Base Realignment and Closure
Program Management Office West
San Diego, California

Draft

Parcel G Removal Site Evaluation Work Plan

Former Hunters Point Naval Shipyard
San Francisco, California

June 2018

Executive Summary

Background

Radiological surveys and remediation were previously conducted at Hunters Point Naval Shipyard (HPNS) as part of a basewide Time-critical Removal Action (TCRA) in accordance with the Action Memorandum (Navy, 2006). Tetra Tech EC, Inc. (TtEC), under contracts with the Department of the Navy (Navy), conducted a large portion of the basewide TCRA from 2006 to 2015. There have been various allegations of data manipulation or falsification committed by TtEC employees and TtEC's subcontractors during the TCRA. An independent third-party evaluation of previous data found evidence of manipulation and falsification at Parcel G (Navy, 2017, 2018). As a result, the Navy developed this work plan to investigate radiological sites in Parcel G.

Project Purpose

The purpose of the investigation presented in this work plan is to determine whether current site conditions are compliant with the remedial action objective (RAO) in the Parcel G Record of Decision (ROD) (Navy, 2009). The RAO for radiologically impacted soil and structures is to prevent receptor exposure to radionuclides of concern (ROCs) in concentrations that exceed remediation goals (RGs) for all potentially complete exposure pathways. Additional reference background areas will also be identified to confirm, or update as necessary, estimates of naturally occurring and man-made background levels for ROCs not attributed to Naval operations at HPNS.

Portions of soil or structures that are not compliant with the RAO will be evaluated for protectiveness based on the United States Environmental Protection Agency's (USEPA's) current guidance on *Radiation Risk Assessment at CERCLA Sites* (USEPA, 2014).

Scope

The radiological investigation will be conducted at the following sites:

- Former Sanitary Sewer and Storm Drain Trenches
- Buildings 317/364/365 Former Building Site
- Building 351A
- Building 351
- Building 366
- Building 401
- Former Building 408 Concrete Pad
- Building 411
- Building 439

The sites and the locations of work are shown on **Table ES-1** and **Figure ES-1**.

Conceptual Site Model

A conceptual site model (CSM) was developed with current knowledge of the site (see **Section 2**). There is uncertainty whether radiological contamination was present or remains in-place. Examples of uncertainties include the following:

- Allegations of previous sample collection fraud, improper sample and document custody/controls, and data manipulation could indicate that contamination was potentially left at the site.

- The previous work relied on a quicker, less accurate method for analyzing radium-226 (^{226}Ra). This method was known by stakeholders at the time to be biased high. A large amount of soil (estimated 80 percent) was likely mischaracterized as contaminated (Argonne National Laboratory, 2011).
- The RGs used previously are within background ranges. Therefore, soil that was considered contaminated could have been attributable to naturally occurring radioactivity or anthropogenic fallout (Argonne National Laboratory, 2011).

The CSM is based largely on the Historical Radiological Assessment (NAVSEA, 2004). A determination as to whether contamination exists at the site cannot be made until additional data are collected, analyzed, and compared to RGs and background concentrations.

Soil Investigations

Soil investigations will be conducted at the following areas:

- Former Sanitary Sewer and Storm Drain Trenches
- Buildings 317/364/365 Former Building Site
- Building 351A Crawl Space

Soil investigation areas will be divided into trench units (TUs) and surface soil survey units (SUs). The size and boundary of the TUs and SUs will be based on the previous plans and reports. The approximate size and boundary of the TUs and SUs are shown on **Figure ES-1**.

A phased investigation approach is presented in this work plan that was designed to provide a high level of confidence that current site conditions either comply or do not comply with the Parcel G ROD RAO (Navy, 2009).

Phase 1 Investigation

Phase 1 includes the radiological investigation on a targeted group of TUs and SUs. Twenty-one of the 63 former sanitary sewer and storm drain TUs were selected for the Phase 1 investigation. Fourteen of the 28 surface soil SUs[1] from the Buildings 317/364/365 Former Building Site and Building 351A Crawl Space were selected for the Phase 1 investigation.

The radiological investigation of soil includes the following:

- Collection of systematic soil samples
- Gamma scan of 100 percent of the soil
- Collection of bias soil samples, where necessary, based on the gamma scan measurements

The targeted TUs and SUs were selected based on the highest potential for radiological contamination. The following information was used to select the units:

- Historical documentation of specific potential upstream sources, spills, or other indicators of potential contamination (NAVSEA, 2004)
- Signs of potential manipulation or falsification from the soil data evaluation (Navy, 2017, 2018)

For TUs associated with former sanitary sewers and storm drains (from 1 to 22 feet deep), 100 percent of the soil will be excavated to the original TU boundaries, as practicable, and gamma scans of the excavated material will be conducted. Excavated soil will be gamma scanned by one of two methods.

[1] Previously, 32 SUs were investigated at Buildings 317/364/365 Former Building Site and Building 351A Crawl Space; however, some SU areas overlapped. For the Buildings 317/364/365 Former Building Site, former SU 22 overlaps TU-153 and will be investigated as part of TU-153. For the Building 351A Crawl Space, former SU-R, SU-S, and SU-U overlapped SU-M, SU-N, and SU-O and will be investigated as SU-M, SU-N, and SU-O.

Soil may be laid out on Radiological Screening Yard pads for a surface scan, or soil may be processed and scanned using soil segregation technology. Following excavation to the original TU boundaries, additional excavation of approximately 6 inches of the trench sidewalls and floors will be performed to provide ex situ scanning and sampling of the trench sidewalls and floors. Global positioning system (GPS)-location correlated results will be collected.

For surface soil SUs, a surface gamma scan of 100 percent of surface soil will be conducted as walk-over or drive-over surveys. GPS-location correlated results will be collected.

Systematic and bias samples will be collected from the excavated soil from the TUs, within the surrounding soil of the TUs, and from the surface soil SUs. The soil samples will be analyzed for ROCs by accredited offsite laboratories, and the results will be evaluated to determine whether concentrations are below the RGs. Soil sample locations will be surveyed using GPS to facilitate relocation if further investigation is warranted.

To the extent practicable, soil with ROCs at concentrations above the RGs will be evaluated further using USEPA's current guidance on *Radiation Risk Assessment at CERCLA Sites* (USEPA, 2014).

Phase 2 Investigation

Additional soil sampling will be conducted on the remaining 42 TUs and 14 SUs as part of the Phase 2 investigation. For TUs associated with former sanitary sewers and storm drains (from 1 to 22 feet deep), subsurface soil samples will be collected via borings. The borings will be advanced beyond the floor boundary of the trench or to the point of refusal. Gamma scans of the core will be conducted. Borehole locations will be surveyed using GPS to facilitate relocation if further investigation is warranted.

For surface soil SUs, systematic samples will be collected from underneath the durable cover layers.

The soil samples will be analyzed for ROC analysis by accredited offsite laboratories. Exceedances of the RGs identified in the soil samples will be evaluated further using USEPA's current guidance on *Radiation Risk Assessment at CERCLA Sites* (USEPA, 2014).

Building Investigations

Investigations of interior surfaces will be performed for the following buildings:

- Building 351A
- Building 351
- Building 366
- Building 401
- Former Building 408 Concrete Pad
- Building 411
- Building 439

Buildings will be divided into SUs, and the size and boundary of the SUs will be based on the previous plans and reports. The radiological investigation will be conducted to include the following:

- Collection of systematic static alpha-beta measurements
- Alpha and beta scan of surfaces
- Collection of bias static alpha-beta measurement where necessary, based on the alpha-beta scan measurements
- Collection of swipe samples

Data Evaluation and Reporting

Data from the radiological investigation will be evaluated to determine whether the site conditions are compliant with the Parcel G ROD RAO. If the residual ROC concentrations are below the RGs in the Parcel G ROD, then the site conditions are compliant with the Parcel G ROD RAO.

Various methods will be used to determine whether the residual ROC concentrations are below the RGs:

- Each sample and measurement result will be compared to the corresponding RG.
- Individual samples reporting ^{226}Ra gamma spectroscopy concentrations greater than the RG for ^{226}Ra will be analyzed for uranium-238 (^{238}U) and ^{226}Ra using comparable analytical methods. For that specific sample, the ^{238}U result will be used as a more representative estimate of the background value for ^{226}Ra, and the alpha spectrometry ^{226}Ra concentration will be compared to the RG for ^{226}Ra using the revised background value.

If the investigation results demonstrate that site conditions are compliant with the Parcel G RAO, then a remedial action completion report (RACR) will be developed. The RACR will describe the results of the investigation and will provide a demonstration that the RAO has been met, and that residual radioactivity levels are comparable with background.

If the investigation results demonstrate that site conditions are not compliant with the Parcel G RAO, then the data will be evaluated to determine whether site conditions are protective of human health using USEPA's current guidance on *Radiation Risk Assessment at CERCLA Sites* (USEPA, 2014). A removal site evaluation report will be developed to include recommendations for further action.