FIGURES

LEGEND

- Freeway
- Highway
- Major Road
- Railroads
- Rivers

TriEco
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Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 1

LOCATION MAP
TREASURE ISLAND
AND THE
SAN FRANCISCO BAY AREA

2012-05-29 C:\GIS\Treasure_Is\TI_AOIs_03-2012\fig-1_TI_SF-CA_Location-Map.mxd TriEco-SD chris.lynch

San Francisco Bay

Former Supply Department Salvage Yard (Lot69)

Bldg 342

Bldg 342 Yard Area

Pandemonium Site II (NE)

Bldg 570 Site

IR Site 24

Bldg 343 & Bldg 344

Bldg 342 Sanitary Sewer Line

IR Site 32

Bldg 233 Area

Former Salvage Yard and Current Sewage Treatment Plant

Bldg 233

Bldg 233 Storm Line

IR Site 6

Waste & Clean Soil Stockpile and Truck Loading & Decon Site

IR Site 33

Bldg 461

Bldg 3 Sanitary Sewer Line

IR Site 21

SWDA North Point

Former Lake of the Nations

Former Incinerator

Bldg 3 Site

SWDA Bayside

Historic Burn Area

IR Site 12

Rubbish Area

SWDA Bigelow Court

SWDA Westside

Pandemonium Site I (NW)

Storage Areas and Sites 30 & 31

Playground and Gyro Compass Repair Shop

AOI 6

AOI 5

AOI 4

AOI 2

AOI 7

AOI 8

AOI 3

AOI 1

Avenue M

Avenue N

Avenue I

Avenue H

Avenue D

Avenue C

Avenue B

Avenue F

Avenue of the Palms

13th St.

11th St.

9th St.

6th St.

5th St.

4th St.

3rd St.

1st St.

North Point St.

Exposition Dr.

Gateview Ave.

Bayside Dr.

California Ave.

IR Site 31

IR Site 30

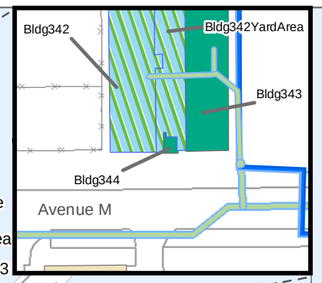
IR Site 20

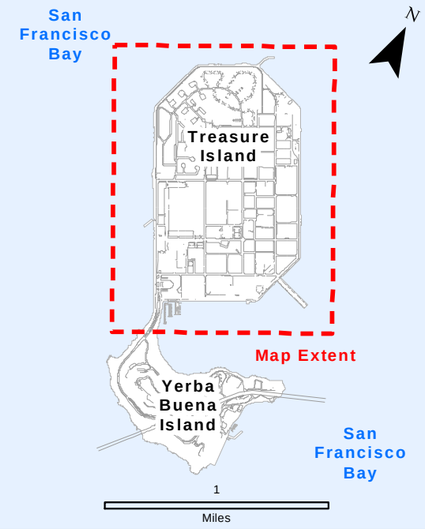
Clipper Cove

San Francisco Bay

250 0 250 500

Feet





LEGEND

- Newly Identified Radiologically Impacted Site
- Newly Identified Radiologically Impacted Sewer or Storm Line
- 2006 HRA Radiologically Impacted Site Where Recent Surveys Have Not Found Low Level Radiological Contamination. Site Released.
- 2006 HRA Radiologically Impacted Site Where Recent Surveys Have Found Low Level Radiological Contamination or Objects
- Area of Interest
- IR Site
- Radiologically Impacted Soil Site With Non-Radiologically Impacted Building/Structure
- Building
- Former Lake of the Nations
- Fence
- Road

Note: Areas are not radiologically impacted unless specifically identified.

HRA Historical Radiological Assessment
IR Installation Restoration
SWDA Solid Waste Disposal Area

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Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 2

NEWLY IDENTIFIED RADIOLOGICALLY IMPACTED AREAS

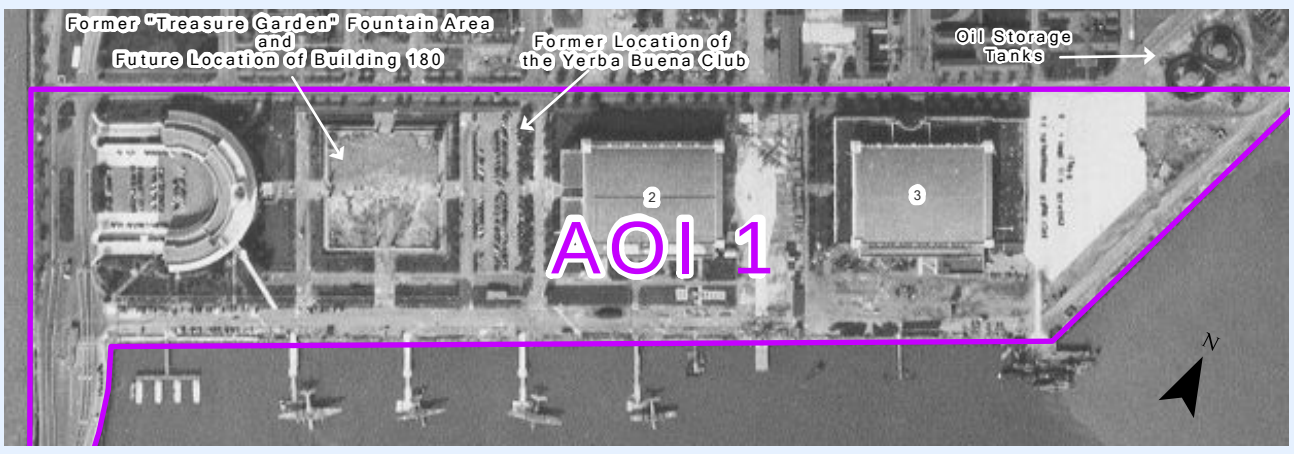
2014-06-25 \\DISKSTATION\TriEcoProjects\NAVFAC - AECRU V\BRAC 2\Treasure Island\CTO-0003_Treasure_Island\Treasure_Is_GIS\TI_HRASTM_2012\Fig02\fig-2_TI_Areas_of_Interest_rev-39.mxd TriEco-Tt clynch

NOTES:
-Treasure Island was leased by Navy on 31 February 1941. The Navy took title to Treasure Island on 17 April 1942.
-Infrastructure was essentially built out and predominately paved since beginning of operations when licensed or unlicensed radioactive materials would have been handled.
-No significant construction occurred during the war period with the exception of piers. Building 180 represents the only significant infrastructure change within this footprint subsequent to the World's Fair. During the World's Fair, the footprint of Building 180 was referred to as the "Treasure Garden" and contained a fountain. In the 4 June 1942 photo (bottom left) the fountain has been demolished and site preparations for Building 180 are underway.
-Building 3 is considered impacted due to the level of repair operations that were conducted during WWII which may have involved the handling of radium containing devices.
-In addition, an optical shop which likely handled radioactive materials was located on the roof of Building 3.
-Oil storage tanks on southeast corner of Treasure Island were removed shortly after the end of the WWII.

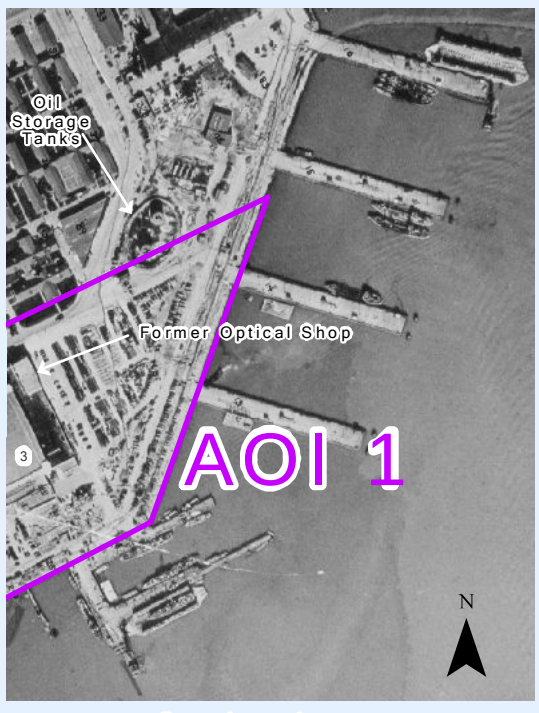
Seaplane Lagoon Area of Interest 1
15 August 2000 (not to scale)

Seaplane Lagoon Area of Interest 1
24 March 1947 (not to scale)

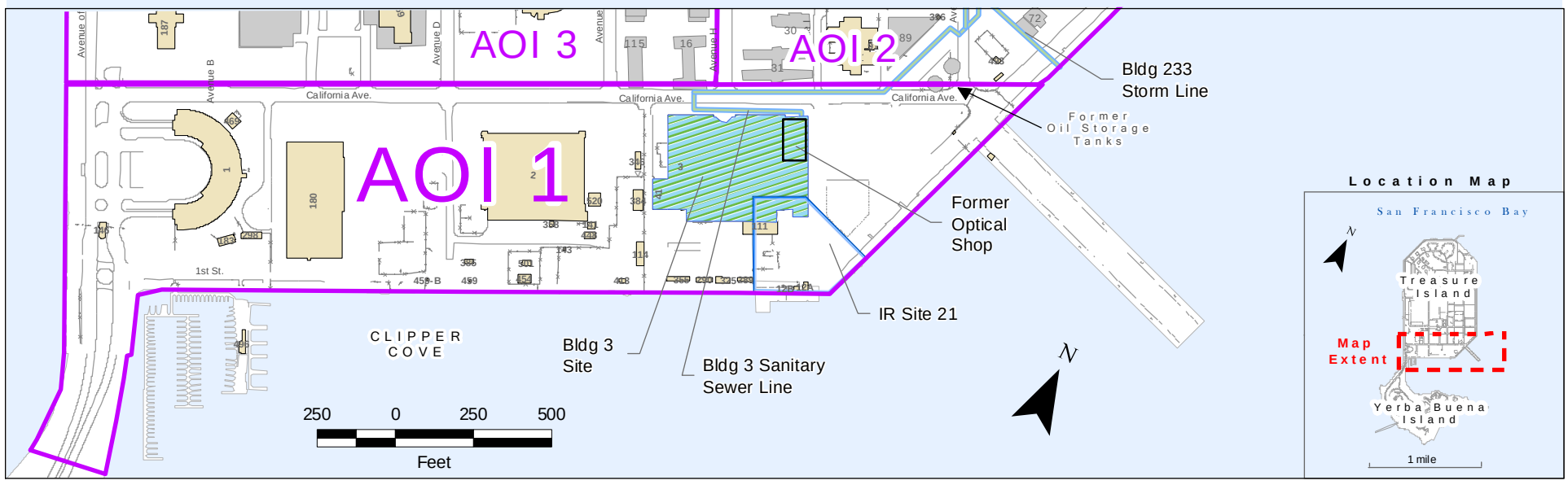
Seaplane Lagoon Area of Interest 1
ca. 1943 (not to scale)



Seaplane Lagoon Area of Interest 1
04 June 1942 (not to scale)



Seaplane Lagoon
Area of Interest 1
20 February1945
(not to scale)



LEGEND

- Area of Interest
- IR Site
- Newly Identified Radiologically Impacted Site
- Newly Identified Radiologically Impacted Sewer or Storm Line
- Existing Building (as of 19 June 2011)
- Demolished Building
- Road
- Fence

Note: Areas are not radiologically impacted unless specifically identified.

IR Installation Restoration

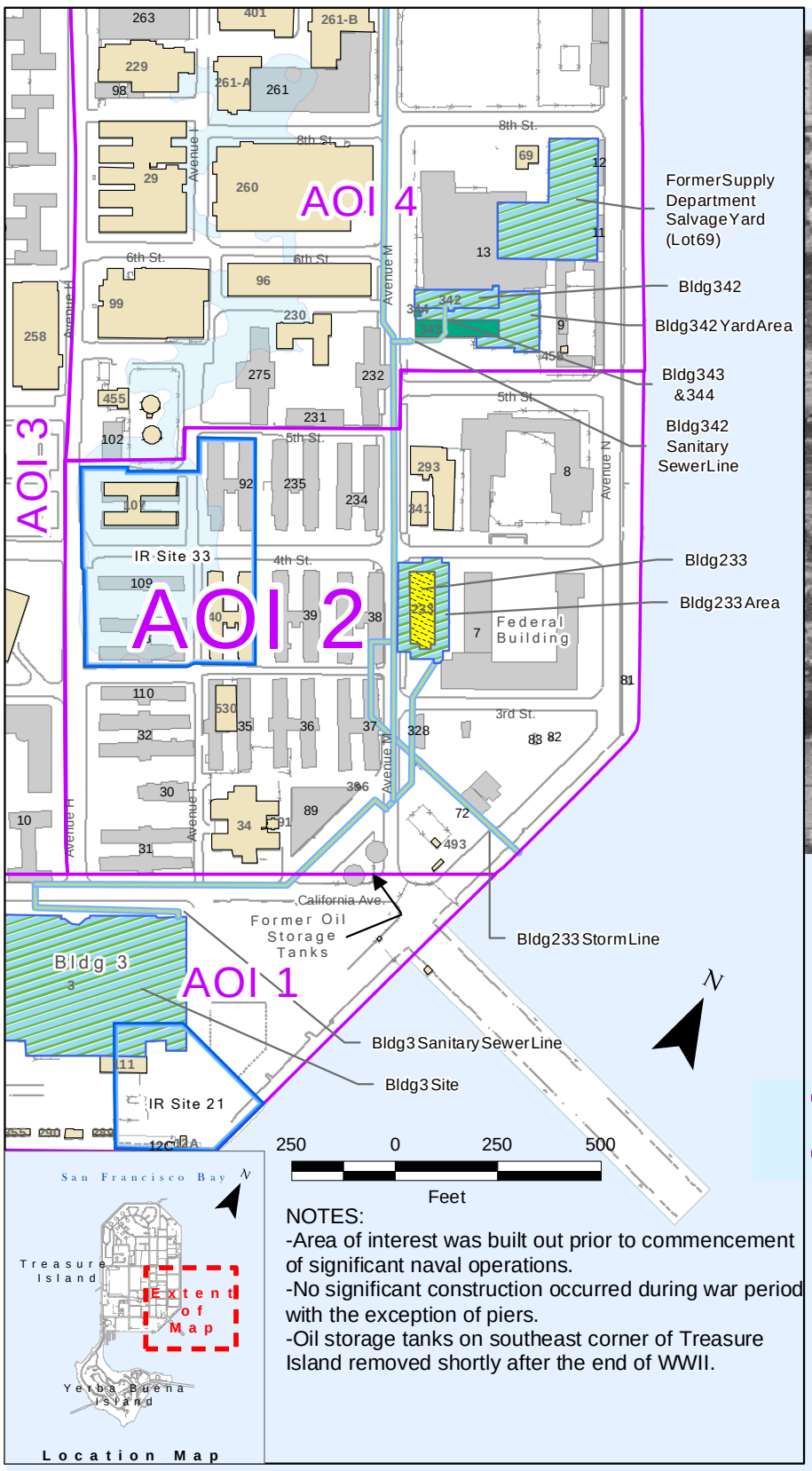
TriEco A Joint Venture

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

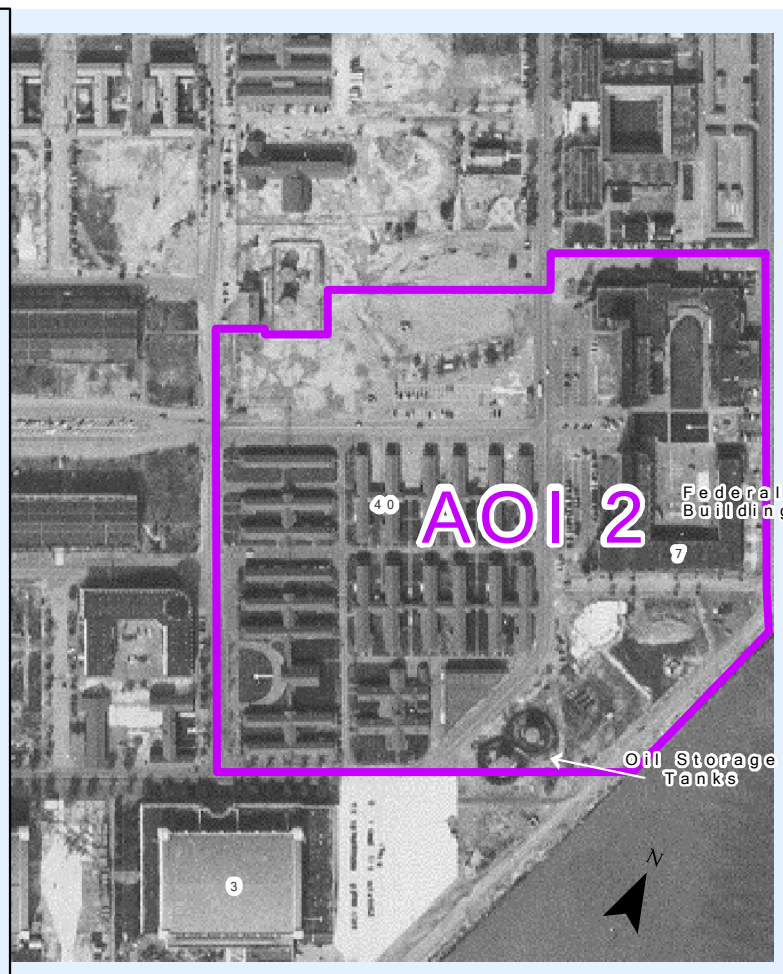
FIGURE 3

SEAPLANE LAGOON AREA OF INTEREST 1

2014-04-09 \\DISKSTATION\TriEcoProjects\NAVFAC - AECRU V\BRAC 2\Treasure Island\CTO-0003_Treasure_Island\Treasure_Is_GIS\TI_HRASTM_2012\Fig03\fig-3_TI_SeaplaneLagoon_AOI-1_rev-17.mxd TriEco-Tt clynch



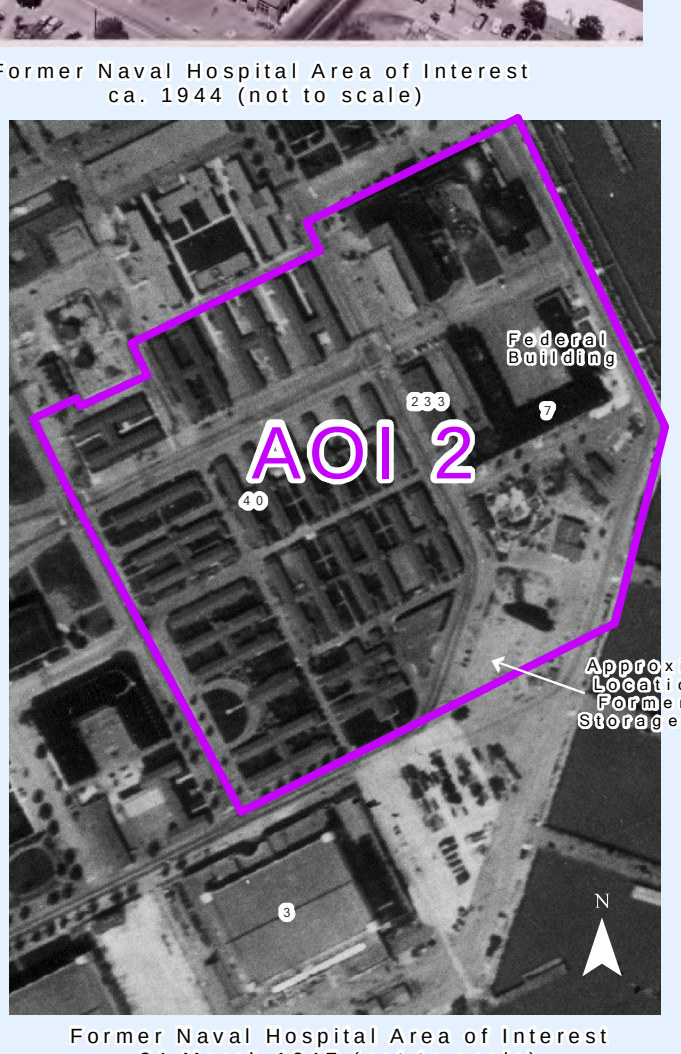
NOTES:
-Area of interest was built out prior to commencement of significant naval operations.
-No significant construction occurred during war period with the exception of piers.
-Oil storage tanks on southeast corner of Treasure Island removed shortly after the end of WWII.



Former Naval Hospital and Surrounding Area of Interest 04 June 1942 (not to scale)

Former Naval Hospital Area of Interest ca. 1944 (not to scale)

Former Naval Hospital Area of Interest 15 August 2000 (not to scale)



Former Naval Hospital Area of Interest 24 March 1947 (not to scale)

LEGEND

- Area of Interest
- Newly Identified Radiologically Impacted Site
- Newly Identified Radiologically Impacted Sewer or Storm Lines
- 2006 HRA Radiologically Impacted Site Where Recent Surveys Have Not Found Low Level Radiological Contamination. Site Released.
- 2006 HRA Radiologically Impacted Site Where Recent Surveys Have Found Low Level Radiological Contamination or Objects
- IR Site
- Road
- Fence
- Existing Building (as of 19 June 2011)
- Demolished Building
- Former Lake of the Nations

Note: Areas are not radiologically impacted unless specifically identified.

HRA Historical Radiological Assessment
IR Installation Restoration

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Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

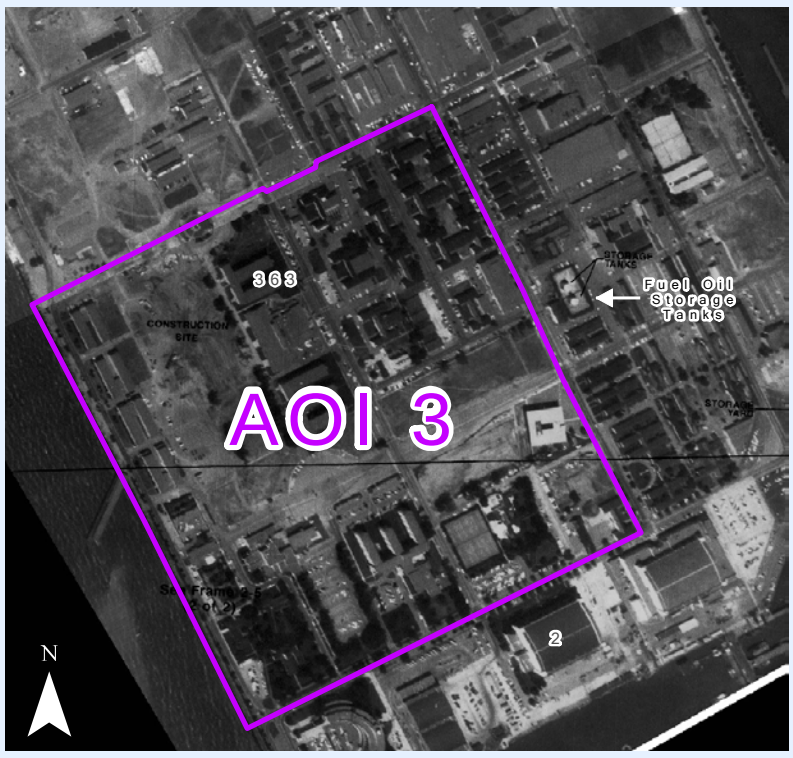
FIGURE 4

FORMER NAVAL HOSPITAL AREA OF INTEREST 2

NOTES:
Area of Interest 3 has no radiologically impacted areas:
1) No evidence of radiological work has been found in this area;
2) Buildings in the area primarily served as barracks and support facilities and there is no evidence of industrial activities in this area;
3) There is no evidence of industrial lay down areas having been present in this area from review of available documents.

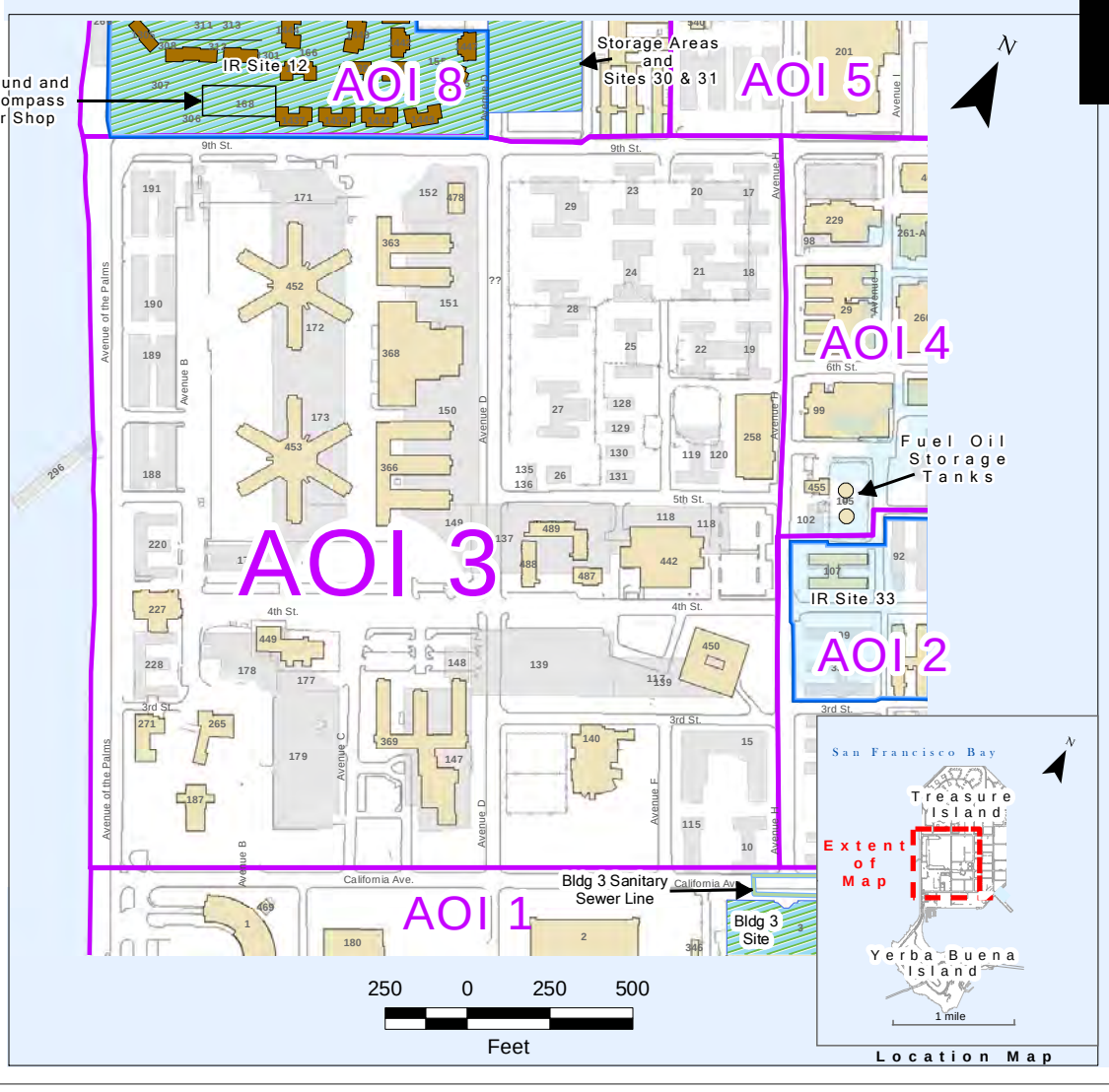
Island Core Area of Interest
15 August 2000 (not to scale)

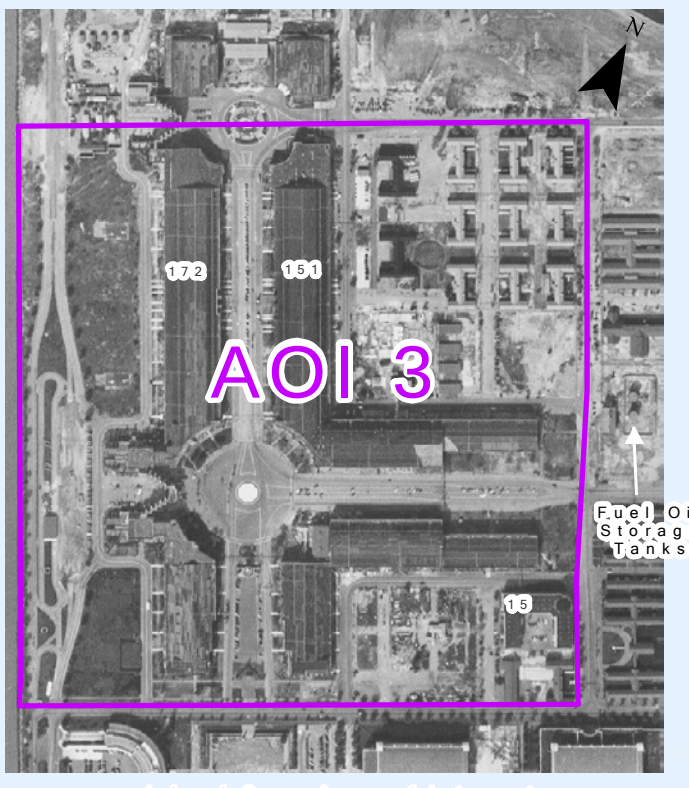
Island Core Area of Interest
19 May1969 (not to scale)



Island Core Area of Interest
18 April 1968 (not to scale)

Island Core Area of Interest
24 March 1947 (not to scale)





Island Core Area of Interest
ca. 1942 (not to scale)

LEGEND

- Area of Interest
- IR Site
- Newly Identified Radiologically Impacted Site
- Radiologically Impacted Soil Site With Non-Radiologically Impacted Building/Structure
- Newly Identified Radiologically Impacted Sewer or Storm Lines
- Former Lake of the Nations
- Existing Building (as of 19 June 2011)
- Demolished Building
- Fence
- Road

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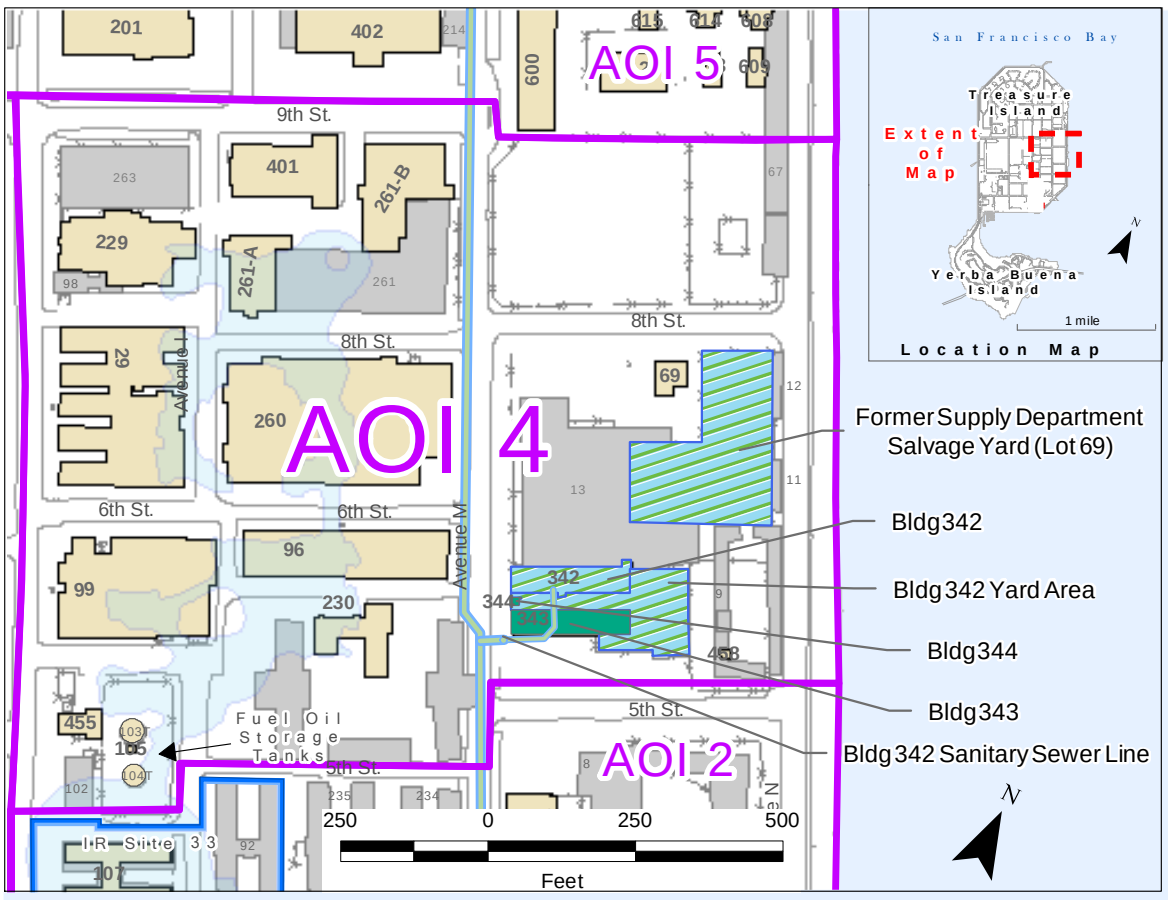
Note: Areas are not radiologically impacted unless specifically identified.

IR Installation Restoration

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5

ISLAND CORE AREA OF INTEREST 3



Former Supply Department Salvage Yard (Lot 69)

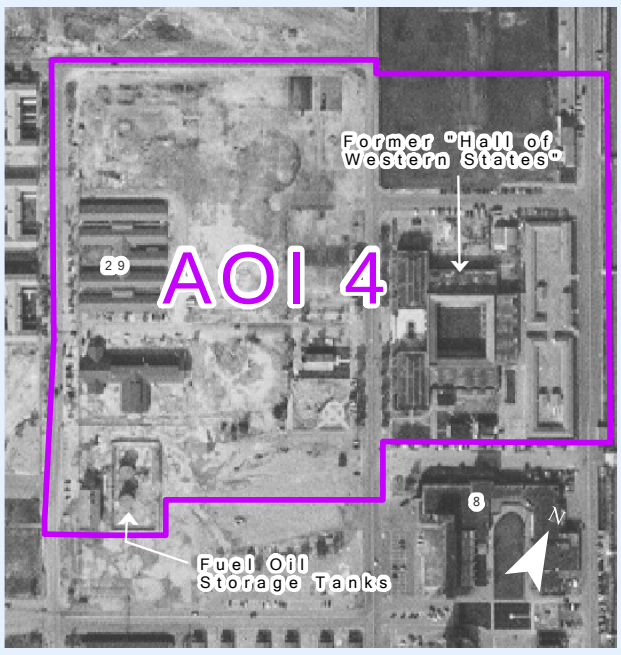
Bldg 342

Bldg 342 Yard Area

Bldg 344

Bldg 343

Bldg 342 Sanitary Sewer Line

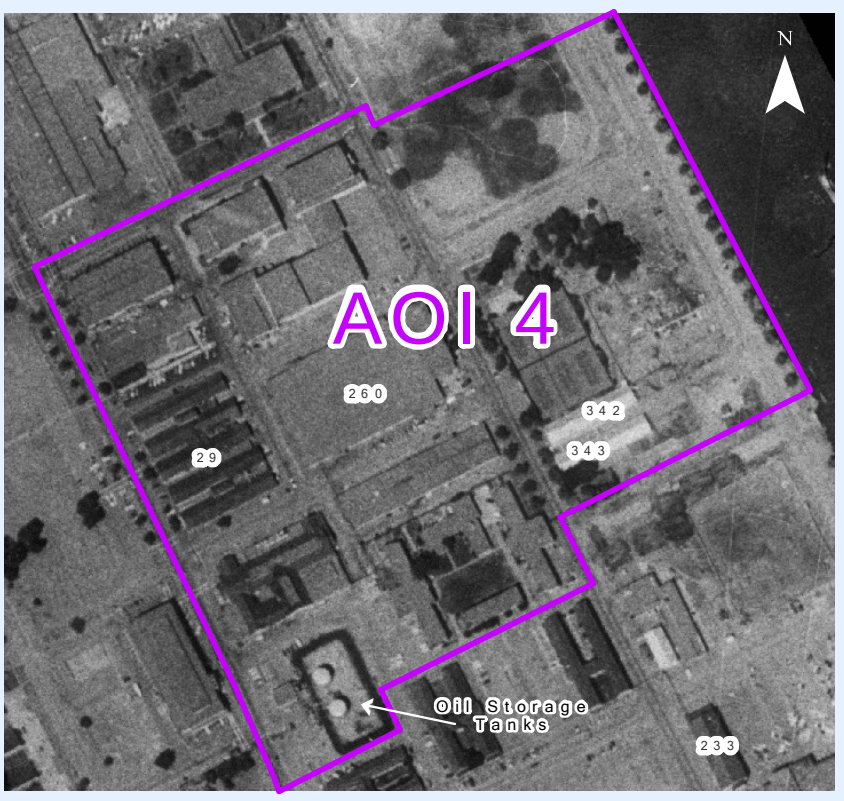


Southwestern Area of Interest
04 June 1942 (not to scale)

Southwestern Area of Interest
24 March 1947 (not to scale)

Southwestern Area of Interest
1 March 1958 (not to scale)

Southwestern Area of Interest
15 August 2000 (not to scale)



Southwestern Area of Interest
09 April 1975 (not to scale)

LEGEND

- Area of Interest
- IR Site
- Newly Identified Radiologically Impacted Site
- Newly Identified Radiologically Impacted Sewer or Storm Line
- Former Lake of the Nations
- 2006 HRA Radiologically Impacted Site Where Recent Surveys Have Not Found Low Level Radiological Contamination. Site Released.
- Existing Building (as of 19 June 2011)
- Demolished Building
- Fence
- Road

Note:
Areas are not radiologically impacted unless specifically identified.

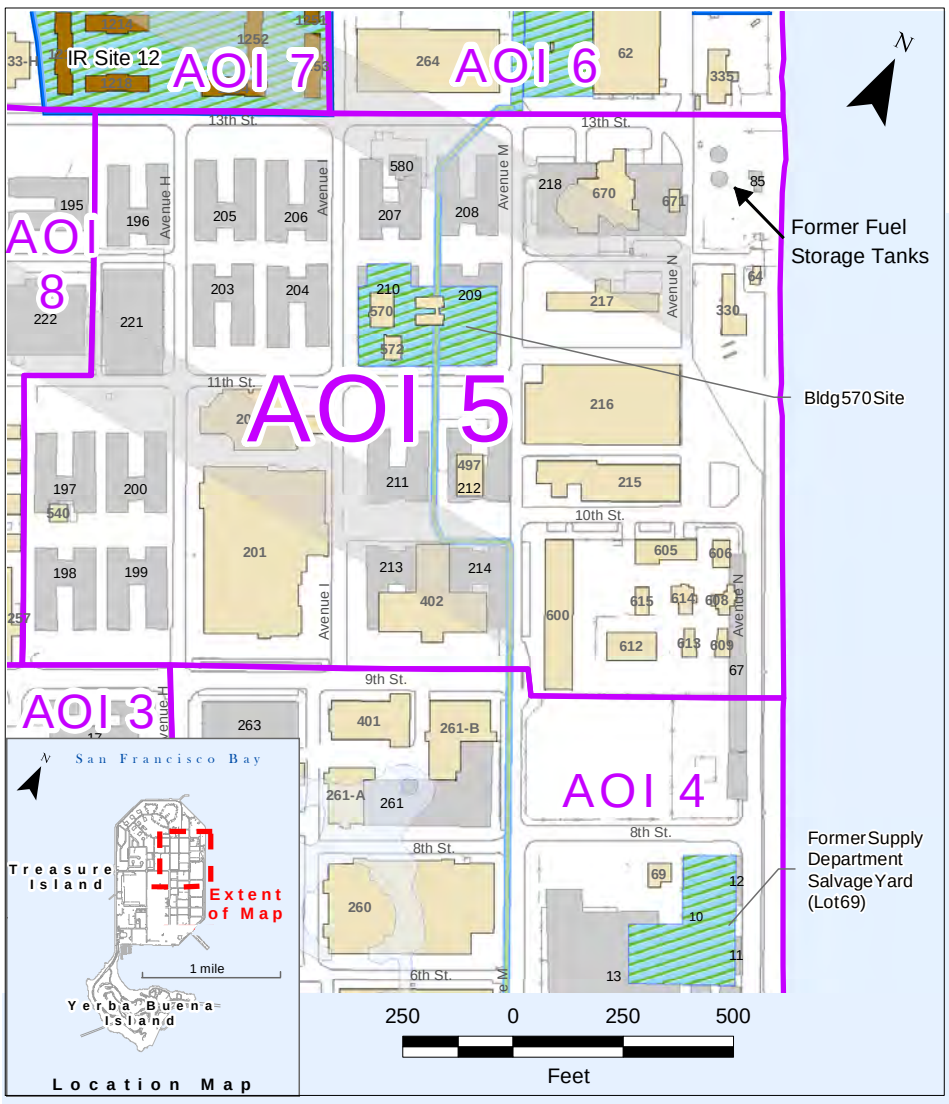
HRA Historical Radiological Assessment
IR Installation Restoration

TriEco A Joint Venture

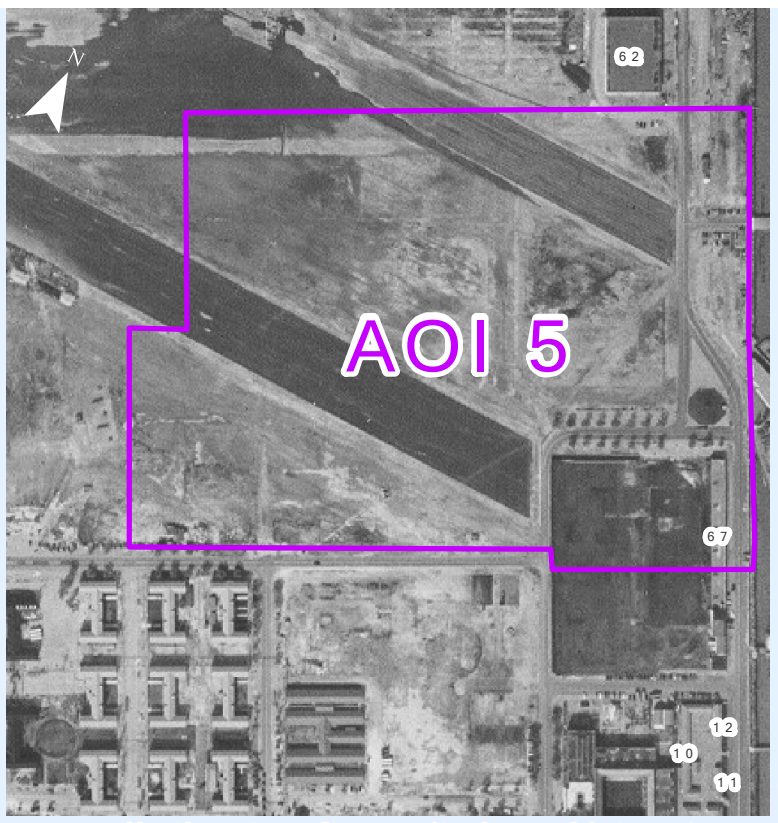
Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 6

SOUTHWESTERN AREA OF INTEREST 4

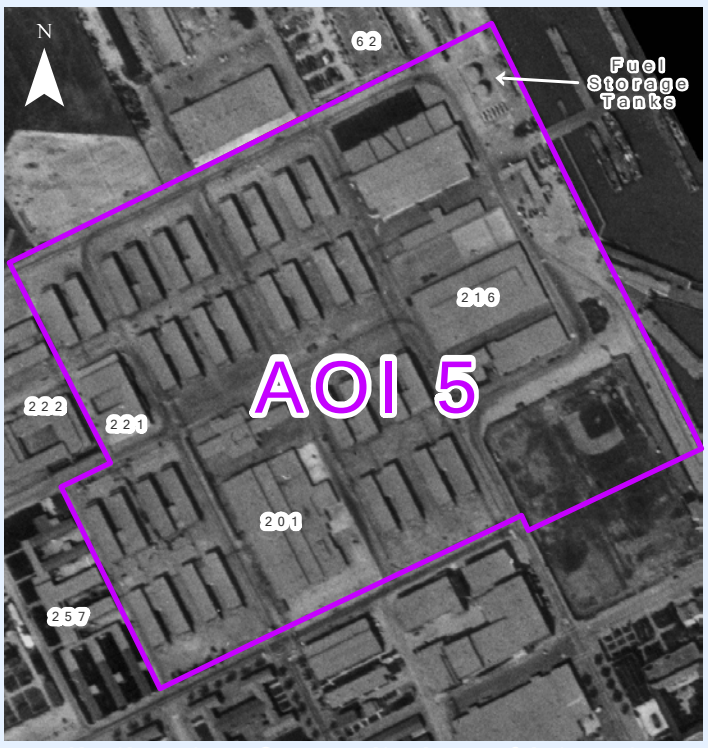


NOTES:
-Area of Interest largely undeveloped prior to commencement of significant naval operations with the exception of runway construction (later abandoned) and the piers.
-The parcel was entirely built out during war period leaving little likelihood or opportunity for disposal operations to occur.

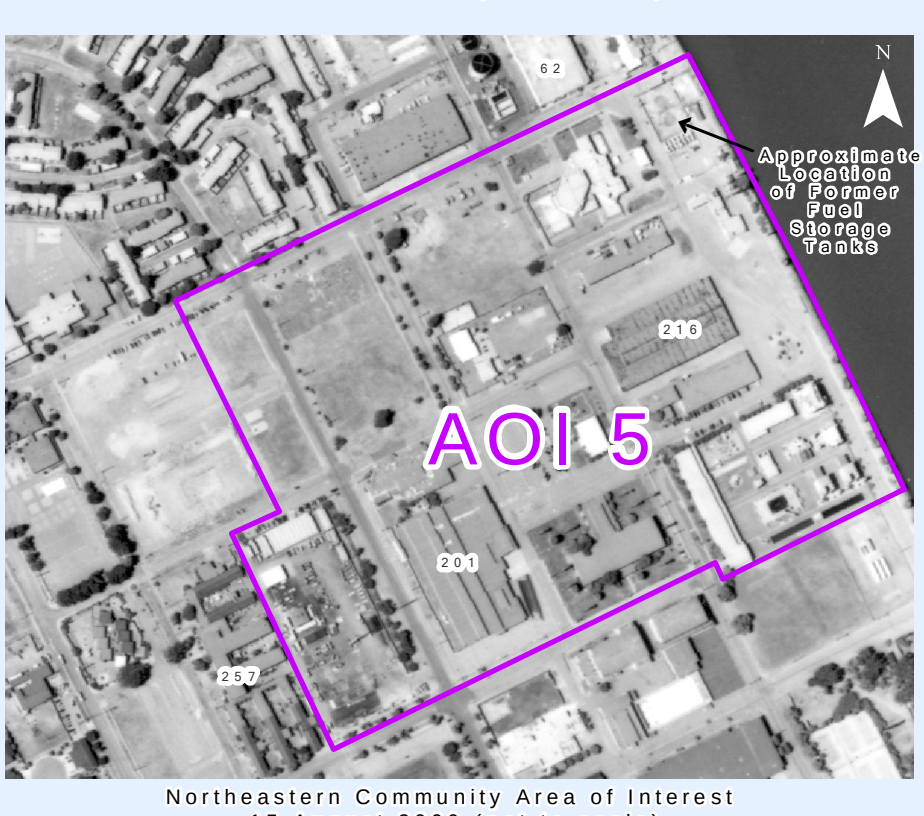


Northeastern Community Area of Interest
04 June 1942 (not to scale)

Northeastern Community Area of Interest
01 March 1958 (not to scale)



Northeastern Community Area of Interest
24 March 1947 (not to scale)



Northeastern Community Area of Interest
15 August 2000 (not to scale)

Northeastern Community Area of Interest
04 September 1975 (not to scale)

LEGEND

- Area of Interest
- IR Site
- Newly Identified Radiologically Impacted Site
- Newly Identified Radiologically Impacted Sewer or Storm Line
- Radiologically Impacted Soil Site With Non-Radiologically Impacted Building/Structure
- Existing Building (as of 19 June 2011)
- Demolished Building
- Former Lake of the Nations
- Former Runway
- Road
- Fence

Note: Areas are not radiologically impacted unless specifically identified.

IR Installation Restoration

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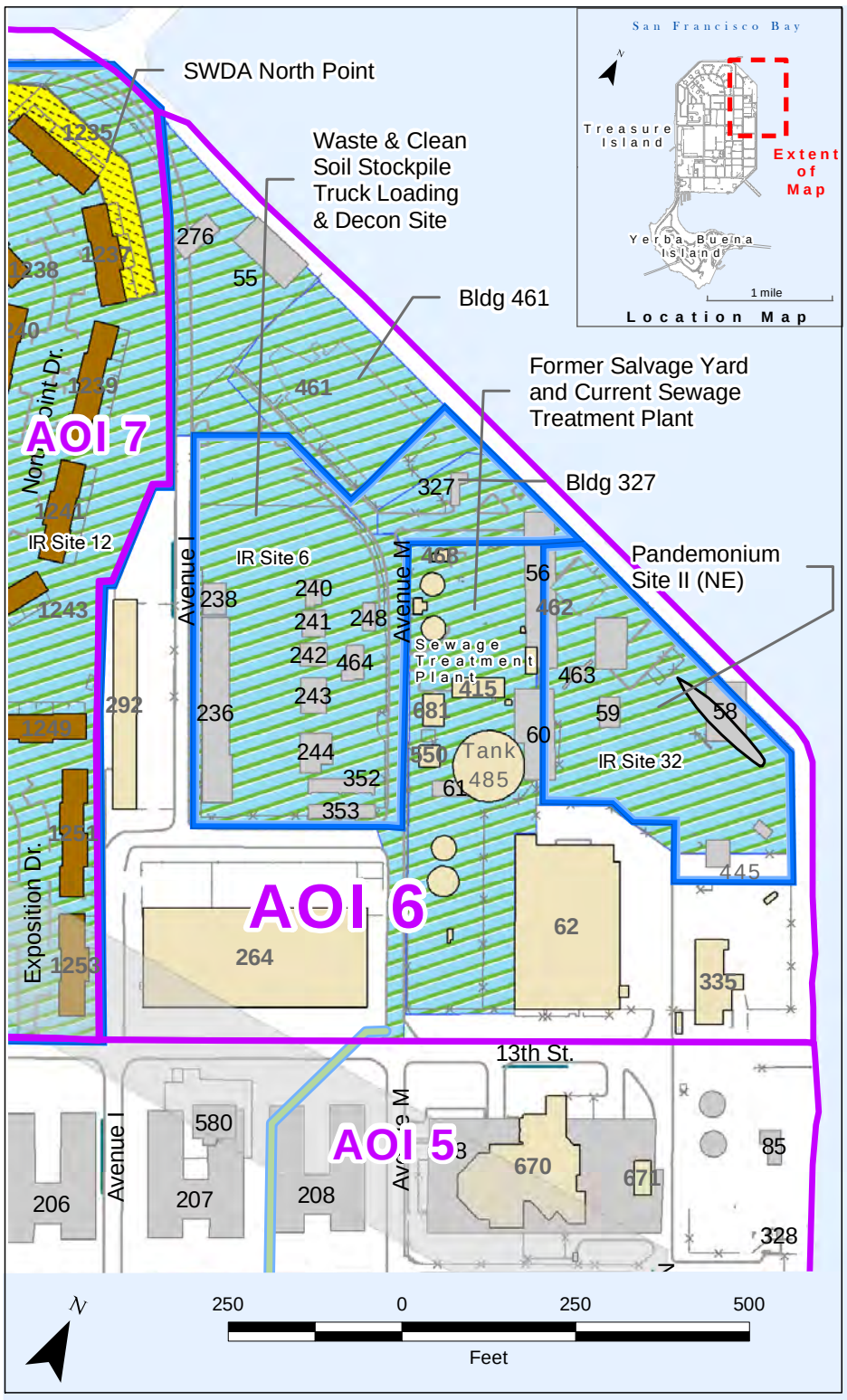
Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

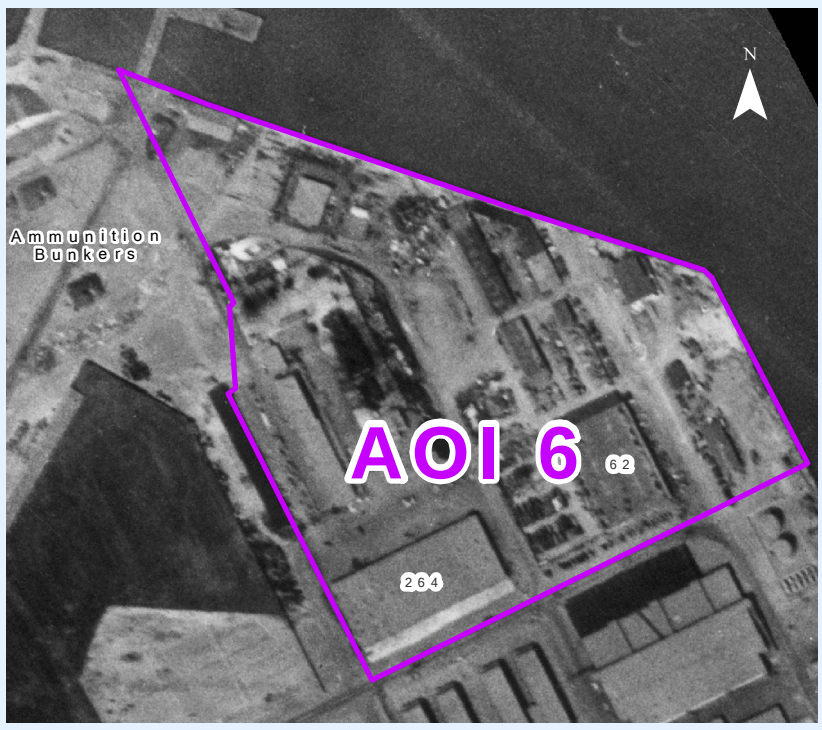
FIGURE 7

NORTHEASTERN COMMUNITY AREA OF INTEREST 5

2014-06-26 \\DISKSTATION\TriEcoProjects\NAVFAC - AECRU V\BRAC 2\Treasure Island\CTO-0003_Treasure_Island\Treasure_Is_GIS\TI_HRASTM_2012\Fig07\fig-7_TI_Dispensary_AOI-5_rev-13.mxd TriEco-Tt clynch



Sewage Treatment Area of Interest
04 June 1942 (not to scale)



Sewage Treatment Area of Interest
24 March 1947 (not to scale)

Sewage Treatment Area of Interest
15 August 2000 (not to scale)

Sewage Treatment Area of Interest
30 December 1969 (not to scale)

NOTES:
-There is evidence of lay down areas being utilized during the war in the area that is now the sewage treatment plant, suggesting this activity was associated with the Supply Department or a salvage yard. The waste treatment facility was constructed in the early 1960s.
-In 1970, the Navy's damage control school, which included radioactive decontamination training, was relocated to the northern portion of the site. Facilities included Buildings 461 and 462 and the USS Pandemonium Site II (NE), a full scale mockup training ship. The relocation was completed in September 1970. The use of these facilities ended by 20 February 1994.

LEGEND

- Area of Interest
- IR Site
- Newly Identified Radiologically Impacted Site
- Newly Identified Radiologically Impacted Sewer or Storm Line
- 2006 HRA Radiologically Impacted Site Where Recent Surveys Have Found Low Level Radiological Contamination or Objects
- Radiologically Impacted Soil Site With Non-Radiologically Impacted Building/Structure
- Existing Building (as of 19 June 2011)
- Demolished Building
- Former Runway
- Road
- Fence

Note: Areas are not radiologically impacted unless specifically identified.

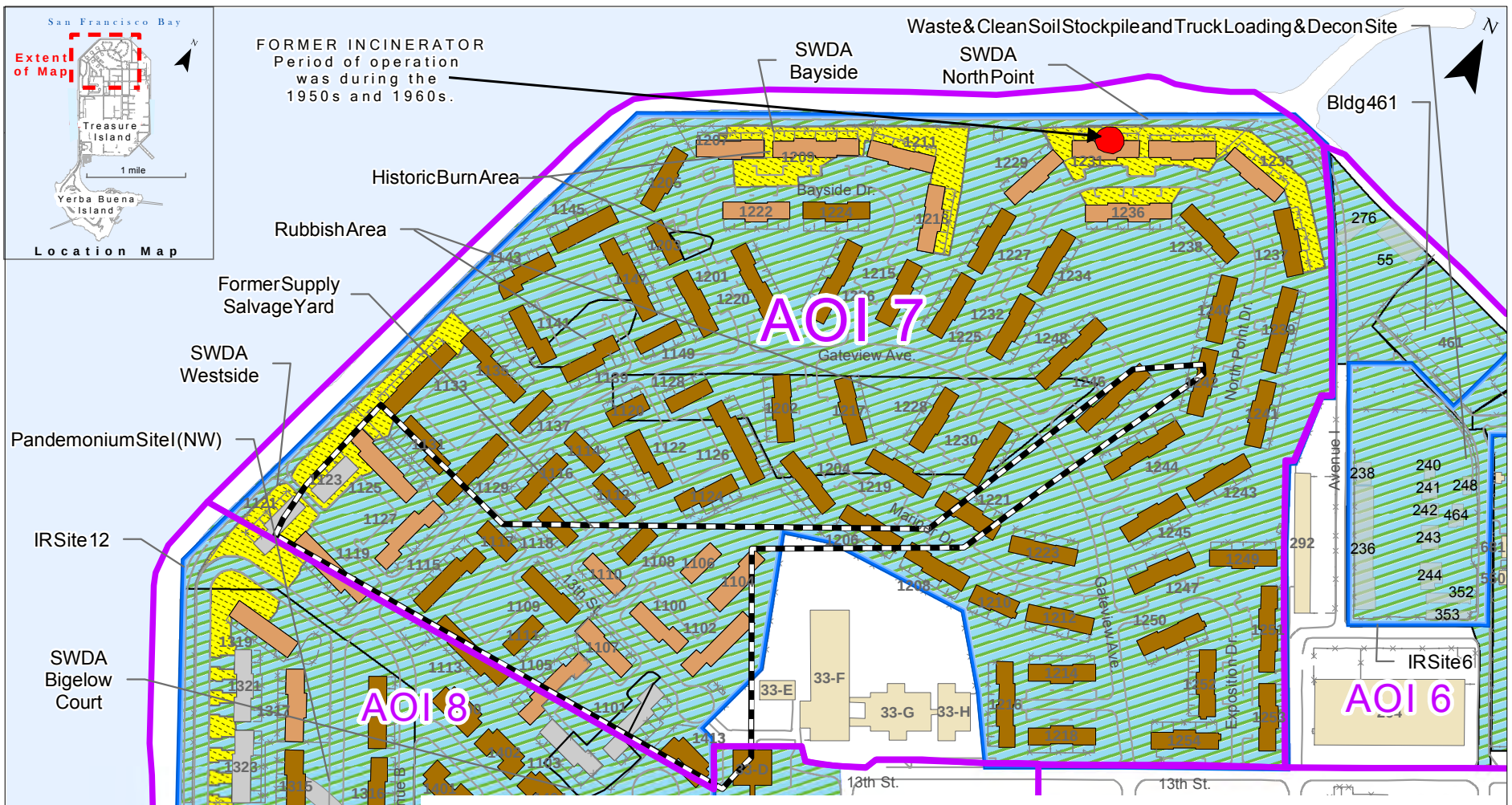
HRA Historical Radiological Assessment
IR Installation Restoration
SWDA Solid Waste Disposal Area

TriEco A Joint Venture

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

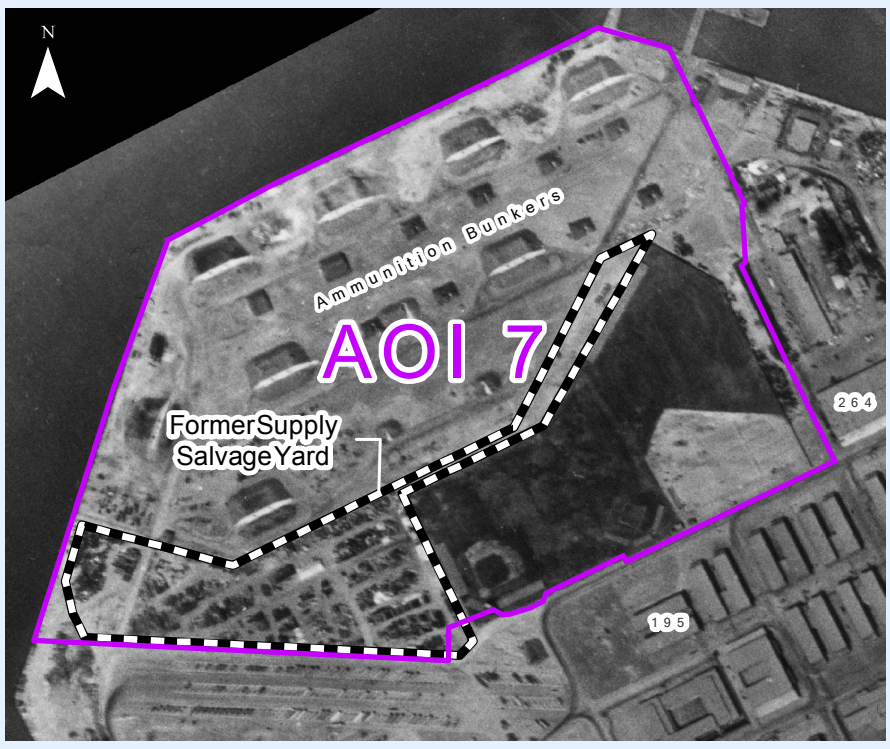
FIGURE 8

SEWAGE TREATMENT AREA OF INTEREST 6

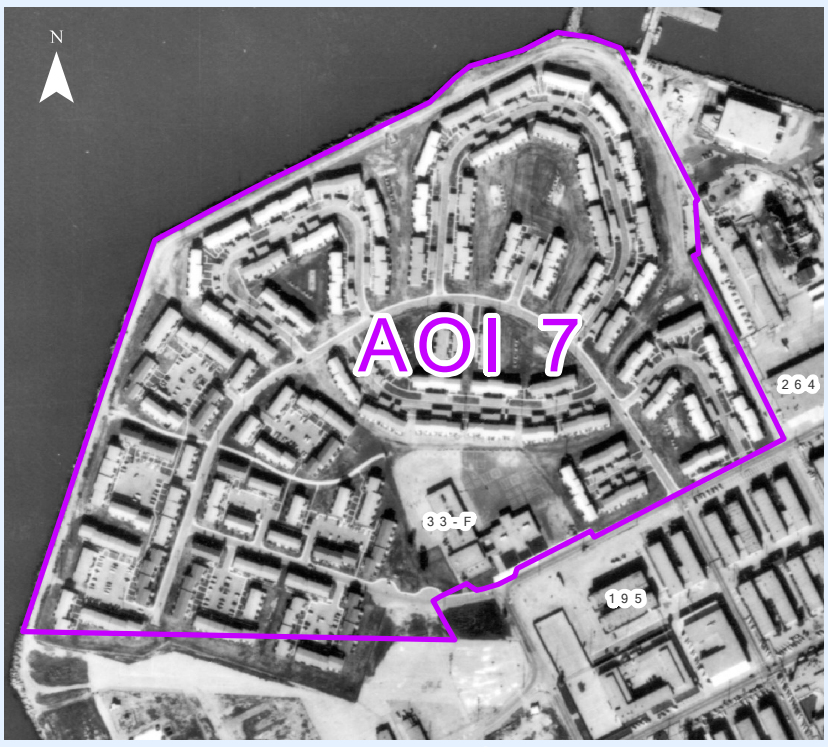


NOTES:
-The Area of Interest remained a likely spot for disposal of debris throughout WWII and into the 1960s.
-Housing was constructed in the area beginning in the mid-1960s.
-A salvage yard was operated in the southwestern portion of the site beginning sometime during WWII and into the 1960s.

Housing Area of Interest
04 June 1942 (not to scale)



Housing Area of Interest
24 March 1947 (not to scale)



Housing Area of Interest
30 December 1969 (not to scale)

Housing Area of Interest
10 April 1968 (not to scale)

LEGEND

- Area of Interest
- IR Site
- Newly Identified Radiologically Impacted Site
- 2006 HRA Radiologically Impacted Site Where Recent Surveys Have Found Low Level Radiological Contamination or Objects
- Radiologically Impacted Soil Site With Non-Radiologically Impacted Building/Structure
- Former Storage/Salvage Yard†

Buildings

- Occupied
- Unoccupied
- Demolished
- Road
- Fence

Notes:
Areas are not radiologically impacted unless specifically identified.
† Former Supply Salvage Yard from US Naval Station Treasure Island San Francisco, California General Development Map, 1962.

HRA Historical Radiological Assessment
IR Installation Restoration
SWDA Solid Waste Disposal Area

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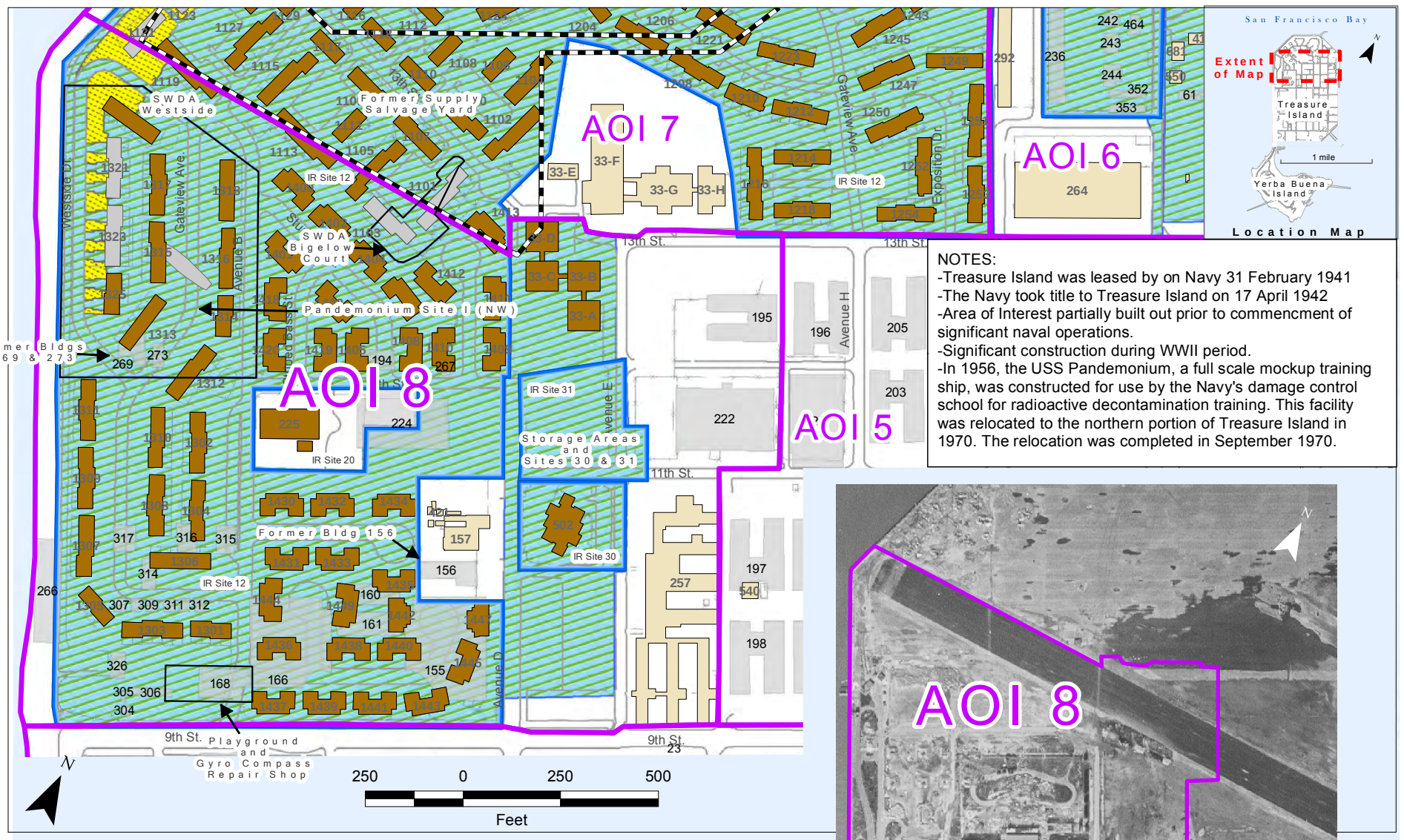
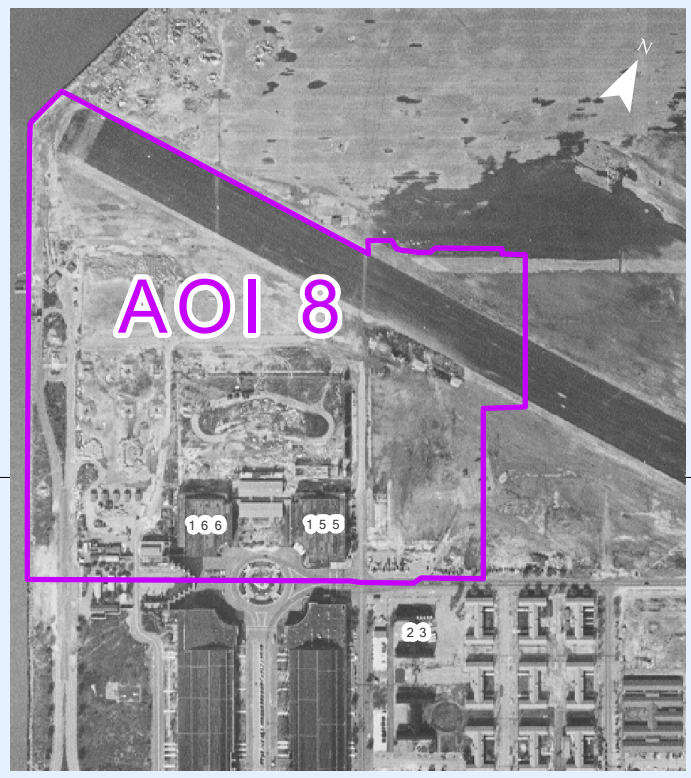
Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

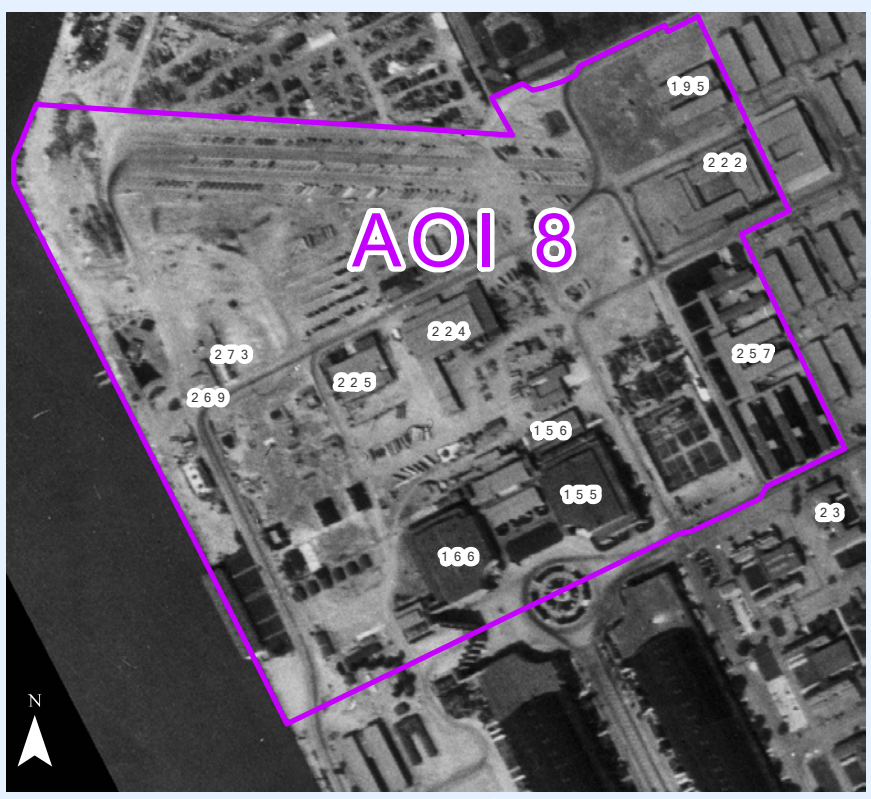
FIGURE 9
HOUSING AREA OF INTEREST 7



NOTES:
-Treasure Island was leased by on Navy 31 February 1941
-The Navy took title to Treasure Island on 17 April 1942
-Area of Interest partially built out prior to commencment of significant naval operations.
-Significant construction during WWII period.
-In 1956, the USS Pandemonium, a full scale mockup training ship, was constructed for use by the Navy's damage control school for radioactive decontamination training. This facility was relocated to the northern portion of Treasure Island in 1970. The relocation was completed in September 1970.



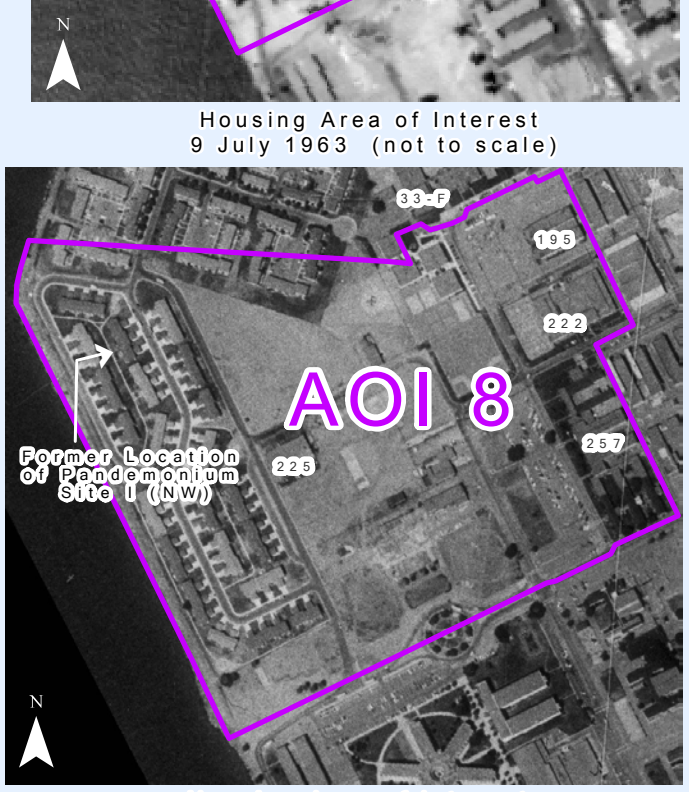
Housing Area of Interest
04 June 1942 (not to scale)



Housing Area of Interest
24 March 1947 (not to scale)

Housing Area of Interest
9 July 1963 (not to scale)

Housing Area of Interest
15 August 2000 (not to scale)



Housing Area of Interest
4 September 1975 (not to scale)

LEGEND

- Area of Interest
- IR Site
- Newly Identified Radiologically Impacted Site
- 2006 HRA Radiologically Impacted Site Where Recent Surveys Have Found Low Level Radiological Contamination or Objects
- Radiologically Impacted Soil Site With Non-Radiologically Impacted Building/Structure
- Former Storage/Salvage Yard†
- Road
- Fence
- Existing Building (as of 19 June 2011)
- Demolished Building

TriEco A Joint Venture

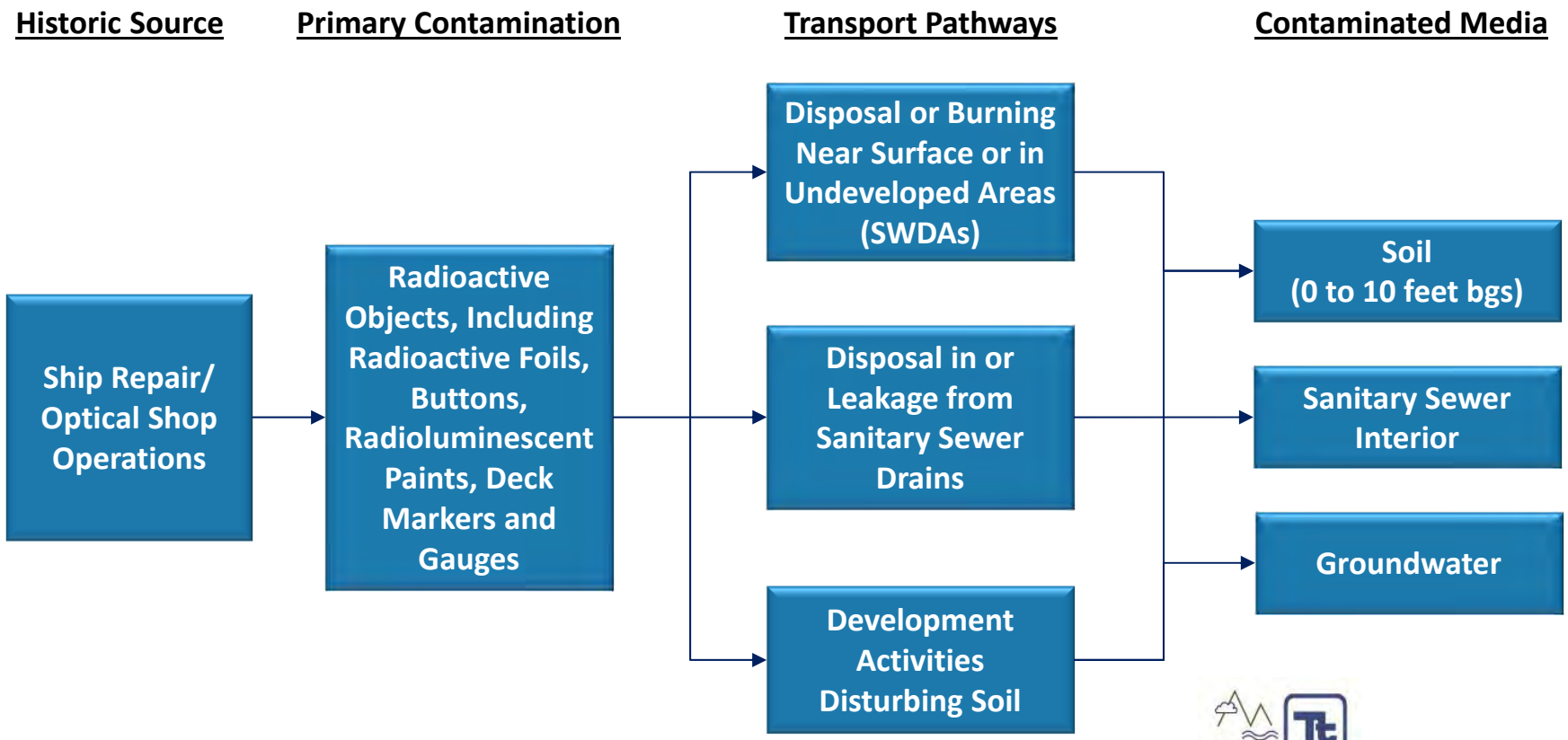
Notes:
Areas are not radiologically impacted unless specifically identified.
† Former Supply Salvage Yard from US Naval Station Treasure Island San Francisco, California General Development Map, 1962.

HRA Historical Radiological Assessment
IR Installation Restoration
SWDA Solid Waste Disposal Area

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 10
HOUSING
AREA OF INTEREST 8

2014-06-26 \\DISKSTATION\TriEcoProjects\NAVFAC - AECRU V\BRAC 2\Treasure Island\CTO-0038 Sites 6 & 24 PPs&RODs\CTO_0038_GIS\IR-Site-12\IR_Site-12_LowLevelRadiologicalObjects_11X17_surface_exposure_r2.mxd TriEco-Tt Mario



TriEco
A Joint Venture

Notes:

bgs Below ground surface
SWDA Solid waste disposal area

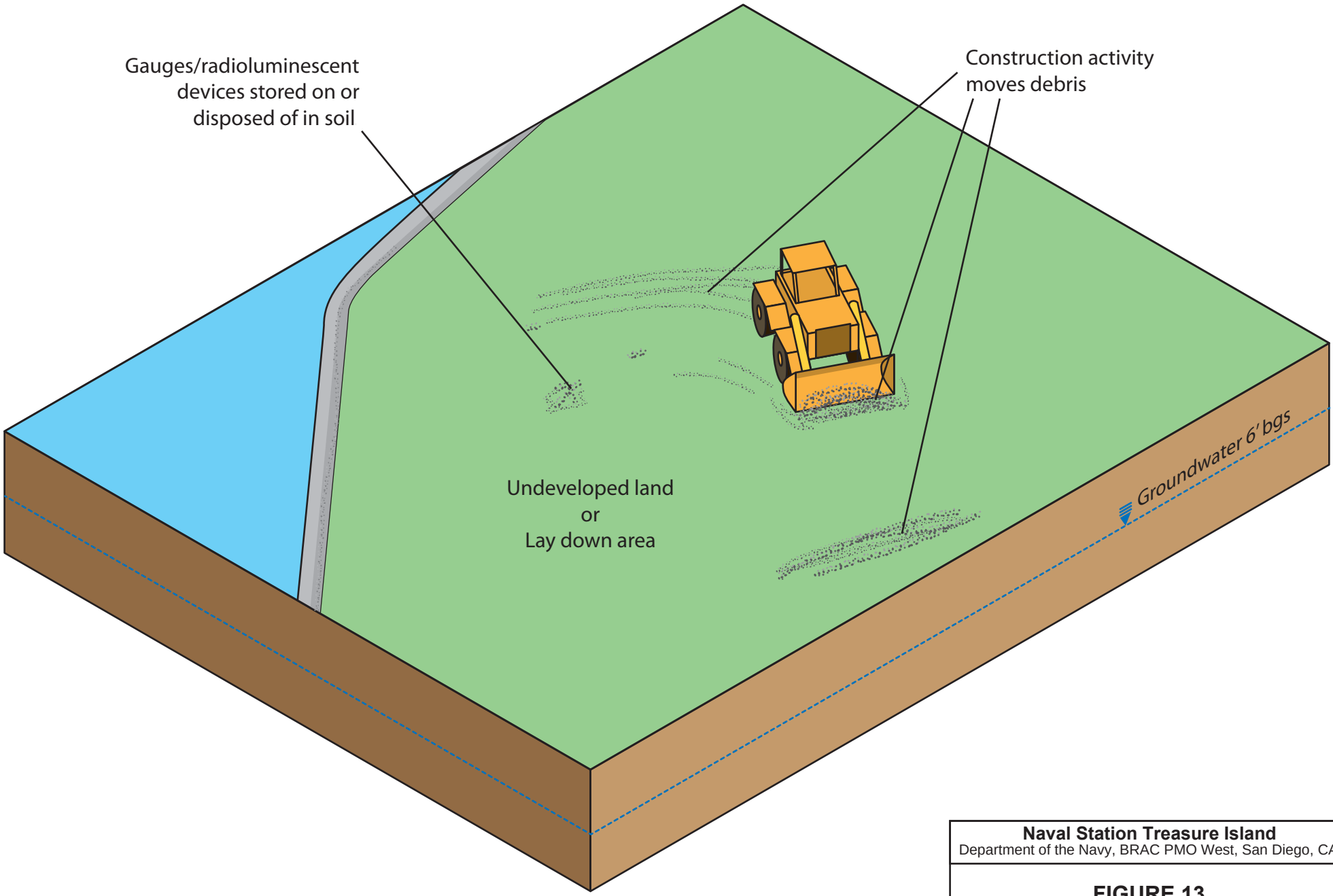
Key Assumptions:

1. Ship repair activities were limited to WWII (the Frontier Base) and for a short period afterward (the "Small Craft Facility").
2. Disposal/burial areas would not be found within active or developed areas of the base.

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 12

REPAIR/SOLID WASTE DISPOSAL OPERATIONS – CONCEPTUAL SITE MODEL

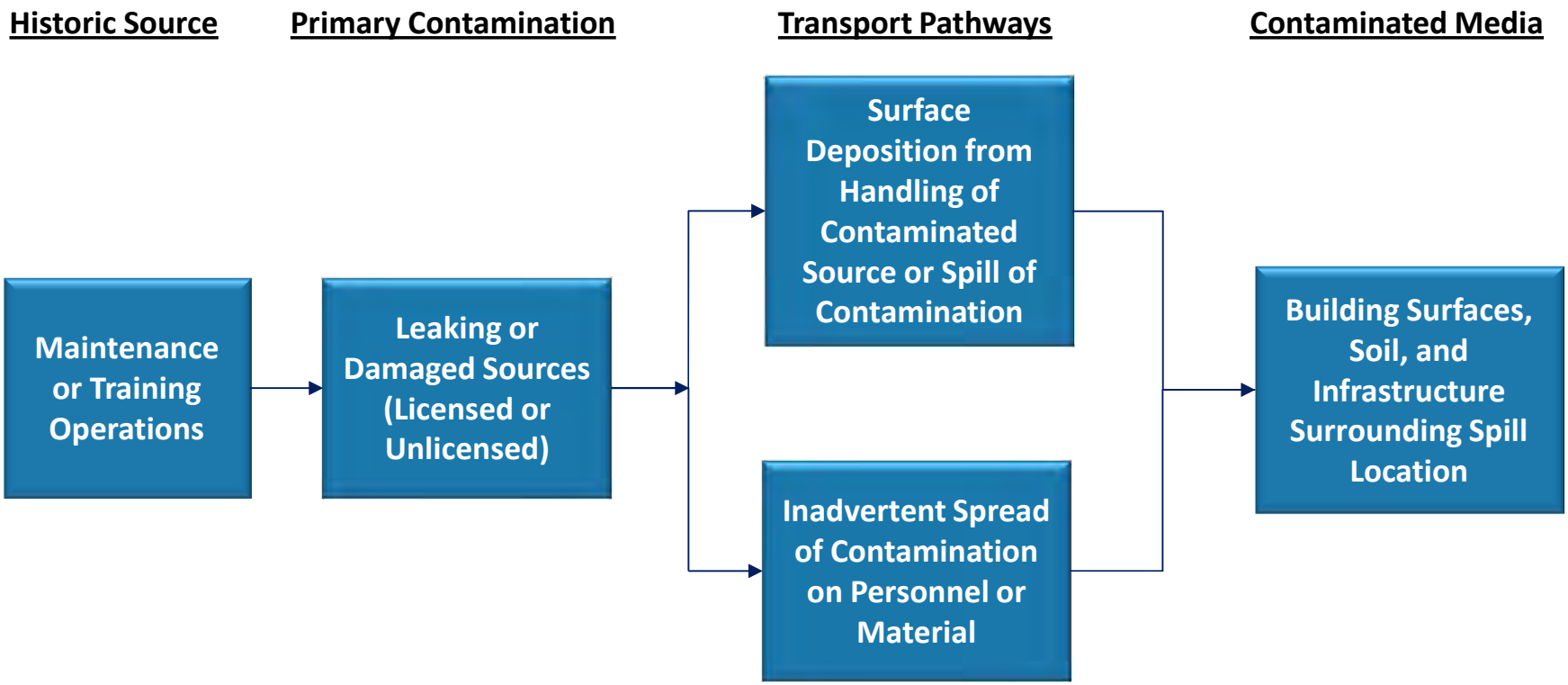


Note:
bgs Below ground surface

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 13

REPAIR/SOLID WASTE DISPOSAL OPERATIONS - CONCEPTUAL SITE MODEL



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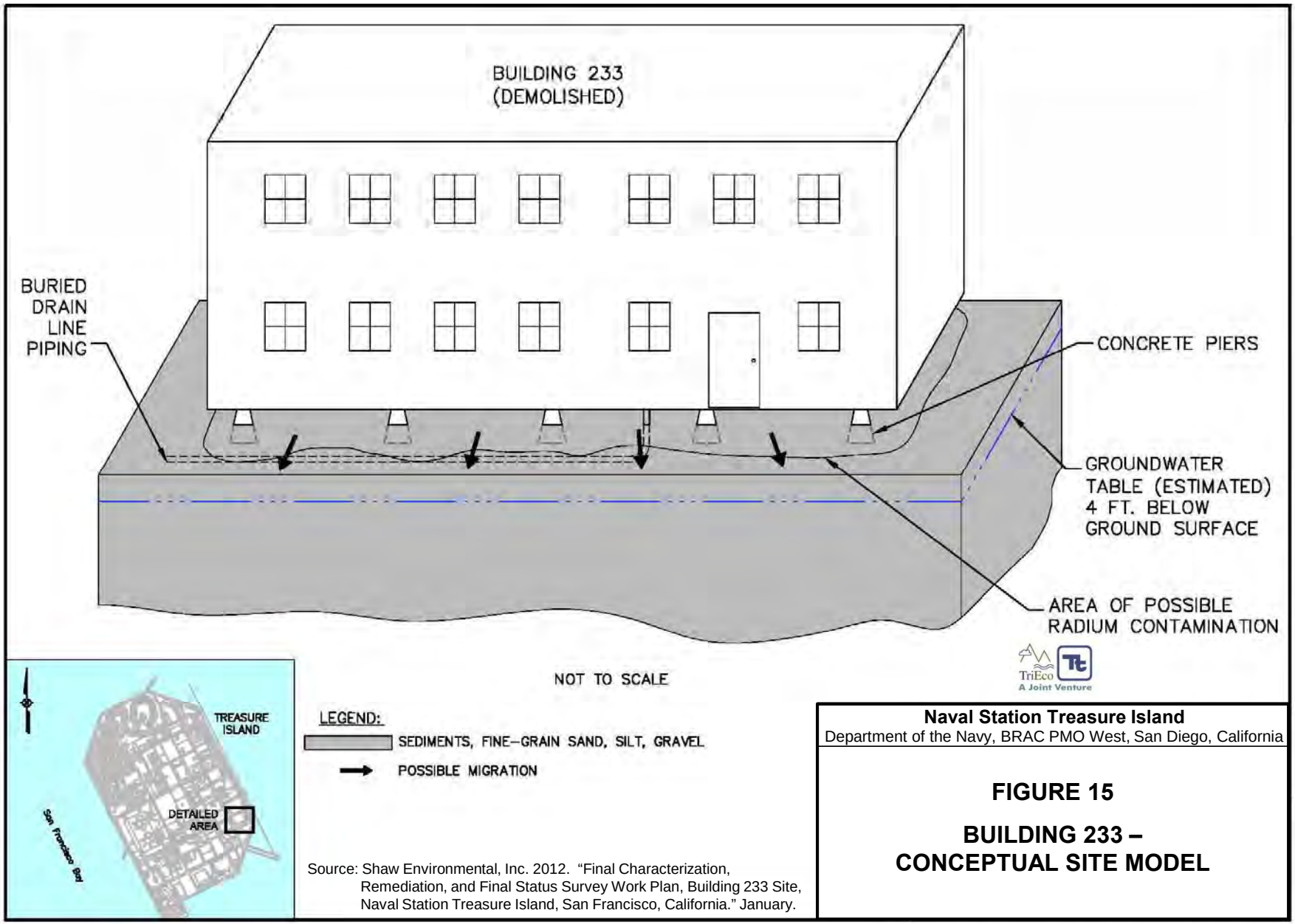
Key Assumption:

1. Known actual or potential spills are confined to Building 233 and former USS *Pandemonium* locations.

FIGURE 14

INCIDENTAL RELEASES FROM TRAINING OPERATIONS – CONCEPTUAL SITE MODEL



Source: Shaw Environmental, Inc. 2012. "Final Characterization, Remediation, and Final Status Survey Work Plan, Building 233 Site, Naval Station Treasure Island, San Francisco, California." January.

Naval Station Treasure Island
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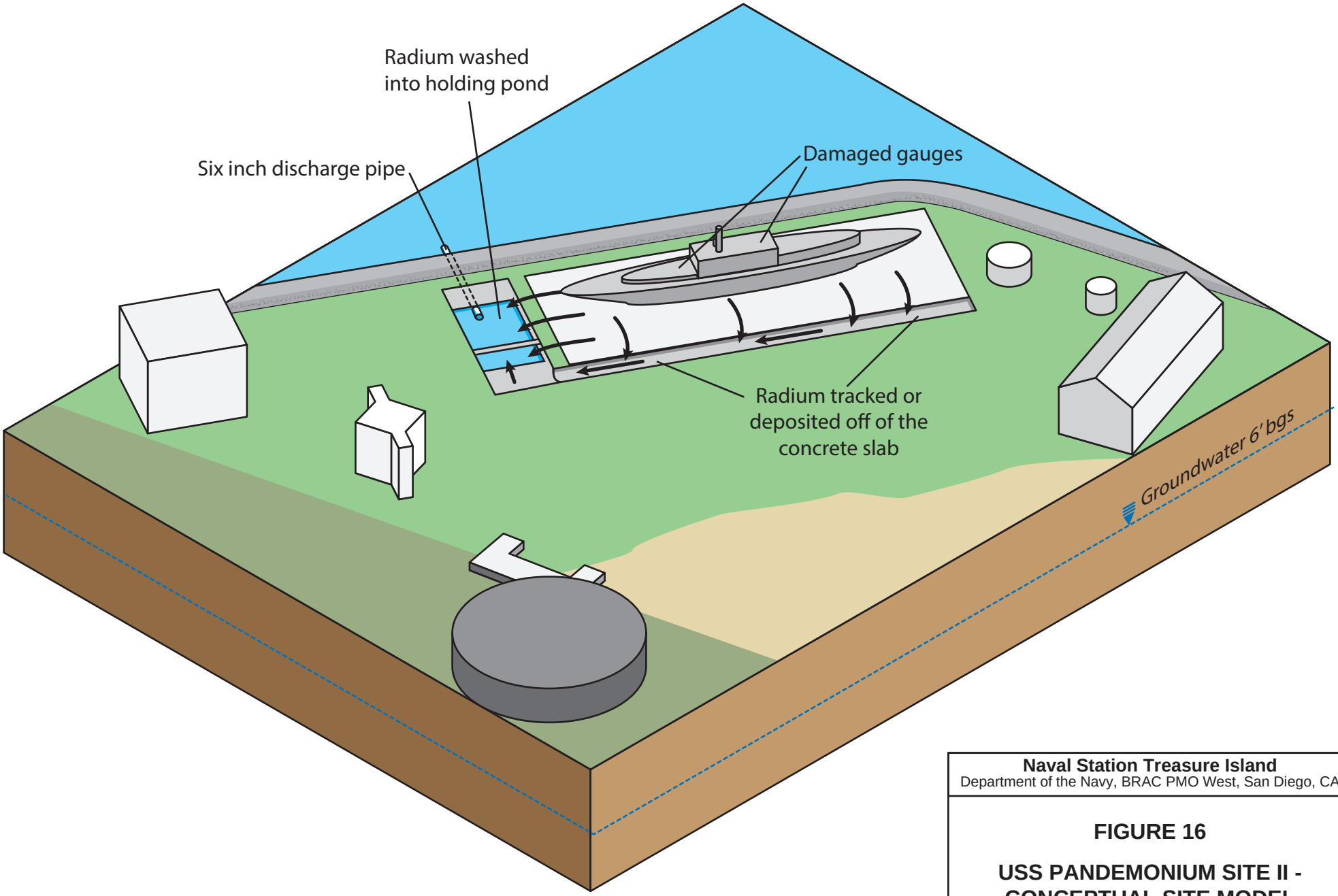
FIGURE 15

BUILDING 233 – CONCEPTUAL SITE MODEL

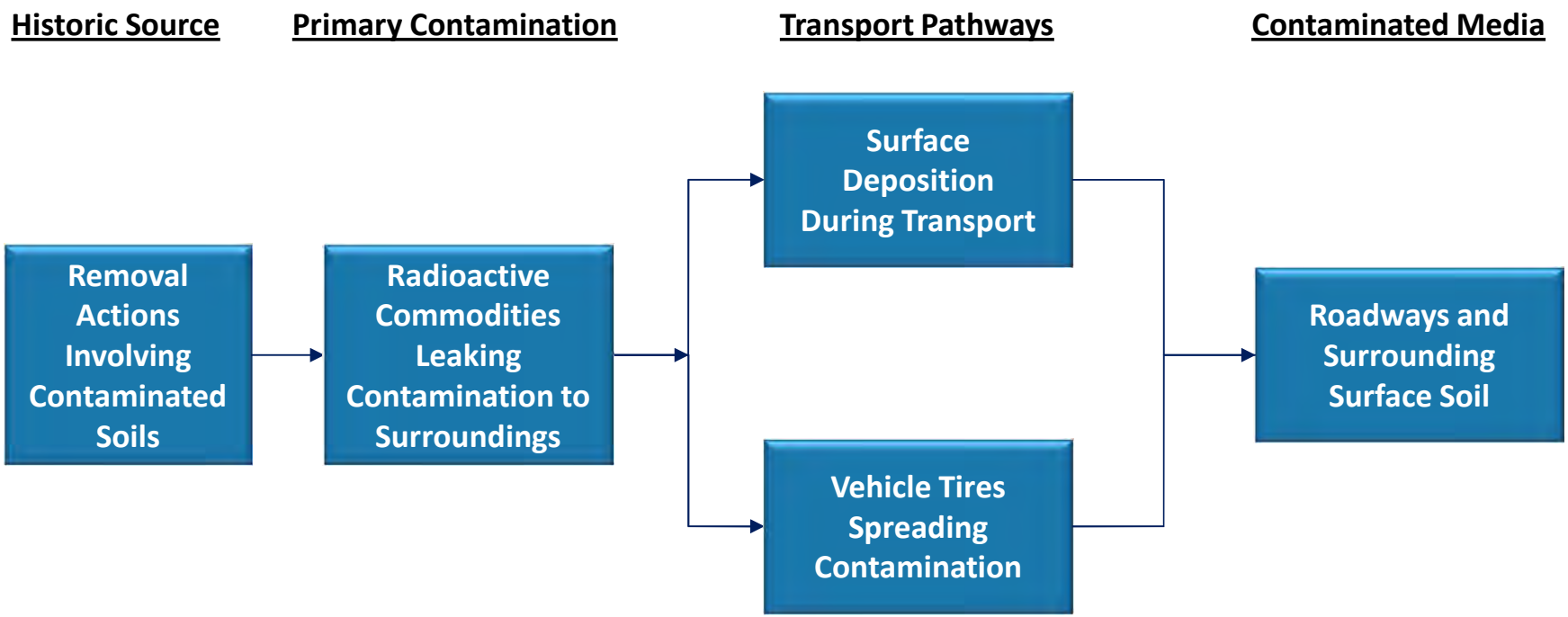


Note:
bgs Below ground surface

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 16

USS PANDEMONIUM SITE II - CONCEPTUAL SITE MODEL



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Note:

SWDA Soild waste disposal area

Key Assumptions:

1. Controls on transport of contaminated soil from Site 6, Site 12 SWDAs, and Site 32 were not adequate to contain contamination.
2. Impacted areas would be confined to primary truck routes.

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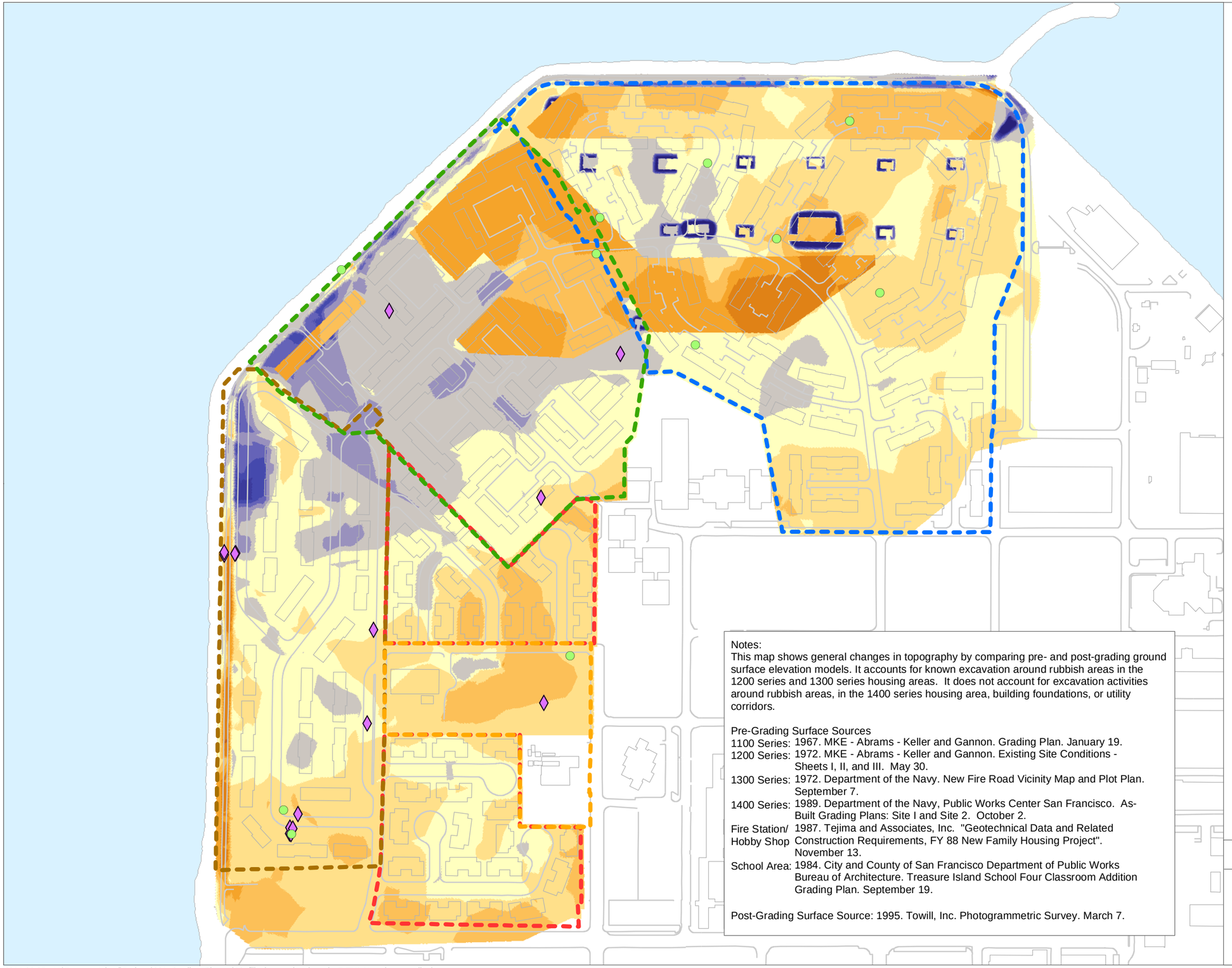
FIGURE 17

SPILLS/CONTAMINATION RESULTING FROM HANDLING OF CONTAMINATED SOILS FROM SITE 12 SWDAs – CONCEPTUAL SITE MODEL



Note:
* Information on excavation and compaction beneath buildings is incomplete. Where available it suggests that between 2 and 2.5 feet of compacted soil was required beneath footings.

150 0 150 300
Feet

Notes:
This map shows general changes in topography by comparing pre- and post-grading ground surface elevation models. It accounts for known excavation around rubbish areas in the 1200 series and 1300 series housing areas. It does not account for excavation activities around rubbish areas, in the 1400 series housing area, building foundations, or utility corridors.

Pre-Grading Surface Sources
1100 Series: 1967. MKE - Abrams - Keller and Gannon. Grading Plan. January 19.
1200 Series: 1972. MKE - Abrams - Keller and Gannon. Existing Site Conditions - Sheets I, II, and III. May 30.
1300 Series: 1972. Department of the Navy. New Fire Road Vicinity Map and Plot Plan. September 7.
1400 Series: 1989. Department of the Navy, Public Works Center San Francisco. As-Built Grading Plans: Site I and Site 2. October 2.
Fire Station/ Hobby Shop: 1987. Tejima and Associates, Inc. "Geotechnical Data and Related Construction Requirements, FY 88 New Family Housing Project". November 13.
School Area: 1984. City and County of San Francisco Department of Public Works Bureau of Architecture. Treasure Island School Four Classroom Addition Grading Plan. September 19.

Post-Grading Surface Source: 1995. Towill, Inc. Photogrammetric Survey. March 7.

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FIGURE 18

GRADING ELEVATION CHANGE COMPARED TO EXCAVATED PRE-GRADING SURFACE

2014-06-25 V:\Treasure Island\Projects\031_Grading_Change\18_fill_above_min_alt.mxd TtEMI-AL simon.cardinale

TABLE

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
1	TI-01	2007-08	0.028	jar	0.0031	New World Technology 3/7/2007 to 4/27/2008
2	TI-02	2007-08	0.022	jar	0.0024	New World Technology 3/7/2007 to 4/27/2008
3	TI-03	2007-08	0.044	jar	0.0049	New World Technology 3/7/2007 to 4/27/2008
4	TI-04	2007-08	0.032	jar	0.0035	New World Technology 3/7/2007 to 4/27/2008
5	TI-05	2007-08	12	jar	1.3271	New World Technology 3/7/2007 to 4/27/2008
6	TI-06	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 4/27/2008
7	TI-07	2007-08	9	foil	0.9954	New World Technology 3/7/2007 to 4/27/2008
8	TI-08	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 4/27/2008
9	TI-09	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 4/27/2008
10	TI-10	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008
11	TI-11	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008
12	TI-12	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008
13	TI-13	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
14	TI-14	2007-08	5	foil	0.5530	New World Technology 3/7/2007 to 11/24/2008
15	TI-15	2007-08	9	foil	0.9954	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
16	TI-16	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
17	TI-17	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008
18	TI-18	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
19	TI-19	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008
20	TI-20	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008
21	TI-21	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
22	TI-22	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
23	TI-23	2007-08	4	foil	0.4424	New World Technology 3/7/2007 to 11/24/2008
24	TI-24	2007-08	4	foil	0.4424	New World Technology 3/7/2007 to 4/27/2008
25	TI-25	2007-08	12	foil	1.3271	New World Technology 3/7/2007 to 11/24/2008
26	TI-26	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
27	TI-27	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
28	TI-28	2007-08	0.02	button	0.0022	New World Technology 3/7/2007 to 11/24/2008
29	TI-29	2007-08	0.006	foil	0.0007	New World Technology 3/7/2007 to 4/27/2008
30	TI-30	2007-08	0.02	foil	0.0022	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
31	TI-31	2007-08	0.044	button	0.0049	New World Technology 3/7/2007 to 11/24/2008
32	TI-32	2007-08	0.04	button	0.0044	New World Technology 3/7/2007 to 11/24/2008
33	TI-33	2007-08	0.006	button	0.0007	New World Technology 3/7/2007 to 11/24/2008
34	TI-34	2007-08	0.022	button	0.0024	New World Technology 3/7/2007 to 11/24/2008
35	TI-35	2007-08	0.022	button	0.0024	New World Technology 3/7/2007 to 11/24/2008
36	TI-36	2007-08	0.02	button	0.0022	New World Technology 3/7/2007 to 4/27/2008
37	TI-37	2007-08	0.032	button	0.0035	New World Technology 3/7/2007 to 11/24/2008
38	TI-38	2007-08	0.03	button	0.0033	New World Technology 3/7/2007 to 11/24/2008
39	TI-39	2007-08	0.032	button	0.0035	New World Technology 3/7/2007 to 11/24/2008
40	TI-40	2007-08	0.02	clear button cover	0.0022	New World Technology 3/7/2007 to 11/24/2008
41	TI-41	2007-08	0.04	soil	0.0044	New World Technology 3/7/2007 to 4/27/2008
42	TI-43	2007-08	0.026	rusted metal	0.0029	New World Technology 3/7/2007 to 11/24/2008
43	TI-44	2007-08	0.015	metal strap with button	0.0017	New World Technology 3/7/2007 to 11/24/2008
44	TI-45	2007-08	0.03	soil	0.0033	New World Technology 3/7/2007 to 11/24/2008
45	TI-46	2007-08	0.024	piece of old deck marker?	0.0027	New World Technology 3/7/2007 to 11/24/2008

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Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
46	TI-47	2007-08	0.02	soil	0.0022	New World Technology 3/7/2007 to 11/24/2008
47	TI-48	2007-08	0.015	soil	0.0017	New World Technology 3/7/2007 to 11/24/2008
48	TI-49	2007-08	0.015	soil	0.0017	New World Technology 3/7/2007 to 4/27/2008
49	TI-50	2007-08	0.04	soil	0.0044	New World Technology 3/7/2007 to 11/24/2008
50	TI-51	2007-08	0.015	soil	0.0017	New World Technology 3/7/2007 to 11/24/2008
51	TI-52	2007-08	0.024	soil	0.0027	New World Technology 3/7/2007 to 11/24/2008
52	TI-53	2007-08	0.08	soil	0.0088	New World Technology 3/7/2007 to 11/24/2008
53	TI-54	2007-08	0.022	soil	0.0024	New World Technology 3/7/2007 to 4/27/2008
54	TI-55	2007-08	0.015	soil	0.0017	New World Technology 3/7/2007 to 11/24/2008
55	TI-56	2007-08	9	foil	0.9954	New World Technology 3/7/2007 to 11/24/2008
56	TI-57	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
57	TI-58	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
58	TI-59	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
59	TI-60	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
60	TI-61	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
61	TI-62	2007-08	8	two 0.5 cm chunks of corrosion?	0.8848	New World Technology 3/7/2007 to 11/24/2008
62	TI-63	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
63	TI-64	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008
64	TI-65	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
65	TI-66	2007-08	0.24	foil	0.0265	New World Technology 3/7/2007 to 4/27/2008
66	TI-67	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
67	TI-68	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008
68	TI-69	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
69	TI-70	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
70	TI-71	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
71	TI-72	2007-08	12	foil	1.3271	New World Technology 3/7/2007 to 11/24/2008
72	TI-73	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 4/27/2008
73	TI-74	2007-08	1.6	foil	0.1770	New World Technology 3/7/2007 to 11/24/2008
74	100	2007-08	58	foil	6.4145	New World Technology 3/7/2007 to 11/24/2008
75	101	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008

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Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
76	102	2007-08	5	foil	0.5530	New World Technology 3/7/2007 to 11/24/2008
77	103	2007-08	0.012	soil	0.0013	New World Technology 3/7/2007 to 4/27/2008
78	104	2007-08	0.008	soil	0.0009	New World Technology 3/7/2007 to 11/24/2008
79	105	2007-08	0.006	soil	0.0007	New World Technology 3/7/2007 to 11/24/2008
80	106	2007-08	0.03	button	0.0033	New World Technology 3/7/2007 to 11/24/2008
81	107	2007-08	0.022	button	0.0024	New World Technology 3/7/2007 to 11/24/2008
82	108	2007-08	0.015	button	0.0017	New World Technology 3/7/2007 to 11/24/2008
83	109	2007-08	0.034	button	0.0038	New World Technology 3/7/2007 to 11/24/2008
84	110	2007-08	0.024	button	0.0027	New World Technology 3/7/2007 to 4/27/2008
85	111	2007-08	0.012	soil	0.0013	New World Technology 3/7/2007 to 11/24/2008
86	112	2007-08	0.04	button	0.0044	New World Technology 3/7/2007 to 11/24/2008
87	113	2007-08	0.006	soil	0.0007	New World Technology 3/7/2007 to 11/24/2008
88	114	2007-08	0.23	button	0.0254	New World Technology 3/7/2007 to 11/24/2008
89	115	2007-08	0.02	button	0.0022	New World Technology 3/7/2007 to 4/27/2008
90	401	04/28/08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
91	402	04/29/08	5	foil	0.5530	New World Technology 3/7/2007 to 11/24/2008
92	403	04/29/08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
93	404	04/30/08	12	foil	1.3271	New World Technology 3/7/2007 to 11/24/2008
94	405	04/30/08	2	possible foil fragments	0.2212	New World Technology 3/7/2007 to 11/24/2008
95	501	05/01/08	15	foil	1.6589	New World Technology 3/7/2007 to 11/24/2008
96	502	05/21/08	0.04	button	0.0044	New World Technology 3/7/2007 to 4/27/2008
97	503	05/22/08	0.008	switch	0.0009	New World Technology 3/7/2007 to 11/24/2008
98	504	05/29/08	0.035	button	0.0039	New World Technology 3/7/2007 to 11/24/2008
99	601	06/02/08	0.025	button	0.0028	New World Technology 3/7/2007 to 11/24/2008
100	602	06/16/08	2	appear to be foil fragments	0.2212	New World Technology 3/7/2007 to 11/24/2008
101	603	06/19/08	0.04	button	0.0044	New World Technology 3/7/2007 to 4/27/2008
102	604	06/26/08	0.04	foil	0.0044	New World Technology 3/7/2007 to 11/24/2008
103	701	07/03/08	0.04	button	0.0044	New World Technology 3/7/2007 to 11/24/2008
104	702	07/24/08	0.008	electronic component	0.0009	New World Technology 3/7/2007 to 11/24/2008
105	703	07/24/08	0.008	metallic piece	0.0009	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

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106	704	07/24/08	0.025	button like	0.0028	New World Technology 3/7/2007 to 11/24/2008
107	705	07/24/08	0.02	metallic piece	0.0022	New World Technology 3/7/2007 to 11/24/2008
108	706	07/30/08	0.008	switch	0.0009	New World Technology 3/7/2007 to 4/27/2008
109	707	07/30/08	0.008	metal piece	0.0009	New World Technology 3/7/2007 to 11/24/2008
110	801	08/04/08	0.008	metal piece	0.0009	New World Technology 3/7/2007 to 11/24/2008
111	802	08/12/08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
112	803	08/19/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
113	804	08/19/08	10	foil fragments	1.1060	New World Technology 3/7/2007 to 4/27/2008
114	805	08/20/08	0.4	metal fragments	0.0442	New World Technology 3/7/2007 to 11/24/2008
115	806	08/20/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
116	807	08/26/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
117	808	08/27/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
118	809	08/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
119	810	08/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
120	901	09/02/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 4/27/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
121	902	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
122	903	09/23/08	0.01	switch	0.0011	New World Technology 3/7/2007 to 11/24/2008
123	904	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
124	905	09/23/08	0.04	metal fragments	0.0044	New World Technology 3/7/2007 to 11/24/2008
125	906	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
126	907	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
127	908	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
128	909	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
129	910	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
130	911	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
131	912	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
132	913	09/23/08	4	foil	0.4424	New World Technology 3/7/2007 to 4/27/2008
133	914	09/24/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
134	915	09/24/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
135	916	09/24/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
136	917	09/24/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
137	918	09/24/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
138	919	09/24/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
139	920	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
140	921	09/25/08	0.04	metal fragments	0.0044	New World Technology 3/7/2007 to 11/24/2008
141	922	09/25/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
142	923	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
143	924	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
144	925	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
145	926	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
146	927	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
147	928	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
148	929	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
149	930	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
150	931	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
151	932	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
152	933	09/25/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
153	934	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
154	935	09/25/08	0.018	metal fragments	0.0020	New World Technology 3/7/2007 to 11/24/2008
155	936	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
156	937	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
157	938	09/25/08	0.03	metal fragments	0.0033	New World Technology 3/7/2007 to 11/24/2008
158	939	09/29/08	20	foil	2.2119	New World Technology 3/7/2007 to 11/24/2008
159	940	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
160	941	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
161	942	09/29/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 4/27/2008
162	943	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
163	944	09/29/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
164	945	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
165	946	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
166	947	09/29/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
167	948	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
168	949	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
169	950	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
170	951	09/29/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
171	952	09/30/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
172	953	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
173	954	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
174	955	09/30/08	0.22	metal fragments	0.0243	New World Technology 3/7/2007 to 11/24/2008
175	956	09/30/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
176	957	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
177	958	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
178	959	09/30/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
179	960	09/30/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
180	961	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 4/27/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
181	962	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
182	963	09/30/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
183	964	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
184	965	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
185	966	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 4/27/2008
186	967	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
187	968	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
188	969	09/30/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
189	970	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
190	971	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
191	972	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
192	973	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 4/27/2008
193	974	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
194	975	09/30/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
195	976	09/30/08	0.018	metal fragments	0.0020	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
196	977	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
197	978	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
198	979	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
199	980	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
200	981	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
201	982	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
202	983	09/30/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
203	984	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
204	1001	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
205	1002	10/01/08	0.08	metal fragments	0.0088	New World Technology 3/7/2007 to 11/24/2008
206	1003	10/01/08	0.03	metal fragments	0.0033	New World Technology 3/7/2007 to 11/24/2008
207	1004	10/01/08	0.05	metal fragments	0.0055	New World Technology 3/7/2007 to 11/24/2008
208	1005	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
209	1006	10/01/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
210	1007	10/01/08	0.05	metal fragments	0.0055	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
211	1008	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
212	1009	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
213	1010	10/01/08	0.08	metal fragments	0.0088	New World Technology 3/7/2007 to 11/24/2008
214	1011	10/01/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
215	1012	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
216	1013	10/01/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
217	1014	10/02/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
218	1015	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
219	1016	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
220	1017	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
221	1018	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
222	1019	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
223	1020	10/02/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
224	1021	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
225	1022	10/02/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
226	1023	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
227	1024	10/02/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
228	1025	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
229	1026	10/06/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
230	1027	10/06/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
231	1028	10/06/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
232	1029	10/06/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
233	1030	10/07/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
234	1031	10/07/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
235	1032	10/07/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
236	1033	10/07/08	2	foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
237	1034	10/07/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
238	1035	10/07/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
239	1036	10/08/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
240	1037	10/08/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
241	1038	10/08/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
242	1039	10/08/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
243	1040	10/08/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
244	1041	10/09/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
245	1042	10/09/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
246	1043	10/13/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
247	1044	10/13/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
248	1045	10/13/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
249	1046	10/13/08	0.025	metal fragments	0.0028	New World Technology 3/7/2007 to 11/24/2008
250	1047	10/13/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
251	1048	10/13/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
252	1049	10/13/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
253	1050	10/13/08	0.04	metal fragments	0.0044	New World Technology 3/7/2007 to 11/24/2008
254	1051	10/13/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
255	1052	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
256	1053	10/14/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
257	1054	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
258	1055	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
259	1056	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
260	1057	10/14/08	0.015	4" dia x 4" long cylindrical gauge	0.0017	New World Technology 3/7/2007 to 11/24/2008
261	1058	10/14/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
262	1059	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
263	1060	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
264	1061	10/14/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
265	1062	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
266	1063	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
267	1064	10/15/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
268	1065	10/15/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
269	1066	10/15/08	1.5	foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
270	1067	10/15/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
271	1068	10/15/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
272	1069	10/15/08	0.5	metal fragments	0.0553	New World Technology 3/7/2007 to 11/24/2008
273	1070	10/15/08	0.02	foil fragment	0.0022	New World Technology 3/7/2007 to 11/24/2008
274	1071	10/16/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
275	1072	10/16/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
276	1073	10/16/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
277	1074	10/16/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
278	1075	10/16/08	0.004	metal fragments	0.0004	New World Technology 3/7/2007 to 11/24/2008
279	1076	10/16/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
280	1077	10/16/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
281	1078	10/16/08	0.1	metal disc	0.0111	New World Technology 3/7/2007 to 11/24/2008
282	1079	10/20/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
283	1080	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
284	1081	10/20/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
285	1082	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
286	1083	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
287	1084	10/20/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
288	1085	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
289	1086	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
290	1087	10/21/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
291	1088	10/21/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
292	1089	10/21/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
293	1090	10/21/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
294	1091	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
295	1092	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
296	1093	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
297	1094	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
298	1095	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
299	1096	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
300	1097	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
301	1098	10/27/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
302	1099	10/27/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
303	10100	10/27/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
304	10101	10/27/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
305	10102	10/27/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
306	10103	10/27/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
307	10104	10/27/08	0.015	metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
308	10105	10/27/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
309	10106	10/28/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
310	10107	10/28/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
311	10108	10/28/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
312	10109	10/28/08	0.004	metal fragments	0.0004	New World Technology 3/7/2007 to 11/24/2008
313	10110	10/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
314	10111	10/28/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
315	10112	10/28/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
316	10113	10/28/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
317	10114	10/28/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
318	10115	10/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
319	10116	10/28/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
320	10117	10/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
321	10118	10/28/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
322	10119	10/28/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
323	10120	10/29/08	2.8	Soil/Debris Fragments	0.3097	New World Technology 3/7/2007 to 11/24/2008
324	10121	10/29/08	0.014	Metal Fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
325	10122	10/29/08	0.014	Metal Fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
326	10123	10/29/08	0.03	Metal Fragments	0.0033	New World Technology 3/7/2007 to 11/24/2008
327	10124	10/29/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
328	10125	10/29/08	0.05	Button	0.0055	New World Technology 3/7/2007 to 11/24/2008
329	10126	10/29/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
330	10127	10/30/08	0.07	Metal Fragments	0.0077	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
331	10128	10/30/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
332	10128	10/30/08	0.012	Metal Fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
333	10130	10/30/08	1	Foil Fragments	0.1106	New World Technology 3/7/2007 to 11/24/2008
334	10131	10/30/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
335	10132	10/30/08	0.05	Soil	0.0055	New World Technology 3/7/2007 to 11/24/2008
336	10133	10/30/08	0.04	Soil	0.0044	New World Technology 3/7/2007 to 11/24/2008
337	10134	10/30/08	0.035	Metal Fragments	0.0039	New World Technology 3/7/2007 to 11/24/2008
338	10135	10/30/08	0.012	Metal Fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
339	1101	11/04/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
340	1102	11/04/08	0.017	Metal Fragments	0.0019	New World Technology 3/7/2007 to 11/24/2008
341	1103	11/04/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
342	1104	11/04/08	0.012	Metal Fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
343	1105	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
344	1106	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
345	1107	11/04/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
346	1108	11/04/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
347	1109	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
348	1110	11/04/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
349	1111	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
350	1112	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
351	1113	11/04/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
352	1114	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
353	1115	11/04/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
354	1116	11/04/08	0.04	Metal Fragments	0.0044	New World Technology 3/7/2007 to 11/24/2008
355	1117	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
356	1118	11/04/08	0.03	Metal Fragments	0.0033	New World Technology 3/7/2007 to 11/24/2008
357	1119	11/04/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
358	1120	11/04/08	4	Foil	0.4424	New World Technology 3/7/2007 to 11/24/2008
359	1121	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
360	1122	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
361	1123	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
362	1124	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
363	1125	11/04/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
364	1126	11/05/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
365	1127	11/05/08	0.05	Metal Fragments	0.0055	New World Technology 3/7/2007 to 11/24/2008
366	1128	11/05/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
367	1129	11/05/08	0.012	Metal Fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
368	1130	11/05/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
369	1131	11/05/08	0.015	Metal Fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
370	1132	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
371	1133	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
372	1134	11/06/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
373	1135	11/06/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
374	1136	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
375	1137	11/06/08	0.5	Foil Fragment	0.0553	New World Technology 3/7/2007 to 11/24/2008

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376	1138	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
377	1139	11/06/08	0.014	Metal Fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
378	1140	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
379	1141	11/06/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
380	1142	11/06/08	0.02	Button	0.0022	New World Technology 3/7/2007 to 11/24/2008
381	1143	11/06/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
382	1144	11/06/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
383	1145	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
384	1146	11/10/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
385	1147	11/10/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
386	1148	11/10/08	0.025	Metal Fragments	0.0028	New World Technology 3/7/2007 to 11/24/2008
387	1149	11/10/08	0.008	Soil	0.0009	New World Technology 3/7/2007 to 11/24/2008
388	1150	11/10/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
389	1151	11/10/08	0.008	Soil	0.0009	New World Technology 3/7/2007 to 11/24/2008
390	1152	11/10/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
391	1153	11/10/08	0.025	Metal Fragments	0.0028	New World Technology 3/7/2007 to 11/24/2008
392	1154	11/10/08	2	Foil Fragments / Soil	0.2212	New World Technology 3/7/2007 to 11/24/2008
393	1155	11/10/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
394	1156	11/10/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
395	1157	11/10/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
396	1158	11/10/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
397	1159	11/10/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
398	1160	11/10/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
399	1161	11/10/08	0.015	Metal Fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
400	1162	11/11/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
401	1163	11/12/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
402	1164	11/13/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
403	1165	11/17/08	0.005	metal object 4" dia x 6"	0.0006	New World Technology 3/7/2007 to 11/24/2008
404	1166	11/17/08	0.012	soil with metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
405	1167	11/17/08	0.007	small metal fragment	0.0008	New World Technology 3/7/2007 to 11/24/2008

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406	1168	11/17/08	0.01	small metal object	0.0011	New World Technology 3/7/2007 to 11/24/2008
407	1169	11/17/08	0.004	metal fragment	0.0004	New World Technology 3/7/2007 to 11/24/2008
408	1170	11/17/08	0.005	metal object 1 ft x 1" dia	0.0006	New World Technology 3/7/2007 to 11/24/2008
409	1171	11/17/08	0.01	metal fragment	0.0011	New World Technology 3/7/2007 to 11/24/2008
410	1172	11/17/08	0.012	metal fragment	0.0013	New World Technology 3/7/2007 to 11/24/2008
411	1173	11/17/08	0.008	rusted metal object 9" dia	0.0009	New World Technology 3/7/2007 to 11/24/2008
412	1174	11/17/08	0.01	metal fragment	0.0011	New World Technology 3/7/2007 to 11/24/2008
413	1175	11/17/08	0.005	metal fragment	0.0006	New World Technology 3/7/2007 to 11/24/2008
414	1176	11/17/08	0.012	metal fragment	0.0013	New World Technology 3/7/2007 to 11/24/2008
415	1177	11/17/08	0.015	soil with metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
416	1178	11/18/08	0.015	metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
417	1179	11/18/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
418	1180	11/18/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
419	1181	11/18/08	0.025	foil	0.0028	New World Technology 3/7/2007 to 11/24/2008
420	1182	11/18/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
421	1183	11/18/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
422	1184	11/18/08	0.03	button	0.0033	New World Technology 3/7/2007 to 11/24/2008
423	1185	11/18/08	0.025	metal fragments	0.0028	New World Technology 3/7/2007 to 11/24/2008
424	1186	11/18/08	0.03	button	0.0033	New World Technology 3/7/2007 to 11/24/2008
425	1187	11/18/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
426	1188	11/18/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
427	1189	11/18/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
428	1190	11/18/08	0.025	button	0.0028	New World Technology 3/7/2007 to 11/24/2008
429	1191	11/18/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
430	1192	11/18/08	0.015	metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
431	1193	11/18/08	0.015	metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
432	1194	11/18/08	0.01	brick (concrete)	0.0011	New World Technology 3/7/2007 to 11/24/2008
433	1195	11/18/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
434	1196	11/18/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
435	1197	11/20/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008

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436	1198	11/20/08	0.025	Glass	0.0028	New World Technology 3/7/2007 to 11/24/2008
437	1199	11/24/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
438	11100	11/24/08	0.015	Soil/Metal Fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
439	09-0001	01/15/09	0.01	Metal Fragments	0.0011	Shaw 07/02/09 to Present
440	070209-1	07/02/09	0.02	Metal Fragment	0.0022	
441	070209-2	07/02/09	0.013	Sandy soil (1 tsp)	0.0014	Shaw 07/02/09 to Present
442	070609-3	07/06/09	0.01	Metal flakes & soil	0.0011	Shaw 07/02/09 to Present
443	070709-4	07/07/09	0.032	4-in dia by 8-in long rusted metal cylinder	0.0035	Shaw 07/02/09 to Present
444	070709-5	07/07/09	0.013	3-in by 2-in flat rusty metal	0.0014	Shaw 07/02/09 to Present
445	070709-6	07/07/09	0.009	1.5-in round by 3/8-in thick metallic device	0.0010	Shaw 07/02/09 to Present
446	070709-7	07/07/09	0.02	metal fragment 0.75-in by 0.5-in by 0.125-in	0.0022	Shaw 07/02/09 to Present
447	070809-8	07/08/09	0.015	3 metal fragments mixed w/soil	0.0017	Shaw 07/02/09 to Present
448	070809-9	07/08/09	0.016	Soil and Rust flakes ~ 2 tsp	0.0018	Shaw 07/02/09 to Present
449	070909-10	07/09/09	0.011	Soil ~ 2 tbsp	0.0012	Shaw 07/02/09 to Present
450	071409-11	07/14/09	0.013	3.5-in round metal	0.0014	Shaw 07/02/09 to Present
451	071409-12	07/14/09	0.014	~1 cup soil	0.0015	Shaw 07/02/09 to Present

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452	071409-13	07/14/09	0.013	~1/4 cup soil w/metal flakes	0.0014	Shaw 07/02/09 to Present
453	071409-14	07/14/09	0.022	Metal 3/4-in long by 1/2-in thick by 1/2-in wide	0.0024	Shaw 07/02/09 to Present
454	071409-15	07/14/09	0.018	Oval metal fragment 1/2-in long by 3/8-in wide	0.0020	Shaw 07/02/09 to Present
455	071409-16	07/14/09	0.014	1/8 cup of soil	0.0015	Shaw 07/02/09 to Present
456	071409-17	07/14/09	0.016	Metal fragment 3/4-in long by 1/4-in wide	0.0018	Shaw 07/02/09 to Present
457	071409-18	07/14/09	0.016	1.5 cups soil with metal fragments	0.0018	Shaw 07/02/09 to Present
458	071509-19	07/15/09	0.015	Wire 3-in long by 1/4-in diameter	0.0017	Shaw 07/02/09 to Present
459	071509-20	07/15/09	0.016	Gauge 5-in diameter by 5-in long with wires extending from the back	0.0018	Shaw 07/02/09 to Present
460	072009-21	07/20/09	0.016	wire 2.5-in long by 0.25-in in diameter	0.0018	Shaw 07/02/09 to Present
461	072009-22	07/20/09	0.015	2-in rounded piece of metal 1/4–in wide	0.0017	Shaw 07/02/09 to Present
462	072009-23	07/20/09	0.012	1.5-in diameter, 3/8-in thick piece of metal	0.0013	Shaw 07/02/09 to Present

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463	072009-24	07/20/09	0.012	A gauge 4-in in diameter by 3-in deep	0.0013	Shaw 07/02/09 to Present
464	072109-25	07/21/09	0.014	piece of metal 1.75-in long by 3/4-in wide	0.0015	Shaw 07/02/09 to Present
465	072109-26	07/21/09	0.024	3/4-in diameter by 1/2-in thick button	0.0027	Shaw 07/02/09 to Present
466	072109-27	07/21/09	0.013	3-in diameter by 3-in deep gauge	0.0014	Shaw 07/02/09 to Present
467	072109-28	07/21/09	0.034	piece of metal 5-in long by 3.5-in wide by 3-in deep	0.0038	Shaw 07/02/09 to Present
468	072209-29	07/22/09	0.017	4-in round by 1.5-in deep metal object	0.0019	Shaw 07/02/09 to Present
469	080309-30	08/03/09	0.016	3.5" x 2.5" x 1.5" Metal object fused with rock	0.0018	Shaw 07/02/09 to Present
470	080309-31	08/03/09	0.012	5" x 4" x 1" Metal Object	0.0013	Shaw 07/02/09 to Present
471	080309-32	08/03/09	0.012	.75" x .5" x .25" Metal Object	0.0013	Shaw 07/02/09 to Present
472	080309-33	08/03/09	0.012	3" x 1.5" x 1" Metal object	0.0013	Shaw 07/02/09 to Present
473	080309-34	08/03/09	0.013	1.5" x 1" x .5" Metal	0.0014	Shaw 07/02/09 to Present
474	080509-35	08/05/09	0.012	Fused mixture of glass, rock, and soil 6" x 4" x 2"	0.0013	Shaw 07/02/09 to Present

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475	081109-36	08/11/09	0.014	Fused metal rock and glass 6" round x 3" thick	0.0015	Shaw 07/02/09 to Present
476	081109-37	08/11/09	0.019	Infused rock, metal and glass 9" long x 6" wide x 5" thick	0.0021	Shaw 07/02/09 to Present
477	081209-38	08/12/09	0.019	4 Metal fragments .75" x .25" and up to 4" x 2" x 1.5"	0.0021	Shaw 07/02/09 to Present
478	081809-39	08/18/09	1	Hexagon shaped object ~.75"	0.1106	Shaw 07/02/09 to Present
479	081809-39A	08/18/09	0.014	7" x 3.5" x 2" object	0.0015	Shaw 07/02/09 to Present
480	082009-40	08/20/09	0.036	Round metal object 1.5" round and .5" thick	0.0040	Shaw 07/02/09 to Present
481	082409-41	08/24/09	0.015	Round metal object 1.5" x 1" x .5"	0.0017	Shaw 07/02/09 to Present
482	082409-42	08/24/09	0.04	Round metal object .75" round and .5" thick	0.0044	Shaw 07/02/09 to Present
483	083109-43	08/31/09	0.017	2" x .5" pocket watch	0.0019	Shaw 07/02/09 to Present
484	083109-44	08/31/09	2	Dime size piece of black metal hexagon shaped	0.2212	Shaw 07/02/09 to Present
485	083109-45	08/31/09	0.024	An infused rock metal and wire 1.5" x 1.25" x .5"	0.0027	Shaw 07/02/09 to Present
486	083109-46	08/31/09	0.06	Round metal object 2" x .5" round	0.0066	Shaw 07/02/09 to Present

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487	090209-47	09/02/09	0.036	Metal button 1.5" x .25"	0.0040	Shaw 07/02/09 to Present
488	090209-48	09/02/09	0.032	Metal object 3" long x 2" wide x 1.5" thick	0.0035	Shaw 07/02/09 to Present
489	091509-49	09/15/09	0.018	Metal object 3" x 2" x 1.5"	0.0020	Shaw 07/02/09 to Present
490	092309-50	09/23/09	0.016	Metal object 1/2" across and 1/8" in depth	0.0018	Shaw 07/02/09 to Present
491	092909-51	09/29/09	0.018	Metal object 3/4" round and 3/8" deep	0.0020	Shaw 07/02/09 to Present
492	093009-52	09/30/09	1.4	Metal object 1/2" diameter and 1/8" deep	0.1548	Shaw 07/02/09 to Present
493	093009-53	09/30/09	0.014	Metal object 1/2" x 1/4" round	0.0015	Shaw 07/02/09 to Present
494	093009-54	09/30/09	0.022	Metal object 4" x 2.5" x 1"	0.0024	Shaw 07/02/09 to Present
495	100109-55	10/01/09	0.044	10" long tool (micrometer)	0.0049	Shaw 07/02/09 to Present
496	102209-56	10/22/09	0.014	Metal object 1" x 1/2" x 1/8"	0.0015	Shaw 07/02/09 to Present
497	102209-57	10/22/09	0.03	Metal object 3 1/2" x 1/2"	0.0033	Shaw 07/02/09 to Present
498	102609-58	10/26/09	0.024	Round metal object 3/4" by 1/4"	0.0027	Shaw 07/02/09 to Present
499	102609-59	10/26/09	0.017	Triangular metal object 1/2" x 1/4"	0.0019	Shaw 07/02/09 to Present
500	102609-60	10/26/09	0.014	Metal object 1/2" x 1/2" x 1/8"	0.0015	Shaw 07/02/09 to Present
501	110409-61	11/04/09	0.014	Wrist watch (no band) 3/4" x 1/4"	0.0015	Shaw 07/02/09 to Present

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
502	110409-62	11/04/09	0.02	Metal object 2 1/2" x 1"	0.0022	Shaw 07/02/09 to Present
503	110409-63	11/04/09	0.024	Metal object 3/8" x 3/8" x 1/8"	0.0027	Shaw 07/02/09 to Present
504	110409-64	11/04/09	0.016	Metal object 4" x 1 1/2"	0.0018	Shaw 07/02/09 to Present
505	110909-65	11/09/09	0.013	Fused wire and rock 2" x 3/4" x 1/2"	0.0014	Shaw 07/02/09 to Present
506	111009-66	11/10/09	0.013	Metal object 1/2" x 1/2" x 1/4"	0.0014	Shaw 07/02/09 to Present
507	111009-67	11/10/09	0.015	Wire 3" long by 1 1/4"	0.0017	Shaw 07/02/09 to Present
508	111209-68	11/12/09	0.034	Metal object 3/4" x 1/2" x 1/4"	0.0038	Shaw 07/02/09 to Present
509	111709-69	11/17/09	0.015	Metal object 1 3/4" x 1/2"	0.0017	Shaw 07/02/09 to Present
510	112309-70	11/23/09	0.015	Fused metal and wire 4" x 2"	0.0017	Shaw 07/02/09 to Present
511	113009-71	11/30/09	0.013	Metal object 2" x 1" x 1"	0.0014	Shaw 07/02/09 to Present
512	113009-72	11/30/09	0.013	Compass 3/4" x 1/4"	0.0014	Shaw 07/02/09 to Present
513	120909-73	12/09/09	0.02	Metal object 3/4" x 1/2" x 1/2"	0.0022	Shaw 07/02/09 to Present
514	120909-74	12/09/09	0.02	Wire 3/4" x 1/4"	0.0022	Shaw 07/02/09 to Present
515	011310-75	01/13/10	0.036	Metal object 6" x 4"	0.0040	Shaw 07/02/09 to Present
516	011310-76	01/13/10	0.032	Metal object 2" x 1/2"	0.0035	Shaw 07/02/09 to Present
517	020210-77	02/02/10	0.034	Metal object 1 1/2" x 1/4"	0.0038	Shaw 07/02/09 to Present
518	020910-78	02/09/10	0.016	Metal object 1" x 1/2"	0.0018	Shaw 07/02/09 to Present
519	021010-79	02/10/10	0.015	Metal object 3" x 2 1/2" x 1/2"	0.0017	Shaw 07/02/09 to Present

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Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
520	021010-80	02/10/10	0.018	Metal object 1" x 3/4" x 1/2"	0.0020	Shaw 07/02/09 to Present
521	021010-81	02/10/10	0.018	Metal object 1" x 3/4" x 1/2"	0.0020	Shaw 07/02/09 to Present
522	021110-82	02/11/10	0.022	Metal object 1" x 1/2"	0.0024	Shaw 07/02/09 to Present
523	021110-83	02/11/10	0.07	Metal object 2" x 1/2"	0.0077	Shaw 07/02/09 to Present
524	021510-84	02/15/10	0.06	Metal object (possible Radiolumine scent Personnel Marker) 2" x 1/4"	0.0066	Shaw 07/02/09 to Present
525	021510-85	02/15/10	0.013	Metal object (slag) 4' x 3" x 3"	0.0014	Shaw 07/02/09 to Present
526	021510-86	02/15/10	0.018	Metal object 3/4" x 1/4"	0.0020	Shaw 07/02/09 to Present
527	021810-87	02/18/10	0.019	Metal object 1/4" round	0.0021	Shaw 07/02/09 to Present
528	021810-88	02/18/10	0.014	Metal object 1/2" x 1/4" x 1/4"	0.0015	Shaw 07/02/09 to Present
529	021810-89	02/18/10	0.015	Metal object 1/2" x 1/4" x 1/4"	0.0017	Shaw 07/02/09 to Present
530	021810-90	02/18/10	0.02	Metal object 1/8" round	0.0022	Shaw 07/02/09 to Present
531	022210-91	02/22/10	0.012	Metal object 1" x 3/4" x 1/2"	0.0013	Shaw 07/02/09 to Present
532	022210-92	02/22/10	0.02	Metal object 8" x 6" x 5"	0.0022	Shaw 07/02/09 to Present
533	022210-93	02/22/10	0.017	Metal object 1/2" x 1/4" x 1/4"	0.0019	Shaw 07/02/09 to Present
534	022210-94	02/22/10	0.016	Metal object 1/2" x 1/2" x 1/4"	0.0018	Shaw 07/02/09 to Present
535	022310-95	02/23/10	0.013	Metal object 1/2" x 1/4"	0.0014	Shaw 07/02/09 to Present

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Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
536	030410-96	03/04/10	0.015	Metal object 1/2" round with 2" wire	0.0017	Shaw 07/02/09 to Present
537	030910-97	03/09/10	0.017	Metal object 1 1/2" x 1" x 1/4"	0.0019	Shaw 07/02/09 to Present
538	030910-98	03/09/10	0.034	Metal object 2" x 2" x 1/16"	0.0038	Shaw 07/02/09 to Present
539	030910-99	03/09/10	0.016	Metal object 1/2" x 1/4" x 1/8"	0.0018	Shaw 07/02/09 to Present
540	031010-100	03/10/10	0.06	Flat metal object 1/2" round	0.0066	Shaw 07/02/09 to Present
541	031010-101	03/10/10	0.018	Metal object 1" x 1/4" x 1/4"	0.0020	Shaw 07/02/09 to Present
542	032410-102	03/24/10	0.013	Metal object 1/4" x 1/4"	0.0014	Shaw 07/02/09 to Present
543	040710-103	04/07/10	0.03	Metal object 1/2" x 1/4"	0.0033	Shaw 07/02/09 to Present
544	050810-104	05/08/10	0.018	Metal object rusted oblong 1/8 " x 1/2"	0.0020	Shaw 07/02/09 to Present
545	051910-105	05/19/10	0.02	Metal object round 1/4" think by 1/2" diameter	0.0022	Shaw 07/02/09 to Present
546	052010-106	05/20/10	0.02	Metal object 4"x4" by 1/4" thick with a 2"x1.5 " diameter object attached in center	0.0022	Shaw 07/02/09 to Present
547	052010-107	05/20/10	0.015	Metal object cylindrical 1"x3/8" diameter	0.0017	Shaw 07/02/09 to Present
548	052010-108	05/20/10	0.8	Metal object 1/4"x1/2"	0.0885	Shaw 07/02/09 to Present

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549	052010-109	05/20/10	0.034	Metal object flat round 1/8" diameter x 1/2"	0.0038	Shaw 07/02/09 to Present
550	052610-110	05/26/10	0.015	Metal object oblong 1/2" x 1/4" x 1/4" thick	0.0017	Shaw 07/02/09 to Present
551	052610-111	05/26/10	0.02	Metal object oblong 1" x 1/2" x 1/4" thick	0.0022	Shaw 07/02/09 to Present
552	052610-112	05/26/10	0.013	Metal object square 1" x 1" x 1/2" thick	0.0014	Shaw 07/02/09 to Present
553	052610-113	05/26/10	0.013	Metal object round 1/2" diameter 1/8" thick	0.0014	Shaw 07/02/09 to Present
554	052610-114	05/26/10	0.015	Metal object oblong 1/2" x 1/4" x 1/8" thick	0.0017	Shaw 07/02/09 to Present
555	070110-115	07/01/10	0.013	Watch round 3" x 1/2"	0.0014	Shaw 07/02/09 to Present
556	070610-116	07/06/10	0.012	Metal object 1" x 1/4"	0.0013	Shaw 07/02/09 to Present
557	070610-117	07/06/10	0.013	Metal object 1" x 1/8"	0.0014	Shaw 07/02/09 to Present
558	070810-118	7/8/2010	0.015	Metal object 1/8" by 1/2" by 1/2"	0.0017	Shaw 07/02/09 to Present
559	070810-119	07/08/10	0.02	Metal round object 1/4" x 1/2" thick	0.0022	Shaw 07/02/09 to Present
560	071310-120	07/13/10	0.016	3" Needle from gauge	0.0018	Shaw 07/02/09 to Present
561	071310-121	07/13/10	0.015	1" long wire in insulation	0.0017	Shaw 07/02/09 to Present
562	071410-122	07/14/10	0.034	Personnel marker 1 1/2" diameter	0.0038	Shaw 07/02/09 to Present

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563	071510-123	07/15/10	0.014	Metal Object 1" x 1/2"	0.0015	Shaw 07/02/09 to Present
564	071910-124	07/19/10	0.013	Piece of Metal 1/8" x 1/4"	0.0014	Shaw 07/02/09 to Present
565	072010-125	07/20/10	0.014	Metal fragment 1/2" x 1/2"	0.0015	Shaw 07/02/09 to Present
566	072110-126	07/21/10	0.014	Metal Foil 1" x 3"	0.0015	Shaw 07/02/09 to Present
567	072210-127	07/22/10	0.02	1" diameter round metal object 1/4" thick	0.0022	Shaw 07/02/09 to Present
568	072610-128	07/26/10	0.017	Metal 1/2" x 3"	0.0019	Shaw 07/02/09 to Present
569	072710-129	07/27/10	0.016	Stone & Metal 1/2" x 1/2"	0.0018	Shaw 07/02/09 to Present
570	072710-130	07/27/10	0.014	Metal object 1/4" x 1/8"	0.0015	Shaw 07/02/09 to Present
571	072710-131	07/27/10	0.017	Metal object 1/2" x 1/4"	0.0019	Shaw 07/02/09 to Present
572	072710-132	07/27/10	0.015	Metallic Fragment 1/32" x 1/64"	0.0017	Shaw 07/02/09 to Present
573	072710-133	07/27/10	0.014	1" x 1/2 thick triangle hard clay metallic	0.0015	Shaw 07/02/09 to Present
574	072710-134	07/27/10	0.024	1/2" x 3/4" triangular hard clay metallic	0.0027	Shaw 07/02/09 to Present
575	072710-135	07/27/10	0.026	Tiny metal fragment 1/8" x 1/8"	0.0029	Shaw 07/02/09 to Present
576	072710-136	07/27/10	0.016	1/4" x 1/8" x 1/8" oval metal object	0.0018	Shaw 07/02/09 to Present
577	072710-137	07/27/10	0.03	1" x 1" x 1/2" triangular hard clay metallic	0.0033	Shaw 07/02/09 to Present

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578	032013-138	03/20/13	1.6	flat octagonal metallic object	0.1770	Tetra Tech EC 03/20/13 to 06/03/13
579	032113-139	03/21/13	0.014	flat octagonal metallic object	0.0015	Tetra Tech EC 03/20/13 to 06/03/13
580	032013-140	05/30/13	0.014	soil	0.0015	Tetra Tech EC 03/20/13 to 06/03/13
581	032113-141	05/30/13	0.014	soil	0.0015	Tetra Tech EC 03/20/13 to 06/03/13
582	032013-142	05/30/13	0.024	soil	0.0027	Tetra Tech EC 03/20/13 to 06/03/13
583	032113-143	05/31/13	0.036	soil	0.0040	Tetra Tech EC 03/20/13 to 06/03/13
584	032013-144	05/31/13	0.015	soil	0.0017	Tetra Tech EC 03/20/13 to 06/03/13
585	032113-145	05/31/13	0.018	soil	0.0020	Tetra Tech EC 03/20/13 to 06/03/13
586	032013-146	06/03/13	0.04	foil fragment	0.0044	Tetra Tech EC 03/20/13 to 06/03/13
587	032113-147	03/21/13	0.022	UNK device	0.0024	Tetra Tech EC 03/20/13 to 06/03/13
588	012814-148	01/28/14	0.012	box of samples	0.0013	Tetra Tech EC 03/20/13 to 06/03/13
589	012814-149	01/28/14	0.4	box of samples	0.0442	Tetra Tech EC 03/20/13 to 06/03/13
590	012814-150	01/28/14	0.22	bucket of Samples	0.0243	Tetra Tech EC 03/20/13 to 06/03/13
591	012814-151	01/28/14	0.36	bag of soil from drum	0.0398	Tetra Tech EC 03/20/13 to 06/03/13
592	020514-152	02/05/14	1.2	metal object .75" hexagon	0.1327	CB&I 02/04/14 to 2/17/14
593	021114-153	02/11/14	0.018	Rock	0.0020	CB&I 02/04/14 to 2/17/14
594	021114-154	02/11/14	0.01	Metal fragment	0.0011	CB&I 02/04/14 to 2/17/14
595	021714-155	02/17/14	0.02	Gauge	0.0022	CB&I 02/04/14 to 2/17/14
596	021914-156	02/19/14	0.008	Toggle switch	0.0009	CB&I 02/19/14
597	022114-157	02/21/14	0.12	TtEC misc material	0.0133	CB&I 02/21/14

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
598	020214-158	02/20/14	0.008	metal objects	0.0009	CB&I 02/20/14
599	022414-159	02/24/14	0.01	metal debris	0.0011	CB&I 02/24/14
600	022414-160	02/24/14	0.16	knob/ Button	0.0177	CB&I 02/24/14
601	032514-161	03/25/14	0.11	2 " dial	0.0122	CB&I 03/25/14
602	Gilbane 1	10/29/13	0.028	debris < 3 cm diameter	0.0031	Gilbane 10/29/13
603	Gilbane 2	10/29/13	0.015	fragments in soil	0.0017	Gilbane 10/29/13
604	Gilbane 3	11/12/13	0.028	metal object	0.0031	Gilbane 11/12/13
605	Gilbane 4	12/02/13	0.02	metal object	0.0022	Gilbane 12/02/13
606	Gilbane 5	12/02/13	0.006	metal object	0.0007	Gilbane 12/02/13
607	Gilbane 6	12/02/13	0.03	metal object	0.0033	Gilbane 12/02/13
608	Gilbane 7	12/05/13	0.03	metal object	0.0033	Gilbane 12/05/13
609	Gilbane 8	12/09/13	0.025	metal object	0.0028	Gilbane 12/09/13
610	Gilbane 9	01/29/14	0.012	glass dial	0.0013	Gilbane 01/29/14

Note:

1. Reading shown as measured in mR/h or calculated using highest contact reading (µR/h) × 0.001.
2. Radium Thumb Rule, RSO Magazine, Volume 10, No 4, 2005 = mR/h × 929/8400.

µR/h	Microroentgen per hour
cm	Centimeter
ID	Identification
mCi	Millicurie
mR/h	Milliroentgen per hour
NA	Not available; not calculated
No.	Number
Ra-226	Radium-226
tbsp	Tablespoon
tsp	Teaspoon

APPENDIX A
GENERAL HEALTH PHYSICS INFORMATION

APPENDIX A: GENERAL HEALTH PHYSICS INFORMATION

A1.0 GENERAL

Radiation is energy in the form of electromagnetic waves or subatomic particles. It is emitted from the nucleus or electron cloud of atoms or from devices generating electromagnetic waves and particles such as X-ray machines, neutron generators, and cyclotrons. Radiation is either *ionizing* or *non-ionizing*.

Radiation that has insufficient energy to remove electrons from atoms is non-ionizing radiation. Examples of non-ionizing radiation include most visible light, infrared light, microwaves, and radio waves. Radiation that has sufficient energy to remove electrons from atoms is ionizing radiation. All radiological investigations at Naval Station Treasure Island have focused on ionizing radiation, which includes alpha, beta, and gamma radiation.

A2.0 ALPHA RADIATION

Alpha particles are charged particles containing two protons and two neutrons. Alpha particles are emitted from the nuclei of certain heavy atoms, such as uranium, when they decay. Because of its size and heavy electrical charge, +2, an alpha particle can travel only a few centimeters in air. It can be stopped or shielded by a sheet of paper. Alpha particles cannot penetrate the outer layer of skin but can cause localized damage inside the body if ingested or inhaled.

A3.0 BETA RADIATION

Beta particles are particles with the mass of an electron and a -1 electrical charge; essentially they are high-velocity electrons. Radioactive isotopes of many different elements emit beta particles. Even though moderate energy beta particles can travel as far as 10 feet through air, they easily can be stopped by a 1/3-inch-thick sheet of plastic or a 1/8-inch-thick sheet of aluminum. They are a hazard to the body's skin and the eyes because beta particles can penetrate the outer layer of skin and affect living tissue.

A4.0 GAMMA RADIATION

Gamma radiation is electromagnetic radiation with no mass or charge. Gamma rays are emitted from the nucleus of an atom during radioactive decay. Gamma radiation can penetrate most materials because it has no mass or charge. In air, higher-energy gamma radiation can travel several hundred feet. Gamma radiation can penetrate the skin and interact with the dense structures of the body. Dense materials such as lead or concrete are needed for shielding against gamma radiation.

A5.0 X-RAYS

X-rays are also electromagnetic radiation with no mass or charge. The difference between gamma radiation and X-radiation is the nature of their origin. Gamma radiation originates in the nucleus, while X-rays originate in the electron region of the atom. The penetrating properties are the same; therefore, safety concerns and shielding mechanisms are similar. X-rays are typically produced by machines, and thus are not a hazard if the machine is turned off.

A6.0 SCIENTIFIC NOTATION

Radiation measurement units are normally reported in scientific notation. Scientific notation is also known as exponential or power-of-ten notation. It is a concise method of expressing numbers from very small to very large. Basically, scientific notation is the expression of a number raised to a power of ten. For example, 3,456 can be expressed as 3.456×10^3. Scientific notation is often used in this technical memorandum when radiation units are reported.

Here is a listing of common numbers expressed in scientific notation:

$10^6 = 1{,}000{,}000$
$10^5 = 100{,}000$
$10^4 = 10{,}000$
$10^3 = 1000$
$10^2 = 100$
$10^1 = 10$
$10^0 = 1$

$10^{-1} = 0.1$ (1/10)
$10^{-2} = 0.01$ (1/100)
$10^{-3} = 0.001$ (1/1000
$10^{-4} = 0.0001$ (1/10,000)
$10^{-5} = 0.00001$ (1/100,000)
$10^{-6} = 0.000001$ (1/1,000,000)

A7.0 RADIATION UNITS

Radiation measurements are stated in units of curies, roentgens, rads, and rems. These units are defined as:

A7.1 CURIE (CI)

The curie measures radioactivity: one curie is that quantity of a radioactive material that will have 37,000,000,000 (3.7×10^{10}) transformations in 1 second. Often, radioactivity is expressed in smaller units like thousandths (10^{-3}**,** millicurie or mCi), millionths (10^{-6}**,** microcurie or μCi), billionths (10^{-9}**,** nanocurie or nCi) or trillionths (10^{-12}, picocurie or pCi) of a curie.

A7.2 ROENTGEN (R)

The roentgen is a unit used to measure exposure. It describes an amount of gamma and X-rays, and only in air. The roentgen is a measure of the ionization of the molecules in a mass of air: one roentgen is equal to depositing in dry air enough energy to cause an electrical charge of 2.58×10^4 coulombs per kilogram (kg; 1 kg = 2.2 pounds). The main advantage of this unit is

that it is easy to measure directly, but it is limited because it is only for deposition in air, and only for gamma and X-rays.

A7.3 RAD (RADIATION ABSORBED DOSE)

The rad is a unit used to measure absorbed dose. This measure relates to the amount of energy actually absorbed in some material. It is used for any type of radiation and any material. One rad is defined as the absorption of 100 ergons (ergs) per gram of material. The unit "rad" can be used for any type of radiation, but it does not describe the biological effects of different radiations.

A7.4 REM (FROM ROENTGEN EQUIVALENT MAN)

The rem is a unit used to derive a quantity called equivalent dose. This measure relates the absorbed dose in biological tissue to the biological effect. Not all radiation has the same biological effect, even for the same amount of absorbed dose. Equivalent dose is often expressed in terms of thousandths of a rem, or millirem (mrem). To determine equivalent dose in rem, absorbed dose (rad) is multiplied by a quality factor (Q) that is unique to the type of incident radiation and the material in which the energy is deposited.

APPENDIX B
INTERVIEWS

APPENDIX B: INTERVIEWS

B1.0 GENERAL

Archival research conducted during preparation of the Naval Station Treasure Island (NAVSTA TI) Historical Radiological Assessment Technical Memorandum (HRASTM) included locating and making contact with people who had specific knowledge of radiological and related operations at NAVSTA TI.

To make contact with these people, archival documents were reviewed for the names of individuals who may have such knowledge, and commercial web search engines were utilized to try to locate those individuals. Interviews with those individuals who were located and consented to provide information have been included as references to this HRASTM. In addition, informal interviews were conducted by e-mail or phone with a number of other individuals, and the substance of all of the interviews conducted follows:

B2.0 INTERVIEWS

Brian DeGraffenried

Dennis Kelly of Tetra Tech spoke with Mr. DeGraffenried by telephone on the afternoon of August 6, 2013. Mr. DeGraffenried was an enlisted sailor and designated as the Chief Photographer in the Naval History of Treasure Island published in 1946 (TI-HRASTM-2). He was on temporary assignment at the TACDEN PHOTO LAB, located on the second floor of Ships Service Building #1, from May 24, 1945, to May 10, 1946. His rate was Photographers Mate 2nd Class and he was the Petty Officer in Charge of the photo laboratory most of that time. His responsibility was photographing assignments for various purposes.

Mr. DeGraffenried did not recall seeing any rubbish or solid waste burial or burning taking place on TI. He did recall photographing the north end of TI (at the time an ammunition storage area), but had no recollection of pits or disposal areas.

Mr. DeGraffenried did not recall any berthing of Operation Crossroads Ships at NAVSTA TI and believes that if they would have been berthed, it would have been after he left (Note: this information is consistent with his time of service and the time frame for the conduct of Operation Crossroads).

Mr. DeGraffenried was asked if he ever observed or photographed the optical shop on Building 3. Mr. DeGraffenried was not aware of the presence of the optical shop and stated he had never seen it.

Mr. DeGraffenried was questioned to see if he had any recall of radioactive materials being used or stored on NAVSTA TI. Mr. Kelly explained that these materials would include the use of radioluminescent paints on dials or in deck markers. Mr. DeGraffenried explained that he was

unaware of any radioactive material use on NAVSTA TI and further explained that he was not aware of the term radioactive until later after he left NAVSTA TI. He did note that he was aware of X-ray machines being used for medical purposes on NAVSTA TI.

In response to who he worked with that may recall more information, he indicated that a potential contact would be Commander Henry McDowell, Commanding Officer of the Radar Training Facility on Treasure Island, who was living at 19 Madison Ave, Summit, NJ, when he last heard from him on March 27, 1947 (Note: that Tetra Tech attempted to locate Commander McDowell and was unable to find him) (TI-HRASTM-47).

Chuck Taylor

Mr. Kelly of Tetra Tech spoke with Mr. Taylor by telephone on the afternoon of November 21, 2013. Mr. Taylor was an enlisted sailor and served at NAVSTA TI from about 1965 to 1970. During this time, he was first assigned as an electronics "A" school (A school was basic or introductory school) instructor and later worked in the Radiation Detection, Indication, and Computation (RADIAC) repair facility in Buildings 342 and 343, and the vault in Building 344. He was also responsible for maintenance of the licensed sources and licenses used for calibrating instruments in the *Pandemonium* training. During that time, he did periodic leak checks on the sources. He recalled that when the *Pandemonium* was moved from the west side of the island to the east side, he first removed all of the sealed sources from the ship and temporarily stored them in the vault in Building 344. His recollection was that the sources were cesium-137. When he temporarily stored them in the Building 344 vault, he built a matrix with 2- by 12-lumber in the vault and filled it with soil surrounding 60-millimeter (mm) shell casings into which he placed the sealed sources.

Mr. Taylor did not recall seeing any rubbish or solid waste burial or burning taking place on TI, nor did he have any information regarding operation of the incinerator, which was operated during the 1950s at the north end of the island or in particular, what happened to the ash from the incinerator. Mr. Taylor did not recall ever hearing any information regarding the berthing of Operation Crossroads Ships.

Mr. Kelly described the octagonal radium foils that have been found in the Solid Waste Disposal Areas (SWDA) on NAVSTA TI. Mr. Taylor was familiar with the foils as he had recently dug up some of those that have been found during his current work on Navy projects at NAVSTA TI; however, he has no recollection of the foils being used in association with any operations on NAVSTA TI. Mr. Kelly asked if perhaps they had been used in association with *Pandemonium* training operations, and Mr. Taylor indicated that he had never seen any foils like those found used anywhere during his tenure on NAVSTA TI. Mr. Taylor was asked if he ever observed the optical shop on Building 3. Mr. Taylor was not aware of the presence of the optical shop and stated he had never seen it.

Mr. Taylor was asked if he ever worked in Building 233, and he indicated that he had not worked there until the recent decontamination efforts in the last few years as a Navy contractor. Mr. Taylor was asked if he recalled any radiation areas or materials ever being present in the supply

department at NAVSTA TI. He responded that he had no recollection of any such radiation areas or materials in the supply department. Mr. Taylor was questioned to see if he recalled radioactive materials used or stored on NAVSTA TI or any radiological spills anywhere on NAVSTA TI. Mr. Taylor explained that he was unaware of any radioactive material use on NAVSTA TI other than as described above. In response to who he worked with who may recall more information, he indicated that he could not recall the names of any individuals who might have additional information or individuals who worked in the Public Works Department (TI-HRASTM-48).

David Nishimura

Mr. Kelly of Tetra Tech spoke with Mr. Nishimura on several occasions by telephone in late 2013. Mr. Nishimura was the Project Civil Engineer for the Actus Sundt Joint Venture, the contractor that built the 1400 series housing on NAVSTA TI. Mr. Nishimura indicated that his primary focus on that project had been the design of the sewer systems, and he noted that he had spent limited time on site during construction. Although no formal interview was conducted, Mr. Nishimura provided the following information:

Mr. Nishimura was asked if he was aware of any evidence (geotechnical or field observations) that rubbish disposal took place on the site prior to the construction of this housing project. Mr. Nishimura responded that the actual construction phase of the project was under the direction of the project managers, project architect, and construction managers, and that he was not very involved, so his knowledge is limited. With that qualification, he did state that he was not aware of any specific rubbish disposal areas within the project boundaries. He recalled that the base was constructed of fill material and not native soil. Mr. Nishimura also stated that he was not aware of any evidence that grading and construction associated with the adjacent housing to the north and west moved soil onto the project site. Tetra Tech attempted to locate the soils engineer for the project, but found that he was deceased.

Mr. Nishimura did not specifically recall if the "Project Boundaries" shown in the as-built drawings had meaning with respect to the extent of site intrusive activities associated with grading (TI-HRASTM-44). Mr. Nishimura stated that typically all work on the turnkey military family housing projects were to be confined to the project boundaries provided by the Military. Mr. Nishimura could not recall whether or not the project boundaries were fenced during construction.

Mr. Nishimura provided the names of several individuals involved in the 1400 series housing construction, including the owner of Town and Country Inc., the project architect, and that of the construction superintendent; however, none of the individuals could be located by Tetra Tech as they were since deceased.

Breton Hanville

Mr. Kelly of Tetra Tech spoke with Mr. Hanville on June 14, 2013. Mr. Hanville was employed by the Naval Facilities Engineering Command, Engineering Field Activity West, at the time of construction of the 1400 series housing in 1987, and his proper title relative to the housing would have been "Project Leader." He fulfilled that role for the design and construction of housing projects up and down the West Coast and Alaska. He has no recollection of any specific issues related to soils engineering or grading at the 1400 series site. He believes that the proper person to contact would be the Resident Officer in Charge of Construction (ROICC) for site-specific information. T etra Tech attempted to contact the ROICC personnel who would have been involved in the construction of the 1400 series housing, but was unable to locate them.

APPENDIX C
RESPONSES TO AGENCY COMMENTS ON THE DRAFT HISTORICAL RADIOLOGICAL ASSESSMENT SUPPLEMENTAL TECHNICAL MEMORANDUM

RESPONSES TO AGENCY COMMENTS ON THE DRAFT HISTORICAL RADIOLOGICAL ASSESSMENT – SUPPLEMENTAL TECHNICAL MEMORANDUM NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

NOTE REGARDING THE FOLLOWING RESPONSES TO COMMENTS:

This document presents the Department of the Navy's (Navy) responses to comments that were previously submitted to the regulatory agencies for review on January 18, 2013. These responses were provided to the "Draft Historical Radiological Assessment – Supplemental Technical Memorandum (HRASTM), Naval Station Treasure Island (NAVSTA TI), San Francisco, California, dated August 6, 2012."

Following submission of these responses, a corresponding revision to the HRASTM, and several meetings with the regulatory agencies, the Navy initiated additional research to address several questions associated with the radiological history of NAVSTA TI. The Navy revised the HRASTM to include the findings of the additional research and to conform to discussions and agreements made following the submission of the following RTCs. As a result of those revisions, some of the responses that follow may no longer reflect the additional findings or changes made to the text of this "*Final Historical Radiological Assessment – Supplemental Technical Memorandum (HRASTM),"* however, these responses were included to maintain the integrity of the administrative record.

RESPONSES TO AGENCY COMMENTS ON THE DRAFT HISTORICAL RADIOLOGICAL ASSESSMENT – SUPPLEMENTAL TECHNICAL MEMORANDUM NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

This document presents the Department of the Navy's (Navy) responses to comments from staff at the California Department of Toxic Substances Control (DTSC); the California Department of Public Health's (CDPH) Environmental Management Branch (EMB); the San Francisco Public Utilities Commission (SF PUC); AMEC Environmental & Infrastructure (AMEC), on behalf of the Treasure Island Development Authority (TIDA); NGTS, Inc. (NGTS) on behalf of TIDA and AMEC; Terraphase Engineering Inc. (Terraphase) on behalf of the Treasure Island Community Development, LLC (TICD); Dade Moeller on behalf of Arc Ecology; EPA; and the San Francisco Bay Regional Water Quality Control Board (Water Board) on the "Draft Historical Radiological Assessment – Supplemental Technical Memorandum (HRASTM), Naval Station Treasure Island (NAVSTA TI), San Francisco, California, dated August 6, 2012." The comments addressed below were received from the DTSC on October 5, 2012; CDPH EMB on October 4, 2012; SF PUC on October 2, 2012; TIDA (NGTS and AMEC) on October 3 and 5, 2012; TICD (Terraphase Engineering) on October 5, 2012; Arc Ecology (Dade Moeller) on October 5, 2012; EPA on October 10, 2012; and the Water Board on October 12, 2012.

Additional comments were received from CDPH EMB on December 11, 2012 in response to the Navy's initial responses to comments received from the above regulatory agencies in October 2012. Please note that the Navy's initial responses to October 2012 comments were thus revised to conform with the responses to December 2012 comments where appropriate.

RESPONSES TO DTSC COMMENTS (REMEDIOS SUNGA)

GENERAL COMMENTS

1. Comment: **<u>Information and Data since 2006 HRA</u>. The HRASTM should discuss and provide all information and data that have been generated and gathered to date from the radiological activities at TI since 2006. The 2006 HRA indicated that radiological contamination in the Solid Waste Disposal Areas (SWDAs) was unlikely. However, the 2007 removal actions in the SWDAs found radiological contamination and several commodities. This new information should be incorporated in the HRASTM.**

Response: The text will be updated to include a listing of commodities that have been found to-date as requested. All remedial actions with radiological analysis were considered in the HRASTM when making determinations of property classification as impacted or not impacted. As information becomes available from ongoing radiological investigation prior to finalization of the HRASTM, the HRASTM text will be updated to summarize any new information resulting from these ongoing investigations. This work includes investigations at Sites 12, 31, 33, and Building 233.

2. Comment: **<u>Final HRASTM</u>. The HRASTM should be finalized with changes in the text, figures, and tables, as needed, in response to all comments, and not just attaching the Responses to Comments to the draft as an appendix.**

Response: Navy concurs.

SPECIFIC COMMENTS

3. Comment: **<u>Section 2.2.7-AOI7: Northern Housing Area of Interest, Pages 18-24</u>. The soil removal action in 2007 at SWDAs 1207/1209 and 1231/1233 should be discussed in this section. The sampling data and a list of all commodities found at these SWDAs should also be included for reference. The discovery of radiological commodities during the 2007 removal action warranted the 2009 surveys at the Northpoint and Bayside housing areas. If wipe samples were collected during this surveys from residential buildings, the results of this sampling should also be incorporated in the HRASTM. The HRASTM should include all radiological findings from any buildings, soil/wipe samples, scans, and commodities found to date not previously provided in the 2006 HRA.**

Response: The work done within solid waste disposal areas (SWDAs) 1207/1209 and 1231/1233 is discussed in general in Sections 4.3.6 and 4.3.7. Regarding the request for additional detail, please see the response to DTSC General Comment #1.

4. Comment: **<u>Section 2.2.8-AOI8: Southern Housing Area, Pages 24 and 25</u>. The 2007 soil removal action at SWDAs A&B should be discussed in this section. The sampling data and a list of all radiological commodities found at these SWDAs should also be included for reference. The removal action findings prompted the California Department of Public Health (CDPH) to survey the areas surrounding the Radiological Controlled Area at SWDAs A&B.**

Response: The work done within SWDAs A&B is discussed in general in Section 4.3.8. Regarding the request for additional detail, please see the response to DTSC General Comment #1.

5. Comment: **<u>Section 4.1-Radiologically Impacted Sites, Pages 28-33</u>. The Bigelow Court SWDA should be included in the list of radiologically impacted sites. The reason for this is because it was classified as a SWDA in earlier investigations at Site 12 and as discussed on page 22 of the HRASTM.**

Response: Comment noted the Navy will designate this area as an impacted. Details on the basis for this recommendation will be addressed in Section 6.0. Contamination potential for subsurface will be listed as unlikely and a scoping survey will be recommended.

6. Comment: <u>Section 4.1.7-Former Storage Areas 30 and 31, Page 32</u>.

6.1 <u>First Paragraph</u>. The last sentence states that no radiological or other Installation Restoration Program (IRP) related work has been done at Site 30 or the areas north and south of the IR sites, since the 2006 HRA. Please clarify the meaning of "work" in this sentence since IR related work or activities have been completed at Site 30, i.e., Proposed Plan and Record of Decision.

Response: The last sentence of the first paragraph has been revised to eliminate the use of the word "work" as follows: "No radiological or other intrusive activities related to the Installation Restoration (IR) Program has been done at Site 30 or the areas north and south of the IR sites since the 2006 HRA."

6.2 <u>Second Paragraph</u>. The second to the last sentence states that laboratory testing confirmed the presence of non-naturally occurring Ra-226, possibly from a deteriorated metal gauge. Please clarify whether a deteriorated metal gauge or any commodity was found in the area of elevated radiological readings.

Response: Elevated radiological readings were discovered during the Phase I activities, but no commodities were observed. Laboratory analysis of soil confirmed the presence of radium (Ra)-226 at levels suggesting non-naturally occurring radionuclides (10 to 11 picocuries per gram [pCi/g]). While unconfirmed, it is possible that this elevated concentration was from a deteriorated man-made item.

7. Comment: <u>Section 4.2-Radiologically Non-Impacted Sites, Pages 33 and 34</u>. The radiological screenings at Site 33 was performed in early 2012 and the results of this survey should be discussed in the HRASTM. Site 33 is classified as not impacted based on the screening results as presented in the Radiological Characterization Report that is currently under review.

Response: Comment noted. The text of the last sentence of the second paragraph of Section 2.2.2 has been revised to read: "At the time of publication, the majority of remedial action fieldwork at the Waterline Replacement Area, Site 33 (Figure 4), has been completed including radiological surveys/samples. Although not yet documented in a final report, the preliminary data would support the conclusion that soil and asphalt

samples from the five separate excavation areas, Site 33 are free of non-naturally occurring Ra-226, cesium (Cs)-137, and strontium (Sr)-90 contamination."

8. Comment: **<u>Section 6.1.2.7-Former Storage Area and Sites 30 and 31, Pages 55-56. Site 31, Page 56</u>. The elevated radiological readings during the July 2010 soil excavation and the removal of soil with no commodities found in April 2011 should be discussed in this section. The HRASTM needs to incorporate all available data.**

Response: Section 6.1.2.7 has been updated to address the current radiological status of Site 31 by revising the language under the header "Previous Radiological Investigations" to read as follows: "The northern and southern portions of the storage area – None; Site 30 – None; Site 31 – non-time-critical removal action (NTCRA). During the Phase I removal action, elevated radioactivity suggesting the presence of non-naturally occurring Ra-226 was discovered in the sidewall of the excavation. Laboratory testing confirmed the presence of Ra-226 in concentrations exceeding the cleanup goal (Shaw 2012b). The contaminated soil was removed and no commodities were found in association with the elevated background." All work will be documented in a site-specific remedial action completion report (RACR) and final status survey (FSS) report.

9. Comment: **<u>Figure 2-Newly Identified Radiologically Impacted Areas</u>.**

9.1 <u>Radiologically Impacted Sites</u>. SWDAs A&B, 1207/1209 and 1231/1233 are shown in this figure but not identified in the Legend as radiologically impacted sites. In addition, Bigelow Court SWDA is not shown and Building 233 is not identified as impacted. Please clearly present both the new areas identified as impacted in this HRASTM as well as those identified in the 2006 HRA in different colors. The figure should denote all radiologically impacted areas identified in the 2006 HRA and the newly identified areas. The newly impacted areas should also include Bigelow Court SWDA and the paved compound at the rear of Buildings 342, 343 and 344 (see Comments #6 and 11). The figure title should also be updated accordingly.

Response: Figure 2 and all other appropriate figures (Figures 4, 6, 8, 9 and 10) have been revised to indicate those areas previously identified as impacted in the 2006 Historical Radiological Assessment (HRA), as requested. In addition, the figure title has been updated and explanatory text has been added to the end of the Section 2.3 to further discuss and introduce the results of the HRA.

In addition, as requested, The Bigelow Court SWDA and the paved compound at the rear of Buildings 342, 343 and 344 have been added as radiologically impacted sites to the HRASTM.

9.2 <u>Radiologically Impacted Site Boundaries</u>. The current SWDA boundaries exclude the buildings where sidewall samples taken beneath the buildings showed radiological contamination. The boundaries should be adjusted to conservatively include the buildings. Building 233 impacted boundaries should also be adjusted as discussed at the BCT meetings based on the detection of radiological contamination along sewer lines. The Building 233 boundary includes surrounding areas beyond the building footprint.

Response: The 2006 HRA boundaries for the SWDAs and Building 233 have been expanded in the HRASTM as recommended. See the revised boundaries in Figures 2, 4, 8, 9 and 10.

The text of the HRA has been modified as follows:

1. Add the following bullet to the end of the Executive Summary:

   - *This HRASTM expands the site boundaries for each of the Site 12 SWDAs to account for investigatory results obtained subsequent to the HRA.*

2. Revise the last sentence of paragraph 5 in Section 2.2.7 to read:

   "*Although further investigation will be performed throughout Site 12, the potential for the presence of radioactive materials in AOI 7 outside of the SWDAs is minimized because:…*"

3. Revise the last sentence of the first paragraph in Section 2.2.8 to read:

   "*The findings of this HRASTM for Area of Interest (AOI) 8 differ from the HRA in that this HRASTM expands the footprint of the existing SWDAs by 50 feet around the perimeter based on new information from investigations subsequent to the final HRA.*"

4. Insert the following new Sections 4.1.1 and 4.1.2 and renumber the follow-on sections:

   "4.1.1 Radiologically Impacted Sites Identified in the HRA

   This section addresses work that was done at sites designated as radiologically impacted at the time of the HRA. These sites include the former Building 233, Buildings 343 and 344, and SWDAs 1231/1233, 1207/1209, and A&B.

4.1.1.1 Building 233

Building 233 was the former location of the RADIAC Instrument Calibration School. In 1950, a spill of radium sulfate was reported in one of the laboratories in Building 233. Students unknowingly tracked the radiological material throughout the building before the spill was discovered. The U.S. Naval Radiological Defense Laboratory decontaminated and cleaned up the building. Although the floor was decontaminated at the time, the Navy is currently performing remedial activities and surveys to ensure the 1950 cleanup meets current standards. At the time of publication, the building and foundation have been removed surface contamination was remediated, and the existing contamination related to storm drains and sewer lines associated with the former building is being characterized.

A radiological assessment of Building 233 was done and a survey report was issued (Tetra Tech EC, Inc. 2008c). The scoping survey indicated that at least some of the building interior, exterior and piping was radiologically impacted. It was recommended that the piping be removed and fully surveyed for release during building demolition. In addition, a scoping survey of the building completed in September 2007 identified contamination under paint in interior areas and areas of elevated readings outside the building (Shaw 2012d). The demolition of the building was completed in January 2011 and at the time of this HRASTM, the Navy is conducting the characterization, remediation, and FSS for the building footprint, the sanitary/storm sewer system associated with the building and the surrounding area in accordance with MARSSIM (Revision 1 August 2000).

4.1.1.2 Buildings 343 and 344

Building 343 is one of the three buildings that comprised the RADIAC school from the 1950s to the 1970s. The closeout survey conducted by the Navy in a storeroom of Building 343 detected two alpha wipe survey points that were above release limits. Although these survey points were decontaminated, the HRA found that these had not been adequately investigated and recommended an FSS for the building. Building 344 was the location of a 1988 investigation of contamination in a waste container. The radioactive contamination was cleaned up and disposed of at a location off of NAVSTA TI. Surveys demonstrated that the areas were decontaminated to meet the Navy standards at the time. The HRA recommended an FSS for Building 344.

MARSSIM Final Status Surveys of Buildings 343 and 344 occurred in September 2007. In 2008, FSS reports were prepared for Buildings 343 and 344 (Tetra Tech EC Inc. 2008a, 2008b). The survey reports regarding Buildings 343 and 344 indicated that the survey results for both buildings had met the release criteria and the buildings could be

released for unrestricted use. DTSC and CDPH concurred that unrestricted release for Buildings 343 and 344 was appropriate (DTSC 2009).

4.1.1.3 SWDA 1231/1233, 1207/1209 (Bayside/North Point)

A NTCRA began in March 2007 at SWDAs 1231/1233, and 1207/1209 (Bayside/North Point) (Shaw 2007b). During the NTCRA, approximately 20 radiological commodities were discovered as well as incidental soil contamination. Additional remediation of SWDAs 1231/1233 and 1207/1209 will take place in order to support free release of the area.

4.1.1.4 SWDA A&B

A NTCRA began in March 2007 at SWDAs A&B (Shaw 2007b). During the NTCRA, several hundred radiological items ranging in Ra-226 content from 0.4 to 6,400 microcuries (µCi) were found. Additional remediation is necessary for SWDA A&B in order to support free release of the area.

4.1.2 Radiologically Impacted Sites Identified in this HRASTM

This section addresses work done at sites not designated as radiologically impacted at the time of the HRA, but subsequently designated as radiologically impacted in this HRASTM. These sites include Building 3, the entire sanitary sewer line from Buildings 3 and 233, the storm drain line from Building 233, the former incinerator in Site 12 and the downwind area potentially affected by aerial deposition, Building 570, both former USS Pandemonium Sites I and II, a probable former salvage yard site, a waste & clean soil stockpile/loading and decontamination site, the Bigelow Court SWDA, the asphalted area outside and east of Building 342, Building 168 (a former gyro compass repair building), and a former storage area (Sites 30 and 31)."

5. Add the following to the end of Section 6.1.1.3:

"*Intrusive investigation of SWDAs A&B, 1207/1209, and 1231/1233 has shown that radioactive debris extends beyond the footprints identified in the HRA for these SWDAs. Figures 2, 9, and 10 of this HRASTM show the expanded footprints for these impacted areas.*"

10. Comment: **<u>Appendix A-References, HRASTM-27 Lic 04-0436002 Amend</u>. This reference document states "The Radiac Instrument Maintenance Branch of Nuclear, Biological and Chemical Defense School is located near the corner of 5th Street and Avenue M on the Northeast side of Treasure Island (Fig. 1). It consists of numbered Buildings 343, 344**

and a portion of 342 and a paved compound of approximately 4,800 square feet which is enclosed by a 7' chain link fence (Figs. 2, 3, 4, and 5)… The paved compound to the rear of the buildings (Fig. 5) is used to conduct outdoor monitoring exercises using sealed sources. Whenever sources are exposed in the compound a red warning light on the inside wall of Lab #3 is activated by staff personnel and personnel are restricted from that area." Based on these statements, the paved compound should be identified in the HRASTM as potentially impacted. Please also verify whether there is documentation indicating a release of sealed sources in any of these locations. This new impacted location should be shown in Figure 2.

Response: The text of the HRASTM has been modified to address this outdoor area as radiologically impacted. T he last paragraph has been rewritten as follows to improve the clarity of the HRASTM:

> "*This HRASTM identifies Building 342 and surrounding area (Figure 6) as impacted based on new information indicating the possibility that prior use of the building may have included use as a radiological counting room. The presence of a counting room suggests the possibility that samples may have been handled without encapsulation and warrants designating the building as radiologically impacted. Buildings 343 and 344 were identified as impacted in the HRA. An FSS was recommended for the storeroom in Building 343 and for Building 344. These FSS reports were completed in 2008 (Tetra Tech EC, Inc. 2008a, 2008b). The California Environmental Protection Agency's DTSC concurred with the unrestricted release of Buildings 343 and 344 on January 16, 2009 (DTSC 2009). Based on the completion of the FSS reports for Buildings 343 and 344, and DTSC acceptance of unrestricted release of these buildings, no further action is required for these buildings at the time of this HRASTM. The radioactive materials license for the Buildings 342, 343 and 344 compound also indicates that the paved area to the rear of the buildings was used to conduct outdoor monitoring exercises using sealed sources. This area has also been designated as impacted to allow for the possibility of outside spills or leaks*."

OTHER COMMENT

11. Comment: Additional comments from CDPH are provided in the enclosed memorandum. Many of these comments pertain directly to the HRASTM, and the Navy should consider them the State's comments. Several of the comments or parts of the comments are related to future work or are not germane to the HRASTM. The Navy should address these comments in future documents. The comments that do not apply directly to the HRASTM and which the Navy should address in future documents are:

- **Comment 3 - third and fourth sentences**
- **Comment 21 - second and third sentences**
- **Comments 7 and 14**
- **Comments 4, 5, 6, 8, 11, 12, 16, 18 and 23 should be addressed in the revised HRASTM if information is available. If not, they should be addressed in a future document**

Response: Comment noted. The Navy has addressed all CDPH comments, including those referenced above. The Navy recognizes that additional site history/information developed after the HRASTM is published may be presented in future documents.

RESPONSES TO CDPH EMB COMMENTS (LARRY MORGAN)

GENERAL COMMENTS

1. Comment: EMB recommends identification and listing of radionuclides of concern for all radiological impacted sites and buildings. The Department of Navy (DON) needs to identify the use of radionuclides, and where and how disposed. Please establish if there were any known radionuclide sealed sources or radiological contamination prior to DON's ownership of Treasure Island (TI), and whether your records indicate the fate and transport of such items.

Response: The HRASTM (as well as the 2006 HRA) identifies radionuclides of concern for all radiological impacted sites and buildings. Please see Section 6.1.2 and subheadings "Potential Radionuclides of Concern" for all newly impacted sites. Regarding previously identified radiologically impacted sites in the HRA, the radionuclides of concern were identified in the HRA in Section 8.3 under the subheading "Radionuclides of Concern."

With respect to identifying the use of radionuclides, and where and how disposal occurred, the research, references and conceptual site models developed in both the 2006 HRA and the HRASTM aim to answer these questions. As noted in the HRASTM, the Navy has reviewed documents from the Golden Gate International Exposition (GGIE) and has found no evidence to date of use or presence of radioactive materials during the period prior to Navy ownership of Treasure Island. While this does not preclude presence of radioluminescent materials on common items such as watches or on instruments associated with the Pan American (Pan Am) Clippers, no evidence has been found of disposal of these items. The following text has been added to the end of the 3rd paragraph in Section 2.2:

> *"The Navy has reviewed documents from the GGIE and has found no evidence to date of the use or presence of radioactive materials during the period prior to Navy ownership of Treasure Island. While this does not preclude the presence of radioluminescent materials in*

association with common items such as watches or on instruments associated with the Pan Am Clippers, no evidence has been found of disposal of these items at TI."

2. Comment: The Historical Radiological Assessment Supplemental Technical Memorandum (HRA-STM) needs to adequately address EMB current concerns regarding the higher level activity Ra-226 items found on Treasure Island (TI) in the form of radium foils and buttons, commonly referred to as commodities.

EMB stated in a Memorandum of May 17, 2012, "Understanding the presence, use and location of disposal for all these items (foils and buttons) needs to be the primary focus of the Technical Memorandum (TM) to the Historical Radiological Assessment (HRA)." The updated Conceptual Site Model, 5.2.1.1 states, "Based on the research conducted to date, the source of the radioactive foils and buttons is unclear..." Please further elaborate their use, location, and disposal. Please detail how many cubic feet of Low Level Radioactive Waste (LLRW) have been shipped from TI and its point of origin. Please detail how many radioactive waste shipments whose contents were greater than LLRW have been made from TI, their nature and point of origin.

Response: The Navy concurs that in the absence of information for a site, a better understanding of function and use of different commodities may lead to a better of understanding of which areas warrant designation as radiologically impacted. However, the weight of evidence suggests that the radium foils resulted from Navy operations and that they were probably used in association with training activities. This basis is concluded because the foils are found buried in the SWDAs. Burial in the SWDAs would have been done by the Navy in the late 1940s or early 1950s based on when the SWDA debris pits were in use. The fact that the burial would have occurred after the WWII period indicates that it is unlikely that the foils would have been from the period of the GGIE. Furthermore, the curie content of the foils seems to vary, which indicates the foils were probably used for naval training activities. The absence of additional specific knowledge does not preclude the Navy from designating impacted areas and conducting appropriate response actions based on the availability of other lines of evidence. In fact, the SWDAs had been identified without any knowledge of what type, if any, commodities were present, even though all but one of the commodities have been found within those SWDAs to-date. I addition, the Navy has performed extensive records research as part of the HRASTM in an attempt to understand as many specifics as possible regarding the types of commodities that have been found. To the extent information is available on the types of commodities that have been found to-date, this information is provided in Section 5.2.1.1 of the HRASTM. The Navy continues to

research all types of radioluminescent devices and Ra-226 sources used by the Navy. Areas of interest on TI include the TI calibration laboratory, classrooms, and USS *Pandemonium* locations due to the use of radioactive sources and devices.

No High Level Radioactive Waste (HLRW) has been shipped from NAVSTA TI. Appropriate changes have been made in response to the CDPH EMB request to summarize information related Low Level Radioactive Waste (LLRW) shipped from TI including available details on such shipments.

3. **Comment:** **DON previously excavated approximately 580 trenches presumably for characterization purposes, and collected over 1,500 soil samples; of which four soil samples were analyzed for radionuclides. EMB has not seen characterization plan(s) that included analysis of a large fraction or all of the 1,500 samples. If the previously collected samples are unavailable for analysis now, the locations where samples were collected and chemicals, debris, staining or odors were found need to be incorporated into upcoming characterization plans. Since CDPH's stated conceptual model is that these sites are potentially impacted by radionuclides, these characterization plans need to be developed soon.**

Response: The soil samples that were collected in 2003 have been subsequently disposed of and are not available for additional analysis. All previous investigative data will be considered in the process of developing upcoming characterization plans and CDPH will be provided an opportunity to comment on these plans.

4. **Comment:** **Based on a preliminary review, EMB has found DON did not provide radiological information about the extent of contamination for all radiologically impacted buildings or sites from the following:**

- **Industrial waste lines,**
- **Outfalls to the San Francisco Bay,**
- **Characterization of surface below asphalt,**
- **Removal of surface anomalies,**
- **Excavation of sewer drainage system,**
- **Plume footprint from incinerator, and**
- **Solid waste disposal areas for the entire island.**

Response: Regarding the extent of contamination at radiologically impacted buildings or the listed sites, the following Navy input is provided:

- Industrial waste lines: There are no industrial waste lines on TI.

- Outfalls to the San Francisco Bay: Outfalls to San Francisco Bay have not been designated as impacted; however, the outfalls will be designated impacted if ongoing investigations warrant such designation.
- Characterization of surface below asphalt: Characterization of soil surfaces below the asphalt cover will occur in impacted areas.
- Removal of surface anomalies: One near-surface anomaly was found and disposed of, and that anomaly is discussed in Section 2.2.7. If additional anomalies are found they will be investigated appropriately.
- Excavation of sewer drainage system: The Navy presumes this comment refers to the sewer lines undergoing remediation in association with Building 233. That work is ongoing and will be reported as additional data becomes available.
- Plume footprint from incinerator will be investigated.
- All known SWDAs for the entire island are being investigated: The Navy presumes this comment refers to the radiologically impacted SWDAs in Site 12 (Bigelow Court, 1231/1233, 1207/1209, and A&B). That work is ongoing and will be reported separately from this HRASTM.

5. Comment: **For future reference, please provide EMB with a summary table of Site 12, Solid Waste Disposal Area (SWDA) sites. The table should include the following information: all buildings, potentially impacted buildings and building sites. At a minimum, display the following information; Area of Interest (AOI), surface area m^2, total number of soil samples collected, elevated Radionuclide of Concern (ROC), total soil remediated, and backfill soil data and analysis for all buildings, building sites and sites.**

It is important for EMB to understand past and current soil movement by DON and their contractors. EMB's conceptual model views the presence of debris, odors or soil discoloration, as an indicator of potential presence of radionuclides. EMB welcomes future review of a revised and complete conceptual site model.

The revision to the HRA document does not list the sites at TI where debris, odors or soil discoloration has been observed. Please list these sites in a summary table and provide a corresponding legend. This table would guide further scoping and characterization work that EMB has indicated will be needed at TI.

Response: The summary of all radiological work performed to-date in the SWDA sites is documented in two separate reports: SWDA Bayside/North Point Post Construction Summary Report (PCSR) and the SWDA A&B PCSR.

These reports summarize all the details and information referenced in the above comment.

Historic soil movement activities within Site 12 and other impacted sites (Sites 32, 31 30, 6 a nd Building 233) includes material related to investigation-derived waste (IDW), remediation, and construction activities. The only other intrusive CERCLA excavation involves the current remedial action at Site 33 for which preliminary results suggest there is no man-made Ra-226 contamination. Soil movement associated with remediation activities are summarized in their respective project reports. For Site 12, this work would have included: PCB investigation at Halyburton and Bigelow Courts; the four historic removal actions conducted within Site 12 (Site 12 R I, Section 1.3.13); and, the ongoing removal actions at SWDAs A&B and Bayside/North Point. Petroleum corrective actions within Site 6 a nd the Toxic Substances Control Act (TSCA) action within Site 32 are also documented in their respective reports. All projects were performed per work plans that included control procedures to properly contain contaminated soil and debris. Work associated with the Building 233 remediation and SWDAs A&B and Bayside/North Point includes radiological characterization of soil. Characterized LLRW is put into sealed bins at the radiologically controlled area and disposed of in out-of-state facilities. Comprehensive records are not available to document soil movements associated with historic construction activities.

Two primary lines of evidence have been used to develop areas that are impacted and subject to further investigation. (1) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites with other non-radiological known soil contamination, and suspect contamination based on hi storical site models. All CERCLA sites with soil contamination are subject to ongoing or future investigation. These CERCLA sites were identified over the years following various investigations, taking into account factors including visual characteristics as well as subsurface soil analysis. (2) In addition, several areas will be investigated because of the conceptual potential for radiological contamination based on hi storical site models (e.g., Building 3, Lot 69, etc.).

6. Comment: In reference to soil movement on TI, EMB recommends including information gained from public interviews of current and past contract workers who worked or remediated during site operation or after site closure.

Response: Although no interviews were or will be conducted as part of the preparation of the HRASTM, the Navy has taken a number of actions to address the potential that soil movement from the Site 12 SWDAs to the soil stockpile areas may have resulted in the spread of contamination. These actions include performing surface scans of the route taken by the transport vehicle, designating the soils stockpile area for the IDW as radiologically impacted, and the commitment to conduct site-wide gamma walkover surveys of Site 12. The information appears in the last paragraph of Sections 2.2.6 and 5.2.3.3.

7. Comment: There are no Applicable or Relevant and Appropriate Requirements (ARARS) in the HRA-STM that describe radiological ARARS. Please provide radiological ARARS information in a prescribed section. See Title 17 of California Code of Regulations Section 30256, which EMB uses to determine Radiological Unrestricted Release Recommendation (RURR) for buildings and sites.

Response: Applicable or Relevant and Appropriate Requirements (ARARs) are not included in HRAs, but are evaluated per site as part of the CERCLA process.

8. Comment: Provide an assessment for the likelihood of contamination migration from surface to subsurface, sediment, soil types, ground water, airborne, and drainage systems for all impacted sites.

Response: Contaminated media and potential migration pathways are addressed in this HRASTM, as well as in the 2006 HRA. Please see "Contaminated media" and "potential migration pathways" in the HRA (Section 8.3) and the HRASTM (Section 6.1.1). Please note that consistent with DTSC's Other Comment #11, additional detail regarding investigation of impacted sites will be appropriately included in future work plans prepared pursuant to CERCLA.

9. Comment: During past discussions at Base Closure Team (BCT) meetings and Technical meetings, DON staff mentioned possible disposal of radionuclides used at Treasure Island (TI). Please provide documentation and resolution about a DON contracted report (NBy-61078) submitted in 1965, and other reports if they exist, that provide further information about "...radioactive and poisonous wastes had been buried west of the abandoned landing strip in a future construction area."

Response: The referenced report is the only known reference regarding deliberate disposal of radiological wastes at Treasure Island other than the short half-life bromine (Br)-82 isotopes that were used during training operations on the USS *Pandemonium,* which are discussed in detail in the HRA. The statement has been confirmed with the discovery of contamination at

SWDA A&B, the referenced disposal area at the end of an early runway. Other known debris disposal activities within Site 12 are supported by other lines of evidence but do not specifically indicate purposeful disposal of radiological wastes. The last paragraph of Section 2.2.8 of the HRASTM has been modified to discuss this cited report by replacing the second sentence with the following four sentences:

> "*After the 2006 HRA, radiological commodities were found in each of the SWDAs confirming the report of radiological disposal activities at Treasure Island. The referenced report is a geotechnical report that contains the statement that 'discussions with station personnel during our investigation revealed that portions of the proposed construction area have been used for the disposal of debris…and that radioactive and poisonous wastes had been buried west of the abandoned landing strip in a future construction area.' (*McCreary Koretsky Engineers 1965*). No other reports have been discovered that specifically suggest the disposition of radiological waste at Treasure Island. .*"

In addition, this report has been added to the HRASTM list of references as follows:

> *McCreary Koretsky Engineers. 1965. "Soil and Foundation Investigations for Appropriated Fund Quarters at U. S. Naval Station, Treasure Island, San Francisco, California." January 11.* ***TI-HRASTM-33.***

10. Comment: Area of Interest (AOI) boundaries should follow streets or natural landmarks. AOI boundaries currently cut through buildings making identification difficult.

Response: All AOI boundaries do follow existing streets or natural landmarks except for the boundary between AOI 7 and AOI 8. The boundary between AOI 7 and AOI 8 was established to align with the northern edge of the former runway. The runway is an important landmark that appears in aerial photographs of TI through the early 1960s, and it facilitates efforts to locate some historic site features important to this analysis, specifically a former salvage yard discussed in Section 2.2.7 and a radioactive material disposal area discussed in Section 2.2.8. As such, the existing AOI boundaries will be retained as presented in the draft HRASTM.

11. Comment: There is no general discussion about release of radiological contaminants from the outfalls to the San Francisco Bay. Please explain potential storm drain and sanitary sewer contamination.

Response: Drainage systems and the potential for impacted sites to affect them have been discussed in this HRASTM. S ee the sub-category "Drainage Systems" under the "Potential Migration Pathways" category in HRA Section 8.3 and in HRASTM Section 6.1.1. The final HRASTM has been modified to designate the entire sanitary sewer line from Buildings 3 and 233 (the potential sources of contamination) to the outfall as contaminated. Storm sewer evaluation within impacted sites will be considered during development of radiological survey work plans.

12. Comment: HRA-STM needs to address the potential contamination migration via sanitary sewer and storm drains. For example, Building 233 sanitary sewer system extends beyond the boundaries of Building Site 233 and its terminus is as yet unknown.

Response: The HRASTM addresses drainage systems as discussed in CDPH EMB General Comment #11 above.

SPECIFIC COMMENTS

13. Comment: <u>Page ES-1, Executive Summary, paragraph four</u>, bulleted radiological impacted areas should have included the following:

- **Site 33 Sailboard pad and drain lines,**
- **Ash Incinerator, and**
- **Roads, storm drains and ditches adjacent to roads and wash down areas used in soil transport**

Response: All radiologically impacted areas will be included in the Executive Summary.

- Site 33 has not been designated as impacted as the weight of the evidence does not support such as designation (see DTSC Comment #7 for additional discussion regarding Site 33).
- The sailboard pad has been designated impacted in the HRASTM as suggested.
- Drain lines are considered in each impacted area as discussed in Section 6 of the HRASTM.
- The former incinerator has been designated impacted as well as the prevailing downwind areas on TI.
- The roads, storm drains, ditches and transfer areas in AOI 6 have all been impacted. AOI 6 is the area most likely to be impacted by contamination resulting from transportation of soil.

14. Comment: **<u>Page 9, Section 2.2.2, AOI 2: Former Hospital Area, second paragraph</u> "The Waterline Replacement Area, Site 33, (Figure 4) is currently undergoing additional investigation ... the work will be published in a Remedial Action Completion Report after the work is done". A final status survey report of Site 33 should also be provided.**

Response: The waterline replacement area, Site 33, is not designated as an impacted site. Characterization surveys have been completed for this site and did not identify any Ra-226, Cs-137, or Sr-90 contamination above the investigation levels. As this is not an impacted site, the Navy is considering regulatory comment.

15. Comment: **<u>Page 11, Section 2.2.2, AOI 2: Former Hospital Area, paragraph three</u>, states "AOI 2 was built out by the end of WWII and because it was already developed by that time, there is little likelihood for debris to be disposed of in the AOI during that period". What is DON's rationale for this statement? What are the soil subsurface conditions? Does DON still maintain that it stored the more than 200 drums of radiological waste originating from Building 233 (Final Treasure Island Naval Station Historical Radiological Assessment, Former Naval Station Treasure Island, San Francisco, California. February 2006, page 6-21, Section 6.6.1, paragraph two, sentence five) prior to being loaded aboard USS *Independence*? Please review to see if this statement still reflects DON assessment.**

Response: The Navy began leasing property on TI in 1941 and began constructing new buildings on the site. By early 1942, the Lake of the Nations had been filled in and construction of the hospital buildings was nearing completion. Disposal of debris in the AOI during that period was unlikely because the site had been developed when the Navy began leasing the property. The only area within AOI 2 where a small amount of debris was observed in the subsurface is at Site 33 and this area was filled in almost immediately following the transition to Navy ownership.

Based on a review of documents included in the HRA and new research conducted as part of the HRASTM, no new information has been found to conflict with the statement that the drums were stored until they were loaded onto the USS *Independence* for storage pending disposal. It is most likely that the drums used for decontamination of Building 233 were stored at the work site and near Building 233 until they were filled, and then they would have been shipped off site to Hunters Point Shipyard where radiological storage areas already existed that could accommodate the drums. The radiologically impacted area surrounding Building 233 has been expanded to include the outdoor paved area, which was the most likely temporary storage area for the drums during the decontamination of Building 233.

16. Comment: **<u>Page 16, Section 2.2.6, AOI6: Sewage Treatment Area, paragraph three</u>, states "After the HRA, and unrelated to the USS *Pandemonium* Site II, a removal action was completed in 2009 at Site 32 that included the footprint of the USS *Pandemonium* Site II". It further noted soil was removed to a depth of two to twelve feet; please include the fate and transport of removed soil. The USS *Pandemonium* itself was dismantled and shipped from site. Please include a radiological assessment of the vessel at time of disassembly as well as fate and transport of remains.**

The infrastructure to wash or remove radiological contamination at both sites needs further clarification. Radiological decontamination by washing or some other means indicates that the affected pipes, containers, ditches etc. are considered contaminated. Please expand the discussion about areas or buildings that are potentially contaminated during radiological training.

Response: Approximately 790 tons of Class 1 (hazardous) soil was excavated from Site 32 and taken to the Chemical Waste Management, Inc. facility in Kettleman City, California. Approximately 12,700 tons of Class 2 (nonhazardous) soil was excavated from Site 32 and disposed of at the Altamont Landfill in Livermore, California. Although no radiological screening of the material was conducted on-site, it is appropriate to note that hazardous waste that is shipped to landfills for disposal may include screening on arrival for radiological materials using radiological portal monitors. There is no record of any waste generated at TI being rejected at a landfill. Concrete and asphalt was broken up and recycled. No liquid waste (waste water) was generated during field activities; soil excavated from below the water table was dried before being transported offsite (Shaw 2011).

As noted in Section 4.1.3 of the HRASTM, "The USS *Pandemonium* was removed from the training site and sold for scrap metal prior to the HRA." The final destination of the scrap metal from the former USS *Pandemonium* is unknown. The Navy would simulate various radiation levels at various locations on the mockup by moving sealed Cs-137 sources within the ship and the students would use monitoring instruments to locate "radioactivity" during training exercises. In addition, decontamination training exercises were conducted that involved dispersing water containing a radioactive isotope with a half-life of approximately 10 days (such as Br-82) on the surface of the mock ship and the students would decontaminate the ship. The concrete holding tanks would collect the effluent water that ran off of the concrete pad until the radioactivity had decreased to safe levels, and then the water would be drained to the San Francisco Bay. The wash-down activities ceased in 1972, but training continued using sealed sources of Cs-137 at the mock ship until 1992.

The ship was stored on land, atop a 9-inch thick concrete pad occupying much of the site. While most of the training was conducted using sealed sources within shielded wells on the mockup ship, decontamination exercises were also conducted by washing down the surface of the ship with water that had radioactive isotopes with short half-lives (10 days). The wash-down water would have presumably drained to the concrete pad and then into the concrete holding tanks via piping or grading of the concrete surface. On a 1973 sanitary sewer system map, a 6-inch pipe is shown leading to the San Francisco Bay from the concrete holding tanks (see HRA reference TI-HRA-82). A figure included in the 2011 Final Site 32 field activity report (Shaw 2011) shows several utilities near the concrete pad, including a steam line, separate storm and sanitary sewer pipelines, a fresh water pipeline (hydrant), and two steel pipelines (2- and 3-inch diameters) of unknown use. During the removal action, the 3-inch steel pipe was discovered originating from the concrete sump and running parallel to the rip rap; the piping was removed and discarded and the openings were plugged (Shaw 2011). Following the removal action, the only remaining site features that could be potentially contaminated were soils deeper than 2 feet below ground surface (bgs) (soils were excavated down to 2 feet bgs in the entire removal action footprint, though some areas were excavated up to 12 feet), the two concrete holding tanks, interior areas within Building 462, and any remaining piping associated with the tanks. All other site features that may have been contaminated during training exercises have been removed. The Navy is planning a gamma walkover survey and sampling of soil and sediment at the former USS *Pandemonium* Site II (NE) area.

17. Comment: **<u>Page 18, Section 2.2.6, AOI 6: Sewage Treatment Area, paragraph one, sentence four</u>, please clarify the period of use, and potential trips per day for the "...end loader bucket..." used to transport potential radiologically contaminated soil from Site 12 to Site 6.**

Response: The field work plan for the NTCRA activities at the Site 12 SWDAs described appropriate procedures for storing and transporting soil that was excavated during the removal action. Section 4.6.4.5 of the NTCRA Work Plan (Shaw 2007b) states that "During excavation activities, waste soil will be either directly loaded on to local haul trucks for transportation to a waste soil/debris staging area or directly loaded into end-dumps for offsite transportation and disposal. Prior to leaving the exclusion zone, local haul trucks and/or end-dumps will be decontaminated and tarped."

Although the work plan called for tarped transport of soil from Site 12 to Site 6, transport of untarped soil within end loader buckets possibly occurred for a limited period of time. Since the use of this transport method clearly was not an approved method of transport, the Navy has committed to conducting a gamma walkover survey of the roadways between Sites 12 and 6 to ensure absence of radioactive contamination

along the roadsides that could have resulted from such transport practices. It is noted that a survey conducted by the contractor at the time did not disclose any evidence of a release of radioactive material associated with this transport method.

18. Comment: **<u>Page 18, Section 2.2.7, AOI 7: Northern Housing Area of Interest, first paragraph</u> states that a radiological survey performed in North Point and Bayside Areas in 2009 provide the data and insert those data and results in the HRA-STM, perhaps as an appendix. Gamma walkover surveys will not address the subsurface contamination or the debris underneath the building and soil beneath telephone poles.**

Response: The work is not complete, data collected to-date for the ongoing NTCRA has also been presented in the draft post construction summary report (Shaw 2012c).

19. Comment: **<u>Page 20, Section 2.2.7, AOI 7: Northern Housing Area of Interest, photograph 19</u>, this is a picture of the former incinerator, provide an assessment of the conceptual site model for the ash from the incinerator that includes standard meteorological data and wind-flow information. The seasonal plume areas need to be identified, especially adjacent to the incinerator. Please identify how the ash from the incinerator was transported and deposited on the island. Please provide maps or diagrams of ash distribution. Please detail the extent of burn pits to which the ash might have been transported, including the methodology on how those pits were bounded.**

The conceptual model should include historical background, nature and extent of the contaminant release, environmental media impacted, fate and transport of radionuclides of concern in the environment, potential receptors, exposure pathways and risk assessment In this description please include the high activity foils, the buildings and debris locations, the adjacent incinerator's plume impact on this site, demographics of ash and burn debris, radiological fall out, wind flow diagrams, sanitary sewer and industrial waste lines, the crawl space below the building and the area surrounding the building.

Response: Please note that the incinerator is located within SWDA 1231/1233 and is considered an impacted area. In addition, areas located downwind of the incinerator based on prevailing winds have been impacted in this HRASTM to account for the possibility of radiological materials having been incinerated. All available information regarding the designation of the former incinerator as an impacted area, including prevailing wind analysis, will be provided in the final HRASTM.

20. Comment: **<u>Page 30, Section 4.1.3, USS *Pandemonium* Site II (NE), paragraph two</u>, states, "…the contractor did periodic radiological scans on the hands and feet of personnel and on rubber tires of heavy equipment demobilizing from the site ... No elevated radiation was detected." Health and Safety scans for remediation staff do not qualify as a characterization scan for any site. Please eliminate this statement from the HRA-STM text.**

Response: The Navy concurs that the information does not preclude the need for future work plans detailing appropriate scoping, characterization, and an FSS for the site. The statement regarding health and safety screening has been eliminated as request.

21. Comment: **<u>Page 36, Section 4.3.4, Building 233, first paragraph</u>, the text fails to mention discovery of additional radiologically impacted terra cotta pipe.**

The Final Status Survey (FSS) must demonstrate a preponderance of evidence that there are no other impacted lines associated with Building 233. The remediation of a newly discovered impacted pipe, encountered while remediating a known impacted pipe, does not meet this standard.

Response: Comment noted. As discussed in the second paragraph of the referenced section, the characterization, remediation, and FSS for the Building 233 footprint, the sanitary and storm sewer system associated with the building and the surrounding area are ongoing. The summary of the response actions will appear in future documents.

22. Comment: **<u>Page 39, Section 5.2.1.4, Human Receptors and Exposure Pathways</u>, please include Building 233, Site 6, Site 32, as bulleted items.**

Response: A bullet for Building 233 will be added to Section 5.2.2.4, which is under the conceptual site model (CSM) for incidental releases in association with training/operations.

Information regarding Site 6 is included as the Waste and Clean Soil Stockpile/Loading and Decontamination Site in Section 5.2.3.4, which is under the CSM for spills/contamination resulting from handling of contaminated soils from Site 12 SWDAs.

Information regarding Site 32 is included as USS *Pandemonium* Site II (NE) in Section 5.2.2.4, which is under the CSM for incidental release in association with training operations.

23. Comment: **<u>Page 43, Section 6.1.1.1, Building 233, paragraph one</u> states "This HRASTM did not identify any changes from the previous findings of the HRA for this building and sanitary sewer system other than the plan to conduct an FSS for the Building footprint, the sanitary sewer system associated with the building and surrounding areas." This statement fails to identify the Building 233 parking lot and additional sanitary sewer pipes adjacent to Building 233 as items to be covered in a FSS. What additional sites or building drainage systems are impacted by the contaminated pipelines?**

Response: The impacted area associated with Building 233 now includes the Class 1 Survey area, which includes the building footprint and surrounding areas that will be subject to a FSS. Utilities and associated catch basins outside of this area will be investigated as a separate area. Building 233 field work performed to-date showing this Class 1 survey area will be documented in a PCSR (Shaw in-production)

RESPONSES TO ADDITIONAL CDPH EMB COMMENTS (DATED DECEMBER 11, 2012) ON THE NAVY'S RESPONSES TO COMMENTS

GENERAL COMMENTS

1. Comment: **EMB requests that the *Draft Historical Radiological Assessment - Supplemental Technical Memorandum (DHRA-STM)* and/or a modified version of the HRA (2006) include a complete listing and investigational information, and times and locations of shipment of all commodities or fragments of commodities or items found to date on Treasure Island. These items have been referred to in documents such as the Site 12 Trench Report of 2004 and *Draft Post Construction Summary Report Installation Restoration Site 12 Solid Waste Disposal Areas 1207/1209 and 1231/1233, September 2012.* Other than Site 12 and Building Site 233, where else have remediation activities or other activities located radionuclides?**

Response: The text will be updated to include a listing of commodities as requested. As indicated in the draft responses to comments provided to CDPH EMB, the HRASTM text will be updated as information becomes available from ongoing investigations to summarize any new information resulting from ongoing investigations. Other than Site 12 and Building 233, radionuclides have only been detected at Site 31, which was discussed in the text of the draft HRASTM.

2. Comment: **Please provide a history of past soil movement during remediation activities, non-remediation activities, and storage of soil for future use or disposal on or off the TI. Include a parallel accounting of all radiological activities on Yerba Buena Island and Treasure Island.**

Response: Navy will consider past soil movement from radiologically impacted areas in future work plans for surveys of radiologically impacted sites. Yerba Buena Island (YBI) is not addressed in the HRASTM because no radiologically impacted sites have been identified on YBI (Weston 2006). CDPH EMB concurred in a December 23, 2011 memorandum that no further involvement by CDPH is required for YBI because of the lack of radionuclide impacts to YBI and the fact that control procedures were in place to properly contain radiologically contaminated soil and debris transported via trucks over YBI (CDPH EMB 2011).

3. Comment: Provide EMB with a copy of all available surface and subsurface drawings, maps, and blueprints that identify current and past locations and routes of sewer and storm lines, drains, manholes, catchments, and outfalls.

Response: The requested documents will be provided separately to CDPH EMB as requested.

4. Comment: Specify all locations of potentially contaminated surfaces or routes that have been contaminated with radionuclides and insert those findings in the HRA.

Response: All potential radiologically contaminated areas and routes have been identified in the HRASTM as radiologically impacted areas and the findings for these areas are discussed in the HRASTM. Truck routes outside of Sites 12 and 6 are not classified as radiologically impacted because known transport of contaminated materials over roadways in these other areas was conducted utilizing control procedures designed to properly contain contaminated soil and debris being transported by trucks.

5. Comment: The current conceptual site model, pages 37 to 42 of the HRA-STM needs to be revised based on the November 29, 2012 Coordination Meeting that outlined recent DON accommodation of additional sites on TI that are now considered impacted with radionuclides.

Response: The CSMs will be adjusted to account for discussion during a November 29, 2012 meeting between the Navy, DTSC, and CDPH EMB. Specifically, the CSMs will be revised to include the potential for radiological impacts from air emissions from the former incinerator, the former gyro compass shop, and the potential for releases into or from sewers (both sanitary and storm).

SPECIFIC COMMENTS RELATED TO NAVY'S RESPONSES TO DTSC COMMENTS

6. Comment: <u>DTSC Comment 8, Page 3 of 20 in responses</u>: The work plan for Site 31 indicates that a FSSR will be done for Site 31. The response to this comment indicates that work will be documented in a site specific Remedial Action Completion Report (RACR). The Navy has

committed to providing a FSSR in their work plan. Is the response saying that the FSSR will be submitted as part of the RACR? Based on a December 7, 2012 Coordination Meeting, the DON indicated that a FSSR will be supplied either through a RACR or a stand-alone FSSR.

Response: It is the Navy's intent to publish the FSS for Site 31 as a stand-alone document that is independent of the Site 31 RACR.

7. Comment: **<u>DTSC Comment 9.2, Item 2 and 4 on Page 5 of 20 in responses</u>: The responses indicate that this HRA-STM expands the footprint perimeters of the existing SWDA's by 50 feet. The HRA-STM needs to explain the basis for this adjustment, and identify information leading to selection of a 50-foot value for the expansion of the footprint for the SWDAs.**

Response: The HRASTM will include an explanation of the basis for this adjustment and identify information that was used to select the 50-foot value.

8. Comment: **<u>DTSC Comment 9.2, Item 3 on Page 5 of 20 in responses</u>: The revised last sentence of paragraph 5 in Section 2.2.7, which was revised to read in part, "...potential for the presence for radioactive materials in AOI-7 outside of the SWDAs is minimized because..." Please state the DON's basis for this conclusion.**

Response: The basis for the Navy's conclusion is stated in the six bullets that are presented in the draft HRASTM at the end of Section 2.2.7. These bullets remain valid evidence for mitigating the potential for radioactive materials outside of the SWDAs.

9. Comment: **<u>DTSC Comment 9.2, Item 5, Section 4.1.1, Radiologically Impacted Sites Identified on the HRA, on Page 5 of 20 in the responses</u>: An examination of the Draft Remedial Investigation Report for Installation Restoration Site 12, Old Bunker Area, Naval Station Treasure Island, San Francisco, June 2011, Figure 1-3, Historical Site Features, photograph dated 1968 shows a section labeled, "Historical Burn Area", which is congruent with Soil Area of Interest 1201/1203/1220. Historically, burn pits have been associated with elevated Ra^{226} levels; and EMB's conceptual site model for TI indicates the soil for Area of Interest 1201/1203/1220 should be considered potentially impacted. Please include a description of the burn areas and an explanation about the conceptual site model.**

Response: Section 2.2.7, which already discusses the burn pits, will be expanded to provide additional information including their locations. In addition, the CSM for Solid Waste Disposal Operations will be modified to include the burn pits. The Navy will consider impacting the portion of Site 12 RI Area of Interest 1201/1203/1220 associated with the "Historical Burn Area."

10. Comment: **<u>DTSC Comment 9.2, Item 5, Section 4.1.1.1, Building 233, on Page 6 of 20 in the responses</u>: Reference labeled as Shaw 2012d needs to be added to the references in the HRA-STM.**

Response: The reference list will be updated in the final HRASTM. The referenced document is the forthcoming Building 233 FSS.

11. Comment: **<u>DTSC Comment 9.2, Item 5, Section 4.1.1.5, SWDA A&B, Page 7 of 20 in the responses</u>: The response states that "… low level radiological items containing Ra-226 were found in all of the SWDAs." The term "low level radiological items" is misleading to many people, and that terms needs to be replaced with a specific range of the activities of items found. While the items found are not high level radioactive waste as defined by the Nuclear Regulatory Commission (NRC), the levels found in these areas are elevated.**

Response: The term "low level" has been eliminated and the second sentence of Section 4.1.1.3 has been revised as follows: "*During the NTCRA, radiological items ranging in Ra-226 content from 0.4 to 6,400 µCi were found in all of the SWDAs."*

12. Comment: **<u>DTSC Comment 9.2, Item Section 4.1.2, Radiologically Impacted Sites Identified in this HRA-STM as described on Page 7 of 20 in the responses</u>: It appears that the HRA-STM needs to address sanitary sewer and storm drainages from, or passing in the vicinity of, potentially impacted areas; potentially impacted buildings and any related structures. These sanitary sewer and storm drainage systems should be designated as potentially impacted in the HRA-STM including their outfalls.**

Response: The final HRASTM has been modified to designate the entire sanitary sewer line from Buildings 3 and 233 (the potential source of contamination) to the outfall as contaminated. Please note that drainage systems and the potential for radiologically impacted sites to affect those systems have been discussed in the draft HRASTM for all impacted sites. See the sub-category "Drainage Systems" under the "Potential Migration Pathways" category in Section 8.3 of the 2006 final HRA and in Section 6.1.1 of the draft HRASTM. Sections of the Building 233 sewer systems have been found to be contaminated with Ra-226. The sewer lines associated with Building 233 remain under investigation and the extent of the contamination has not been fully determined. Characterization of the sanitary system associated with the Building 3 optical repair shop will also occur as a separate project. Storm sewer evaluation within impacted sites will be considered during development of radiological survey work plans.

13. Comment: **Please include areas now classified as potentially impacted due to their location relative to collection and disposal of ash directly from the incinerator, and due to the incinerator's discharge plume of smoke and ash potentially contaminated with radionuclides.**

Response: The former incinerator was located within SWDA 1231/1233, which is considered an impacted area. The CSMs and potentially impacted areas will be adjusted to include the potential for radiological impacts from air emissions from the former incinerator, as well as potential impacts associated with ash disposal. (Note that no records have been located that provides any details on ash disposal from the former incinerator). All available information regarding the incinerator will be provided in the final HRASTM.

14. Comment: **<u>DTSC Comment 10, on Page 8 of 20 in the responses</u>: This indicates that text of the HRA-STM has been modified to address Building 342 and the area between Buildings 342, 343, and 344. However, the response fails to indicate that the HRA-STM has been modified to address the Building 343 and 344 sanitary sewer line.**

Response: Buildings 342 and 343 are serviced by sanitary sewer lines. No sanitary sewer line services Building 344. The sanitary sewer line servicing Building 342 will be designated as impacted in the final HRASTM. A FSS was conducted for Building 343 in 2008; no contamination was found and the building was provided unrestricted release by the DTSC per a memorandum from CDPH to DTSC.

SPECIFIC COMMENTS RELATED TO NAVY'S RESPONSES TO CDPH GENERAL COMMENTS

15. Comment: **<u>CDPH Comment 2, page10 of 20 in the responses</u>: This response appears to indicate that the Navy has no idea where the larger level Ra-226 sources came from or where these sources could be found on Treasure Island.**

Response: The prior CDPH comment focused, in part, on the potential use of radiological items on Treasure Island prior to the Navy's ownership. The Navy's response was intended to convey that the Navy has searched for and found no records of the use of radiological items prior to Navy ownership. While this does not preclude the presence of radioluminescent materials on common items such as watches or on instruments associated with the Pan Am Clippers, or the GGIE, no specific evidence has been found regarding the use or disposal of these items at TI.

The Navy does not, as indicated in the comment, know what the larger level Ra-226 sources (radium foils) were used for, or where they were used; however, the extent of the disposal locations (SWDAs) are known with a high degree of certainty and the areas containing those disposal locations has been designated as radiologically impacted. The Navy will

continue to investigate the use of the foils after the publication of the HRASTM.

16. Comment: **<u>CDPH Comment #1</u> indicates that there is no record indicating that the sources found on Treasure Island came from the Golden Gate International Exposition. Some of the sources found so far exceed levels of Ra-226 known to have been used in instruments, or as deck or bridge markers. Based on the responses to CDPH Comments 1 and 2, it appears the DON has no current information regarding the activities that could have utilized these sources and why the highest level Ra-226 sources were disposed on Treasure Island or existing location of contamination. Therefore, the basis for designation of areas impacted by these sources is knowledge of where they have been found to date. So the current conceptual model for the largest Ra-226 sources found is that their location of use and use is unknown, consequently, it is unknown where they could be disposed. Based on available information, all but one of these sources has been found within the SWDAs. Other than where they have been found to date, there is no basis to prematurely eliminate other locations on Treasure Island.**

Response: Comment noted. The HRASTM conservatively impacts the locations where both licensed and unlicensed activities could have taken place, regardless of any actual documentation specifically indicating so. In the absence of specific documentation, conceptual site models have been developed to support impacting a site.

17. Comment: **The numerous sources that came from the Building 1321 "hot spot" have apparently not been characterized and that characterization information might provide additional information useful for the site conceptual model. Please provide an estimate of the date when that information would be available.**

Response: No specific information regarding commodities found at the Building 1321 "hotspot" is available. The soil associated with the "hotspot" under the steel plate (a subarea of SWDA A) that was excavated in June 2011 was placed commingled (soil and any commodities present) into B-25 boxes. The material will be disposed of in upcoming field work activities during 2013.

18 Comment: **<u>CDPH Comment 3, on page 11 of 20, in responses</u>: The soil samples collected in 2003 from the trenching work have been disposed. As noted previously, CDPH considers any areas with debris or discoloration to be potentially impacted. The previous trenching activity in Site 12 recorded areas with observed debris or discoloration. Therefore, those areas should be identified as potentially impacted in the HRA-STM.**

Response: Although the Navy does not agree with the statement that any areas with debris or discoloration as discussed in the trenching work should be considered impacted for that reason alone, the Navy will conduct further radiological surveys within IR Site 12.

19. Comment: **<u>CDPH Comment 4, on page 11 of 20:</u>**

Bullet 2: This indicates outfalls have not been designated as impacted if ongoing investigations warrant such designation. Given that the sanitary sewer lines and storm drains from Building 233 have both been identified as impacted, an investigation of outfalls is warranted. Please include outfalls as potentially impacted.

Bullet 5: Please amend this bullet to include storm drains.

Bullet 6: The incinerator plume footprint should be shown in the HRA-STM as potentially impacted.

Response: Bullet 2: The entire upland section of the sanitary sewer lines from Building 3 (the most upstream potential contamination source) to the waterfront has been identified as impacted. As indicated in the prior response, outfalls to San Francisco Bay have not been designated as impacted; however, the outfalls will be designated impacted if ongoing investigations of sewer lines yield data that warrant such designation.

Bullet 5: As noted in the original CDPH EMB Comment #4 and its reference to "excavation of sewage drainage system," it is presumed that this additional CDPH EMB comment requests that the draft HRASTM be modified to include current radiological information for the ongoing investigation of storm drain lines at Building 233. Thus, the text of the final HRASTM will be updated to summarize the investigation and remedial actions completed at Building 233 to-date.

Bullet 6: Areas on TI within the incinerator plume footprint and the Building 461 area that is downwind of the former incinerator will be shown as radiologically impacted.

20a. Comment: **<u>CDPH Comment 5, on page 12 of 20 in responses</u>: This statement is misleading. While Site 12 was subject to extensive subsurface soil characterization as reported in Shaw 2004, the characterization was for Chemicals of Concern. Only a few samples were analyzed for radionuclides. Please amend the response to indicate the number of radiological samples taken and the utility of those samples.**

Response: The Navy agrees that the primary purpose of the Site 12 trenching investigation was for subsurface characterization and to identify areas of debris disposal, staining, and for chemicals of concern that did not include radioisotopes (except for three soil samples that were analyzed for radioisotopes at a laboratory). The trenching investigation consisted of

587 trenches approximately 2 feet wide by 5 feet long and excavated to 4 feet bgs. Removed soils and the trench walls were logged and scanned with sodium iodide detectors for gamma radiation. A total of 2,244 radiation readings were recorded and of these, only three exceeded the health and safety action levels. While this work was not conducted to the standards recommended by MARSSIM, it does provide valuable information about the potential for debris disposal within Site 12 and the relative lack of higher reading commodities within the trenched areas.

20b. Comment: **<u>CDPH Comment 5, on page 12 of 20 in responses</u>: Please list in table form the sites where debris, odor or soil discoloration was observed and add them as potentially impacted.**

Response: As indicated in the Navy's response to additional CDPH EMB Comment #20a above, detailed results and a tabular presentation of the trench log observations were previously published (Shaw 2004) and is included as a reference in Appendix A of the HRASTM.

20c. Comment: **<u>CDPH Comment 5, on page 12 of 20 in responses</u>: Figure 2 does not appear to identify those SWDA's that have been identified as radiologically impacted in the legend, nor does it show the 50-foot step-out from the existing SWDA footprint perimeters.**

Response: The 50-foot step-out boundary from the existing SWDA boundaries will be included on the figures.

21. Comment: **<u>CDPH Comment 11, on page 14 of 20 in responses</u>: This indicates that the Building 233 sewer line contamination is not expected to extend beyond the gravity portion of the sewer systems. Please explain the basis for this statement.**

Response: The HRASTM will be revised to show the entire downstream portion of the sanitary sewer line from Building 233 as radiologically impacted; therefore, the statement subject to this comment will be removed.

SPECIFIC COMMENTS RELATED TO NAVY'S RESPONSES TO CDPH SPECIFIC COMMENTS

22. Comment: **<u>CDPH Comment 15, on page 16 of 20 responses</u>: Please refine the time period and potential locations of temporary storage areas for the 200 drums of radiological waste originating from Building 233. The DON states that all drums were eventually loaded on the USS Independence for disposal.**

Response: There is no record of the temporary storage area(s) for the waste drums associated with the Building 233 spill cleanup. It is presumed that for practical reasons these drums were stored near Building 233 prior to being shipped to the USS *Independence* at Hunters Point Shipyard. The Navy

notes that, according to the HRA, the shipment of the drums to the USS *Independence* was for storage and not for disposal.

23. Comment: **<u>CDPH Comment 16, on page 16 of 20 in responses</u>: Will additional information about waste disposal from USS Pandemonium Site 2 be included in the HRA-STM? If this site is now considered potentially impacted, what actions are needed for the waste previously shipped to Altamont and Buttonwillow?**

Response: The additional information provided in the Navy's response to original CDPH EMB Comment #16 will be summarized in the final HRASTM. While the USS *Pandemonium* Site II has now been designated as radiologically impacted, the Navy notes this is a conservative designation and no evidence of actual contamination at the site exists. No action is planned regarding previous waste shipments unless results of the future investigation indicate that actual contamination existed on the site.

23b. Comment: **Note that based on the original HRA, the description of uses of Cs-137 need to be further developed so it is clear that only Cs-137 sealed sources were used, if that is indeed the case.**

Response: It is presumed that this comment refers to the USS *Pandemonium* Site II (NE). It is not the case that only Cs-137 sealed sources were used at USS *Pandemonium* Site II, as detailed in both the HRA and the HRASTM. Bagged radioluminescent gauges were used as check sources as discussed in Section 2.2.6 of the draft HRASTM. The knowledge that these types of items were used during training exercises contributed to the Navy's decision to consider the site radiologically impacted.

RESPONSES TO SF PUC COMMENTS (GEORGE BIBBINS)

GENERAL COMMENTS

1. Comment: **Document is for TI only; what is YBI status?**

Response: The CDPH EMB has concurred that areas of YBI subject to future transfer are not contaminated. (CDPH EMB 2011). Therefore, this HRASTM does not evaluate YBI. The last sentence in Section 2.1 has been replaced with the following sentence to clarify the status of YBI: "CDPH has concurred that areas on YBI subject to future property transfers are not contaminated and are therefore have not been evaluated in the HRASTM."

SPECIFIC COMMENTS

1. Comment: **<u>Figure 2</u>: Newly Identified Radiologically Impacted Areas (Map)**

- **Building 233 not colored green although sounds "previously impacted" (Section 2.2.2 and 4.3.4); maybe because already demolished, however some activities are ongoing.**

- **Site 12 SWDAs not shown as "impacted", although radiation remediation and monitoring is ongoing (Section 2.2.7 and 4.3.6).**
- **Radiological item found in AOI 7, but outside of SWDA (Sections 2.2.7, 5.2.1.3 and 4, 6.1.1.3, Figures 11 and 12). Future scans planned; precaution/warning needed for SFPUC subsurface work. Not noted on map or document; "impacted" designation appears applicable.**

Response: Areas previously identified as radiologically impacted (i.e. Building 233 and the SWDAs) were added to the figures in this HRASTM as further discussed in response to DTSC Specific Comment #9.1.

Site 12 will be subject to area specific scoping surveys as well as further general investigation to determine potential for radiological contamination outside of discrete areas. Due to the current status of Site 12 as a site still under evaluation as well as the presence of other impacted sites on TI, radiological controls are required for any intrusive work in these areas. Figure 2 will note that all areas not formally designated as impacted are considered non-impacted.

2. Comment: **<u>Sections 6.1.2.4 and 6.1.2.5</u>: What is basis for listing contamination potential as unlikely; is potential there because areas may have buried salvage materials (6.1.2.4) or site 12 SWDA soil (6.1.2.5).**

Response: The assessments provided in these sections are qualitative judgments prepared in conformance with Sections 7.3 and 7.4 of the HRA. For clarity, Section 6.1 of the HRASTM has been expanded to include a new sentence that reads: "The findings and recommendations presented in this section have been developed in conformance with Sections 7.3 and 7.4 of the HRA, which provides background and guidance on assessing media, migration pathways and recommendations (Weston 2006)."

The former Salvage Yard has been designated with a contamination potential of "unlikely" in Section 6.1.2.4 because of absence of direct evidence that radiological items or other debris was buried, and because extensive excavation would have occurred in association with construction of the sewage treatment plant.

The Waste and Clean Soil Stockpile/Loading and Decontamination Site has been designated with a contamination potential of "unlikely" in Section 6.1.2.5 because (1) the source of contamination would have been IDW from recent removal activities, (2) no direct evidence indicates that radiological items or other debris was buried in the subsurface, and (3) all work has been conducted with procedures in place and with awareness that radiological materials were being handled.

RESPONSES TO TIDA (AMEC) COMMENTS (SCOTT WARNER)

GENERAL COMMENTS

1. Comment: We believe that the introduction to the document (starting in Section 1.0) should be strengthened to better indicate the rationale for commencing with the research that lead to the HRASTM. We also request that the introduction be strengthened to better indicate how the conclusions reached by the HRASTM integrate with those reached by the 2006 HRA. Please clarify what parts of the 2006 HRA are now obsolete, and which parts are specifically supplemented by the HRASTM. Please provide an overall "roadmap" showing the integration of the information, if appropriate.

Response: The text of Section 1.1 has been replaced with the following text to address this comment:

> *"The HRASTM format and content are designed to augment the original HRA with new information obtained through additional research and the review and consideration of new data that became available through site investigations since the HRA was finalized. The new information was also used to update CSMs for radiologically impacted areas and to update the list of areas designated as impacted. The updated CSMs, historical research, and a review of activities that occurred at TI since the original HRA was published are presented in this HRASTM. Figure 2 presents all of the areas which are considered radiologically impacted and non-impacted on TI based on the results of the 2006 HRA and this HRASTM. Details regarding specific CERCLA investigations or remedial efforts after issuance of this HRASTM will be documented in project specific reports or additional technical memoranda."*

2. Comment: We also request that the definition of "impacted" and "non-impacted" sites be provided in the opening paragraph of the document. Please consider both the technical and non-technical reader in providing this definition.

Response: The following new paragraph has been added to the end of the Executive Summary and as a new second paragraph in Section 1.1.

> *"A radiologically impacted site is one that has, or at one time had, the potential for radioactive contamination, based on historical information, in excess of natural background or fallout levels. The designation as radiologically impacted does not confirm that radioactive contamination is present; only that the possibility exists and must be investigated. A non-impacted site is one not classified as impacted and with no possibility of containing residual radioactivity in excess of natural background or fallout levels.*

3. Comment: **It appears that key drivers to the reasoning for preparing the HRASTM do not appear until late in the document. For example, Section 5.2 refers to preparing Conceptual Site Models (CSM) as a major advantage of this HRASTM. We believe this to be important and this objective should be presented early in the introduction to the document. Another important item that should be presented much earlier is the information in Section 2.3 on the summary of the 2006 HRA (which currently appears on Page 26 of the HRASTM).**

Response: See new text inserted in accordance with response to TIDA (AMEC) General Comment #1

4. Comment: **While a full listing of references is provided in the accompanying Compact Disc (CD) of information, could a table be provided that better indicates what documents in the Reference CD was used to support the various bullets of information provided on Pages 1 and 2 of Section 1.2.**

Response: Citations to the references that support the findings have been added to Section 1.2. Please note that not all findings are supported by such references. Some findings are based on maps or figures included in the text or the results of ongoing activities as described in the text.

5. Comment: **Please define, or consider, replacing the word "significant" within the document, unless this term is being used for specific quantification of a value (such as "statistically significant"). For example, what does "significant" ship repair refer to (in Section 1.2, Page 2) compared to what "insignificant" ship repair activities might refer to.**

Response: In general, the term "significant" has either been replaced with the word "major" or the term has been deleted. The word "significant" has been retained at a few locations where appropriate.

6. Comment: **The final section of the HRASTM (6.2) indicates that all areas subject to the prior HRA and this HRASTM are suitable for transfer with respect to impacts on human health and the environment. However, the HRASTM indicates substantial differences from the HRA, and questions remain regarding the potential for discrete sources or localized contamination, unknown piping, former facilities that could have been impacted where deconstruction material may have found its way to other parts of TI. We suggest that this section provide an area by area summary table to better evaluate the potential issues, including uncertainties that will affect the transferability of areas on the island.**

Response: As stated in the existing text, all areas of NAVSTA TI subject to the prior HRA and this HRASTM are suitable for transfer with respect to potential impacts on human health and the environment from exposure to radiological contamination, provided they have not been designated as radiologically impacted in either of these documents. The designations—developed based on a very conservative evaluation of TI—include areas where the hypothetical discrete source would most likely be present. Although the significant contamination is typically sought during any environmental investigation, the HRASTM conservatively has considered even where de minimus concentrations of radionuclides would most likely be present. This includes select lengths of sewer systems.

The text of Section 6.2 has been revised to add a new second paragraph as follows in response to this comment: "No further action is necessary to address the potential for radiological contamination at areas within TI that are subject to this HRASTM, and are not designated radiologically impacted as shown in Figure 2. In areas that are not impacted, no evidence has been found to warrant further investigation of those areas." Similar language has also been added to the front of the document, at the end of the Executive Summary.

RESPONSES TO TIDA (NGTS) COMMENTS (BOB BURNS)

GENERAL COMMENTS

1. Comment: Please clarify how the STM is to be reconciled/integrated with the original HRA or how the two documents are going to be applied to provide consistent guidance for performing radiological investigations on TI. Be as explicit as possible regarding parts of the HRA that may be obsolete, and those parts/conclusions where the STM is more of a compliment or supplement to the HRA.

Response: Although the HRASTM is intended to supplement the 2006 HRA, the HRASTM was developed so that it is a stand-alone document that can be referenced for an accurate radiological status of sites at the time of publication. Although the primary purpose of the HRASTM was to evaluate areas not impacted in the 2006 document, the HRASTM does provide extra detail regarding sites discussed in the prior HRA. Section 6.0 of the HRASTM does discuss the conclusions of the original HRA that have been modified as a result of new information and research during development of the HRASTM. Section 6.0 also presents conclusions regarding new sites identified as impacted in this HRASTM.

2. Comment: The definition of radiologically impacted and the other information provided in Section 2.3 should be moved to or otherwise restated in the introductory sections of the STM. The conclusion that no imminent threat or substantial risk to human or environmental health

was identified should receive particular emphasis. We request that the definitions of "impacted" and "non-impacted" be introduced at the very start of the document and repeated in practical locations thereafter.

Response: See response to TIDA (AMEC) General Comments #1 and #2.

3. Comment: As discussed under Section 3.2 and elsewhere, there is a potential for anomalous or otherwise unknown discrete sources or associated, localized contamination to be discovered at TI in areas outside the currently known SWDAs. This should be addressed in the Executive Summary, the Conceptual Site Model (Section 5), and the Findings and Recommendations (Section 6).

Response: The following language has been added to the end of the second paragraph of Section 1.1 in response to this comment:

> "*Additional radiological investigation will be conducted within Site 12, in addition to specific impacted areas (i.e. SWDAs) within Site 12."*

See the response to TIDA (AMEC) General Comment #6 for changes made to Section 6.2.

SPECIFIC COMMENTS

1. Comment: <u>Section 1.1</u>: Please acknowledge and summarize some of the concerns with the original HRA expressed by CDPH in April 2011. Presently no information is provided as to what prompted the STM to be developed.

Response: As requested, additional text has been added to summarize CDPH concerns that led to the development of the HRASTM. The second and third sentences have been rewritten as follows in response to this comment: "The format and content are designed to be responsive to concerns expressed by the CDPH and to augment the original HRA with new information obtained through additional research and the review and consideration of new data that became available through site investigations since the HRA was finalized. The new information was used to update CSMs for radiologically impacted areas as was requested by the CDPH and to update the list of areas designated as impacted."

2. Comment: <u>Section 1.3</u>: Is there a word missing in the first sentence of this section?

Response: The first sentence has been revised to insert the word "presented" in the following sentence: "A detailed review of the facility background was done using the information acquired through the file research and is *presented* in Section 2.0."

3. Comment: **<u>Page 10</u>: Photos 6 and 7 appear to have inconsistent orientation. Please correct or clarify if so.**

Response: Photo 7 has been rotated 90 degrees counterclockwise to provide consistent orientation as requested.

4. Comment: **<u>Section 2.2.2, first paragraph at the top of page 11</u>: Elaborate on the findings from the radiological investigations at the Building 233 site with respect to the discovery of undocumented piping and the fact the (known) sewer line and the surrounding soil were found to be contaminated. Undocumented utility lines or inaccurate location information should be considered in work planning.**

Response: At time of publication, remediation is essentially complete within the Class 1 survey area at Building 233. This field work will be documented in a PCSR (Shaw in production). Additional field work will be performed in 2013 to conduct the FSS to support free release of the Building 233 Class 1 area. The Navy concurs that undocumented utility lines or inaccurate location information should be considered in work planning. Characterization of all sewer lines within the Building 233 footprint is part of the ongoing fieldwork for that site, which is essentially complete. Evaluation of sewer lines outside of the Class 1 survey area for the Building 233 footprint will be addressed in subsequent investigations.

5. Comment: **<u>Section 2.2.6, bottom of page 16</u>: What was the fate of the soil removed from Site 32 to remediate chemical contamination? Are additional actions warranted for that material now that that area has been deemed radiologically impacted?**

Response: Please see the response to CDPH EMB Specific Comment #16.

6. Comment: **<u>Section 2.2.6 re: the further investigations related to the elevated gross gamma measurements discussed on page 18</u>: How will the findings from these additional investigations be incorporated in the HRA/STM once they are completed?**

Response: The sites identified as radiologically impacted in the 2006 HRA, as well as in this HRASTM, are considered to be the entire set of radiologically impacted sites on NAVSTA TI. Findings from future investigation/site characterization will be documented in follow-on documents such as completion reports, and survey reports or additional technical memoranda

7. Comment: **<u>Section 2.2.7</u>: While the results from the gamma walkover surveys performed outside the SWDAs in Site 12 are a good indication there is no widespread radiological contamination, caution should be applied in how those results are interpreted with respect to discrete**

commodities given that one has already been found. It may be an overreach to say the potential for radioactive material outside the SWDAs is minimized.

Response: Comment noted. In order to supplement the CSMs and characterization performed to-date that have identified the discrete impacted areas within Site 12, further radiological surveys will be performed within Site 12 in addition to surveys of specifically identified impacted areas.

8. Comment: <u>Section 2.2.7, page 22, second bullet</u>: What was the fate of the soil excavated from the Halyburton and Bigelow Court areas in Site 12?

Response: All soil excavated as part of the removal action was disposed of off-site at appropriate landfills per the State reviewed (Cal/EPA) work plan.

9. Comment: <u>Section 2.2.7, page 24, first bullet</u>: Elaborate on the source of the elevated dose rate readings that prompted expansion of the RCA.

Response: The CDPH reported Ra-226 as the source of the elevated radiation readings (CDPH RHB 2011). Further information regarding the source of the elevated readings that prompted expansion of the radiologically controlled area (RCA) has yet to be determined. The sources of elevated readings will be addressed as part of the Phase II NTCRA work at the SWDA A&B. The Navy presumes that the sources of the elevated readings will be additional commodities or contamination similar to that already found within SWDA A&B or related to asphaltic debris. Such commodities have included deck markers, buttons, metal debris, and foils.

10. Comment: <u>Section 4.0</u>: What is meant by work done "outside" the impacted and non-impacted areas? Shouldn't all areas be one or the other?

Response: All areas are designated as either impacted or non- impacted. Figure 2 shows the classification of property on Treasure Island. A "radiologically impacted site" has, or had at one time, the potential for radioactive contamination above natural background or fallout levels based on historical information. Conversely, a site designated as "non-impacted" has hosted radiological operations but currently poses no reasonable possibility for the presence of radioactive contamination.

11. Comment: <u>Section 4.1</u>: Augment the title to make it clear only the newly-identified radiologically impacted sites are addressed.

Response: Subsequent to the publication of the draft HRASTM pursuant to the response to DTSC Specific Comment #9.2, this section has been rewritten. The section now addresses all radiologically impacted sites and the initial text reads as follows: "This section addresses work done at sites designated as radiologically impacted. This includes sites designated as

radiologically impacted at the time of the HRA, and sites that have been designated as radiologically impacted as part of the HRASTM evaluation efforts."

12. Comment: **<u>Section 4.2 et seq.</u>: The STM cites the fact that no "intrusive IRP work" has been done at a number of sites since the original HRA as a basis for deeming those areas as non-impacted rather than a re-evaluation of those areas vis-à-vis the new information and additional degree of conservatism applied in the STM. This results in an inconsistency with respect to the former pier areas, for instance, where the finding that significant ship repair activities took place on TI would call into question the non-impacted designation given these areas in the HRA. It is recognized those pier areas are long gone, but the associated shoreline areas could still be considered radiologically impacted. There could also be questions about the fate of the materials from the pier demolition actions. The STM should be clear that the non-impacted designations given in Section 4.2 et seq. are based on the original HRA and do not represent a reevaluation of those areas.**

Response: The non-impacted areas were reevaluated as part of the HRASTM and no new evidence has been found to suggest that the shoreline areas should be considered radiologically impacted. Please note that, contrary to the citation in the comment, this section neither implies nor states that "the fact that no 'intrusive IRP work' has been done at a number of sites since the original HRA as a basis for deeming those areas as non-impacted…"

13. Comment: **<u>Section 4.3.2</u>: Recommend including a statement about any public health risk (or lack thereof) associated with the Site 12 recreational area.**

Response: The CDPH has separately requested that the Navy designate the Site 12 recreation area as radiologically impacted (CDPH 2012a). As a result of the recommendation and further evaluation of historical data and references, a portion of the recreation area will be classified as impacted. The subject text in Section 4.3.2 was deleted and moved to Section 4.1, which discusses impacted sites. Section 4.1.10 now reads as follows: "In July 2011, the CDPH RHB performed surveys (CDPH RHB 2011b) of the 9th Street recreational area on NAVSTA TI (see Figure 10). Based on the elevated readings that were noted during the survey, the CDPH RHB recommended the recreational area be designated as radiologically impacted. On March 22, 2012, the CDPH modified their recommendations for this area to provide the conclusion that they did not believe that that there is an external radiation exposure hazard from the recreational area elevated readings and to include characterization to identify the isotopes present and additional actions if found necessary (CDPH 2012a). The CDPH recommended the recreational area not be used as a basis for site

wide background radiation levels due to elevated radiation readings (CDPH 2012a). Subsequent investigation by the Navy included additional soil sampling and the results are suggestive of background naturally occurring isotopes. Based on recent analysis of existing characterization data, additional samples and analysis is required to definitively state whether the detected isotopes are naturally occurring. This sampling is anticipated in conjunction with future survey work plans that will be required because a portion of the area has been designated as impacted in conformance with the CDPH RHB recommendation."

Changes have also been made to the Executive Summary and Sections 2.2.8 and 6.1.2.10 to designate the recreation field as a radiologically impacted site.

14. Comment: **Section 4.3.4: Same comment as for Section 2.2.2 with respect to the additional utility lines discovered at the Building 233 site.**

Response: Please see response to TIDA (NGTS) Specific Comment #4.

15. Comment: **Section 5.0: None of the CSMs appear to address anomalous discrete commodities such as those identified in Site 31 and elsewhere. Given this was one of the drivers for creating the STM in the first place the CSMs ought to address the potential for such sources/types of contaminants.**

Response: Please see response to TIDA (NGTS) General Comment #3.

16. Comment: **Section 5.0: The CSMs focus on specific buildings and areas rather than types of activities. As with any historical site assessment, the STM/HRA should serve as a general guidance document for all radiological investigations at TI.**

Response: The CSMs included in this HRASTM were developed to more fully recognize and conform to the known releases on TI. For instance, the CSM for Repair/Solid Waste Disposal Operations addresses the possibility of disposal of radioactive commodities and contamination resulting from repair/recycling activities in general, but also takes into account some site-specific information such as known disturbances by grading activities during construction of housing within the SWDAs in Site 12. Previous known activities causing contamination such as training or documented disposal have been re-affirmed by the HRASTM. Several new sites however, e.g. lot 69, have been added to the list of impacted sites due to the addition of repair/recycling efforts as potentially impacting sites. Additionally, the HRASTM takes into account all radiological investigations at TI, i.e. those at Site 12, 31, 33 and Building 233.

17. Comment: **<u>Section 5.2.1 and Figure 11</u>: It does not seem appropriate to limit disposal (inadvertent or otherwise) of commodities to known salvage yards. Also, suggest revising the transport pathway to read "near-surface disposal."**

Response: Figure 11 was revised to read "Near Surface Disposal" as suggested.

18. Comment: **<u>Section 5.2.1 and Figure 11</u>: Except for the mention of "sanitary sewers" in Section 5.2.1.2, the CSM does not appear to address known or unknown plumbing or drainage systems in or downstream of the area of concern, or potential contamination migration from such systems (either directly or from leakage).**

Response: The CSM in Figure 11 was revised to include disposal in and leakage from sanitary sewer systems as suggested. Figures 11, 12, 13, and 15 have also been modified to show the contaminant migration pathway from surface soil into storm drains.

19. Comment: **<u>Section 5.2.1</u>: With respect to Building 3 and other facilities where similar work was performed, was there reasonable potential for ship repair activities to have involved any surface-contaminated materials or internally-contaminated components such as those that could have originated from vessels involving in nuclear weapons testing operations in the Pacific Proving Grounds? Presently the CSM does not address potential airborne or liquid contamination pathways from routine repair/refurbishment operations (cutting, grinding, shot blasting, cleaning, rinsing, etc.). We recognize that significant time has elapsed (relative to fission and activation product half-lives) since weapons testing activities in the Pacific ceased, but longer-lived fission products could still remain, in addition to potential actinides. We view this as unlikely, but it is a question that could be raised.**

Response: There is no evidence of repair work at NAVSTA TI on contaminated ships subjected to nuclear weapons testing. The HRA provides a detailed discussion of ships subjected to nuclear weapons testing during OPERATION CROSSROADS and their history at NAVSTA TI. As discussed in the HRA, four ships were brought to NAVSTA TI for berthing following decontamination at other locations. The ships were berthed at NAVSTA TI while awaiting final radiological clearance for redeployment to the fleet. The HRA notes that all four ships subsequently received final clearances, and the HRA concludes that "there is no likelihood of contamination due to berthing of OPERATION CROSSROADS ships." Research for this HRASTM found no additional information that would alter the conclusion of the 2006 HRA.

20. Comment: **<u>Sections 5.2.1.4, 5.2.2.4, and 5.2.3.4</u>: Consider augmenting the categories of potentially-exposed individuals (workers, residents, etc.) with types of activities that could result in them becoming exposed.**

Response: The following text will be added to the end of Sections 5.2.1.4, 5.2.2.4, and 5.2.3.4: " Human receptors may be exposed to radiological contamination in three basic ways: ingestion of, dermal contact with, and inhalation of media (soil, water, air) that is impacted by radioactive contamination."

21. Comment: **<u>Section 5.2.3</u>: The CSM does not address stormwater runoff, wind dispersal, etc. as contamination transport mechanisms for the contaminated soil removed from Site 12. Has this material always been containerized? Also, there is no mention of wash water or other potential contamination transport mechanisms associated with rinsing or cleaning of vehicles used to transport contaminated soil.**

Response: Soil removed from Site 12 has historically been placed into containers for ultimate transport to various disposal facilities. Methods for containerizing soil including direct loading at the site, transport via end loader, and direct loading to sealed container have been employed at Site 12. Due to the concerns about transporting contaminated soil within Site 12, CDPH performed their survey of the roadways. Furthermore, the Navy will conduct additional evaluation of the roadways and open areas to address the potential for surface contamination. Although all material has not always been containerized, all environmental soil remediation efforts have been conducted following work plan procedures to control contaminated soil. This would include decontamination of equipment and vehicles, as well as proper control and disposition of decontamination media. Additionally, sewers will be evaluated as necessary within Site 12. See response to TIDA (NGTS) Specific Comment #18 for additional background.

22. Comment: **<u>Section 6.1.1.1</u>: Same comment as for Sections 2.2.2 and 4.3.4 with respect to the additional utility lines discovered at the Building 233 site.**

Response: Please see response to TIDA (NGTS) Specific Comment #4.

23. Comment: **<u>Section 6.1.1.1</u>, second sentence at the top of page 43 reading "… at least some of the building piping is radiologically impacted." Suggest changing "impacted" to contaminated.**

Response: Section 6.1.1.1 was revised as recommended in the comment.

24. Comment: **<u>Section 6.1.2.1</u>: If such areas still exist, consider expanding the scope of the scoping survey for Building 3 to include areas where dusts or liquids could have accumulated during ship repair activities (e.g., behind wall panels, in/on overhead structures or fixtures, in air handling components, blower motor interiors, intake/exhaust points, floor drains, etc.). Ensure that the characterization methods used would be sensitive to legacy fission products or actinides in addition to Ra-226 or Th-232.**

Response: The "Structures" category under "Contaminated Media" is designated as "Low" to account for the need to consider the building structure itself as potentially contaminated. Designs of future surveys required because of designation of Building 3 as impacted will be considered at the time those survey work plans are prepared. The surveys will also consider CDPH's scans conducted in September 2012 (CDPH RHB 2012b, 2012c), which did not identify any radiation above background levels. Regarding legacy fission products or actinides, these have not been added to the "Potential Radionuclides of Concern." See response to TIDA (NGTS) Specific Comment #19 for additional background.

25. Comment: **<u>Section 6.1.2.1</u>: If there's a high potential for contaminated plumbing/piping associated with the optical shop or other activities, it seems inconsistent to then say there's no potential for contaminated subsurface soil or sediment.**

Response: The "Contaminated Media" sub-section of Section 6.1.2.1 has been revised to re-designate the contamination potential for subsurface soil from "None" to "Low" and the contamination potential for sediment from "None" to "High (sediment within the sanitary sewer piping)."

RESPONSES TO TICD (TERRAPHASE) COMMENTS (BILL CARSON AND WENDY BELLAH)

GENERAL COMMENT

1. Comment: **The document is meant to be a living document, however two known radiological issues are not discussed in the document and it seems pertinent to discuss them in this draft rather than releasing another draft almost immediately upon finalization of this version. The specific issues are:**

- **Radiological detections found beneath the sewer lines for Building 233.**
- **Potential impacts to utilities for Building 3.**

Response: Details regarding the additional characterization of utilities outside of the Building 233 footprint will be discussed in the final HRASTM. The potential for impacts on utilities at Building 3 is considered to be

associated with the sanitary sewer system. The existing text captures that potential by identifying the contamination and indicating a high probability that drainage systems could provide migration pathways. The results of the Navy's future characterization of Building 3 and associated sanitary sewer will be summarized in a corresponding report, i.e., FSS.

SPECIFIC COMMENT

1. **Comment:** **Section 1.2, Bulleted list at top of Page 2: Should the SWDA NTCRA and Building 233 activities be added to this list? If not, why were these activities/results not reviewed?**

   Response: The SWDA NTCRA and Building 233 activities were reviewed along with all other field activities at TI. The referenced list was intended to serve as a general indication of records that were reviewed, not as a detailed list of such. The last bullet has been rewritten to be more descriptive as follows: "Field activity logs, work plans and other materials associated with intrusive environmental remediation work."

2. **Comment:** **Section 1.2, First bullet at the bottom of Page 2: Please change the sentence in the middle of the text to read: "While it is unclear precisely when these ship repair activities ceased, they were significantly reduced immediately following WWII."**

   Response: The word "war" has been changed to read "WWII" as suggested.

3. **Comment:** **Section 2.2.1, Fourth paragraph: How do we know there are not other utility lines for Building 3?**

   Response: The referenced paragraph discusses the former optical repair shop, which is the specific area of interest regarding presence of drain lines. Only one sanitary sewer line is shown on plans for areas leading to the former optical repair shop, and this same line appears on utility drawings. Physical evidence within Building 3 confirms presence of the drain lines that would have served the optical shop. Based on numerous historical plans, there is one main gravity sanitary sewer line that has historically serviced Building 3 and it will be investigated as part of the Building 3 radiological scoping survey.

4. **Comment:** **Section 2.2.2, Last paragraph: This section discusses B233. Should the utility lines for B233 also be discussed in this section?**

   Response: The utility line is discussed in this section to the extent that this section notes the impacted status of Building 233 area and sewer lines.

5. **Comment:** **<u>Section 2.2.6, Last paragraph</u>: This section discusses AOI 6. However, the end of this paragraph discusses the further investigation activities that are required in Site 12 which is in AOI 7. It may help a reader if this discussion is moved to the next section where activities in AOI 7 are discussed.**

   Response: The relevant text has been moved to Section 2.2.7 as suggested.

6. **Comment:** **<u>Section 2.2.7, Page 22, Second bullet</u>: Please clarify if the excavations conducted in the former storage yard were backfilled to grade or if they were left at an elevation below grade.**

   Response: According to the post-construction report (IT 2002a), the excavations were not backfilled to grade. The bullet in Section 2.2.7 will be revised to add the following sentence as the third to last sentence: "The excavation was not backfilled completely to the final grade because additional removal is necessary in the area near Building 1100."

7. **Comment:** **<u>Section 2.2.7, Photo 23</u>: Additional explanation for the shading shown on the photograph is needed. What areas are considered radiologically impacted and what are not?**

   Response: The text and photo have been updated to identify the Bigelow Court SWDA areas in Photo 23 as radiologically impacted.

8. **Comment:** **<u>Section 6.2</u>: This section states that the FOST areas are suitable for transfer, except for those areas identified in the HRA and the HRASTM as radiologically impacted. However, this HRASTM does not discuss the impacts to the B233 utilities and the potential impacts to the Building 3 utilities. Please clarify how these areas are/will be delineated and the appropriateness of the transfer of these areas under the FOST.**

   Response: Figure 2 has been revised to show the previously impacted Building 233 and the impacted sewer and storm lines. The current Figure 2 shows the impacted sanitary sewer line associated with Building 3. The sanitary sewer lines for both sites are shown as impacted along with downstream portions of the sewer lines.

RESPONSES TO ARC ECOLOGY (DADE MOELLER) COMMENTS (STEPHEN BUMP)

GENERAL RECOMMENDATION

1. **Comment:** **One of the drivers for the updated HRA was the intrusive investigation that has happened since the original HRA was written in 2006. As additional intrusive investigation is undertaken, radiological**

screening should be conducted on removed material to ensure that additional undiscovered impacted areas are not present.

Response: The Navy will conduct radiological screening during intrusive investigation of all radiologically impacted sites until completion of a FSS at those sites. All work will proceed in accordance with plans accepted by the state, and will be documented in site-specific reports. In general, areas not designated as radiologically impacted do not warrant further investigation or screening; however, the Navy has agreed to conduct additional radiological surveys of Site 12.

GENERAL COMMENT

1. Comment: There is very little information presented regarding selection of reference areas for the final status surveys. These areas need to be selected carefully due to the history of Treasure Island. For example, when Building 343 was surveyed, Building 342 was used the reference area. Building 342 is now listed as impacted which could call into question the results of the final status survey of Building 343. Reference areas for outdoor areas need to be of similar soil types and must be on Treasure Island. It should be noted if any imported fill material has been placed in the reference area (an example being when the Lake of the Nations was backfilled following the exposition). Such areas should not be used as they will not be representative of the soil present on the remainder of Treasure Island. Care must be taken that the reference area is sufficiently distant from other outdoor impacted areas as to minimize the potential for cross contamination. Reference Areas for buildings should be buildings of similar construction and buildings constructed during the same time frame as the building of interest.

Response: The process of selecting reference areas for any radiological investigation will be included as part of the related work plans. Summary of site selection and characterization is included in subsequent summary reports. The comment regarding use of Building 342 as a reference area is noted. Should future surveys detect contamination in Building 342, the survey results for Building 343 will be evaluated relative to the new data. However, this is an unlikely scenario because no anomalous or unexpected readings were noted during the reference area measurements in Building 342.

SPECIFIC COMMENTS

1. Comment: <u>Section 6.1.1.2, Building 343</u>: Building 342 was used as the reference area for the Final Status Survey (FSS) of Building 343. As part of that FSS it was assumed the Building 342 had no radiological history. The

HRASTM has now reclassified Building 342 as impacted. The FSS for Building 343 should be re-evaluated in light of this reclassification.

Response: See response to ARC Ecology General Comment #1.

3. Comment: **<u>Gamma Walkover Surveys</u>: The purpose of Gamma Walkover Surveys needs to be clearly defined. Once the purpose is defined, the sensitivity and limitations also need to be defined. For example, as they are currently being performed, they are adequate to detect hot spot anomalies that are near the surface as noted in several references in the HRASTM. They are not adequate to detect soil contamination that may be near, but above natural background levels. In addition, if the instrumentation used is calibrated to Cesium-137, as is common, the instrument's response to Radium-226 is approximately a factor of two lower which needs to be accounted for in the calculations (see Table 6-7 of MARSSIM, a higher MDC means a lower response). Calibrating the field instrumentation to Ra-226 would eliminate some of this uncertainty. It would not eliminate the inability of a walkover survey to detect soil contamination. In areas where soil contamination is suspected, a sampling protocol should be established that can clearly define whether there is in fact contamination present above natural background levels. As noted earlier, selection of a reference area with which to compare these samples is a key aspect of this sampling protocol.**

Response: The purpose of the gamma walkover survey is to further investigate the surface areas within Site 12 including roadways, in response to a 2011 CDPH scan of Site 12 roadways. The level of detail discussed in the comment, including reference areas, will be addressed in the preparation of the survey work plan. Although there were elevated readings within the Site 12 roadways, it is expected that this is due to naturally occurring isotopes within the roadway aggregate. Roadway shoulders as well as open spaces between houses not previously scanned by the Navy will also be scanned as a conservative effort to ensure lack of human health risk from unknown shallow subsurface radiological contamination.

3. Comment: **<u>Impacted Area Surveys</u>: At least two of the impacted areas, USS Pandemonium Site NW and the former Salvage Yard, have had significant construction added on top of the impacted area. Additional supporting documentation is needed to justify only scoping surveys and Gamma Walkover Surveys of these areas given their operational history. This is also supported by the addition of Building 570 and its laydown area where contaminated soil samples from the Solid Waste Disposal Areas on Site 12 were stored and analyzed. The proximity of these SWDAs to the USS Pandemonium Site NE should be evaluated for impact.**

Response: The respective first sentences of the "Recommended Actions" in Sections 6.1.2.3 and 6.1.2.6 ha ve been revised to read as follows: "Complete a scoping survey of the subsurface soil and former holding tanks, structures, and ground surface in the USS *Pandemonium* Site I (NW) area and a gamma walkover survey of the roadways and areas not previously subject to gamma walkover surveys." To address the comment regarding proximity to the SWDAs, the "Former Uses" subsection in Section 6.1.2.6 has been revised to add the following new last sentence: "In addition, this site is located adjacent to and contiguous with SWDA A&B discussed in Section 6.1.1.3."

SUMMARY

1. Comment: The HRASTM follows the MARSSIM HRA process and appears to be a thorough and conservative update to the original HRA. The conclusions reached and the recommended actions for each of the impacted areas are reasonable, except as noted, based on the radiological history and the operations conducted in the facilities. The isotopes of interest are reasonable based on the operations of the Treasure Island Shipyard. The HRASTM is a good first step in the MARSSIM process and identifies those areas needing additional radiological investigation. It does not draw any conclusions about their impact on the environment or the public, only that there is a potential impact that needs to be investigated.

Response: Comment noted.

RESPONSE TO EPA COMMENT (DAVID STENSBY)

GENERAL COMMENT

1. Comment: EPA has reviewed the Subject Document. EPA agrees with the State that the document should include and discuss all the additional information California DTSC and DPH have requested. EPA fully concurs with the California DTSC and DPH comments. We do not have any additional comments or questions on the "Draft Historical Radiological Assessment Supplemental Technical Memorandum".

Response: Comment noted. Please see responses to DTSC and CDPH EMB comments.

RESPONSES TO WATER BOARD COMMENTS (MYRIAM ZECH)

SPECIFIC COMMENTS

1. Comment: Please add a glossary to the beginning of the document. Words like "impacted" or "contaminated" are defined in the 2006 HRA, but not

in the HRASTM. Interested parties reviewing the HRASTM may not necessarily consult the 2006 HRA.

Response: A glossary has been added as requested.

2. Comment: The Executive Summary could benefit from a small section explaining the difference between alpha and beta particles, and why we're interested in Radium-226, Thorium-232 and Cesium-137.

Response: The fourth paragraph of the Executive Summary has be rewritten as follows to comply with the suggested changes: "As a result of the research performed and discussed elsewhere in this HRASTM, activities involving the use of the radioisotopes Ra-226, Cs-137, and thorium (Th)-232 resulted in the designation of new radiologically impacted areas. Ra-226 is associated with use in radioluminescent paints, Cs-137 with use in sealed sources, and Th-232 in optical coatings and glass. Discussion regarding nuclear health physics, including alpha and beta particles, will be reserved for discussion in other forums and not in the HRASTM because of the complex and expansive nature of the topic.

3. Comment: Please add a final paragraph to the Executive Summary, describing what work remains to be done to ensure that all sites are radiologically safe.

Response: A new paragraph has been added to the end of the Executive Summary as follows: "Sites that have been designated as radiologically impacted in the prior HRA or in this HRASTM will be addressed following the recommended action protocols outlined in Section 7.4 of the 2006 HRA (Weston 2006)."

4. Comment: Please include a table indicating:

a) radiation levels found in the soil, in pCi/g;
b) release criteria;
c) background concentrations.

Response: This type of information is site-specific and will be documented in corresponding work plans, after-action summary reports, and the final status .

5. Comment: Please include a table or a chart indicating dates by which investigations or reports are to be completed, including:

a) the scoping surveys that remain to be done;
b) the report explaining the elevated readings at the 9th Street recreational area;
c) the work currently being done on Building 233.

Response: Closeouts of radiologically impacted sites (including those sites identified in the draft HRASTM), as well as anticipated deliverables and time frames, have been integrated into the NAVSTA TI Site Management Plan. Living schedules for further characterization and remediation will be developed with the BCT. A separate technical memorandum will be developed to focus on the 9th street recreational area. The text has updated to summarize the current status of the Building 233 and associated sewer investigations.

6. Comment: Please indicate how elevated count rates (in cpm) relate to pCi/g (p. 26, second paragraph).

Response: The elevated count rates in units of counts per minute (cpm) are the results of radiological gamma scanning with a sodium iodide detector, whereas the Ra-226 concentrations expressed in pCi/g are the results of radiological analyses of soil samples. The relationship between the count rate acquired during gamma scanning and the Ra-226 concentration derived from the analytical results is qualitative. Areas of elevated count rate are used to bias soil sample locations.

7. Comment: The 2006 HRA says that "The Cs-137 sealed sources were leak tested and were demonstrated to be intact." However, on p. 26, the HRASTM designates the USS *Pandemonium* Site I (NW) area as a "radiologically impacted area based on a more conservative interpretation of existing information [about Cs-137] in the HRA." Can you please explain what the more conservative interpretation is, and explain which sites are affected?

Response: The ninth sentence of the fifth paragraph of Section 2.2.8 has been replaced with the following to be consistent with Section 4 of the HRASTM and to clarify the basis for the changed designation: "This HRASTM designates the USS *Pandemonium* Site I (NW) area as a radiologically impacted area based on a more conservative estimate that the documented use of unlicensed instrument check sources could have resulted in a spread of contamination."

8. Comment: Since materials stored at the former storage yard before the construction of housing are not known (p.22), please include Halyburton Court and Bigelow Court on the "impacted" list on p. 44.

Response: Bigelow Court has been designated as impacted (See response to DTSC Specific Comments #9 for Bigelow Court discussion). Halyburton Court has not been impacted as there is no evidence that the area was used as a solid waste disposal area.

9. Comment: On p. 61, please explain more clearly that the purpose of a FOST is to document that the property is environmentally suitable for transfer. Please add a note to say that Buildings 343 and 344 were released for closure because, although impacted, 2007 surveys have shown that they are not contaminated.

Response: Section 6.2 of the HRASTM was revised to read as follows:

"The purpose of a Finding of Suitability to Transfer is to identify property that is environmentally suitable for transfer and to identify any specific notices, restrictions or covenants that are required. All areas of NAVSTA TI subject to the prior HRA and this HRASTM are suitable for transfer with respect to potential impacts on human health and the environment from exposure to radiological contamination, provided: (1) they have not been designated as radiologically impacted in either of these documents, and (2) they are clear of other CERCLA issues preventing transfer. Only Buildings 343 and 344 have reached regulatory closure for radiological concerns as they have been released for unrestricted use (DTSC 2009). Therefore, these "radiologically impacted" buildings are suitable for transfer. No radiological related notices, restriction or covenants are required for the FOST areas.

No further action is necessary to address the potential for radiological contamination at areas within TI that were subject to the HRA or this HRASTM, and are (1) not designated as radiologically impacted, or (2) designated as non-impacted. The conservative evaluation of TI as a whole serves to identify areas not only where significant contamination could be, but even where there are anomalous discrete sources of localized contamination from unlicensed activities. In areas that are not impacted, the probability of contamination posing an unacceptable human health risk is minimal and no evidence has been found to warrant further investigation of the areas."

10. Comment: Typo on p. 37, second paragraph: "impacted areas based <u>on</u> the detection of Ra-226."

Response: The text was revised as suggested.

RESPONSE TO REGULATORY AGENCY COMMENTS ON THE INTERNAL FINAL HISTORICAL RADIOLOGICAL ASSESSMENT-SUPPLEMENTAL TECHNICAL MEMORANDUM AND RESPONSES TO AGENCY COMMENTS ON THE DRAFT HISTORICAL RADIOLOGICAL ASSESSMENT-SUPPLEMENTAL TECHNICAL MEMORANDUM, NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

This document presents the responses to comments from staff from the Department of Toxic Substances Control (DTSC) on the redline version of the "Internal Final Historical Radiological Assessment – Supplemental Technical Memorandum [HRASTM], Naval Station Treasure Island, San Francisco, California," and the Responses to Agency Comments on t he Draft HRASTM, dated February 14, 2013. The comments addressed below were received from DTSC on March 4, 2013.

RESPONSES TO DTSC COMMENTS

GENERAL COMMENTS

1. Comment: New impacted areas/Utility lines and area south of Building 233. The area surrounded by the utility lines south of Building 233 and the utility lines beyond the impacted boundaries of Buildings 3, 233 and 342 as highlighted on Figure 2 is not listed in the bullet list in the Executive Summary. These lines are labeled as Bldg 3 Sanitary Sewer Line, Bldg 233 Storm Line, and Bldg 342 Sanitary Sewer Line on Figure 2. This area and utility lines should be collectively classified as one new impacted area separate from the buildings.

Response: Please see response to Specific Comment #1.

2. Comment: Boundaries of new impacted areas. Please verify the boundaries of the new impacted areas for the larger rubbish area and the yard behind Building 342. The boundaries shown in Figure 2 and the AOI specific figures are inconsistent with the photos.

Response: The boundaries have been revised for consistency.

3. Comment: No Further Action (NFA) on non-impacted areas. The NFA statements in the Executive Summary and FOST section are confusing. It sounds like that NFA is recommended for the whole of TI which is the subject of the HRASTM. Please revise these statements.

Response: These sections have been revised as a result of the comment.

SPECIFIC COMMENTS

1. **Comment:** **<u>Executive Summary, Page ES-2, 8th Bullet</u>. Please add the sewer and storm lines in the bullet list of new impacted areas. Figure 2 shows utility lines from Buildings 3, 233 and 342 to the storm outfall and the WWTP. These lines outside of the buildings and the area surrounding the lines south of Building 233 should be collectively classified as an impacted area separate from the buildings.**

   Response: Potential migration pathways are evaluated in Section 6.1 for radiologically impacted areas. This includes the storm and sanitary utility lines servicing Buildings 3, 233 a nd 342 and the portions shown on t he Figures 2 through 9.

2. **Comment:** **<u>Executive Summary, Page ES-3, 1st Paragraph</u>. Should this definition of an impacted site be moved before the list of newly identified impacted areas?**

   Response: The text defining an impacted site has been moved as suggested.

3. **Comment:** **<u>Executive Summary, Page ES-3, Last Paragraph</u>. The statement is confusing. The whole of TI is the subject of the HRASTM. Please revise this statement.**

   Response: The statement has been revised to read as follows: "*No further action is necessary to address the potential for radiological contamination at TI that are not designated radiologically impacted. No evidence has been found to warrant further radiological investigation of areas that are not impacted.*"

4. **Comment:** **<u>Section 1.1, Purpose, Page 1, 2nd Paragraph</u>. Please delete. This is a duplicate of a paragraph in the Executive Summary.**

   Response: The Executive Summary is intended to be stand alone and may contain duplicate text of the document if specific wording and descriptions are desired.

5. **Comment:** **<u>Section 2.2.2, AO1 2: Former Hospital Area, Page 12, Top Paragraph,</u>. Please add the sentence "Therefore, IR Site 33 was classified as not impacted in this HRASTM."**

   Response: The text was revised as suggested.

6. **Comment:** **<u>Section 2.2.2, AO1 2: Former Hospital Area, Page 13, Top Paragraph</u>. Item #12 of the Action Items from the 11/29/2103 conference call requires including the cleanup document for Building 233 in Appendix A. Has this been included in Appendix A?**

Response: The following reference has been added to Appendix A as requested.

Shaw. 2014. "*Final Radiological Remedial Action Report and Final Status Survey Plan, Building 233 Site, Former Naval Station Treasure Island, San Francisco, California*." January. TI-HRASTM-49.

7. Comment: Section 2.2.2, AO1 2: Former Hospital Area, Page 13, Top Paragraph. Insert "be": "A report will "be" issued…

Response: The text was revised as suggested.

8. Comment: Section 2.2.4, AO1 4: Southwestern Community Area, Page 16, 2nd Paragraph. Please insert "and CDPH": (DTSC "and CDPH" 2009)

Response: The referenced letter for DTSC 2009 included the CDPH letter as an attachment, thus no change was made to the citation. Rather, the sixth sentence of the last paragraph of Section 2.2.4 was revised to the following: " The California Environmental Protection Agency's DTSC concurred with the unrestricted release of Buildings 343 and 344 on January 16, 2009, and the CDPH concurred with unrestricted use on November 12, 2008 (DTSC 2009)."

9. Comment: Section 2.2.5, AO1 5: Northeastern Community Area, Page 18, 1st Paragraph. Missing word. Insert "of": "…mobilization "of" two gamma..."

Response: This comment is no longer relevant due to other text revisions.

10. Comment: Section 2.2.6, AO1 6: Sewage Treatment Area, Page 18. Please discuss the four identified impacted areas in AOI 6 in bullet form for clarity.

Response: The section has been modified as requested.

11. Comment: Section 2.2.6, AO1 6: Sewage Treatment Area, Page 18, First Paragraph. Please name the two Pandemonium sites consistently in the text and figures. Figure 2 shows "NE" and no "II".

Response: Figure 2 and text has been modified accordingly.

12. Comment: Section 2.2.6, AO1 6: Sewage Treatment Area, Page 19, 3rd Paragraph. *"Radiological sampling was not part of this action, although radiological portals were not set off at target landfills."* Please clarify this statement.

Response: The subject sentence and section has been rewritten to read as follows: "*Radiological sampling was not part of this action, although some screening occurred when excavated soil was delivered to landfills. Landfills typically screen incoming truckloads of soil for radioactivity with sensitive portal monitors and will refuse loads if the delivery causes the portal monitor to sound an alarm. There are no reports that radiological portal monitors had sounded an alarm when the landfills accepted the waste from the removal action at Site 32.*"

13. Comment: **<u>Section 2.2.6, AO1 6: Sewage Treatment Area, Page 21, 1st Paragraph</u>. *"Additionally, bins filled in Site 12 had to be emptied at Site 6 and resurveyed. Elevated readings outside of the bins had prevented their transport over public roads."* Please clarify these statements. How were the bins transported from Site 12 to Site 6. What roads were used?**

Response: The sentence was revised for clarity to read as follows: "*Additionally, bins containing radioactively contaminated soil that were filled in Site 12 were emptied at Site 6 and resurveyed (Shaw 2013a, 2013b).*" Truck routes are shown in the work plans for the solid waste disposal areas (SWDAs); but no changes to the text has been made because all of Site 12 has been radiologically impacted thus making the specific roads used for transport of the bins little importance.

14. Comment: **<u>Section 2.2.7, AO1 7: Northern Housing Area of Interest, Page 24, 1st Paragraph</u>. Please delete this statement *"Although further investigation will be done throughout Site 12"* or clarify based on the 2/25/2103 conference call.**

Response: The statement has been clarified to read as follows: "*Although further investigation will be done throughout Site 12, various lines of evidence exist to suggest the movement of low-level radiological objects (LLROs) outside of SWDAs by grading was limited within Area of Interest 7 as follows…*"

15. Comment: **<u>Section 2.2.7, AO1 7: Northern Housing Area of Interest, Page 28, 1st Paragraph</u>. Please explain the how the boundary of the larger rubbish area was determined. This boundary is not consistent with the approximate limits of the rubbish disposal area in Photo 24 below.**

Response: The following has been added to the caption of the photo: "*(Note: The lower rubbish disposal area is only partially shown)*" T he rubbish disposal areas are based on the report by McCreary, Koretsky Engineers 1965.

16. Comment: **<u>Section 2.2.7, AO1 7: Northern Housing Area of Interest, Page 28, Last Paragraph</u>. Please revise this new paragraph based on the team's 2/25/2013 conference call.**

Response: The last paragraph has been deleted due to the decision to radiologically impact all of Site 12.

17. Comment: **<u>Section 2.2.8, AO1 8: Southern Housing Area, Page 29, 1st Paragraph, 4th Sentence</u>. Please clarify that although a larger portion of Bigelow Court is within AOI 8, Bigelow Court was classified as impacted under AOI 7.**

Response: The first paragraph of Section 2.2.8 was revised to include the following text as the fourth sentence: "*In addition, this HRASTM provides additional detail regarding AOI 8 including an approximately 175,000-square-foot former storage yard overlapping Bigelow Court (portions of Bigelow Court are also located in AOI 7).*"

Section 2.2.7 was also revised to read, in part: "*Based on a 1945 aerial photograph, Site 12 also contains portions of an approximately 175,000-square-foot former storage yard overlapping Halyburton Court and Bigelow Court (TriEco-Tt 2012) (portions of Bigelow Court are also found in AOI 8).*"

18. Comment: **<u>Section 2.2.8, AO1 8: Southern Housing Area, Page 29, 1st Paragraph, 4th Sentence</u>. Please label the Pandemonium Site I (NW) on Figure 9, and make the name consistent on Figure 2.**

Response: Figures 2 and 9 have been revised as requested.

19. Comment: **<u>Section 2.2.8, AO1 8: Southern Housing Area, Page 29, 1st Paragraph, 4th Sentence</u>. Please discuss this "new information" suggesting that a 50-foot buffer is appropriate to extend the SWDA impacted areas.**

Response: The language regarding the "new information" and the 50 foot buffer has been removed and the entire footprint of Site 12 has now been designated as radiologically impacted.

20. Comment: **<u>Section 2.2.8, AO1 8: Southern Housing Area, Page 31, 2nd Paragraph, 2nd Sentence</u>. Please identify the specific SWDAs where commodities were found since Bigelow Court was also identified as a SWDA in the Site 12 RI report.**

Response: The second sentence of the 7th paragraph was revised to read as follows: "*After the 2006 HRA, LLROs were found in each of the SWDAs, with the exception of the Bigelow Court debris disposal area, confirming the report of radiological disposal at TI.*"

21. Comment: **<u>Section 4.1.1.3, SWDAs 1231/1233 and 1207/1209 (Bayside/North Point), and Section 4.1.1.4, SWDA A&B), Page 35</u>. Please clarify that all commodities have been removed from the SWDAs to the storage area at TI, and not all commodities have been removed from TI based on the Dec 2012 RAB meeting presentation. The remaining commodities that are still stored at TI should be discussed.**

Response: The following new 5th sentence has been added to Section 4.1.1.3: "*LLROs are retained on TI until sufficient quantities have been collected and shipment logistics have been arranged.*"

22. Comment: **<u>Section 4.1.2, Radiologically Impacted Sites Identified in this HRASTM, Page 36</u>. Please include the utility lines from Buildings 3, 233 and 342 to the storm outfall and the WWTP in the list of impacted sites as shown on Figure 2.**

Response: Please see response to Specific Comment 1.

23. Comment: **<u>Section 4.1.2.8, Building 342, Photo 30: Site 31 Excavation Areas, Page 41</u>. This yard area limit is not consistent with the area in Figures 2 and 6. Please reconcile the impacted yard area.**

Response: Figures 2 and 6 of have been revised to match the yard area as shown in the photo.

24. Comment: **<u>Section 4.3, Other Significant Radiologically-Related Work, Page 46</u>. Please discuss the following work in this section: (1) Navy radiological surveys and soil sampling as part of the background concentration determination; and (2) CDPH RHB surveys in 2012 requested by the City.**

Response: Additional text has been added to Section 4.3 to address requested surveys.

25. Comment: **<u>Section 4.3.1, Site 12 Trenching, Page 47</u>. This is inconsistent with the introductory sentence under Section 4.3 that states this section presents other significant radiological surveys done AFTER the final HRA.**

Response: The first two sentences of Section 4.3.2 have been revised to clarify the timing of the trenching work: "*The Navy did trenching and sampling throughout Site 12. These trenching investigations began concurrently with the HRA, but the analysis was not completed until after the final HRA was published.*"

26. Comment: **<u>Section 6.1.1.1, Building 233, 2nd Paragraph, Last Sentence, Page 55</u>. Please clearly identify the sewer systems downstream of Building 233. Figure 2 shows lines from Buildings 3, 233 and 342 to the outfall and the WWTP downstream and upstream of Building 233. These lines outside of the buildings should be classified as an impacted area separate from the buildings.**

Response: Please see response to Specific Comment #1.

27. Comment: **<u>Section 6.1.1.3, Site 12, Site Description, Last Sentence, Page 56</u>. Please clarify that the commodities were found only at the four SWDAs A, B, 1207/1209, and 1231/1233, and not throughout Site 12.**

Response: Based on findings subsequent to this comment, the suggested clarification was not made.

28. Comment: **<u>Section 6.1.1.3, Site 12, Recommended Actions, Last Sentence, Page 57</u>. Please revise this statement per the team's 2/25/2013 conference call.**

Response: Based on decisions subsequent to this comment, the entire Site 12 area has been designated as radiologically impacted. T he "Recommended Actions" subsection in Section 6.1.1.3 has been revised accordingly.

29. Comment: **<u>Section 6.1.2, Radiologically Impacted Sites Identified in this HRASTM, Page 57</u>. These utility lines outside of the buildings and the area surrounding the lines south of Building 233 should be collectively classified as an impacted area separate from the buildings.**

Response: Please see response to Specific Comment #1

30. Comment: **<u>Section 6.1.2,7, Former Storage Area and Sites 30 and 31, Site 31, Last Sentence, Page 69</u>. Please revised this statement since completion report and FSS report for Site 31 has not been submitted to the regulatory agencies for review.**

Response: The following text has been added to the end of the Site 31 discussion: "*At the time of this HRASTM, the Navy has finished the soil remediation at Site 31 and the site has been restored and radiologically downposted. The remedial action completion report is being prepared.*"

31. Comment: **<u>Section 6.1.2,7, Former Storage Area and Sites 30 and 31, Previous Radiological Investigations, Page 70</u>. Please clarify that the contamination was found within Site 31 and only small volume of soil is impacted.**

Response: The second sentence has been revised to read as follows: "*During the Phase I removal action, a small volume of soil with elevated radioactivity suggesting the presence of non-naturally occurring Ra-226 was discovered in the sidewall of the Site 31 excavation.*"

32. Comment: <u>Section 6.2, Findings of Suitability to Transfer (FOST) Areas, Last Paragraph, Page 82</u>. Please rewrite for clarity.

Response: The last paragraph of Section 6.2 has been rewritten to read as follows: "*No further action is necessary to address the potential for radiological contamination at areas in TI that are (1) not designated as radiologically impacted, or (2) designated as non-impacted in both the HRA and this HRASTM. The probability that contamination would pose an unacceptable human health risk is minimal and no evidence has been found to warrant further investigation of those areas in areas that are not designated as radiologically impacted or are designated as non-impacted.*"

33. Comment: <u>Figure 2</u>. Please label the utility lines outside of the buildings and the area surrounded by the lines collectively as one impacted area.

Response: See response to Specific Comment #1

34. Comment: <u>Figure 2</u>. Please show Site 24 boundary.

Response: Figure 2 has been updated to show the Site 24 boundary as requested.

35. Comment: <u>Figure 4</u>. The area surrounded the utility lines is shaded as impacted in Figure 2.

Response: Figures 2 and 4 have been updated to show the same impacts for utility lines.

36. Comment: <u>Figure 8</u>. Please make label consistent with the text as "Pandemonium Site II (NE)."

Response: The label has been changed as requested.

37. Comment: <u>Figure 8</u>. Please show and label Building 327. This building is shown and labeled in the first draft HRASTM.

Response: Building 327 has been shown and labeled as requested.

38. Comment: <u>Figure 9</u>. Please identify buildings that are not occupied in a different color and noted in the legend.

Response: Unoccupied buildings in Figure 9 and 10 have been noted in a different color as requested.

39. Comment: **<u>Figure 10</u>. Please label the SWDA, Pandemonium Site I (NW) and the playground that were classified as impacted.**

Response: The polygons that define these areas have been added to the figure and labeled accordingly as requested.

APPENDIX D
HISTORICAL RADIOLOGICAL ASSESSMENT SUPPLEMENTAL TECHNICAL MEMORANDUM REFERENCES

(Provided on DVD)