California Department of Public Health-Environmental Management Branch (CDPH-EMB) Review

Activity: Review Draft Final Addendum to Parcels B and G Radiological Removal Action Completion Report, Former Hunters Point Shipyard, San Francisco, California. October, 2015.

November 5, 2015

Draft Final *Addendum to Parcels B and G Radiological Removal Action Completion Report (RACR)* Hunters Point Shipyard, was issued on October 7, 2015. In this document in a response to the September 22, 2015 EMB memo that requested Department of Navy (DON) to provide a "reasonable" proposal that can establish a technical defensible evaluation of the 10 buildings in the addendum document, the DON has stated "past surveys meet the standard" and hence no new work was proposed.

EMB's main concern has been that the radiological scan speeds as proposed in the original work plans may have been exceeded when radiological surveys were actually conducted in the field at 12 buildings suggesting that higher levels of radiological activity could have been missed in the survey. The above mentioned addendum document is a RACR for 12 buildings; however two buildings have already been rescanned using the scan speeds in the original approved work plans. See attached memo and comments on the rescan data that were submitted on October 12, 2015.

CDPH has conducted two site visits in the past month – 09/23/15 and 10/21/15. The purpose of the visits was to assess the 10 buildings in person and evaluate the need to rescan. This was an effort by CDPH to evaluate any additional work that the DON needed to perform by weighing all lines of evidence including historical information, usage, building structure, previous surveys, and CDPH confirmation surveys. The site assessments were part of a larger solution. CDPH focused on all the buildings with the potential to affect the public health.

The purpose of this memo is to identify and evaluate 10 buildings from the Draft Final *Addendum to Parcels B and G Radiological Removal Action Completion Report* that have not been rescanned and make recommendations for rework. CDPH performed a comprehensive evaluation of all historical information and data for these recommendations. The possible recommendations and the criteria for the decision are listed below.

EMB action recommendations:

1. Re-scan for alpha and beta emitters.
2. No re-scan.

Decision criteria:

A. Historical radiological usage at structure.

B. Historical conventional usage of structure, if applicable.

C. Structure design and construction.

D. Historical Surveys

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON.

F. Radiological classification and reason(s) for DON classification of structure for FSS.

G. EMB Confirmation Surveys

A. Parcel B

1. Building 103:

EMB action recommendation: No Re-scan

The primary use was non radiological. This building was mainly used as Barracks from WWII. Only the first floor had radiological uses. The First floor was used as Personnel Decontamination Center for Operations Crossroads. Historical surveys showed radiological contamination in showers, bathroom areas and radium was found in the crawl space underneath the building.. Shower components, shower tiles, flooring, ventilation, drains and as well as the soil under the crawl space located on the first floor were removed and disposed as low level radioactive waste at an appropriate off-site facility. The Navy rescanned the soil and collected soil samples. The soil samples showed no residual contamination. No remediation occurred on 2nd floor. EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs of the building.

A. Historical radiological usage at structure: Personnel Decontamination Center for Operations Crossroads which included dormitories and bathroom facilities used for personnel decontamination activities. The radionuclide of concern is Cs-137, Sr-90, Pu-239 and Radium-226.

B. Historical conventional usage of structure: WW II Barracks

C. Structure design and construction: Two-story building; wood construction; shallow gabled roof, long narrow rectangular structure; wood floor (approximately both floors 1206 m^2)

D. Historical Surveys: Class 3 surveys conducted in 2002 were found insufficient by Navy. 2004 survey of crawl space found radium activity.

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: Crawl Space only: 5 of 7 SUs required remediation, SUs A, B, C, D, and F were remediated for elevated Ra-226. SUs E and G were not impacted and not remediated. Shower components, shower tiles, flooring, ventilation and drains located on the first floor were removed

F. Radiological classification and reason(s) for DON classification of structure for FSS: Class 1 Survey Unit (SUs): 27 SUs with 7 of 27 SUs located in the crawl space; Class 2: 12 SUs

   1st Floor: 11 Class SUs Floor areas, 7 SUs Class 2 ceilings (Class 1 SUs were designated due the areas where personnel could have tracked contamination from NRDL to showers, etc.).

   2nd Floor: 9 SUs floor area Class 1 SUs, 5 SUs Class 2 Ceilings

   Crawl Space: 7 Class 1SUs

G. EMB Confirmation Surveys: EMB conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs of the building.

2. Building 113:

EMB action recommendation: No Re-scan

The building 113 was primarily used as a submarine repair shop, a non-radiological usage. The Navy determined the building had only radiological sealed sources that are unlikely to contaminate the building. Historical surveys conducted in 2002 found no contamination. The Navy took conservative measures by removing and disposing properly all drainage and ventilation systems from the building. EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

A. Historical radiological usage at structure: Storage of radioactive sealed sources for Cs-137, Sr-90 and Pu-239, and storage of samples for atomic weapons tests

B. Historical conventional usage of structure, if applicable: Former submarine component repair area

C. Structure design and construction: Three-story wood framed shop, shallow gabled roof, concrete foundation; floor area: approximately 1620m^2 total surface for Class 1 and 1757 m2 total surface for Class 2

D. Historical Surveys: Class 3 surveys in 2002. No contamination was found.

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: No previous radiological remediation/removal actions noted

F. Radiological classification and reason(s) for DON classification of structure: Class 1: 25 SUs floors/walls < 2 meters, Class 2: 8 SUs upper walls/ceilings > 2 meters

Entire structure was classified as Class 1 by DON due to insufficient information related to sealed sources storage.

G. EMB Confirmation Surveys: EMB conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs of the building.

3. Building 113A:

EMB action recommendation: No Re-scan

Building 113A primary use was non-radiological, this building was used for machine, material and maintenance shop. However it was also used for non-destructive radiography using sealed sources. RASO surveyed the building in 1978 and found no contamination. The DON removed all radiological sealed sources found in the building and surveyed the sources before disposing of properly. The Navy also removed and disposed drainage and ventilation systems of the building properly. EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

A. Historical radiological usage at structure: Non-destructive testing radiography; radioactive waste storage building. The ROC's Cs-137, Co-60, Ra-226, Sr-90

B. Historical conventional usage of structure, if applicable: Concrete storage vault for torpedo storage, machine and maintenance shop, material storage shop,

C: Structure Design and Construction: one story 25 by 25 foot concrete storage

D. Historical Surveys: 1978 RASO conducted scoping surveys for Alpha, Beta, Gamma and no contamination found

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: No previous radiological remediation/removal actions noted

F. Radiological classification and reason(s) for DON classification of structure: Class 1: 12 SUs floors/lower walls < 2 meters, Class 2: 4 SUs upper walls/ceilings > 2 meters

G. EMB Confirmation Surveys: EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs of the building.

4. Building 130:

EMB action recommendation: Rescan for alpha and beta emitters

This building was used as Storage area for Low Level Radioactive Waste (LLRW) and investigation derived wastes (IDW) contaminated with radium-226 (Ra-226). The Navy has removed all ventilation systems, drainage systems, walls and some flooring. However, based on the historical usage and historical surveys in 2002 were found to be inconclusive, EMB recommends rescanning randomly selected 10% of all Class 1 SUs of the building. EMB has conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

A. Historical radiological usage at structure: Storage area for Low Level Radioactive Waste (LLRW) and investigation derived wastes (IDW) contaminated with radium-226 (Ra-226).

B. Historical conventional usage of structure, if applicable: Wood frame shop, general ship repair, machine and metal workshops.

C. Structure design and construction: Single-story, wood framed shop building, open sheds, flat, shallow gabled roof, concrete slab (Class 1 (2882 $m^{2)}$ and Class 2 (2461.02 m2)

D. Historical Surveys: 2002 Class 3 surveys. Navy considered the surveys insufficient.

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: Navy has removed all ventilation systems, drainage systems, walls and some flooring.

F. Radiological classification and reason(s) for DON classification of structure: Class 1: 35 SUs floor/walls < 2 meters; Class 2: 5 SUs floors/walls>2 meters.

Entire floor and lower walls of structure was classified Class 1 by DON due to insufficient information related to location of LLRW/IDW Storage

G. EMB Confirmation Surveys: EMB conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs of the building.

5. Building 140:

EMB action recommendation: No Re-scan

EMB recommends no scanning for Building 140 Pump House and Discharge Channel.

Building 140 Pump house: All radiological sources (gauges and dials) were removed and disposed properly. EMB visited the building and saw all the equipment were removed and disposed.

Discharge Channel: The Navy ensured no radiological contamination was left from the discharge channel. The Navy removed all sediment from the discharge channel, analyzed the soil for radionuclides and disposed soil appropriately. In order for the Navy to access the sediments, the Navy removed the concrete lid that the discharge channel was housed under. The Navy surveyed all the concrete and disposed appropriately. The Navy removed all the water in the discharge channel, plugged all channel connected to the channel and installed a cofferdam to prevent water from entering the channel. The Navy surveyed the channel and collected swipes on the channel. EMB also conducted 10-20% (no less than 10%) confirmation static on all class 1 SUs at the discharge channel.

A. Historical radiological usage at structure: Radiological decontamination for ships and equipment associated with Operation Crossroads. Pumping equipment potentially contaminated due to the pumping of high volumes of seawater from Dry Dock #3 and discharged through a dedicated discharge channel into the bay.

B. Historical conventional usage of structure, if applicable: Pump house and discharge channel for draining seawater from Dry Dock #3; Single brick structure adjacent to Dry Dock #3.

C. Structure design and construction:

Building 140 Pump house: Multi-story structure with single story above ground construction of brick exterior, with brick and tile interior containing pump machinery controls. Below ground structure is of concrete construction with access stairway, pump and impeller housings, seawater channels from Dry Dock #3 leading to ground level discharge channel. NOTE: Access stairway is currently inundated with seawater up to ground level.

Discharge Channel: Constructed of Coarse aggregate concrete channel and channel walls.

D. Historical Surveys: No previous investigation

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON:

Building 140 Pump house: Removal of 69 ^{226}Ra dials and gauges from electrical equipment

Building 140 Discharge Channel: The Navy identified and removed of contaminants of concerns with subsequent flushing of associated piping with over billions gallons of water from 1953 to 1974.

Navy removed all sediment samples from discharge channels, surveyed inside the discharge channels by using a camera, removed all water and sediments from the discharge channel. All media was characterized as radiological contamination and disposed as LLRW.

F. Radiological classification and reason(s) for DON classification of structure: Class 1: 3 SUs located in the discharge channel. Class 1 due to Dry Dock #3 used for dry-docking, decontamination activities (i.e., sandblasting) and undocking (i.e., "refloating") of Operation Crossroads target ship hulls and superstructures. Undocking cycles required flooding Dry Dock #3 and pumping of high volumes of potentially radiologically contaminated seawater from flooded Dry Dock 3 via Building 140 pump machinery and into a dedicated discharge channel after refloating of ships. In addition, Dry Dock #3 was used for numerous docking/undocking cycle decades after the conclusion of Operation Crossroads activities at the former HPNSY.

G. EMB Confirmation Surveys: EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs on discharge channel only

6. Building 146:

EMB action recommendation: None. NOTE: Navy has rescanned building at correct scan speed. See attached memo and comments sent to the Navy on October 12, 2015

A. Historical radiological usage at structure: Low Level Radioactive waste storage area, radioluminescent device collection point, gamma-ray/X-ray industrial radiography

B. Historical conventional usage of structure, if applicable: Photo lab

C. Structure design and construction: Building is a two-story structure constructed of cast concrete with open high bay in the front and smaller wood framed rooms in the rear of the building, wood framed rooms, gabled roof, total floor surface area: 3966 m^2.

D. Historical Surveys: 2002, Class 3 surveys no contamination found

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: No Previous radiological Remediation/removal actions noted

F. Radiological classification and reason(s) for DON classification of structure:

Class 1: 19 SUs; Class 2, 14 SUs Entire structure was classified as Class 1 by DON after remediation was completed for the entire floor of the Northwest corner and less than 2 meters from the floor. Class 2 assigned above 2 m.

G. EMB Confirmation Surveys: EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

B. Parcel G:

1. Building 351:

EMB action recommendation: No Rescan:

In 1955 the DON performed thorough radiological survey on building 351 and found no contamination. During the historical surveys conducted in 2008, the Navy resurveyed the building and found one item: beta contaminated drinking fountain. The Navy properly disposed the item. The Navy removed tiles from the floors and

disposed as LLRW. All wooden floors under the tiles were surveyed and swipe samples were collected, the results showed no activity above the release criteria. All ventilation system was disassembled and disposed as LLRW. The drainage systems were removed from all floors of the building including sinks. The Navy removed all drainages after saw cutting the concrete around the pipe. The Navy swipe surveyed the concrete surrounding the drains to ensure no contamination occurred from leak pipe. All floor openings from the removal of drains on each floor were swiped and no contamination was found. EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

A. Historical radiological usage at structure: Previously used as Naval Radiological Defense Laboratory (NRDL) and ROC's ^{90}Sr, ^{137}Cs, ^{226}Ra, ^{232}Th

B. Historical conventional usage of structure, if applicable: Machine shop, electronics work area, biological research laboratory, sampling laboratory, general research laboratory

C. Structure design and construction: Three-story main structure with flat roof, five story tower in northwest corner, floor space: approximately 3447 m^2.

D. Historical Surveys: Surveys conducted in 1955 found no contamination. 2002 Navy performed a Class 3 survey and found no contamination, except for 1 item: drinking fountain with high beta readings.

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: The Navy surveyed and scanned a total of 8 equipment items found in the building. All but one equipment item (drinking fountain) showed beta contamination greater than release criteria. The Navy removed the beta contaminated drinking fountain and disposed the item properly.

F. Radiological classification and reason(s) for DON classification of structure:

Class 1: 41 SUs; Class 2: 5 SUs. Entire structure was classified as Class 1 by DON due to insufficient information related to NRDL activities. Class 1 entire floor for all three stories and below 2 meters from walls, Class 2 above 2 meters and ceilings

G. EMB Confirmation Surveys: EMB also conducted 10-20% static surveys (no less than 10%) confirmation static surveys on all class 1 SUs.

2. Building 351A (B-351A):

EMB action recommendation: Rescan for alpha and beta emitters

The SUs listed below as (a) must be rescanned because both alpha and beta scan speeds are in question. The radiological contamination found in this building was localized in one area in a lead enclosure found in SU 43. Rescanning the rest of the building is not recommended.

The SUs listed below:

a. **B-351A; SU - 43: loose alpha and beta contamination**

A. Historical radiological usage at structure: Naval Radiological Defense Laboratory (NRDL) used as a chemistry lab, instrument calibration, repair facility.

B. Historical conventional usage of structure, if applicable: Concrete construction, Chemistry laboratory machine shop, instruments calibration, and repair facility

C. Structure design and construction: One-story concrete structure constructed with below ground crawl space. Structure is located south of Building 351. Total floor approximately 3447.6 m^2.

D. Historical Surveys: 2001 Surveys discovered Beta contamination in SU 37, and loose alpha and beta contamination in SU 43 (Lead Enclosure). In 2003 Class 3 Surveys were conducted, DON investigated piping and crawl space and disposed of piping, contaminated soil, performed remediation determined the surveys were insufficient for unrestricted release. Further Surveys were recommended by the Navy.

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: Workroom #47: Found Beta contamination in a sink and associated drain. DON removed and disposed beta contaminated drain piping and sink. Also a small leaded enclosure contained loose alpha/beta contamination. The lead enclosure was decontaminated, removed and disposed properly.

F. Radiological classification and reason(s) for DON classification of structure. Class 1: 40 SUs main floor; Class 1: 19 SUs Crawl space and Class 2: 1 SU surrounding the crawl space

G. EMB Confirmation Surveys: EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

3. Building 366

EMB action recommendation: No Rescan

In this building the Navy determined Cs-137 contamination was found localized and contained inside the ventilation system. The ventilation system was scanned and disposed properly. The Navy also found detectable levels of Ra-226 distributed throughout the floor drain system. The floor drains were removed, scanned and disposed properly. The Navy removed all contamination from the building. Historical surveys also showed results with found no contamination. EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

A. Historical radiological usage at structure: Naval Radiological Defense Laboratory (NRDL), instrument calibration, chemical research laboratory, shipyard gamma-ray/X-ray radiography shop

B. Historical conventional usage of structure, if applicable: Chemical research laboratory, general laboratories, boat and plastic shop

C. Structure design and construction: Single-story structure, raised ceiling composed of exterior sheet metal with interior walls constructed of traditional wood and sheetrock materials, floors constructed of concrete pad, isolated asphalt patching. Floor space area 3276 m2

D. Historical Surveys: 1995 Surveys Class 3, found no contamination

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: Ventilation system: Detectable Cs-137; scoping surveys were performed prior to dismantlement; 34 ventilation pieces were surveyed for gamma, alpha, beta, all what 34 pieces disposed as LLRA, prior to disposal a vacuum cleaner equipped to clean up IDW debris was used.

F. Radiological classification and reason(s) for DON classification of structure: Class 1: 59 SUs; entire floor and walls less than 2 meters, walls above 2 meters Class 2: 8 SUs, Class 3 1 SU roof

G. EMB Confirmation Surveys: EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

4. Building 401

EMB action recommendation: No Re-scan

All radiological sources found in the building were sealed and removed. All the sources retrieved by the DON were sealed and swipe samples were collected to ensure no contaminants leaked. All the sources were properly disposed. EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

A. Historical radiological usage at structure: Post closure of HPNSY: Civilian tenant leased the building stored several gauges and dials containing ^{226}Ra, check sources sealed, electron tubes, radioluminescent devices.

What historical radiological usage was done or conducted by the Navy at Building 401 prior to the closure: Tenant used

B. Historical conventional usage of structure, if applicable: Maintenance shop, office, trade shops, general stores.

C. Structure design and construction: 2 stories Building made wood frame, wood floors

D. Historical Surveys: No previous surveys

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: No remediation

F. Radiological classification and reason(s) for DON classification of structure: Class 1: 33 SUs; Class 2: 2 SUs. Note: Navy designated Class 1 SUs for all areas leased to tenant where stored radiological material was found.

G. EMB Confirmation Surveys: EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

5. Building 411

EMB action recommendation: No Re-scan

All radiological sources found in the building were sealed and were stored in a lead enclosure area that housed the x-ray machine and industrial radiography shop. All sealed sources were removed and properly disposed. Historical surveys found no contamination. EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

A. Historical radiological usage at structure: X-ray machine and use of 4 sealed radioactive sources of Co-60 Cs-137 in the industrial radiography shop

B. Historical conventional usage of structure, if applicable: Cafeteria, Boilermaker ship, general ship repair

C. Structure design and construction: Three-story structure, made of large curtain wall, steel framed building, with flat roof, lead enclosed (25 m by 25 m) industrial radiography source exposure and X-ray machine facility.

D. Historical Surveys: 2002 Class 3 surveys were performed, no contamination found

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: No remediation

F. Radiological classification and reason(s) for DON classification of structure: Class 1: 5 SUs where industrial radiography was performed; Class 2: 2 SUs; Class 3: 4 SUs (2 SUs first floor, 1 SU second floor and 1 SU third floor.)

G. EMB Confirmation Surveys: EMB also conducted 10-20% (no less than 10%) confirmation static surveys on all class 1 SUs.

6. Building 439

EMB action recommendation: None. NOTE: Navy has rescanned building at correct scan speed. See attached memo and comments sent to the Navy on October 12, 2015

A. Historical radiological usage at structure: Post closure of HPNSY: Process and analyzed metals by civilian tenant Ra-226 slag material

B. Historical conventional usage of structure, if applicable: Equipment storage facility

C. Structure design and construction: One-story concrete construction (open bay entrance outside

D. Historical Surveys: Performed a scoping survey and found Cs-137 contamination through out

E. Remediation efforts directed at the elimination of radioactive contamination detected by DON: The Navy remediated the Class 1 SUs where slag material contaminated with Ra-226 was found.

F. Radiological classification and reason(s) for DON classification of structure.

Class 1: 2 SUs located at the northwest corner of Building 439 where metal assay occurred; Class 2: Buffer zone surrounding the two Class 1 SUs.

G. EMB Confirmation Surveys: EMB also conducted 10-20% (no less than 10% confirmation static surveys on all class 1 SUs.