.2.2.1 Method Blanks

No contaminants were detected in the method blanks for this analysis.

##### 4.2.2.2 TBs

No contaminants were detected in the trip blanks for this analysis.

##### 4.2.2.3 EBs and FBs

No contaminants were detected in the equipment or field blanks for this analysis.

### 4.3 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the DLs attained were below the specified LOQs. The comparability of the data is regarded as acceptable.

### 4.4 Completeness

The completeness level attained for TPH as gasoline field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

### 4.5 Sensitivity

The calibration was evaluated for instrument sensitivity and was determined to be technically acceptable. All laboratory DLs and LOQs met the specified requirements described in the QAPP.

## 5.0 TOTAL PETROLEUM HYDROCARBONS AS EXTRACTABLES

A total of 13 soil and 9 water samples were analyzed for diesel range organics (DRO) and lubricant oil range organics (LRO) by EPA SW-846 Method 8015C. All TPH as extractable data were assessed to be valid since none of the 44 total results were rejected due to holding time or QC exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCCS criteria and evaluated based on the PQOs.

### 5.1 Precision and Accuracy

#### 5.1.1 Instrument Calibration

The %RSDs in the initial calibration and the %Ds in the initial and continuing calibration verifications met the acceptance criteria of 20 percent.

#### 5.1.2 Surrogates

All surrogate %Rs were within the acceptance criteria.

#### 5.1.3 MS/MSD Samples

All MS/MSD %Rs and RPDs were within the acceptance criteria.

#### 5.1.4 LCS Samples

All LCS %Rs were within the acceptance criteria.

#### 5.1.5 FD Samples

No TPH as extractables were detected in the field duplicates. The field duplicates are identified in the data validation reports.

#### 5.1.6 Proficiency Testing Samples

PT samples were not performed for the sampling event.

#### 5.1.7 Compound Quantitation and Target Identification

All compound quantitation and target identification were found to be acceptable.

### 5.2 Representativeness

#### 5.2.1 Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All holding times were met.

#### 5.2.2 Blanks

Method blanks, EBs, and FBs were analyzed to evaluate representativeness.

##### 5.2.2.1 Method Blanks

No contaminants were detected in the method blanks for this analysis.

##### 5.2.2.2 EBs and FBs

No contaminants were detected in the equipment or field blanks for this analysis.

### 5.3 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the DLs attained were below the specified LOQs. Target analytes detected below the LOQs flagged (J) by the laboratory should be considered estimated. The comparability of the data is regarded as acceptable.

### 5.4 Completeness

The completeness level attained for TPH as extractable field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

### 5.5 Sensitivity

The calibration was evaluated for instrument sensitivity and was determined to be technically acceptable. All laboratory DLs and LOQs met the specified requirements described in the QAPP.

## 6.0 LEAD

A total of 13 soil and 9 water samples were analyzed for lead by EPA SW-846 Method 6020A. All lead data were assessed to be valid since none of the 30 total results were rejected due to holding time or QC exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCCS criteria and evaluated based on the PQOs.

### 6.1 Precision and Accuracy

#### 6.1.1 Instrument Calibration

Initial and continuing calibration verification results provide a means of evaluating accuracy within a particular SDG. Correlation coefficient (r) and percent recovery (%R) are the two major parameters used to measure the effectiveness of instrument calibration. The correlation coefficient indicates the linearity of the calibration curve. %R is used to verify the ongoing calibration acceptability of the analytical system. The most critical of the two calibration parameters, r, has the potential to affect data accuracy across a

SDG when it is outside the acceptable QC limits. %R exceedances suggest more routine instrumental anomalies, which typically impact all sample results for the affected analytes.

The correlation coefficients in the initial calibrations were within the acceptance criteria of ≥ 0.995. The %Rs in the initial and continuing calibration verifications were within the acceptance criteria of 90-110 percent.

#### 6.1.2 MS/MSD Samples

All MS/MSD %Rs and RPDs were within the acceptance criteria.

#### 6.1.3 LCS/LCSD Samples

All LCS/LCSD %Rs and RPDs were within the acceptance criteria.

#### 6.1.4 Internal Standards

All internal standard %Rs were within the acceptance criteria on which Full validation was performed.

#### 6.1.5 ICP Serial Dilution

All ICP serial dilution %Ds were within the acceptance criteria.

#### 6.1.6 ICP Interference Check Sample

All ICP interference check %Rs were within the acceptance criteria.

#### 6.1.7 FD Samples

The RPD for lead was outside the acceptance criteria for field duplicate samples KC143 and KC144. Sample data were not qualified on the basis of field duplicate imprecision. The field duplicates are presented in detail in the data validation reports.

#### 6.1.8 Proficiency Testing Samples

PT samples were not performed for the sampling event.

#### 6.1.9 Sample Result Verification

All sample results were found to be acceptable.

### 6.2 Representativeness

#### 6.2.1 Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All holding times were met.

### 6.2.2 Blanks

Method blanks, ICB/CCBs, EBs, and FBs were analyzed to evaluate representativeness. The concentration for an individual target analyte in any of the types of QA/QC blanks was used for data qualification.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation. The corrective action consisted of amending the laboratory reported results based on the following criteria.

> Results Below or Above the LOQ If a sample result for the blank contaminant was less than the LOQ or greater than the sample LOQ and less 5 times the method blank value or the highest applicable calibration blank value, the sample result for the blank contaminant was amended as a non-detect at the concentration reported in the sample results.
>
> No Action If a sample result for the blank contaminant was greater than 5 times the method blank value or the highest applicable calibration blank value, the result was not amended.

#### 6.2.2.1 Method and Calibration Blanks

No contaminants were detected in the method or calibration blanks for this analysis.

#### 6.2.2.2 EBs and FBs

No contaminants were detected in the field blanks for this analysis.

No data were qualified due to contaminants detected in the equipment blanks for this analysis.

### 6.3 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the DLs attained were below the specified LOQs. Target analytes detected below the LOQs flagged (J) by the laboratory should be considered estimated. The comparability of the data is regarded as acceptable.

### 6.4 Completeness

The completeness level attained for lead field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

### 6.5 Sensitivity

The calibration was evaluated for instrument sensitivity and was determined to be technically acceptable. All laboratory DLs and LOQs met the specified requirements described in the QAPP.

## 7.0 VARIANCES IN ANALYTICAL PERFORMANCE

The laboratory used standard analytical methods for all of the analyses throughout the project. No systematic variances in analytical performance were noted in the case narratives.

## 8.0 SUMMARY OF PARCCS CRITERIA

The validation reports present the PARCCS results for all SDGs. Each PARCCS criterion is discussed in detail in the following sections.

### 8.1 Precision and Accuracy

The presence of headspace indicates that the BTEX and TPH as gasoline results may be biased low for the associated samples.

Precision and accuracy were evaluated using data quality indicators such as calibration, surrogates, MS/MSD, LCS, and internal standards. The precision and accuracy of the data set were considered acceptable after integration of qualification of estimated results as noted in Sections 2.2.1 and 4.2.1.

### 8.2 Representativeness

All samples for each method and matrix were evaluated for holding time compliance. All samples were associated with a method blank in each individual SDG. The representativeness of the project data is considered acceptable.

### 8.3 Comparability

Sampling frequency requirements were met in obtaining field duplicates and necessary field blanks. The laboratory used standard analytical methods for their analyses. The analytical results were reported in correct standard units. Comparability was evaluated using holding times, sample preservation, and sample integrity. The overall comparability of the data set was considered acceptable after integration of qualification of estimated results as noted in Section 2.2.1 and 4.2.1.

### 8.4 Completeness

Of the 605 total results reported, no results were rejected. The completeness for all SDGs is as follows:

| Parameter | Total Analytes | No. of Rejects | % Completeness |
|---|---|---|---|
| BTEX | 108 | 0 | 100 |
| PAHs | 396 | 0 | 100 |
| TPH as Gasoline | 27 | 0 | 100 |
| TPH as Extractables | 44 | 0 | 100 |
| Lead | 30 | 0 | 100 |
| **Total** | **605** | **0** | **100** |

The completeness percentage based on rejected data met the 90 percent DQO goal.

### 8.5 Sensitivity

Sensitivity was achieved by the laboratory to support the DQOs. Calibration concentrations, DLs, and LOQs met the project requirements.

## Table I

## Validation Sample Table

| SDG | Client Sample ID | Lab Sample ID | Matrix | QC Type | Sample Date | Validation Level | BTEX (8260C) | PAH (8270D-SIM) | TPH-G (8015C) | TPH-E (8015C) | Total Pb (6020A) | Diss. Pb (6020A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72613 | KC126 | AY92009 | Water | TB | 01/29/2014 08:20 | Standard | X | | X | | | |
| 72613 | KC127 | AY92010 | Soil | | 01/29/2014 08:25 | Standard | X | X | X | X | X | |
| 72613 | KC128 | AY92011 | Soil | | 01/29/2014 08:50 | Standard | X | X | X | X | X | |
| 72613 | KC129 | AY92012 | Water | TB | 01/30/2014 10:00 | Standard | X | | X | | | |
| 72613 | KC130 | AY92013 | Soil | | 01/30/2014 10:20 | Full | X | X | X | X | X | |
| 72613 | KC131 | AY92014 | Soil | | 01/30/2014 10:40 | Standard | X | X | X | X | X | |
| 72613 | KC132 | AY92015 | Soil | | 01/30/2014 13:00 | Standard | X | X | X | X | X | |
| 72613 | KC133 | AY92016 | Soil | FD1 | 01/30/2014 13:10 | Standard | X | X | X | X | X | |
| 72613 | KC134 | AY92017 | Soil | FD1 | 01/30/2014 13:15 | Standard | X | X | X | X | X | |
| 72613 | KC135 | AY92018 | Soil | | 01/30/2014 14:25 | Standard | X | X | X | X | X | |
| 72613 | KC136 | AY92019 | Soil | | 01/30/2014 14:35 | Standard | X | X | X | X | X | |
| 72613 | KC136MS | AY92019MS | Soil | MS | 01/30/2014 14:35 | Standard | | X | | X | X | |
| 72613 | KC136MSD | AY92019MSD | Soil | MSD | 01/30/2014 14:35 | Standard | | X | | X | X | |
| 72621 | KC137 | AY92032 | Water | TB | 01/31/2014 07:20 | Standard | X | | X | | | |
| 72621 | KC138 | AY92033 | Soil | | 01/31/2014 07:30 | Standard | X | X | X | X | X | |
| 72621 | KC139 | AY92034 | Soil | | 01/31/2014 07:45 | Full | X | X | X | X | X | |
| 72621 | KC140 | AY92035 | Soil | | 01/31/2014 09:00 | Standard | X | X | X | X | X | |
| 72621 | KC141 | AY92036 | Soil | | 01/31/2014 09:20 | Standard | X | X | X | X | X | |
| 72621 | KC141MS | AY92036MS | Soil | MS | 01/31/2014 09:20 | Standard | | | | | X | |
| 72621 | KC141MSD | AY92036MSD | Soil | MSD | 01/31/2014 09:20 | Standard | | | | | X | |
| 72650 | KC142 | AY92130 | Water | TB | 02/05/2014 08:30 | Standard | X | | X | | | |
| 72650 | KC143 | AY92131 | Water | FD2 | 02/05/2014 09:35 | Full | X | X | X | X | X | X |
| 72650 | KC144 | AY92132 | Water | FD2 | 02/05/2014 09:45 | Standard | X | X | X | X | X | X |
| 72650 | KC145 | AY92133 | Water | | 02/05/2014 13:20 | Standard | X | X | X | X | X | X |
| 72650 | KC146 | AY92134 | Water | | 02/05/2014 15:30 | Standard | X | X | X | X | X | X |
| 72650 | KC146MS | AY92134MS | Water | MS | 02/05/2014 15:30 | Standard | | | | | X | X |
| 72650 | KC146MSD | AY92134MSD | Water | MSD | 02/05/2014 15:30 | Standard | | | | | X | X |
| 72662 | KC147 | AY92224 | Water | TB | 02/06/2014 07:30 | Standard | X | | X | | | |
| 72662 | KC148 | AY92225 | Water | | 02/06/2014 08:30 | Standard | X | X | X | X | X | X |
| 72662 | KC148MS | AY92225MS | Water | MS | 02/06/2014 08:30 | Standard | X | X | X | X | X | X |
| 72662 | KC148MSD | AY92225MSD | Water | MSD | 02/06/2014 08:30 | Standard | X | X | X | X | X | X |
| 72662 | KC149 | AY92226 | Water | | 02/06/2014 11:10 | Standard | X | X | X | X | X | X |
| 72662 | KC150 | AY92227 | Water | | 02/06/2014 13:25 | Standard | X | X | X | X | X | X |
| 72662 | KC151 | AY92228 | Water | FB | 02/06/2014 14:00 | Standard | X | X | X | X | X | |
| 72662 | KC152 | AY92229 | Water | EB | 02/06/2014 14:10 | Standard | X | X | X | X | X | X |

# Appendix I
# Response to Comments

Project Title: Draft Supplemental Remedial Investigation Letter Report
Former Fuel Farm Sludge Disposal Area
Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii
Reviewer: Steven P. Mow, Hawaii Department of Health Hazard Evaluation and Emergency Response Office
Date: 2 July 2014

| Comment No. | Section No. | Comment |
|---|---|---|
| 1 | Section 4, Conclusions and Recommendations, page 4-1 | Will the exceedances at B10 and MW58 be delineated under a separate IRP or compliance investigation or is the Navy claiming that the Fuel Farm Sludge Disposal investigation has adequately delineated the vertical and horizontal extent of contamination? Please clarify. |

Response: Comment acknowledged. The Navy's position is that the Fuel Farm Sludge Disposal investigation has adequately delineated the vertical and horizontal extent of contamination. The Supplemental RI Letter Report text has been revised as indicated in **boldface** type below.

In the Executive Summary, Conclusions and Recommendations, first bullet:

- COPC concentrations in subsurface soil and groundwater samples collected during the supplemental RI did not exceed applicable DOH EALs. In addition, COPC concentrations in subsurface soil and groundwater samples collected during the 2012 RI from other monitoring wells in proximity to MW58 were either non-detect or were well below their respective DOH EALs (AECOM and WCP 2013b). Therefore, subsurface soil and groundwater exceedances of TPH-GRO and benzo(a)pyrene observed during the 2012 RI have been **adequately** delineated **(both horizontally and vertically)**, and any existing residual contamination in this area can be managed in place as it poses no significant risk to human health and the environment. Measures described in Environmental Hazard Evaluation / Environmental Hazard Management Plan [EHE/EHMP] for Aboveground Storage Tank 1253, Marine Corps Base Hawaii, Kaneohe, Hawaii, Revision 01 (AECOM and WCP 2013a), hereafter referred to as the "EHE/EHMP, Revision 01," are protective and appropriate for the MW58 location so no continued monitoring or further investigation is warranted.

In the Conclusions, Section 4.1, first bullet:

- Subsurface soil and groundwater sampling during the supplemental RI failed to detect levels of TPH-GRO, -DRO, -LRO, BTEX, PAHs, and lead exceeding DOH Tier 1 EALs in subsurface soil and groundwater samples. COPC concentrations in subsurface soil and groundwater samples collected during the 2012 RI from other monitoring wells (MW55, MW56, and MW59) in proximity to MW58 were either non-detect or were well below their respective DOH EALs (AECOM and WCP 2013b). Therefore, the subsurface soil and groundwater exceedances of TPH-GRO and benzo(a)pyrene observed during the 2012 RI have been **adequately** delineated **(both horizontally and vertically)** and are isolated to the area in close proximity to boring B10 and MW58.

In the Recommendations Section 4.2, first bullet:

- The subsurface soil and groundwater exceedances of TPH-GRO and benzo(a)pyrene observed during the 2012 RI have been **adequately** delineated **(both horizontally and vertically)** and are isolated to the area in close proximity to boring B10 and MW58. Any existing residual contamination in this area can be managed in place as it poses no significant risk to human health and the environment. Measures described in the EHE/EHMP, Revision 01 (AECOM and WCP 2013a) are protective and appropriate for the MW58 location so no continued monitoring or further investigation is warranted.

Also, as noted in the Executive Summary, Conclusions and Recommendations (first bullet) and Recommendations, Section 4.2 (first bullet), measures described in the EHE/EHMP, Revision 01 (AECOM and WCP 2013a) are protective and appropriate for the MW58 area so no continued monitoring or further investigation is warranted.

Project Title: Draft Supplemental Remedial Investigation Letter Report
Former Fuel Farm Sludge Disposal Area
Marine Corps Base Hawaii, Kaneohe Bay, Oahu, Hawaii
Reviewer: Steven P. Mow, Hawaii Department of Health Hazard Evaluation and Emergency Response Office
Date: 2 July 2014

| Comment No. | Section No. | Comment |
|---|---|---|
| 2 | General | Once comment #1 has been addressed, please make a formal request for No Further Action with ICs and submit the portions of the AST 1253 EHE/EHMP that will pertain to the Fuel Farm Sludge Disposal Site along with the request. |

Response: Comment acknowledged.