



**Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310**

**FINAL ADDENDUM 2
TO THE
FINAL SAMPLING AND ANALYSIS PLAN
(Field Sampling Plan and Quality Assurance Project Plan)
February 28, 2007**

**SITE 27
FORMER NAVAL AIR STATION MOFFETT FIELD
MOFFETT FIELD, CALIFORNIA**

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
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CONTRACT NO. N68711-98-D-5713
CTO No. 0098

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SITE 27
FORMER NAVAL STATION MOFFETT FIELD
MOFFETT FIELD, CALIFORNIA

DCN: FWSD-RAC-07-0628



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SAMPLING AND ANALYSIS PLAN
(FIELD SAMPLING PLAN AND QUALITY
ASSURANCE PROJECT PLAN) FOR SITE 27
DATED 28 FEBRUARY 2007

IS APPENDIX C OF THE FINAL REMEDIAL DESIGN
REPORT FOR SITE 27

DATED 11 APRIL 2006

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1.0 INTRODUCTION

This addendum to the Sampling and Analysis Plan (SAP) (*Final Sampling and Analysis Plan for Site 27, Former Naval Air Station Moffett, Moffett Field, California*, (TN& Associates, Inc., and Tetra Tech EC, Inc [TtEC], 2006) (referred to as the original SAP) was prepared to include revisions to sampling activities at Site 27 at the former Naval Air Station Moffett, Moffett Field, California. This addendum to the SAP was prepared on behalf of the Naval Facilities Engineering Command, Southwest (NAVFAC SW) by TtEC, under Remedial Action Contract (RAC) No. N68711-98-D-5713, Contract Task Order (CTO) No. 0098. This addendum complies with the requirements of revising the SAP when a scope or regulation change occurs during the course of the work in accordance with *Environmental Work Instruction (EWI) #2, 3EN2.2, Review, Approval, Revision, and Amendment of Sampling and Analysis Plans (SAPs)* (NAVFAC SW, 2006). This addendum to the SAP includes only changes to the sections of the SAP that require modification relevant to the proposed activities.

Based on changes in the field, negotiations between the Department of the Navy (DON) and the regulatory agencies, and the need to move forward in a timely manner to reduce costs, the following changes are proposed.

In Section 2.1.4 of the original SAP, wastewater characterization procedures were described as well as the procedures to sample water within the channel prior to beginning excavation. Two water samples will be added in the area of the previous debris pile excavation to determine any impacts to the water that may have occurred during debris removal activities. The HydroPunch[®] sampling system will be used to obtain these samples.

In Section 2.1.7 of the original SAP, a step-out procedure was detailed for sampling the Lockheed berm. However, the impacted portions of the berm have been more extensive and deeper than originally anticipated. Therefore, rather than terminate sampling and excavating at 2 feet below ground surface (bgs) the berm will continue to be excavated in six-inch vertical increments as long as a) the confirmation sample results are above the soil remedial action objectives (RAOs) described in Section 1.1.6 of the original SAP, b) the integrity of the berm is not compromised, or c) the excavation depth is greater than 1 foot above groundwater level. If sample results are still above soil RAOs and the excavation depth is within 1 foot of the groundwater level, excavation activities will cease such that the integrity of the berm will not be compromised.

In Section 2.1.8 of the original SAP, confirmation samples were to be collected in the bottom of the excavation of the debris pile area once the limits of the excavation had been reached. Due to site conditions and safety concerns, most of the excavation was backfilled before all the confirmation samples could be obtained. Therefore, the confirmation samples that were not collected after excavation will be obtained using direct-push technology (DPT). Sample locations

will be selected based on a 50-foot by 50-foot grid system (see Figure 1). One confirmation sample will be collected at a randomly selected location per each 50-foot by 50-foot grid. Six locations will be sampled using DPT to collect soil samples.

This addendum will be used in conjunction with the original SAP. Sections of the original SAP that required revision are as follows:

Section 1.0

Section 2.0

Section 13.0

Figure 1 (added)

In addition, Data Quality Objectives table (Table 1) has been updated to reflect the revisions described in this addendum.

2.0 DATA GENERATION AND ACQUISITION

2.1 SAMPLING PROCESS DESIGN

2.1.4 Water Sampling for Waste Characterization

Additional text

In order to determine any impacts to the groundwater that may have occurred during excavation activities at the debris pile excavation, two HydroPunch[®] samples will be collected from the six grids identified in Figure 1, and sent to the laboratory to analyze for Title 22 metals, polychlorinated biphenyls (PCBs), and pesticides. Water sample results will be compared to the baseline concentrations established during this project as described in Section 2.1.4 of the original SAP.

2.1.7 Confirmation Samples of Northern Channel Slopes

Revised last two sentences of paragraph one

This process will be repeated until the confirmation sample results for the north and south slopes of the Northern Channel meet the RAOs for soil or to a maximum depth of 2 feet. This process will also be repeated a) until the confirmation sample results for the Lockheed berm meet the soil RAOs, b) the integrity of the berm is compromised, or c) the depth of the excavation is within 1 foot of the groundwater level. RAOs for soil are listed in Section 1.1.6 of the original SAP.

2.1.8 Confirmation Samples of the Debris Pile Area

Revised section

Confirmation samples will be collected based on a 50-foot by 50-foot grid system using DPT. One confirmation sample will be collected at a randomly selected location per 50-foot by 50-foot grid (Figure 1). A total of six DPT soil samples will be collected. Soil samples will be delivered to the analytical laboratory and analyzed for the chemicals of ecological concern (COECs), which includes Title 22 metals, PCBs, and pesticides. Soil sample results will be compared to the soil RAOs; however, further excavation based on results above RAOs will not be possible since the area has already been backfilled due to site conditions and safety concerns and groundwater was within 1 foot of the excavation depth after debris was removed. Nevertheless, the results will be reported to the DON to determine if further action is required.

2.2 SAMPLE COLLECTION METHODOLOGY

2.2.4 Water Sampling for Waste Characterization

Additional text

At the DPT sampling locations selected for groundwater sample collection in the debris pile area, a boring will be advanced using a DPT rig to a depth of from 5 to 10 feet bgs. The depth will be based on when the bottom clay layer is encountered. The groundwater sample will be collected using the HydroPunch[®] sampling system. The following steps summarize the sampling procedures:

1. Sampling personnel will don a new pair of disposable nitrile gloves immediately before collecting groundwater samples at each location.
2. DPT equipment will be used to drive the HydroPunch[®] sampling system to the desired sampling depth. The HydroPunch[®] sampling system consists of a stainless steel or polyvinyl chloride (PVC) slotted screen interval, typically 12 to 24 inches in length, attached to a metal, conical drive tip.
3. When the HydroPunch[®] sampler reaches the sampling depth, the drive casing will be retracted, thereby exposing the HydroPunch[®] screen interval to saturated formation.
4. A new, disposable Teflon[®] bailer will be used to retrieve groundwater samples.
5. Containers for Title 22 metals, PCBs, and pesticides listed in Table C.2-2 of the original SAP will be collected.
6. Each container will be labeled and clear packing tape will be placed over the label to secure it.
7. Samples will be custody sealed and packaged in accordance with Section 2.3 of the original SAP.
8. After packaging, samples will be stored in a cooler with sufficient ice (cooler will be approximately half full of wet ice placed below and above sample containers).
9. Field documentation including field logbooks and chains of custody (CoCs) will be filled out during sample collection in accordance with Section 2.3 of the original SAP.
10. Non-disposable sampling equipment will be decontaminated per Section 2.2.10 of the original SAP between each sample acquisition.
11. A new length of PVC screen will be used for each HydroPunch[®] sample or stainless-steel HydroPunch[®] screens will be decontaminated between each use.

2.2.8 Confirmation Samples of the Debris Pile Area

Revised section

Confirmation samples will be collected based on 50-foot by 50-foot grid system using DPT. One confirmation sample will be collected at a randomly selected location per 50-foot by 50-foot grid (Figure 1). Six DPT soil samples will be collected. Soil samples will be delivered to the analytical laboratory and analyzed for the COECs.

At each sample location the boring will be advanced, using a DPT rig, to a depth of from 5 to 10 feet bgs. The depth will be based on when the bottom clay layer is encountered. Soil samples will be retrieved in acetate sampling sleeves that line the inner core barrel. The following steps summarize the sampling procedures that will be performed.

1. Sampling personnel will don a new pair of disposable nitrile gloves immediately before collecting soil samples at each location.
2. DPT equipment will be used to drive the soil sampling system to the desired sampling depth. The soil sampling system consists of a piston-type sampler attached to the inner rod and drill string.
3. When the sampling depth is reached, the soil core sampler that contains the sample sleeves will be pushed "open" to collect the soil sample.
4. The sampler and drill string will be retracted from the borehole, and the sample sleeve will be recovered. The sample sleeve will be capped on each end and marked with the depth interval and the sample orientation. Each container will be labeled and clear packing tape will be placed over the label to secure it.
5. Samples will be custody sealed and packaged in accordance with Section 2.3 of the original SAP.
6. After packaging, samples will be stored in a cooler with sufficient ice (cooler will be approximately half full of wet ice placed below and above sample containers).
7. Field documentation including field logbooks and CoCs will be filled out during sample collection in accordance with Section 2.3 of the original SAP.
8. Non-disposable sampling equipment will be decontaminated per Section 2.2.10 of the original SAP between each sample acquisition.

13.0 REFERENCES

Additional references:

TN& Associates, Inc., and Tetra Tech EC, Inc. 2006. *Final Sampling and Analysis Plan for Site 27*. Contract Number N68711-04-D-1105, CTO 0002. Former Naval Air Station Moffett, Moffett Field, California. March.

TABLE 1
DATA QUALITY OBJECTIVES

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
Statement of Problem	Decisions	Inputs to the Decisions	Boundaries of the Study	Decision Rules	Limits on Decision Errors	Optimize the Sampling Design
<p><i>Based on extensive environmental investigations conducted from 1995 to 2002 to evaluate the ecology and nature and extent of contamination, the Navy determined that chemicals including PCBs, pesticides, and metals in sediment samples from the Northern Channel and associated areas, known as Site 27, at the former Naval Air Station Moffett Field are at levels that require cleanup.</i></p> <p><i>The primary objective of this project is to develop the remedial design documents for implementation of the proposed remedial actions for Site 27. The Navy proposes to clean up contaminated sediments and soils by:</i></p> <ul style="list-style-type: none"> • <i>Collecting in-situ sediment/soil samples from within the Northern Channel, Marriage Road Ditch, North Patrol Road Ditch, Lockheed berm, north and south slopes of the western portion of the Northern Channel for chemical testing for waste characterization purposes.</i> • <i>Collecting samples from the debris stockpile for chemical testing for waste characterization purposes.</i> • <i>Removing a layer of sediments and soils, and debris pile considered to be hazardous to the ecological receptors.</i> • <i>Transporting excavated sediments, soils, and debris to an appropriate off-site facility for disposal.</i> • <i>Conducting confirmation sampling of sediments and surface soils after excavation of the area to ensure that cleanup goals have been achieved.</i> • <i>Collecting runoff water from sediment drying pads in detention/settling basin, pumped to several of the Baker tanks, then pumped through the on-site filtration system, and finally temporarily stored in the remaining Baker tanks. Baker tanks to be sampled, then water to be discharged to Northern Channel depending on analytical results.</i> • <i>Re-establishing the water flow through the drainage channels, revegetating the disturbed areas, and improving the local habitat environment.</i> • <i>Collecting and analyzing import material samples prior to backfilling</i> • Performing groundwater sampling in debris area to determine if excavation activities impacted the groundwater in the debris area <p><i>In addition, a bench-scale test is needed in order to find the filter types that optimize the on-site filtration system configuration to meet the discharge requirement for turbidity. A summary of bench-scale design is described in Section 2.1.5..</i></p>	<ol style="list-style-type: none"> 1. <i>Are the filters selected in the remedial design adequate to bring the turbidity of wastewater to the discharge limit described in Section 2.1.5?</i> 2. <i>Are the analytical results from the in-situ and debris pile samples below the IDW, 10x STLC, and 20x TCLP limits in Table B-1 (Attachment B)?</i> 3. <i>Are the analytical results from the confirmation sampling at Site 27 above the RAOs as listed in Table B-1 (Attachment B)?</i> 4. <i>Are the analytical results from the confirmation sampling at debris pile area above the RAOs as listed in Table B-1 (Attachment B)?</i> 5. <i>Are the analytical results from the wastewater above the discharge requirements in Table B-1 (Attachment B)?</i> 6. <i>Are the analytical results for the import material above the action levels listed in Table B-1 (Attachment B)?</i> 7. Are the analytical results from the groundwater samples collected from the debris area above the baseline concentrations described in Section 2.1.4 of the original SAP? 	<ol style="list-style-type: none"> 1. <i>Results from the bench-scale test that simulates the on-site filtration system design.</i> 2. <i>Results of the in-situ and debris pile samples.</i> 3. <i>Results of confirmation soil samples.</i> 4. <i>Results of confirmation soil samples from debris pile area.</i> 5. <i>Results of the wastewater samples.</i> 6. <i>Results of the import material samples</i> 7. Results from groundwater samples in the debris area.. 	<p><i>Figure C.1-2 of the SAP illustrates the proposed excavation area.</i></p> <p>Figure 1 illustrates the location of the debris pile DPT sample points.</p> <p><i>Project duration is anticipated to be from April through October 2006.</i></p> <ol style="list-style-type: none"> 1. <i>One sediment and water mixture sample will be collected from the channel prior to the start of excavation activities in accordance with procedures in Section 2.2.5.</i> 2. <i>In-situ samples will be collected every 50 linear feet, as described in Section 2.0 of the SAP. One debris pile sample will be collected for every 500 cubic yards. Samples will be analyzed for the COECs. Ten percent of the samples collected will be analyzed for additional disposal facility requirements.</i> 3. <i>Confirmation soil samples will be collected from each 50-foot linear section at zero to 6 inches bgs from the Northern Channel, ditches and along the slopes.</i> 4. <i>Confirmation soil samples will be collected at from each 50-foot by 50-foot grid at the debris pile area. Samples will be analyzed for COECs.</i> 5. <i>Prior to discharge, one representative sample will be collected from the Baker tanks for waste characterization and discharge purposes. Samples will be analyzed for the site's discharge requirements (for the Northern Channel).</i> 6. <i>Import material samples will be collected at a frequency as described in the DTSC guidance document. Import material samples will be analyzed as described in Section 2.0 of the SAP</i> 7. Hydropunch samples will be collected from two sampling locations in the debris pile area during DPT soil sampling activities.. 	<ol style="list-style-type: none"> 1. <i>If the turbidity results of the first filtrate from the bench-scale test do not meet the discharge requirement, then the filtration system design will be modified. Otherwise, the current on-site filtration system design will be installed.</i> 2. <i>If the results are below the IDW, 10x STLC, and 20x TCLP limits, then the waste will be classified as non-hazardous. Otherwise, additional analyses such as STLC or TCLP will be conducted if the concentration is above 10 times the STLC limit for that analyte or 20 times the TCLP limit for any analyte to determine if the waste is California State hazardous (STLC exceedance) or RCRA hazardous (TCLP exceedance) and will be manifested, transported, and disposed of accordingly.</i> 3a. If the results of confirmation soil and sediment samples collected at Site 27 from the north and south slopes are above the RAOs for sediments and soil, then the entire area in question will be over-excavated and resampled every 6 inches of depth to a maximum of 2 feet. Otherwise, grading activities will commence. 3b. If the results of confirmation soil samples collected at Site 27 from the Lockheed berm are above the RAOs for soil as listed in Table B-1 of the original SAP, then the entire area in question will be over-excavated and resampled every 6 inches of depth to a maximum of 1 foot within the groundwater level or such that the integrity of the berm is not compromised. Otherwise, grading activities will commence. 4. If the results of confirmation soil samples collected at the debris pile area are above the RAOs for soil, then the DON will be notified to determine if further action is required since the area has already been backfilled due to site conditions and safety concerns. Otherwise, no further action will be required. 5. <i>If the results of the wastewater samples are above the discharge limits, then the wastewater will be pumped through the on-site filtration system once more, and if wastewater does not meet discharge requirement after two treatments, then wastewater will be classified as California state hazardous (STLC) or RCRA hazardous (TCLP) and will be disposed of accordingly. Otherwise, the wastewater will be discharged into the Northern Channel.</i> 6. <i>If the results of the import material are above the action levels, then the material will not be used on site. Another import fill source will be identified, and samples will be collected and compared against the action levels. Otherwise, the import material will be used as backfill on site.</i> 7. If the results of the groundwater samples are above the baseline concentrations described in Section 2.1.4 of the original SAP, then the DON will be notified to determine if further action is required. Otherwise, no further action will be required. 	<p><i>To limit decision errors, analytical method requirements and project-specific DQOs were established. Published analytical method and laboratory-specific performance requirements are the primary determiners of DQOs for precision and accuracy.</i></p> <p><i>Field crews will review the SAP before collection of samples. The laboratory performing the analysis will be given a copy of the SAP before analysis of samples.</i></p> <p><i>Third-party data validation will be performed on all samples, except waste characterization samples.</i></p> <p><i>Sampling and analysis protocols will be carefully followed to limit errors.</i></p>	<ol style="list-style-type: none"> 1. <i>Bench-scale test and system design will be conducted and modified until turbidity results meets the discharge requirements described in Section 2.1.5.</i> 2. <i>In-situ sampling, as described in Step 4, was designed to characterize the sediment/soil in place thereby facilitating the segregation of the material during excavation.</i> 3. <i>Confirmation soil samples will be collected from zero to 6 inches as described in Step 4. Each sample will be collected from a random location every 50 linear feet along the Northern Channel, ditches, and slopes.</i> 4. <i>Confirmation soil samples will be collected within each 50-foot by 50-foot grid at the debris stockpile area as described in Step 4.</i> 5. <i>Prior to discharge, wastewater will be collected from the Baker tanks, as described in Step 4.</i> 6. <i>Import material samples will be collected and analyzed, as described in Step 4.</i> 7. Hydropunch samples will be collected and analyzed as described in Step 4.

Italics indicates text from original SAP.

Bold indicates steps that were added or revised based on this addendum.

TABLE 1
DATA QUALITY OBJECTIVES

Acronyms/Abbreviations:

bgs – below ground surface
COEC – chemical of ecological concern
DQO – data quality objective
DON – Department of the Navy
DPT – direct push technology
DTSC – Department of Toxic Substances Control
IDW – investigation-derived waste
PCB – polychlorinated biphenyl
RAO – Remedial Action Objective
RCRA – Resource Conservation and Recovery Act
SAP – Sampling and Analysis Plan
STLC – Soluble Threshold Limit Concentration
TCLP – Toxicity Characteristic Leaching Procedure

FIGURES

