



**Naval Facilities Engineering Command Southwest
BRAC PMO West
San Diego, CA**

AIR MONITORING SUMMARY REPORT

MAY 25 TO JUNE 7, 2019

Remedial Action/Non-Time-Critical Removal Action Installation
Restoration Site 12

FORMER NAVAL STATION TREASURE ISLAND, SAN
FRANCISCO, CA

June 2019

Approved for public release; distribution is unlimited

DCN: GLBN-0005-4239-031



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Restoration Site 12

FORMER NAVAL STATION TREASURE ISLAND, SAN
FRANCISCO, CA

Prepared for:



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Naval Facilities Engineering Command Southwest
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LIST OF ABBREVIATIONS AND ACRONYMS

4,4'-DDD	4,4-dichlorodiphenyldichloroethane
AMP	Air Monitoring Plan
BAAQMD	Bay Area Air Quality Management District
BAP	benzo(a)pyrene
cfm	cubic feet per minute
CFR	Code of Federal Regulations
DAC	derived air concentration
DTSC	Department of Toxic Substances Control
HERO	Human and Ecological Risk Office
Gilbane	Gilbane Federal
DCP	Dust Control Plan
IR	Installation Restoration
mg/m ³	milligram per cubic meter
Navy	U.S. Department of the Navy
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PDR	personal data-logging real-time aerosol monitor
PM10	particulate matter less than 10 microns in diameter
PUF	polyurethane foam
Ra-226	radium-226
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TLV	threshold limit value
TSP	total suspended particulates
µg/m ³	microgram per cubic meter
USEPA	United States Environmental Protection Agency
Work Plan	<i>Final Work Plan, Remedial Action/Non-Time Critical Removal Action, Installation Restoration Site 12, Former Naval Station Treasure Island, San Francisco, California</i>

1.0 INTRODUCTION

This Air Monitoring Report was prepared by Gilbane Federal (Gilbane) as requested by the United States Department of the Navy (Navy) under the Radiological Multiple Award Contract (RADMAC II) N62473-12-D-D005, Contract Task Order F4239. Gilbane is performing dust and air monitoring at Former Naval Station Treasure Island in accordance with the Final Dust Control Plan (DCP) and Air Monitoring Plan (AMP), included as appendices to *Remedial Action/Non-Time Critical Removal Action Work Plan, Installation Restoration Site 12, Former Naval Station Treasure Island, San Francisco, California* (Work Plan; Gilbane, 2018).

The DCP describes best management practices and procedures to be implemented to minimize dust generation during work activities. Dust monitoring is conducted to ensure that these procedures are effective. Dust monitoring is also conducted to verify that the working environment meets occupational health and safety standards and that workers are safe. The AMP outlines the requirements for prevention of exposure for construction workers to dust and potential airborne chemicals of concern from the work area. The AMP also establishes the conservative project action levels for dust at the work area boundary to protect residents.

This summary report describes the following:

- Dust and air monitoring sampling locations – **Section 2.0**;
- Dust and air monitoring sample collection and analytical methods – **Section 3.0**;
- Dust and air monitoring data – **Section 4.0**; and
- Dust and air monitoring results – **Section 5.0**.

This summary report presents the dust and air monitoring test results at Installation Restoration (IR) Site 12 and/or IR Site 32 from May 25th, 2019 through June 7th, 2019 and compares the results with the established action levels included in the Work Plan (Gilbane, 2018).

IR Site 32, located 600 yards to the east of IR Site 12, is being used as a radiological screening yard and staging yard for the IR Site 12 project activities. The screening criteria established for IR Site 12 will be applied to the air monitoring at IR Site 32.

During the reporting period, personal data-logging real-time aerosol monitoring (PDR) dust data was collected. Air samples were collected and analyzed for lead, chromium, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dioxin [2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)], total suspended particulates (TSP), and particulate matter less than 10 microns in diameter (PM10). In addition, air samples were analyzed for radiological gross alpha and beta levels.

2.0 MONITORING SITE LOCATIONS

2.1 Dust Monitoring

During earthmoving activities, multiple PDR stations are set up to monitor real-time airborne dust concentrations. The purpose of the PDR stations is to act as a first line of defense in protecting workers' health, and ultimately the public's health, during field activities. Dust levels are monitored at, and immediately adjacent to, the work area at the locations that will most likely contain the greatest volume of airborne dust. The objective of this dust monitoring approach is to demonstrate that dust levels are below action levels.

The general locations for dust monitors in IR Site 32 are shown on Figure 1, and the general locations for dust monitors for IR Site 12 are shown on Figure 2. Specific locations of each PDR are described in the individual PDR daily data files. Field forms from each location are presented in Attachment 1 of this report. During earth moving activities (i.e. transporting soil to radiological screening yard pads, managing radiological screening yard pads, etc.) at IR Site 32, one PDR serves as the upwind (background) location and two PDRs are placed in downwind perimeter locations. Correspondingly, during earth moving activities at IR Site 12 (i.e., transportation of excavated soil to the radiological screening yard, excavation, and backfilling), one PDR serves as the upwind (background) location and two PDRs are placed in downwind perimeter locations. Weather forecasts including wind direction are checked daily with a weather station located at Building 572.

2.2 Air Monitoring

Air monitoring samples were collected at the upwind Perimeter Road location and at the downwind location at the gate to Site 32. Air monitoring samples collected using high volume samplers are collected to identify and quantify airborne contaminants and to confirm the results recorded during dust (PDR) monitoring. Air monitoring stations are mobilized to collect air monitoring samples upwind and downwind of work areas. General locations of air monitoring stations are shown on Figure 3. The locations of the air monitoring stations are determined based on the prevailing wind direction (typically

from the northwest) and are modified as needed. A weather station is erected to monitor the wind direction.

High volume air monitoring stations remain stationary while sampling is being conducted; however, locations may be adjusted when the wind direction changes and when overall excavation work areas change from one site to another. Each upwind and downwind high-volume monitoring station includes separate monitoring systems for the following:

- TSP - collected daily
- PM10 - collected daily
- Lead and chromium - collected daily
- PAHs, PCBs, and Dioxins - collected on alternating days

2.3 Radiological Air Monitoring

Radiological air samplers are positioned adjacent to excavation work activities for radiologically impacted soil at one upwind and one downwind location during earthmoving activities associated with radiologically impacted soil. The radiological air samplers may be co-located with PDRs or the high-volume samplers.

3.0 SAMPLING AND ANALYTICAL METHODS

Dust and air samples are collected during earthmoving activities. However, during precipitation events, the dust and air monitoring units may not be operable. An attempt will be made to collect samples and readings regardless of the weather. If dust or air monitors are found to be malfunctioning or nonfunctional, earthmoving activities will stop until monitors can be repaired or replaced. The Site Health and Safety Officer is responsible for monitoring the air and dust monitoring sampling equipment. In rare cases, due to ancillary equipment malfunction such as generator failure during the night, a sample may be collected that represents a period of less than 24 hours. If this situation occurs, a note is added to the sample result data tables indicating why the full sampling period was not achieved.

3.1 Dust Samples

The PDR is a high sensitivity photometric monitor with a light-scattering sensing configuration that has been optimized for the measurement of the respirable fraction of airborne dust, smoke, fumes, and mists.

PDRs are used to evaluate real-time monitoring of airborne dust concentrations, to determine if there is a need for additional dust control or personal protection.

3.2 Air Samples

Air samples were sampled in accordance with the United States Environmental Protection Agency (USEPA) reference sampling method for PM₁₀, described in 40 Code of Federal Regulations (CFR) 50, Subpart J. Each sample was collected on a filter over an approximately 24-hour period; the filter was then weighed to determine the amount of PM₁₀ collected.

TSP samples were collected with a high-volume (39 to 60 cubic feet per minute [cfm]) air sampler in accordance with USEPA's reference sampling method for TSP, described in Title 40 CFR, Part 50, Subpart B. Each sample was collected on a filter over an approximately 24-hour period; the filter was then weighed to determine the amount of TSP collected. Once the filter weight was determined, the sample was analyzed for lead and chromium in accordance with USEPA Method 6020 using inductively coupled mass spectrometry.

Air samples for PCBs, PAHs, and dioxins are collected and analyzed in accordance with USEPA Methods TO-4A, TO-13, TO-9A, respectively, using TISCH polyurethane (PUF) samplers. The filter media collected from the air samplers is submitted to the analytical laboratory for appropriate analysis.

PCB, PAH, and dioxin samples are collected on alternating days at the downwind and upwind stations during earthmoving activities.

3.3 Radiological Air Samples

Radiological air monitoring is also conducted upwind and downwind on days of earthmoving activities. Radiological samples are collected with a LV-1 low volume air sampler. Air filters are counted on site following a decay period and are compared with public air concentration limits published in 10 CFR Part 20. Radiological air sampling methods and procedures are detailed in Gilbane Radiological Procedure PR-RP-150 *Radiological Survey and Sampling* (Gilbane, 2016).

The radiological air sample is counted on a Low Background Protean WPC-9950 and analyzed for gross alpha and beta activity. The calculated airborne concentration in microcuries is then compared to the effluent concentration (often but incorrectly refer to as a derived air concentration [DAC] which applies only to occupational exposures) limit specified in Table 2 of Appendix B to 10 CFR 20. The effluent

concentration is the concentration of a given radionuclide in air which, if inhaled continuously over the course of a year, results in an exposure equal to the annual regulatory limit specified in 10 CFR 20.1302. The threshold for radiological effluent air monitoring samples is 10 percent of the effluent concentration, which ensures work practices are evaluated and modified as necessary to ensure the limit is not reached.

4.0 DUST AND AIR MONITORING DATA

The Human and Ecological Risk Office (HERO) at the request of the California Department of Toxic Substances Control (DTSC) developed dust action levels for community air monitoring for IR Site 12. Subchronic and chronic dust action levels as PM₁₀ were calculated for lead, chromium, dioxin, benzo(a)pyrene (BAP), 4,4-dichlorodiphenyldichloroethane (4,4'-DDD) and PCBs. As presented in the document *Dust Action Levels for Installation Restoration Site 12, Former Naval Station Treasure Island, San Francisco, California* (HERO, 2018), the action levels were calculated using the maximum chemicals of concern soil concentrations at IR Site 12. As noted in **Section 1.0**, IR Site 12 action levels will be implemented for project work at IR Site 32.

Based on HERO's recommendations, a PM₁₀ dust action level of 50 microgram per cubic meter (ug/m³) will be implemented for all excavations areas at IR Site 12 except at the area surrounding sampling location KCH-1217-1 which will have a limit of 8 ug/m³ due to the elevated level of contaminants historically measured at this location. TSP is expected to be further controlled based on the limit employed for PM₁₀, in accordance with guidance provided by the San Francisco Bay Area Air Quality Management District (BAAQMD), which estimates that PM₁₀ makes up approximately 55 percent of TSP. If it is apparent that project activities are the cause of exceedances, additional control measures will be considered and implemented.

Dust monitoring action levels that are implemented on a real-time basis are listed in Table 1. PDR data are collected and reviewed each day by the Site Health and Safety Manager. PDR data are included in Attachment 1.

Analytical results from air monitoring samples are compared with the project screening criteria (threshold limit values [TLV]) listed in Table 2. Air monitoring results are included in Attachment 2. Radiological monitoring results are included in Attachment 3.

Table 1
Dust Monitoring Project Action Levels

Method	Monitoring Location	Monitoring Frequency ^a	Action Level ^b	Action
PDR	Near Workers' Breathing Zones (typically on equipment)	Periodically ^c	<2.5 mg/m ³ >2.5 mg/m ³	Continue work. Use Level D and increase dust control (i.e., apply water or other suppression method). Optionally upgrade to Level C until concentrations are reduced.
	Job Site Perimeter	Continuously	<1.0 mg/m ³ >1.0 mg/m ³	Continue work. Increase dust control and re-evaluate. Stop work if levels do not decrease.

Notes:

Only the Health and Safety Manager is authorized to downgrade levels of personal protective equipment.

^a Frequency of air monitoring may be adjusted by the project Certified Industrial Hygienist after sufficient characterization of site contaminants has been completed, tasks have been modified, or site controls have proven effective.

^b Five readings exceeding the action level in any 15-minute period or a sustained reading exceeding the action level for five minutes will trigger a response. Action levels represent airborne particulate concentrations in excess of background particulate concentrations.

^c PDR will be monitored a minimum of three times a day.

< less than

> greater than

mg/m³ milligram per cubic meter

PDR personal data-logging real-time aerosol monitor

Table 2
Air Monitoring Project Screening Criteria

Chemicals of Concern	Project Screening Criteria (Threshold Limit Value) $\mu\text{g}/\text{m}^3$	Basis
Lead	242	TI Site 12 Dust Action Level
Chromium	929	TI Site 12 Dust Action Level
TSP	50	TI Site 12 Dust Action Level
PM10	50	BAAQMD ambient air quality
BAP	50 (8) ^b	TI Site 12 Dust Action Level
PCBs ^a	NA	TI Site 12 Dust Action Level
4,4'-DDD	200	TI Site 12 Dust Action Level
Dioxin ^a	1E+07	TI Site 12 Dust Action Level
Radiological (Ra-226)	10% of DAC ^c	Occupational and public air concentration limits for Ra-226 published in 10 Code of Federal Regulations Part 20.

Notes:

a The dust action level was increased by a factor of 10 to account for the short-term duration of the project relative to the lifetime assumptions incorporated into the toxicity criteria and exposure assumption.

b BAP action levels will be 50 $\mu\text{g}/\text{m}^3$ for all excavations except for the area surrounding sample locations KCH-1217-1 at which it will be 8 $\mu\text{g}/\text{m}^3$

c Public air concentration limits are commonly referred to as DAC, but are in actuality Effluent Concentrations from Table 2 for 10 CFR Part 20.

% percent

4,4'-DDD dichlorodiphenyldichloroethane

BAAQMD Bay Area Air Quality Management District

BAP benzo(a)pyrene

DAC derived air concentration

PCBs polychlorinated biphenyls

PM10 particulate matter smaller than 10 microns in diameter

Ra-226 radium-226

TSP total suspended particulates

$\mu\text{g}/\text{m}^3$ microgram per cubic meter

5.0 AIR MONITORING RESULTS

If dust (PDR) monitoring equipment alarm, the source of exceedance will be determined by evaluating both upwind and downwind dust (PDR) sample locations. If the difference between upwind and downwind concentrations is greater than the action level for a sustained period of 15 minutes, then earthmoving activities will be halted until dust control measures are implemented. These may include, but are not limited to adding water to the work area during earth moving tasks, evaluation of alternate work procedures or equipment, and/or cessation of the activity that is creating the dust until the PDR readings are below the screening criteria.

PDR summary results are presented in Attachment 1. Weather information (including ambient pressure and temperature data) and high-volume air monitoring sample results are presented in Attachment 2. Weather information was collected from the weather station at Building 572, Avenue M, Treasure Island, San Francisco, California. Radiological air monitoring results are presented in Attachment 3.

PM10 analytical results from May 25, 2019 to June 7, 2019 did not exceed the project-specific screening criteria presented in Table 2.

TSP analytical results from May 25, 2019 to June 7, 2019 did not exceed the project-specific screening criteria presented in Table 2, with the exception of the result from May 29, 2019 at AMS02 which was reported at a delta between the downwind and upwind stations of 65.21 ug/m³, and the result from June 7, 2019 which was reported at a delta between the downwind and upwind stations of 125.35 ug/m³. The dust monitoring logs presented in Attachment 1 for the corresponding days (May 28, 2019 and June 6, 2019, respectively) show that there were no earthmoving activities at Site 32 for the days in question, indicating site activities were not the source of the exceedance.

Metals (chromium and lead), PAHs, total PCBs, and dioxin analytical results from May 25, 2019 to June 7, 2019 did not exceed the project-specific screening criteria presented in Table 2.

Dust (PDR) delta action levels did not exceed during the reporting period. The data sheets are found in Attachment 1.

Radiological air monitoring action levels were not exceeded during the reporting period.

6.0 REFERENCES

Gilbane, 2016. *Radiological Procedure PR-RP-150 Radiological Survey and Sampling*. January.

Gilbane, 2018. *Remedial Action/Non-Time Critical Removal Action Work Plan, Installation Restoration Site 12, Former Naval Station Treasure Island, San Francisco, California*. September.

Gilbane, 2018. *Remedial Action/Non-Time Critical Removal Action Work Plan, Air Monitoring Report, Installation Restoration Site 12, Former Naval Station Treasure Island, San Francisco, California*. September.

Gilbane, 2018. *Remedial Action/Non-Time Critical Removal Action Work Plan, Dust Control Plan, Installation Restoration Site 12, Former Naval Station Treasure Island, San Francisco, California*. September.

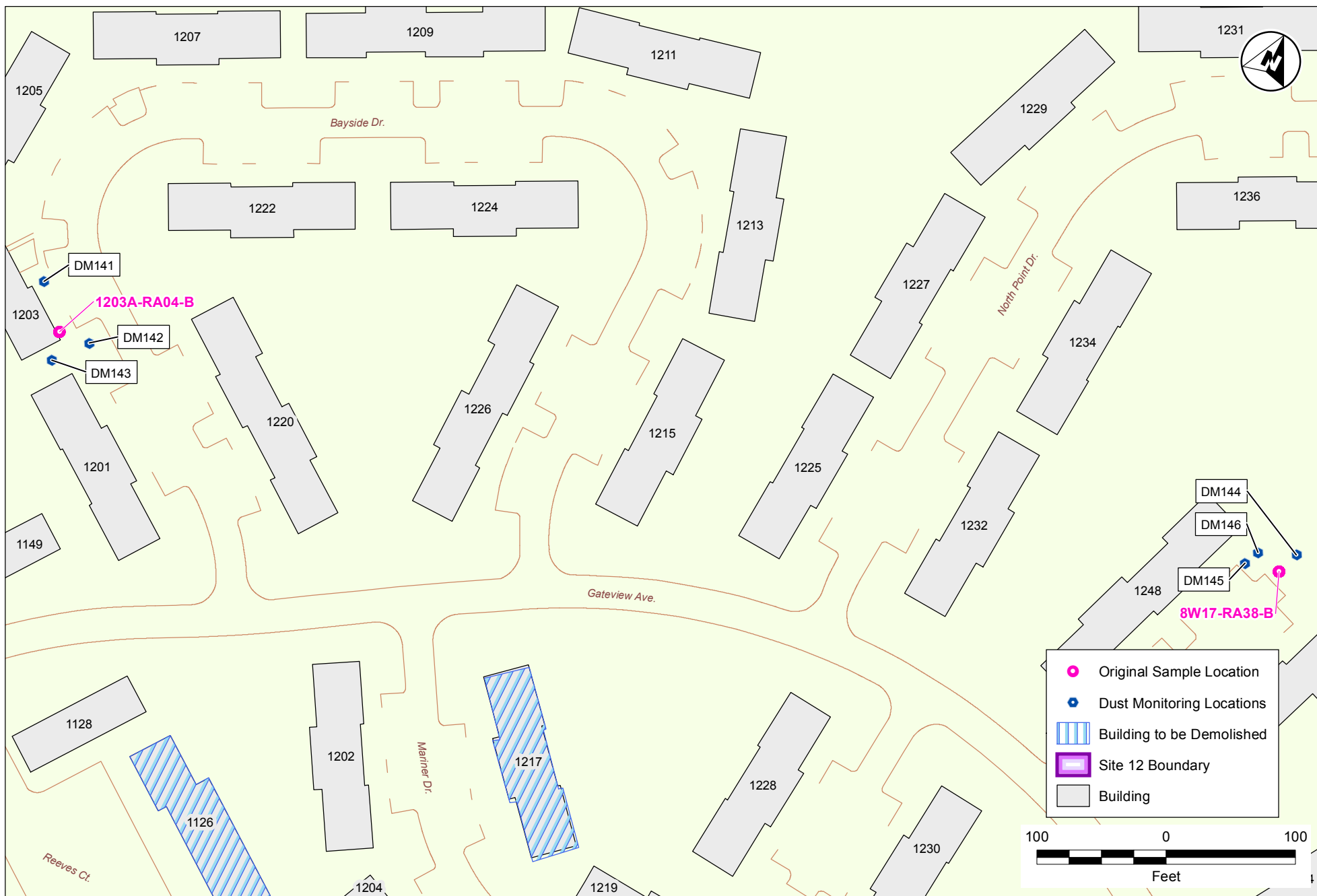
HERO, 2018. *Dust Action Levels for Installation Restoration Site 12, Former Naval Station Treasure Island, San Francisco, California*. September.

FIGURES



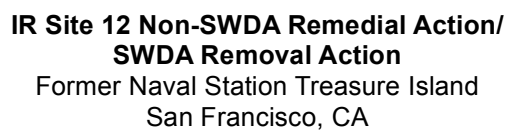
**IR Site 12 Non-SWDA Remedial Action/
SWDA Removal Action**
Former Naval Station Treasure Island
San Francisco, CA

Figure 1
PDR Monitoring Locations
IR Site 32



**IR Site 12 Non-SWDA Remedial Action/
SWDA Removal Action**
Former Naval Station Treasure Island
San Francisco, CA

Figure 2
PDR Monitoring Locations
IR Site 12



ATTACHMENTS

ATTACHMENT 1
PDR SUMMARY TABLE AND FIELD FORMS

Table 1-1

Personal Data-logging Real-time (PDR) Aerosol Monitoring Results

Remedial Action/NTCRA IR Site 12

Former Naval Station Treasure Island, San Francisco, California



DustTrak Unit	IR Site	Date	Maximum (mg/m ³)	Average (mg/m ³)	Delta Between Upwind and Downwind stations (mg/m ³)	Below action level? (0.050 mg/m ³) (Yes/No)
DM1	Site 32	5/28/2019	0.018	0.015	NA	NA
DM2	Site 32		0.028	0.020	0.005	Yes
DM3	Site 32		0.015	0.011	-0.005	Yes
DM1	Site 32	5/29/2019	0.041	0.029	NA	NA
DM2	Site 32		0.046	0.030	0.001	Yes
DM3	Site 32		0.040	0.026	-0.003	Yes
DM141	Site 12		0.029	0.027	NA	NA
DM142	Site 12		0.029	0.027	0.000	Yes
DM143	Site 12		0.021	0.021	-0.006	Yes
DM1	Site 32	5/30/2019	0.007	0.004	NA	NA
DM2	Site 32		0.024	0.013	0.009	Yes
DM3	Site 32		0.008	0.006	0.002	Yes
DM1	Site 32	6/3/2019	0.019	0.016	NA	NA
DM2	Site 32		0.031	0.018	0.002	Yes
DM3	Site 32		0.016	0.015	-0.001	Yes
DM144	Site 12		0.022	0.016	NA	NA
DM145	Site 12		0.019	0.013	-0.002	Yes
DM146	Site 12		0.016	0.012	-0.004	Yes
DM1	Site 32	6/4/2019	0.038	0.034	NA	NA
DM2	Site 32		0.040	0.034	0.000	Yes
DM3	Site 32		0.038	0.036	0.003	Yes
DM1	Site 32	6/5/2019	0.040	0.031	NA	NA
DM2	Site 32		0.035	0.026	-0.004	Yes
DM3	Site 32		0.030	0.027	-0.003	Yes
DM1	Site 32	6/6/2019	0.021	0.016	NA	NA
DM2	Site 32		0.024	0.019	0.003	Yes
DM3	Site 32		0.021	0.017	0.001	Yes

Notes:

bold = results above screening criteriamg/m³ = milligram per cubic meter

NA = not applicable

Client Name NAVFAC

Project No. J310000300

Date 5/28/19

Page 1 of 1

Logged by Mike Cox

Weather Sunny

Instrument Type: Dust Trak II

Calibration Standards Used	Factory Calibrated

[illegible]

Calibration Standards Used Factory Calibrated

Page 1 of 1

[illegible]

Client Name NAVFAC

Project No. J310000300

Date 5/30/19

Page 1 of 1

Logged by Mike Cox

Weather Sunny

Instrument Type: Dust Trak II

Calibration Standards Used Factory Calibrated

[illegible]

AIR MONITORING LOG

Client Name NAVFAC

Date 6/3/19

Project No. J310000300

Page 1 of 1

Logged by Mike Cox

Weather Sunny

Instrument Type: Dust Trak II

Calibration Standards Used Factory Calibrated

Time	Dust Monitoring Station Number	Location	Instrument Reading (mg/m3)	Unit Number	Activities, Remarks
7:30	DM1	UW site 32	0.019	3703	No earth moving activities
↓	DM2	DW site 32	0.031	1649	Construction Demo ongoing from other construction Ave I
↓	DM3	DW site 32	0.015	0943	
11:00	DM144	UW Discrete excavation 8W-17	0.022	1285	
	DM145	DW Discrete excavation 8W-17	0.019	2724	
6/6/19	DM146	DW Discrete excavation 8W-17	0.016	2714	
12:00	DM144		0.018		
	DM145		0.012		
	DM146		0.010		
1:00	DM144		0.016		
	DM2		0.012		
	DM3		0.015		
2:00	DM144		0.010		
	DM145		0.008		
	DM146		0.010		
3:00	DM144		0.012		
	DM145		0.014		
	DM146		0.011		
4:30	DM1		0.013		
	DM2		0.011		
	DM3		0.016		

[illegible]

Client Name NAVFAC

Project No. J310000300

Date 6/5/19

Page 1 of 1

Logged by Mike Cox

Weather Sunny

Instrument Type: Dust Trak II

Calibration Standards Used	Factory Calibrated
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2	2
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100	100

[illegible]

Client Name NAVFAC

Date 6/6/19

Page 1 of 1

Weather Sunny

Instrument Type: Dust Trak II

Calibration Standards Used	Factory Calibrated
1	1
2	2
3	3
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[illegible]

ATTACHMENT 2
SUMMARY OF AIR MONITORING AND AIR SAMPLING RESULTS

Table 2-1**Ambient Pressure and Temperature Monitoring Results****Remedial Action/NTCRA IR Site 12****Former Naval Station Treasure Island, San Francisco, California**

Sample Date	Ambient Pressure (inches of Hg)	Ambient Temperature (°F)	Ambient Temperature (K)
5/29/2019	29.93	56.71	286.88
5/30/2019	29.86	56.32	286.66
5/31/2019	29.9	54.04	285.39
6/4/2019	29.88	55.59	286.26
6/5/2019	29.86	59.25	288.29
6/6/2019	29.86	58.78	288.03
6/7/2019	29.93	56.14	286.56

Notes:

Weather data collected from weather station at Building 572, Avenue M, Treasure Island, San Francisco, CA

°F = Degrees Fahrenheit

Hg = mercury

K = Kelvin

Table 2-2
Particulate Matter Smaller than Ten Microns (PM10)
Remedial Action/NTCRA IR Site 12
Former Naval Station Treasure Island, San Francisco, California



Location ID	Sampling Period (Hours)	Sample Date	Particulate Matter Less Than 10 Microns in Diameter (ug/m ³)	Delta between Downwind and Upwind Stations (ug/m ³)	PM10 Exceedance? (Yes/No)
Screening Criteria					50
AMS01	24.26	5/29/2019	30	NA	NA
	25.24	5/30/2019	25	NA	NA
	24.37	5/31/2019	11	NA	NA
	24.68	6/4/2019	34	NA	NA
	24.64	6/5/2019	51	NA	NA
	24.92	6/6/2019	32	NA	NA
	23.79	6/7/2019	28	NA	NA
AMS02	23.24	5/29/2019	43	13	No
	2.87*	5/30/2019	NA	NA	NA
	22.70	5/31/2019	26	15	No
	23.60	6/4/2019	53	19	No
	23.78	6/5/2019	63	12	No
	24.22	6/6/2019	35	3.0	No
	22.95	6/7/2019	56	28	No
AMS07	24.32	5/29/2019	30	NA	NA
	23.13	5/30/2019	24	NA	NA
	22.69	5/31/2019	22	NA	NA
	23.88	6/4/2019	67	NA	NA
	23.82	6/5/2019	92	NA	NA
	24.14	6/6/2019	67	NA	NA
	23.19	6/7/2019	42	NA	NA
AMS12	23.25	5/29/2019	32	2.0	No
	24.24	5/30/2019	28	4.0	No
	23.56	5/31/2019	7.9	-14.1	No
	23.65	6/4/2019	32	-35	No
	23.72	6/5/2019	43	-49	No
	24.00	6/6/2019	32	-35	No
	23.00	6/7/2019	12	-30	No

Notes:

ug/m³ = microgram per cubic meter

NA = not applicable

PM10 = particulate matter less than 10 microns in diameter

* = PM10 sampler malfunctioned; no sample submitted

Table 2-3

Total Suspended Particulates Monitoring Results

Remedial Action/NTCRA IR Site 12

Former Naval Station Treasure Island, San Francisco, California



Location ID	Sampling Period (Hours)	Sample Date	Total Suspended Particulate (ug/m ³)	Delta Between Downwind and Upwind Stations (ug/m ³)	TSP Exceedance? (Yes/No)
Screening Criteria					50
AMS01	24.24	5/29/2019	44.56	NA	NA
	25.24	5/30/2019	38.23	NA	NA
	24.39	5/31/2019	20.56	NA	NA
	24.64	6/4/2019	43.21	NA	NA
	24.63	6/5/2019	67.03	NA	NA
	24.92	6/6/2019	49.35	NA	NA
	23.79	6/7/2019	46.51	NA	NA
AMS02	23.26	5/29/2019	109.76	65.21	Yes
	2.80*	5/30/2019	NA	NA	NA
	22.85	5/31/2019	66.77	46.21	No
	23.64	6/4/2019	90.84	47.62	No
	23.79	6/5/2019	99.28	32.24	No
	24.23	6/6/2019	58.63	9.27	No
	22.97	6/7/2019	171.86	125.35	Yes
AMS07	24.33	5/29/2019	36.21	NA	NA
	22.18	5/30/2019	47.94	NA	NA
	21.85	5/31/2019	25.53	NA	NA
	23.90	6/4/2019	48.73	NA	NA
	23.87	6/5/2019	60.18	NA	NA
	24.12	6/6/2019	77.07	NA	NA
	23.29	6/7/2019	52.93	NA	NA
AMS12	23.26	5/29/2019	40.48	4.26	No
	24.27	5/30/2019	36.12	-11.82	No
	23.54	5/31/2019	14.89	-10.64	No
	23.70	6/4/2019	35.26	-13.47	No
	23.73	6/5/2019	47.31	-12.87	No
	24.04	6/6/2019	33.55	-43.52	No
	22.97	6/7/2019	32.37	-20.56	No

Notes:

NA = not applicable

TSP = total suspended particulate

bold = results above screening criteria

* = TSP sampler malfunctioned; no sample submitted

Table 2-4

Metals by EPA 6020 Monitoring Results

Remedial Action/NTCRA IR Site 12

Former Naval Station Treasure Island, San Francisco, California



Location ID	Sampling Period (Hours)	Sample Date	Lead (ug/m ³)	Lead Exceedance? (Yes/No)	Chromium (ug/m ³)	Chromium Exceedance? (Yes/No)
Screening Criteria				242	929	
AMS01	24.26	5/29/2019	0.00084 J	No	0.0046	No
	25.24	5/30/2019	0.00074 J	No	0.0041	No
	24.37	5/31/2019	0.0056	No	0.0043	No
	24.68	6/4/2019	0.00087	No	0.0044	No
	24.64	6/5/2019	0.00082 J	No	0.0042	No
	24.92	6/6/2019	0.00089	No	0.0044	No
	23.79	6/7/2019	0.00069 J	No	0.0044	No
AMS02	23.24	5/29/2019	0.0048	No	0.006	No
	2.87*	5/30/2019	NA	No	NA	No
	22.70	5/31/2019	0.0023	No	0.0052	No
	23.60	6/4/2019	0.002	No	0.0048	No
	23.78	6/5/2019	0.0023	No	0.0053	No
	24.22	6/6/2019	0.0018	No	0.005	No
	22.95	6/7/2019	0.0083	No	0.0074	No
AMS07	24.32	5/29/2019	0.00069 J	No	0.0012 J	No
	23.13	5/30/2019	0.00075 J	No	0.0042	No
	22.69	5/31/2019	0.00076 J	No	0.0043	No
	23.88	6/4/2019	0.00092	No	0.0044	No
	23.82	6/5/2019	0.00086 J	No	0.0043	No
	24.14	6/6/2019	0.0023	No	0.005	No
	23.19	6/7/2019	0.0017	No	0.0049	No
AMS12	23.25	5/29/2019	0.00097	No	0.0012 J	No
	24.24	5/30/2019	0.00086 J	No	0.0044	No
	23.56	5/31/2019	0.0036	No	0.004	No
	23.65	6/4/2019	0.0009	No	0.0046	No
	23.72	6/5/2019	0.0012	No	0.0043	No
	24.00	6/6/2019	0.00084 J	No	0.0041	No
	23.00	6/7/2019	0.0012	No	0.0043	No

Notes:

J = indicates an estimated value

NA = not applicable

ug/m³ = microgram per cubic meter

* = sampler malfunctioned; no sample submitted

Table 2-5
Polycyclic Aromatic Hydrocarbons by TO-13 Monitoring Results
Remedial Action/NTCRA IR Site 12
Former Naval Station Treasure Island, San Francisco, California

Location ID	Sampling Period (Hours)	Sample Date	BAP(Eq) Exceed-ance? (Yes/No)	BAP(Eq)	2-Methyl-naphthalene (ug/m ³)	Acenaph-thene (ug/m ³)	Acenaph-tylene (ug/m ³)	Anthra-cene (ug/m ³)	Benzo(a) anthra-cene (ug/m ³)	Benzo(a) pyrene (ug/m ³)	Benzo(b) fluoran-thene (ug/m ³)	Benzo(g,h,i) perylene (ug/m ³)	Benzo(k) fluoran-thene (ug/m ³)	Chrysene (ug/m ³)	Dibenz(a,h) anthra-cene (ug/m ³)	Fluoran-thene (ug/m ³)	Fluorene (ug/m ³)	Indeno (1,2,3-c,d) pyrene (ug/m ³)	Naphthalene (ug/m ³)	Phenan-threne (ug/m ³)	Pyrene (ug/m ³)	
Screening Criteria ¹				50	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	
AMS01	24.37	5/31/2019	No	0	0.0046	0.00027 J	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	0.00032 J	< 0.00048	0.0045	0.00046 J	< 0.00048	
	24.93	6/6/2019	No	0	0.0064	0.00039 J	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	< 0.00048	0.00045 J	< 0.00048	0.0036	0.00091	< 0.00048	
AMS02	22.79	5/31/2019	No	0	0.0039	0.00048 J	< 0.00055	< 0.00055	< 0.00055	< 0.00055	< 0.00055	< 0.00055	< 0.00055	< 0.00055	< 0.00055	< 0.00055	0.00023 J	0.00076	< 0.00055	0.0066	0.0016	0.00038 J
	24.21	6/6/2019	No	0	0.0017	0.00048	< 0.00041	< 0.00041	< 0.00041	< 0.00041	< 0.00041	< 0.00041	< 0.00041	< 0.00041	< 0.00041	< 0.00041	0.00027 J	0.00065	< 0.00041	0.0025	0.0017	0.00021 J
AMS07	22.71	5/31/2019	No	0	0.0023	0.00023 J	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	0.00031 J	< 0.00037	0.0039	0.00058	< 0.00037	
	24.20	6/6/2019	No	0	0.0028	0.00023 J	0.00024 J	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	< 0.00037	0.00019 J	0.00039	< 0.00037	0.0038	0.00077	0.00052
AMS12	23.56	5/31/2019	No	0	0.0016	0.00018 J	< 0.00038	< 0.00038	< 0.00038	< 0.00038	< 0.00038	< 0.00038	< 0.00038	< 0.00038	< 0.00038	< 0.00038	0.00025 J	< 0.00038	0.004	0.00056	0.00019 J	
	23.96	6/6/2019	No	0	0.0013	< 0.00039	0.00019 J	< 0.00039	< 0.00039	< 0.00039	< 0.00039	< 0.00039	< 0.00039	< 0.00039	< 0.00039	< 0.00039	0.00025 J	< 0.00039	0.0026	0.00061	0.00018 J	

Notes:

¹ The screening criteria for BAP(Eq) is 50 ug/m³ except for the area surrounding excavation KCH-1217-1 at which it will be 8 ug/m³.

NE = Not established

BAP(Eq) = Benzo(a) pyrene equivalency

J = estimated value

< = nondetected less than associated reporting limit

Table 2-6
Polychlorinated Biphenyls by TO-4A Monitoring Results
Remedial Action/NTCRA IR Site 12
Former Naval Station Treasure Island, San Francisco, California



Location ID	Sampling Period (Hours)	Sample Date	Total PCB Exceedance? (Yes/No)	Total PCB	PCB-1016 (Aroclor 1016) (ug/m ³)	PCB-1221 (Aroclor 1221) (ug/m ³)	PCB-1232 (Aroclor 1232) (ug/m ³)	PCB-1242 (Aroclor 1242) (ug/m ³)	PCB-1248 (Aroclor 1248) (ug/m ³)	PCB-1254 (Aroclor 1254) (ug/m ³)	PCB-1260 (Aroclor 1260) (ug/m ³)
Screening Criteria							NE				
AMS01	25.18	5/30/2019	NA	0	< 0.00068	< 0.00068	< 0.00068	< 0.00068	< 0.00068	< 0.00068	< 0.00068
	24.62	6/5/2019	NA	0	< 0.00072	< 0.00072	< 0.00072	< 0.00072	< 0.00072	< 0.00072	< 0.00072
AMS02	2.81*	5/30/2019	NA	NA	NA	NA	NA	NA	NA	NA	NA
	23.76	6/5/2019	NA	0	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007
AMS07	23.11	5/30/2019	NA	0	< 0.00062	< 0.00062	< 0.00062	< 0.00062	< 0.00062	< 0.00062	< 0.00062
	23.84	6/5/2019	NA	0	< 0.00054	< 0.00054	< 0.00054	< 0.00054	< 0.00054	< 0.00054	< 0.00054
AMS12	24.21	5/30/2019	NA	0	< 0.00055	< 0.00055	< 0.00055	< 0.00055	< 0.00055	< 0.00055	< 0.00055
	23.7	6/5/2019	NA	0	< 0.00056	< 0.00056	< 0.00056	< 0.00056	< 0.00056	< 0.00056	< 0.00056

Notes:

NA = Not applicable

NE = none established

PCB = polychlorinated biphenyl

ug/m³ = microgram per cubic meter

< = nondetected less than associated reporting limit

* = PUF sampler malfunction; no sample submitted

Table 2-7
Dioxin as 2,3,4,7,8-TCDD by TO-9A Monitoring Results
Remedial Action/NTCRA IR Site 12
Former Naval Station Treasure Island, San Francisco, California



Location ID	Sampling Period (Hours)	Sample Date	2,3,7,8-Tetrachlorodibenzo-p-dioxin (ug/m ³)	Dioxin Exceedance? (Yes/No)
Screening Criteria				10,000,000 ug/m³
AMS01	24.2	5/29/2019	0.0000000011 J	No
	24.59	6/4/2019	< 0.00000002	No
	23.71	6/7/2019	< 0.00000002	No
AMS02	23.26	5/29/2019	< 0.00000002	No
	23.57	6/4/2019	< 0.00000002	No
	22.92	6/7/2019	< 0.00000002	No
AMS07	24.32	5/29/2019	0.0000000056 J	No
	23.89	6/4/2019	< 0.00000001	No
	23.19	6/7/2019	< 0.00000001	No
AMS12	23.27	5/29/2019	0.0000000011 J	No
	23.73	6/4/2019	< 0.00000001	No
	22.98	6/7/2019	< 0.00000001	No

Notes:

J = Estimated value

ug/m³ = microgram per cubic meter

< = nondetected less than associated reporting limit

ATTACHMENT 3
RADIOLOGICAL AIR MONITORING RESULTS



AIR SAMPLE RESULTS - PUBLIC EXPOSURE MONITORING

Project Information									Effluent Air Concentration					Sampling Period			Color Codes					
Contract / Task Order Number: N62473-17-D-0005		Project Title / Location: IR Site 12 RD/RA, Treasure Island, SF, CA			Gilbane Project Number: J310000300						Alpha	Beta	Air samples collected between May 25, 2019 and June 7, 2019		Value < MDC		Value < 0.1 x Effluent Conc					
									Radionuclide		Ra-226	Sr-90			< 72 hr decay time		Value > 0.1 x Effluent Conc					
Information effective as of: 6/25/2019									Effluent Conc (µCi/ml)		9.E-13	6.E-12			Data reviewed		Value > Effluent Conc					
Sample Collection									Count Information								Sample Results				Initials	
Sample Number	Sample Type	Sample Location	Equip No	Ave Flow Rate (lpm)	Start Day Time	End Date Time	Elapsed Time (min)	Volume (ml)	Inst No	Count Date	Time (min)	Counting Units	Gross Activity		Net dpm		Activity (µCi/ml)		Effluent Conc (%)		Count Tech	Data Reviewer
													Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		
AS-379	Perimeter	AMS-01	PE01	50	5/28/19 7:25	5/28/19 15:30	485	2.4E+07	A	6/3/19	20	cpm	0.100	3.400	0.3	6.8	5.4E-15	1.3E-13	0.6%	2.1%	BS	CB
AS-380	Perimeter	AMS-02	PE02	60	5/28/19 7:10	5/28/19 15:00	470	2.8E+07	A	6/3/19	20	cpm	0.150	3.750	0.4	7.7	6.9E-15	1.2E-13	0.8%	2.1%	BS	CB
AS-381	Perimeter	AMS-07	PE03	50	5/28/19 7:35	5/28/19 16:10	515	2.6E+07	A	6/3/19	20	cpm	0.150	3.900	0.4	8.1	7.6E-15	1.4E-13	0.8%	2.4%	BS	CB
AS-382	Perimeter	AMS-12	PE04	50	5/28/19 7:15	5/28/19 15:10	475	2.4E+07	A	6/3/19	20	cpm	0.250	3.550	0.7	7.2	1.4E-14	1.4E-13	1.5%	2.3%	BS	CB
AS-383	Perimeter	AMS-01	PE01	50	5/29/19 6:05	5/29/19 14:59	534	2.7E+07	A	6/3/19	20	cpm	0.200	3.900	0.6	8.1	9.7E-15	1.4E-13	1.1%	2.3%	BS	CB
AS-384	Perimeter	AMS-02	PE02	60	5/29/19 5:55	5/29/19 15:08	553	3.3E+07	A	6/3/19	20	cpm	0.200	3.600	0.6	7.3	7.8E-15	9.9E-14	0.9%	1.7%	BS	CB
AS-385	Perimeter	AMS-07	PE03	50	5/29/19 6:15	5/29/19 14:47	512	2.6E+07	A	6/3/19	20	cpm	0.300	3.550	0.9	7.2	1.5E-14	1.3E-13	1.7%	2.1%	BS	CB
AS-386	Perimeter	AMS-12	PE04	50	5/29/19 6:00	5/29/19 14:54	534	2.7E+07	A	6/3/19	20	cpm	0.100	4.200	0.3	8.9	4.9E-15	1.5E-13	0.5%	2.5%	BS	CB
AS-387	Perimeter	AMS-01	PE01	50	5/30/19 5:40	5/30/19 15:05	565	2.8E+07	A	6/3/19	20	cpm	0.200	4.300	0.6	9.2	9.2E-15	1.5E-13	1.0%	2.4%	BS	CB
AS-388	Perimeter	AMS-02	PE02	60	5/30/19 7:30	5/30/19 16:00	510	3.1E+07	A	6/3/19	20	cpm	0.000	2.800	0.0	5.1	0.0E+00	7.6E-14	0.0%	1.3%	BS	CB
AS-389	Perimeter	AMS-07	PE03	50	5/30/19 5:50	5/30/19 15:15	565	2.8E+07	A	6/3/19	20	cpm	0.050	4.300	0.1	9.2	2.3E-15	1.5E-13	0.3%	2.4%	BS	CB
AS-390	Perimeter	AMS-12	PE04	50	5/30/19 5:35	5/30/19 15:00	565	2.8E+07	A	6/3/19	20	cpm	0.200	3.700	0.6	7.6	9.2E-15	1.2E-13	1.0%	2.0%	BS	CB
AS-391	Perimeter	AMS-01	PE01	50	6/3/19 6:30	6/3/19 14:54	504	2.5E+07	A	6/10/19	20	cpm	0.100	4.800	0.3	10.6	5.2E-15	1.9E-13	0.6%	3.1%	BS	CB
AS-392	Perimeter	AMS-02	PE02	60	6/3/19 6:20	6/3/19 14:53	513	3.1E+07	A	6/10/19	20	cpm	0.150	3.600	0.4	7.3	6.3E-15	1.1E-13	0.7%	1.8%	BS	CB
AS-393	Perimeter	AMS-07	PE08	50	6/3/19 6:40	6/3/19 15:00	500	2.5E+07	A	6/10/19	20	cpm	0.250	3.850	0.7	8.0	1.3E-14	1.4E-13	1.4%	2.4%	BS	CB
AS-394	Perimeter	AMS-12	PE09	50	6/3/19 6:15	6/3/19 14:50	515	2.6E+07	A	6/10/19	20	cpm	0.100	2.850	0.3	5.3	5.0E-15	9.2E-14	0.6%	1.5%	BS	CB
AS-395	Perimeter	EX # 8W-17	PE07	50	6/3/19 9:30	6/3/19 14:30	300	1.5E+07	A	6/10/19	20	cpm	0.250	3.950	0.7	8.3	2.2E-14	2.5E-13	2.4%	4.1%	BS	CB
AS-396	Perimeter	AMS-01	PE01	50	6/4/19 5:50	6/4/19 15:00	550	2.8E+07	A	6/10/19	20	cpm	0.150	4.000	0.4	8.4	7.1E-15	1.4E-13	0.8%	2.3%	BS	CB
AS-397	Perimeter	AMS-02	PE02	60	6/4/19 5:40	6/4/19 15:10	570	3.4E+07	A	6/10/19	20	cpm	0.100	4.650	0.3	10.2	3.8E-15	1.3E-13	0.4%	2.2%	BS	CB
AS-398	Perimeter	AMS-07	PE08	65	6/4/19 6:00	6/4/19 14:55	535	3.5E+07	A	6/10/19	20	cpm	0.100	3.150	0.3	6.1	3.7E-15	7.9E-14	0.4%	1.3%	BS	CB
AS-399	Perimeter	AMS-12	PE09	50	6/4/19 5:45	6/4/19 14:50	545	2.7E+07	A	6/10/19	20	cpm	0.250	3.150	0.7	6.1	1.2E-14	1.0E-13	1.3%	1.7%	BS	CB
AS-400	Perimeter	AMS-01	PE01	50	6/5/19 5:30	6/5/19 15:23	593	3.0E+07	A	6/10/19	20	cpm	0.150	4.000	0.4	8.4	6.6E-15	1.3E-13	0.7%	2.1%	BS	CB
AS-401	Perimeter	AMS-02	PE02	60	6/5/19 5:20	6/5/19 15:27	607	3.6E+07	A	6/10/19	20	cpm	0.250	4.000	0.7	8.4	8.9E-15	1.0E-13	1.0%	1.7%	BS	CB
AS-402	Perimeter	AMS-07	PE08	65	6/5/19 5:45	6/5/19 15:18	573	3.7E+07	A	6/10/19	20	cpm	0.250	5.050	0.7	11.2	8.7E-15	1.4E-13	1.0%	2.3%	BS	CB
AS-403	Perimeter	AMS-12	PE09	50	6/5/19 5:25	6/5/19 15:31	606	3.0E+07	A	6/10/19	20	cpm	0.200	4.000	0.6	8.4	8.6E-15	1.2E-13	1.0%	2.1%	BS	CB
AS404	Perimeter	AMS-01	PE01	50	6/6/19 5:40	6/6/19 14:56	556	2.8E+07	A	6/10/19	20	cpm	0.250	3.900	0.7	8.1	1.2E-14	1.3E-13	1.3%	2.2%	BS	CB
AS-405	Perimeter	AMS-02	PE02	60	6/6/19 5:30	6/6/19 14:59	569	3.4E+07	A	6/10/19	20	cpm	0.250	4.500	0.7	9.8	9.5E-15	1.3E-13	1.1%	2.1%	BS	CB
AS-406	Perimeter	AMS-07	PE08	65	6/6/19 5:50	6/6/19 14:30	520	3.4E+07	A	6/10/19	20	cpm	0.300	3.500	0.9	7.0	1.2E-14	9.4E-14	1.3%	1.6%	BS	CB



AIR SAMPLE RESULTS - PUBLIC EXPOSURE MONITORING

Project Information									Effluent Air Concentration				Sampling Period			Color Codes						
Contract / Task Order Number: N62473-17-D-0005		Project Title / Location: IR Site 12 RD/RA, Treasure Island, SF, CA			Gilbane Project Number: J310000300					Alpha	Beta	Air samples collected between May 25, 2019 and June 7, 2019		Value < MDC		Value < 0.1 x Effluent Conc						
									Radionuclide		Ra-226			Sr-90	< 72 hr decay time		Value > 0.1 x Effluent Conc					
Information effective as of: 6/25/2019									Effluent Conc (µCi/ml)		9.E-13			6.E-12	Data reviewed		Value > Effluent Conc					
Sample Collection									Count Information							Sample Results				Initials		
Sample Number	Sample Type	Sample Location	Equip No	Ave Flow Rate (lpm)	Start Day Time	End Date Time	Elapsed Time (min)	Volume (ml)	Inst No	Count Date	Time (min)	Counting Units	Gross Activity		Net dpm		Activity (µCi/ml)		Effluent Conc (%)		Count Tech	Data Reviewer
													Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta		
AS-407	Perimeter	AMS-12	PE09	50	6/6/19 5:35	6/6/19 14:57	562	2.8E+07	A	6/10/19	20	cpm	0.150	4.450	0.4	9.6	6.9E-15	1.5E-13	0.8%	2.6%	BS	CB