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August 14, 2018

Ms. Laura Duchnak, Director
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DEPARTMENT OF NAVY'S DRAFT PARCEL G REMOVAL SITE EVALUATION WORK PLAN FOR FORMER HUNTERS POINT NAVEL SHIPYARD, DATED JUNE 2018

Dear Ms. Duchnak:

The Department of Toxic Substances Control (DTSC) has reviewed the draft Parcel G Removal Site Evaluation Work Plan for the former Hunters Point Naval Shipyard site (Hunters Point Site) (Work Plan) dated June 2018 and received on June 18, 2018. Pursuant to the 1990 (and subsequently amended 1992) Federal Facilities Agreement, DTSC is the state of California's lead agency overseeing the Department of Navy's (Navy's) investigation and cleanup of the Hunters Point Site. Also, the California Department of Public Health (CDPH) provides radiological evaluation related to the Hunters Point Site under a contract to DTSC.

This letter includes DTSC's general comments along with the attached memorandum from CDPH dated August 14, 2018 with specific comments on radiological issues. DTSC supports the recommendations made by CDPH as provided in its memorandum. DTSC has also consulted with the United States Environmental Protection Agency (US EPA) and supports US EPA's comments on the technical aspects of the Work Plan and overall recommendations, as provided in its August 14, 2018 comment letter.

DTSC provided comments on the first preliminary draft of the Work Plan dated February 9, 2018. Those comments were submitted to the Navy on March 26, 2018. Based on DTSC's review of the June 2018 Work Plan, DTSC has determined that many of those comments have not been addressed or incorporated into the revised June 2018 Work Plan. Therefore, some of the comments below are similar to DTSC's previously submitted comments.

DTSC understands the importance of moving forward as soon as possible to collect data to ensure that the Hunters Point Site is safe for the public and environment. DTSC

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worked collaboratively with CDPH and US EPA (collectively "Agencies") to develop the Regulatory Agency Approach (which is summarized in Attachment 2.1 to US EPA's March 26, 2018 letter to the Navy available at https://semspub.epa.gov/work/09/100009179.pdf; pg. 36 of the pdf) to accomplish this with a high level of confidence in the results. DTSC requests that the Navy revise the Work Plan to address the Agencies' comments in a draft final Work Plan so that DTSC along with CDPH and US EPA can quickly review and approve it, as appropriate, and the Navy can start retesting as soon as possible. Without the requested changes, DTSC and CDPH will not have the necessary data and scientific support to determine that Parcel G has met the Record of Decision for Hunters Point Site (ROD) remediation goals (RGs).

General Comments:

1. The Work Plan does not reflect the Regulatory Agency Approach. The Regulatory Agency Approach was provided to the Navy on February 6, 2018 during a conference call and again on February 16, 2018 at a meeting with the Navy and Agencies. The Regulatory Agency Approach requires that if a single radiological exceedance of the RG in a trench or building survey unit that was detected during the Phase I of the investigations cannot be shown to be naturally occurring radioactive material (NORM; also referred to as background), it triggers a 100% Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Class 1 survey of all trench or building survey units in Parcel G. This requirement is based on a statistical review by US EPA to ensure a 95% confidence level that 95% of the survey units sampled are free of radiological exceedances associated with the Navy's past activities that are not NORM/background. DTSC acknowledges, as indicated in the draft Work Plan (Appendix A) that new background soil data will be collected and evaluated as part of this investigation to determine the appropriate background levels.

   The Phase II sampling effort of the remainder of the soil survey units will provide additional confidence that the remaining survey units meet the 2009 Record of Decision (ROD) RGs, US EPA risk criteria, as well as meet the sampling requirements of CDPH. As indicated in the February 16, 2018 meeting, the Regulatory Agency Approach provides a scientifically supported alternative approach that will be acceptable to DTSC based on the scope of falsification of data and data quality issues identified at Parcel G. The Work Plan needs to be revised to reflect the Regulatory Agency Approach.

2. As mentioned above, the soil investigation is to be conducted in two phases under the Regulatory Agency Approach. Phase 1 requires 33% of the Trench Units (TUs) and 50% of the Building Soil Units (SUs) in Parcel G to be completely excavated and 100% of the soil surveyed. Phase 2 consists of a different survey and sampling effort of the remaining 67% of the TUs and SUs. Phase 2 would only be acceptable if there were no exceedances of the

RAO/RGs, with the exception of NORM/background, in Phase 1. CDPH requires surveys and sampling in all TUs and SUs. Without the Navy's full acceptance of Phase I with respect to one failure leading to the requirement for 100% survey/sampling of all SUs or TUs, unless the Navy can demonstrate that the exceedance(s) are related to NORM/background, Phase I is no longer an option and 100% excavation and survey of all TUs and SUs would be required. The Regulatory Agency Approach is a scientifically supported alternative that is acceptable to the Agencies based on the scope of falsification of data and data quality issues at Parcel G. CDPH has indicated that it will not issue a recommendation for radiological unrestricted release to DTSC if the Navy does not fully accept the Regulatory Agency Approach or conducts 100% retesting. The Work Plan needs to be revised accordingly.

3. The Work Plan indicates that if data collected are not compliant with certain objectives, then the data will be evaluated for protectiveness based on the US EPA's current guidance on Radiation Risk Assessment. The description of the objectives (Remedial Action Objectives (RAO)) is inconsistent throughout the Work Plan, e.g., the Parcel G *RAO*, the RAO and background levels, or the RG*s*. The Work Plan needs to be revised for consistency. DTSC believes that a data point that exceeds an RG does not meet the RAO unless the Navy can demonstrate that the data point is NORM/background.

4. The Work Plan states that soil or structures that are not compliant with the RAO will be evaluated for protectiveness based on the US EPA's current guidance on *Radiation Risk Assessment*. DTSC defers to US EPA to interpret their own guidance and reiterates that the site investigation and remediation must meet the ROD RGs. Therefore, it is DTSC's position that the Work Plan needs to be revised accordingly.

5. If data exceeds RAO/RGs, the Work Plan indicates that further evaluation would be conducted to determine whether Site conditions are protective of human health using US EPA's current guidance on Radiation Risk Assessment. This would not meet CDPH's requirement to obtain levels similar to naturally occurring levels and/or anthropogenic background levels. As stated in the enclosed CDPH memo, "a final status survey report that compares the distribution of data from the building/excavation sites with applicable reference area data and documents the remediation efforts" will be required. Soil concentrations that exceed RGs plus reference area data (background levels) cannot be left in place. If left in place, CDPH has indicated that it cannot issue a recommendation for radiological unrestricted release to DTSC. Therefore, the Work Plan needs to be revised accordingly.

6. The Phase I TUs and SUs selected by the Navy for resampling need to be revised to reflect US EPA's recommendations for TUs and SUs to be resampled.

7. The Work Plan indicates that an additional 6 inches of soil beyond the trench walls will be removed and surveyed instead of conducting surveys of the walls within the trench. This method would not indicate where along the wall soil was obtained in order to investigate further if an exceedance of the RG is identified. The additional 6 inches of soil need to be segregated from the rest of the excavated soil from each trench and, if an exceedance of the RGs is identified that is not determined to be NORM/background, the sidewall or bottom of the trench from which that soil was removed needs to be surveyed. Additionally, soil should not be returned to the excavated area until the trench wall evaluation is completed. Therefore, the Work Plan needs to be revised accordingly.

8. The Regulatory Agency Approach for Phase II required removal of the asphalt over TUs and SUs in order for surface surveys to be conducted in addition to core sampling. The Work Plan does not include these surface surveys. CDPH requires that all TUs and SUs be surveyed. CDPH has indicated that it cannot issue a recommendation for radiological unrestricted release to DTSC if surveys are not conducted at each TU and SU. Therefore, the Work Plan needs to be revised accordingly.

9. Finally, throughout the Work Plan the Navy indicates that there have been various allegations of data manipulation or falsification committed by Tetra Tech EC employees and their subcontractors. In March and May of 2017, two former employees pleaded guilty to admitting falsification of documents in a United States Department of Justice case. In light of this, some allegations have now been proven. Further, and as indicated earlier, in addition to the falsifications of data, the Agencies identified various data quality issues, as well. Therefore, it is recommended that the Work Plan be revised to reflect these, accordingly.

Additionally, as mentioned earlier in this letter, CDPH has provided comments in the enclosed memorandum. That needs to be addressed in the Work Plan. Please revise the Work Plan and submit a Draft Final Work Plan which addresses the Agencies' comments. If you have any questions, please contact me at (714) 484-5321 or Mohsen.Nazemi@dtsc.ca.gov, or Ms. Nina Bacey, Project Manager at (510) 540-2480 or Juanita.Bacey@dtsc.ca.gov.

Sincerely,

Mohsen Nazemi, M.S., P.E.
Deputy Director
Site Mitigation and Restoration Program

Enclosure: Memorandum from CDHP

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State of California—Health and Human Services Agency
California Department of Public Health

KAREN L. SMITH, MD, MPH
Director and State Public Health Officer

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DATE: August 14 , 2018

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SUB: Review *DRAFT Parcel G Removal Site Evaluation Work Plan Former Hunters Point Naval Shipyard* San Francisco, California. Issued June 18, 2018.

As submitted by the California Department of Toxic Substances Control (DTSC), Environmental Management Branch (EMB) of the California Department of Public Health (CDPH) reviewed the *DRAFT Parcel G Removal Site Evaluation Work Plan Former Hunters Point Naval Shipyard,* San Francisco, California, for radiological issues. This review was performed in support of the Interagency Agreement between DTSC and CDPH.

If you need further assistance please contact Matthew Wright of my staff at (916) 210-8550 or via email at Matthew.Wright@cdph.ca.gov.

The Environmental Management Branch (EMB) of the California Department of Public Health (CDPH) appreciates the opportunity to review the submitted document, Review DRAFT *Parcel G Removal Site Evaluation Work Plan Former Hunters Point Naval Shipyard,* San Francisco, California. Issued June 18, 2018.

General Comments:

1. Please note that CDPH-EMB utilizes Section 30256 in Title 17 of the California Code of Regulations (17 CCR 30256) to render a decision to concur with a Radiological Unrestricted Release Recommendation (RURR). As a result, CDPH-EMB requires a final status survey report that compares the distribution of data from the building/excavation sites with applicable reference area data and documents the remediation efforts. The final status survey should document and explain reasonable efforts that have been made to remediate the site.

2. This work plan seems to be drawn up without regard to United States Environmental Protection Agency (USEPA), California Department of Toxic Substance Control (DTSC) and California Department of Public Health (CDPH) proposal. CDPH worked collaboratively with DTSC and USEPA (collectively "Regulators") to develop, Regulators' Approach (https://semspub.epa.gov/work/09/100009179.pdf; pg. 36-38). This document establishes the minimum amount of resampling acceptable in order for the Environmental Management Branch (EMB) of CDPH issue a radiological unrestricted release recommendation (RURR). Please note specifically the requirement that if one trench unit fails (soil concentration exceeds the cleanup goal, which is Remedial Goal [RG] plus reference background, and is not proven to be Naturally Occurring Radiological Material [NORM]), then 100% of Parcel G trench units must be excavated, scanned, and remediated if needed. This same clause applies to building site soil survey units.

3. Please perform the following statistical analyses on the data collected from the Survey Units (SUs) with data collected from the background reference area: box plot, histogram, distribution analysis, normal (log) probability plot, Q-Q plot and comparison to material specific background.

4. Equations drawn from source texts, technical references or regulatory guides should include source citations to assist in the review process. Equations which are derived from source texts, technical references or regulatory guides should

demonstrate derivation.

5. CDPH-EMB is concerned that the re-excavation specified for the Phase 1 Trench Unit Design also represents a soil treatment due to movement and mixing of the potentially elevated trench soil prior to scanning. What steps will be taken to preserve the integrity of the soil sampling process?

Specific Comments:

6. Section 1, introduction page 1-1, paragraph one, sentence three, *"The radiological characterization will be conducted in accordance with the general approach and methodologies that are provided in the Draft Parcel G Removal Site Evaluation Work Plan (Parcel G Work Plan) (Navy, 2018), a separate Sampling and Analysis Plan (SAP), and a separate Accident Prevention Plan/Site Safety and Health Plan (APP/SSHP)."* Please provide the above cited documents for CDPH-EMB review prior to onset of survey activities. CDPH-EMB will not consider its comments closed until these documents are provided.

7. Executive Summary, Project Purpose, page iii, paragraph two, sentence one, *"Portions of soil or structures that are not compliant with the RAO will be evaluated for protectiveness based on the United States Environmental Protection Agency's (USEPA's) current guidance on Radiation Risk Assessment at CERCLA Sites (USEPA, 2014)".* As noted above, CDPH-EMB requires a final status survey report that compares the distribution of data from the building/excavation sites with applicable reference area data in order to concur to issue a RURR; please include a statistical comparison to applicable reference area data as a part of the project purpose.

8. Executive Summary, Scope, page iii, paragraph one, sentence one, "*The radiological investigation will be conducted at the following sites:*

   - *Former Sanitary Sewer and Storm Drain Trenches*
   - *Buildings 317/364/365 Former Building Site*
   - *Building 351A*
   - *Building 351*
   - *Building 366*
   - *Building 401*

- *Former Building 408 Concrete Pad*
- *Building 411*
- *Building 439".*

According to Regulators' Approach (https://semspub.epa.gov/work/09/100009179.pdf; pg. 36-38) a certain criteria has been established for the selection of priority survey units. Please refer to the United States Environmental Protection Agency (USEPA) Review of the Draft Parcel G Removal Site Evaluation Work Plan, Hunters Point naval Shipyard, San Francisco, California, June 18, 2018, USEPA Review dated August 14, 2018; comments for specific areas to be surveyed.

9. Executive Summary, Conceptual Site Model, pages iii and iv. The section does not describe how the conceptual site model has changed due to previous remediation work. For example, based on the Historical Radiological Assessment, sewer and storm drain pipes were present and thought to be the source of contamination in trench units with the soil above the pipes being mostly not impacted. Currently, the pipes have been removed but the backfill soil may be contaminated or its status is unknown due to alleged activities.

10. Executive Summary, Soil Investigations, page iv, paragraph one, sentence one, "*Soil investigations will be conducted at the following areas:*

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

    Please refer to the United States Environmental Protection Agency (USEPA) Review of the Draft Parcel G Removal Site Evaluation Work Plan, Hunters Point naval Shipyard, San Francisco, California, June 18, 2018, USEPA Review dated August 14, 2018; comments for specific areas to be surveyed.

11. Phase 1 Investigation, page iv, paragraph one, sentence one, "*Phase 1 includes the radiological investigation on a targeted group of TUs and SUs. Twenty-one of the 63 former sanitary sewer and storm drain TUs were selected for the Phase 1 investigation. Fourteen of the 28 surface soil SUs1 from the Buildings*

317/364/365 Former Building Site and Building 351A Crawl Space were selected for the Phase 1 investigation."). Please refer to the United States Environmental Protection Agency (USEPA) Review of the Draft Parcel G Removal Site Evaluation Work Plan, Hunters Point naval Shipyard, San Francisco, California, June 18, 2018, USEPA Review dated August 14, 2018; comments for specific areas to be surveyed.

12. Phase 1 Investigation, page v, paragraph one, sentence one, *"Soil may be laid out on Radiological Screening Yard pads for a surface scan, or soil may be processed and scanned using soil segregation technology."* Please be advised that CDPH-EMB has not yet been provided the information necessary to come to a decision on the use of soil segregation technology at HPNS.

13. Phase 1 Investigation, page v, paragraph one, sentence two, *"Following excavation to the original TU boundaries, additional excavation of approximately 6 inches of the trench sidewalls and floors will be performed to provide ex situ scanning and sampling of the trench sidewalls and floors."* Please ensure that the over-excavation soils are sampled separately and stored separately from soils removed from the original TU. Please ensure the excavated soils are traceable back to their TU origin. If a radiological exceedance is found; CDPH-EMB requires a follow up Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Class I survey be performed on the TU of the soil's origin.

14. Phase 1 Investigation, page v, paragraph three, sentence one, *"Systematic and bias samples will be collected from the excavated soil from the TUs, within the surrounding soil of the TUs, and from the surface soil SUs."* Please ensure that the over-excavation soils are sampled separately and stored separately from soils removed from the original TU. Please ensure the excavated soils are traceable back to their TU of origin. If a radiological exceedance is found; CDPH-EMB requires a follow up MARSSIM Class I survey be performed on TU of the soil's origin.

15. Building Investigations, page v, paragraph one, sentence one, *"Investigations of interior surfaces will be performed for the following buildings:*

    - *Building 351A*
    - *Building 351*

- *Building 366*
- *Building 401*
- *Former Building 408 Concrete Pad*
- *Building 411*
- *Building 439*

Please refer to the United States Environmental Protection Agency (USEPA) Review of the Draft Parcel G Removal Site Evaluation Work Plan, Hunters Point naval Shipyard, San Francisco, California, June 18, 2018, USEPA Review dated August 14, 2018; comments for specific areas to be surveyed.

16. Data Evaluation and Reporting, page vi, paragraph two, bullet two, sentences one and two:

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

Please specify that the process outlined above is to establish that Ra-226 levels are within the naturally occurring radioactive material (NORM) range. Please refer reader to Section 5.4 for a fuller discussion of NORM Background Investigation.

17. Table ES-1. Soil and Building Trench and Survey Units; Figure ES-1. Soil and Building Sites. Please refer to the United States Environmental Protection Agency (USEPA) Review of the Draft Parcel G Removal Site Evaluation Work Plan, Hunters Point naval Shipyard, San Francisco, California, June 18, 2018, USEPA Review dated August 14, 2018; comments for specific areas to be surveyed.

18. Section 3.1 Data Quality Objectives, page 3-1,bullet five-Develop Decision Rules, paragraph one, sentence two, "*The RACR will describe the results of the*

investigation and will provide a demonstration that radioactivity levels meet the Parcel G RAO or represent background conditions." Please see comment #1.

19. Section 3.1 Data Quality Objectives, page 3-1,bullet five-Develop Decision Rules, paragraph two, sentence one, *"If the investigation results demonstrate that site conditions are not compliant with the Parcel G RAO and exceed background levels, then the data will be evaluated to determine whether site conditions are protective of human health using USEPA's current guidance on Radiation Risk Assessment at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sites (USEPA, 2014)."* As noted above, CDPH-EMB requires a final status survey report that compares the distribution of data from the building/excavation sites with applicable reference area data in order to concur to issue a RURR; this is irrespective of USEPA's current guidance on Radiation Risk Assessment at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sites (USEPA, 2014).

20. Section 3.1 Data Quality Objectives, page 3-2, bullet one, sentences one and two:

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

    Please see comment number 16.

21. Section 3.3.1 Investigation Levels, page 3-3, paragraph three, sentence four, *"The spectra will be evaluated using regions of interest peak identification tools for the ROCs that correspond to gamma rays at 186 kiloelectron volt (keV) for 226Ra, 609 keV (226Ra daughter bismuth-214 [214Bi]), and 662 keV for 137Cs."* EMB notes that using gamma rays at 186 kiloelectron volt (keV) for 226Ra is a quicker, less accurate method of analyzing for 226Ra and is known to be biased high. This bias is noted in the discussion of the conceptual site model, page IV, paragraph one, bullet one, sentence two, "A large amount of soil (estimated 80 percent) was likely mischaracterized as contaminated (Argonne National Laboratory, 2011)." Also, for short scan counts it is doubtful that enough counts will be obtained in the selected peak region to provide adequate counting

statistics to identify soils at the Ra-226 investigation level. Please explain the use of 186 kiloelectron volt (keV) as the identifying peak for 226Ra.

22. Section 3.4 Radiological Investigation Design, page 3-4, paragraph three, sentences two and three:

> *"Phase 1 includes the radiological investigation of 21 previously established TUs and Phase 2 includes the remaining 42 TUs in Parcel G. Similarly, for surface soil areas associated with soil from building sites, Phase 1 includes the radiological investigation of 14 of the 28 SUs4 and Phase 2 includes the remaining 14 SUs in Parcel G."*

Please refer to the United States Environmental Protection Agency (USEPA) Review of the Draft Parcel G Removal Site Evaluation Work Plan, Hunters Point naval Shipyard, San Francisco, California, June 18, 2018, USEPA Review dated August 14, 2018; comments for specific areas to be surveyed.

23. Section 3.4.1, Number of Samples, page 3-4, paragraph one, sentence one, "*Following the previously established protocol (TtEC, 2012), a minimum of 18 systematically located samples will be collected from each TU or SU.*"

    a. Please provide the calculations which will determine the number of soil samples to be collected reflective of new reliable data.
    b. Does this mean that for soils surveyed on a radiological survey yard (RSY) pad, a minimum of 18 (or otherwise determined number of samples) systematically located samples will be collected from each six inch lift of soil from TU or SU?
    c. What trigger value will cause biased samples be collected and analyzed?

24. Section 3.4.4 Phase 1 Trench Unit Design, page 3-5, paragraph two, sentence two, "*The excavated soil material will be investigated by gamma scan surveys and systematic and bias soil sample collection following either the automated soil sorting system process (Section 3.6.3.1) or the RSY process (Section 3.6.3.2).*" Please see comment number 12.

25. Section 3.4.5 Phase 2 Trench Unit Design, page 3-7, paragraph two, sentence one, "*Within the backfill of each previous TU boundary, six systematic locations will be cored down to approximately 6 inches below the depth of previous excavation.*"

a. According to Regulators' Approach (https://semspub.epa.gov/work/09/100009179.pdf; pg. 36-38) the number of core samples required within the trench will be determined based on new reliable data and statistical analysis.

b. EMB asserts that the term, "core samples", refers to the entire soil column (plug) removed as a result of direct push technology. From this column of soil any number of individual soil samples may be obtained. For example: if the value, "N", is calculated from new reliable data such that the resulting value of ,"N", is 20; then 20 core sample soil columns (plugs) must be obtained. In this example, if 3 soil samples were obtained from each core sample soil column (plug); then the resulting number of soil samples to be collected is 60.

26. Section 3.4.6 Phase 1 Survey Unit Design, page 3-7, paragraph one, sentence one, "*Radiological investigations will be conducted on a targeted group of 14 of the 28 SUs associated with soil from building sites where only surface soil scanning and sampling was previously conducted (Figure 3-1).*" Please refer to the United States Environmental Protection Agency (USEPA) Review of the Draft Parcel G Removal Site Evaluation Work Plan, Hunters Point naval Shipyard, San Francisco, California, June 18, 2018, USEPA Review dated August 14, 2018; comments for specific areas to be surveyed.

27. Section 3.4.6 Phase 1 Survey Unit Design, page 3-7, paragraph two, sentence four, "*Gross gamma and gamma spectra obtained during the surface gamma scan surveys will be analyzed using region of interest peak identification tools for the ROCs.*" Please see comment number 21.

28. Section 3.4.7 Phase 2 Survey Unit Design, page 3-8, paragraph one, sentence one, "*Phase 2 soil area SUs will be characterized by collecting systematic surface soil samples.*" Please include a 100% Gamma Walkover Survey (GWS) for phase 2 surface soil areas.

29. Section 3.5.1 Soil Gamma Scanning Instruments, page 3-8, paragraph one, sentence four, "*The spectra will be evaluated using regions of interest peak identification tools for the ROCs that correspond to gamma rays at 186 keV for 226Ra, 609 keV (226Ra daughter 214Bi), and 662 keV for 137Cs.*" Please see comment number 21.

30. Section 3.5.2.2 Gamma Scan Minimum Detectable Concentration, page 3-9, paragraph one, sentence one, "*Field instrument use will be evaluated and controlled to verify that MDCs less than the appropriate limit for scanning measurements are routinely achieved*". This apparently contradicts Section 3.3.1 Investigation Levels, page 3-3, Table 3-6, Soil Survey Measurement Investigation Levels, Investigation Level (pCi/g), footnote, "a", "Gamma scan surveys will not detect 137Cs at 0.113 pCi/g." Please explain how MDCs less than the appropriate limit for scanning measurements are routinely achieved.

31. Section 3.5.2.2 Gamma Scan Minimum Detectable Concentration, Equation 3-1:

$$\text{“}MDCR_s = \frac{MDCR}{\sqrt{p\varepsilon}}$$

Where:
MDCR = minimum detectable count rate (cpm)
p = surveyor efficiency
ε = instrument efficiency (cpm/μR/hr; Table 6.4, NRC, 1998)."

CDPH-EMB believes this equation to be incorrectly stated. Table 6.4, NRC, 1998 applies to static one minute counts specific to U-238. The equation does not include both the weighted instrument and surface efficiencies in its calculation. Please review; and if necessary, correct.

32. Section 3.6.3 Phase 1 Trench Unit Investigation, page 3-13, paragraph two, sentence three, "*One hundred percent of the Phase 1 ESU soils will undergo scan surveys using real-time gamma spectroscopy equipment in the soil sorting process or the RSY pad process.*" See comments numbers ten and 17.

33. Section 3.6.3 Phase 1 Trench Unit Investigation, page 3-13, paragraph three, sentence four, "*Following completion of scanning activities, the ESU and SFU material will be returned to the same trench that the material originated from.*" What procedure will be followed if elevated radiological readings exceed the RGs or are not comparable to reference areas? Please explain.

34. Section 3.6.3.1 Automated Soil Sorting System Process, page 3-14. Please see comment number 12.

35. Section 3.6.3.1 Automated Soil Sorting System Process, page 3-15, Soil Sampling, paragraph two, sentence one, "*One bias soil sample will be collected from the soil material that has been discharged to the "Diverted* Pile" bin." A soil survey aimed at representative sampling of diverted soil shall be performed on all soils discharged to the diverted soils bin and the design of that survey should be provided in the work plan. What other actions will be taken when soil is diverted to document the TU and areas from which the soil originated?

36. Section 3.6.3.2 Radiological Screening Yard Pad Process, page 3-16, Investigation, paragraph one, sentence one, "*A minimum of 18 systematic soil samples will be collected along with any bias samples based on the results of the gamma scan surveys.*" Please see comment number 23 (a).

37. Section 3.6.3.2 Radiological Screening Yard Pad Process, page 3-16, Investigation, paragraph two, sentence two, "*The Bicron 3x5x16 NaI detector coupled to a multi-channel analyzer (or equivalent system) will be equipped with spectral capabilities to provide isotopic identification and quantification in additional to gross gamma readings.*" At what threshold point will elevated gross gamma readings initiate additional investigation? Please explain.

38. Section 3.6.3.2 Radiological Screening Yard Pad Process, page 3-17, Investigation, paragraph three, sentence one, "*Datasets will be transferred from the data logger onto a personal computer to create spreadsheets and geographic information system-plotted maps.*" Please provide the contour information (contour method, dot size and appropriate defaults) as contour mapping can smooth over discrete elevated locations.

39. Section 3.6.3.2 Radiological Screening Yard Pad Process, page 3-17, Investigation, paragraph three, sentence five, "*Bias samples will be collected from potential areas of elevated activity displaying gamma scan survey results greater than the investigation level (Section 5.3.1).*" Since the gamma scan instrumentation being employed cannot detect the RG 0.113 pCi/g value for Cs-137; does this mean that every identification of Cs-137 will necessitate a bias sample? Please explain. Will gross gamma concentrations trigger further investigation? Please explain.

40. Section 3.6.4 Phase 2 Trench Unit Investigation, page 3-17, paragraph one, sentence one, "*Investigations of the Phase 2 TUs will consist of a combination of core scan surveys and soil samples*". The Regulatory Agency Approach for Parcel G- March 23, 2018; offers relief from having to excavate 67% (43) trench units. However; the proposal is conditional in the sense that DON must fulfill the survey requirements outlined in the proposal. Please explain why only surface scans above cores are proposed for the Phase 2 TU investigation instead of 100% surface scans; and how this meets the requirements of Regulators' approach.

41. Section 3.6.4 Phase 2 Trench Unit Investigation, page 3-18, paragraph two, sentences one and two:

> *"An additional set of 18 systematic samples will be collected from 6 systematic locations representative of the trench sidewalls. The six core locations will be located within 1 meter of the previous sidewall excavation limits and will extend to the maximum previous excavation depth."*

According to Regulators' Approach (https://semspub.epa.gov/work/09/100009179.pdf; pg. 36-38) the number of core samples required within the trench will be determined based on new reliable data and statistical analysis.

a. Please see comment number 23 (a),
b. Please note core sample locations are required every 50 linear feet, for trenches greater than 150 linear feet; how will 6 core sampling locations meet this sampling requirement?

42. Section 3.6.5 Phase 1 Survey Unit Investigation, page 3-19. Please amend this section title so that it is clear that the section refers to building site soil units.

43. Section 3.6.5 Phase 1 Survey Unit Investigation, page 3-19, paragraph four, sentence one, "*Datasets will be transferred from the data logger onto a personal computer to create spreadsheets and, if feasible, gamma scan survey results will be mapped.*" Please see comment number 38.

44. Section 3.6.5 Phase 1 Survey Unit Investigation, page 3-19, paragraph four, sentence two, *"Data obtained during the surface gamma scan surveys, including gross gamma, and individual radionuclide spectral measurements, will be analyzed to identify areas where surface radiation levels appear to be greater than the radionuclide-specific investigation levels using regions of interest-peak identification tools."* Please ensure that gross gamma scan data; which is not the same as interest-peak identification, is analyzed to identify areas of elevated gamma activity, flagged for field verification and noted on a survey map.

45. Section 3.6.5.1 Surface Soil Sample Collection, page 3-21. Please retain all soil samples for CDPH-EMB confirmatory analysis.

46. Section 3.6.7 Phase 2 Survey Unit Investigation, page 3-20. Please amend this section title so that it is clear that the section refers to building site soil units.

47. Section 3.7 Radiological Laboratory Analysis, page 3-21. Please include as appendices the laboratory procedures for analyzing the ROCS.

48. Section 3.7 Radiological Laboratory Analysis, page 3-21, paragraph two, sentence one, *"Analysis will be based on the site-specific ROCs listed in Table 3-4, and in accordance with the SAP. The soil samples will be assayed using gamma spectroscopy analysis for 137Cs and 226Ra with at least 10 percent of samples receiving gas flow proportional analysis for 90Sr."* How will the 10 percent of soil samples to be examined for 90Sr be selected? Please explain.

49. Section 3.7 Radiological Laboratory Analysis, page 3-21, paragraph two, sentence four, *"Additionally, if the laboratory results indicate concentrations of 137Cs above its RG, the sample will be analyzed for 90Sr. If the laboratory results indicated the presence of concentrations of 137Cs or 90Sr at or above the RG, additional analysis via alpha spectrometry for 239Pu will be performed."* Please perform alpha spectrometry for ten percent of soil samples for Pu239 in addition to those samples whose concentrations of 137Cs or 90Sr are at or above the RG.

50. Section 4.1 Data Quality Objectives, page 4-1, bullet 4, sentence one, **Step 4-Define the Study Boundaries**: *"The study boundaries are accessible interior surfaces of Buildings 351, 351A, 366, 401, 411, and 439, and the concrete pad at*

former Building 408 (Figure 4-1)." Please refer to the United States Environmental Protection Agency (USEPA) Review of the Draft Parcel G Removal Site Evaluation Work Plan, Hunters Point naval Shipyard, San Francisco, California, June 18, 2018, USEPA Review dated August 14, 2018; comments for specific areas to be surveyed.

51. Section 4.4.1 Number of Static Measurements, page 4-3, paragraph one, sentence two, *"Following the previously established protocols (TtEC, 2012), a minimum of 18 measurements will be performed in each SU and on each RBA surface type."* Please see comment number 23 (a).

52. Section 4.4.2 Radiological Background, page 4-3, paragraph one, sentence three. *"At least 18 static measurements will be taken on each surface material in the RBA that is representative of the material in the building SUs".* Please provide the calculations which will determine the number of surface material samples to be collected reflective of new reliable data. Please see comment number 23 (a).

53. Section 4.4.3 Survey Units, page 4-3, paragraph one, sentence one, *"Parcel G buildings will be divided into identifiable SUs similar in area and nomenclature to the previous final status survey of each building."* If the proposed Parcel G SUs design deviate from the previous Parcel G building SUs in area, nomenclature or material, please explain the reason for the deviation.

54. Section 4.4.3 Survey Units, page 4-3, paragraph one, sentence three, *"The remaining upper wall surfaces and ceilings will form the remaining survey units of no more than 2,000 m2 each".*
    a. Please state clearly if the remaining 2,000 m2 upper wall surfaces and ceilings will form either Class I or Class II MARSSIM SUs.
    b. For all Building Floor Plan Figures; Figure 4-2 through and including Figure 4-8, please include the remaining 2,000 m2 SUs in the figures.
    c. Please include the remaining 2,000 m2 SUs as a part of Figure 4-10, "Example Building Survey Unit and Sample Locations".
    d. For those buildings which are not surveyed in their entirety; please explain why only a portion of the building was subject to a MARSSIM survey.
    e. Please provide a Class II MARSSIM buffer survey around where Class I MARSSIM surveys performed.
    f. Please clarify if task specific plan or a work plan will be prepared for each

individual building.

55. Section 4.5.4 Instrument Efficiencies, page 4-4, Table 4-3. Survey Instrument Efficiencies and Background Count Rates from Manufacturers. Please include manufacture's name in table.

56. Section 4.5.4 Instrument Efficiencies, page4-4, Table 4-3. Survey Instrument Efficiencies and Background Count Rates from Manufacturers, Parameter, Alpha total efficiency (4π) for 235U, Model 3030, *"0.39"*. EMB staff is unable to find this U-235 value on manufacture's website or in their product manual. Please describe origin of this value.

57. Section 4.5.7.3 Probability of Alpha Detection for High-background Detectors, page 4-7, Equation 4-2. This equation appears to have elements of two MARSSIM Appendix J equations; for P (n≥1) and for P (n≥2) comingled. Please review and correct if necessary.

58. Section 4.5.7.4 Beta Scan Minimum Detectable Concentration, page 4-8, Equation 4-4. Please examine this term and correct if necessary.

59. Section 4.5.7.4 Beta Scan Minimum Detectable Concentration, page 4-9, *Table 4-6. Beta Scan Minimum Detectable Concentrations*. Please examine these results and correct if necessary.

60. Section 5, Data Evaluation and Reporting. Please add, where applicable, specifications for data evaluation such as those specified in comment number three.

61. Section 5.3.1 Identify Potential Areas of Elevated Activity, page 5-4, paragraph one, sentence six, "*In addition, SU areas with multiple lines of evidence indicating a potential increase in localized activity based on posting plots, histograms, and Q-Q plots of scan, static measurement, or sample data will be investigated as a potential area of elevated activity.*" Please quantify what is meant by the phrase, "...of evidence indicating a potential increase"; i.e., what level of increase will trigger additional investigation. Also please include normal (log) probability plot.

62. Section 5.3.2 Investigate Potential Areas of Elevated Activity, page 5-5, paragraph one, sentence five, *"Determining the extent of elevated activity for ROCs without a significant gamma emission, such as 90Sr and 239Pu, will require collecting additional soil samples or establishing a correlation between the difficult-to-detect ROC and 226Ra."* Please see comment number 49.

63. Section 5.3.2 Investigate Potential Areas of Elevated Activity, page 5-5, paragraph three, sentence four, *"If the revised 226Ra result exceeds background by more than 1.0 pCi/g, ~~additional evaluation may be performed~~."* Please delete indicated phrase and replace with, "and not shown to be NORM or anthropogenic background; then sample demonstrates non-compliance with Parcel G ROD RAO and is deemed a failure."

64. Section 5.5 Reference Background Area Soil, page 5-6, Equation 5-1. Equations drawn from source texts, technical references or regulatory guides should include source citations to assist in the review process

65. Appendix A:Section 3.1.3 Reference Background Area Locations, page 3-2, paragraph one, sentence four, *"In order to simplify the sampling design, an approximately 20-foot by 20-foot square has been established within each of the four historical RBA footprints."*

    a. This area is too small to be completely representative of reference background area. Please resize and provide an explanation of the size provided.
    b. Please provide unique nomenclature for the, "footprints", as it is confusing to the reader if the text is referring to the larger RBA or the smaller internal footprint.

66. Appendix A: Section 3.1.4 Number of Samples, page 3-3, paragraph one, sentence two, *"The NRC criteria for providing characterization of a complex site, found in United States Nuclear Regulatory Commission Regulation (NUREG) 1505 (NRC, 1998) is at least 100 samples from at least 5 distinct locations."* This appears to be a reference to Table 13.5 Power of the F-test When $\omega^2=\sigma^2$. Data drawn from source texts, technical references or regulatory guides should include

source citations to assist in the review process. The text notes that Table 13.5 is a step in the application of Scenario B, which in turn requires the application of the Quantile test to, "... detect non-uniform concentrations of residual radioactivity that may be excess of the release criteria, but might be missed by the WRS test." Will the Quantile test be applied to the soil sample results drawn from Parcel G SUs and TUs?

67. Appendix A: Section 3.1.4 Number of Samples, page 3-3, paragraph one, sentence six, *"Five surface soil samples will be collected from RBAs 1 through 4, for a total of 25 onsite surface soil samples."* Please check the multiplication in this sentence and in bullet number four. In order to make a valid comparison between survey units (TUs or SUs) and their relevant reference background areas (RBAs); CDPH-EMB requires that the RBAs have a technically defensible number of systematically located soil samples. If it is the intent to have four separate RBAs established to represent four different kinds of SU or TU conditions, please explain how five surface soil samples from the selected RBA could be used to make a valid statistical comparison to the 18 or more samples drawn from the SU or TU.

68. Appendix A: Section 3.2.3, Scan Measurements, page 3-9, paragraph three, sentence two, *"An instrument-specific SOP will be provided to the Navy prior to initiation of field activities."* Please provide a copy to the regulatory agencies for review at the same time.

69. Appendix B: Draft Radiation Protection Work Plan Radiological Data Evaluation and Confirmation Survey; Section 2.6, Radiological Control Technicians, page 6, paragraph one, sentences two and three: All RCT's shall be qualified as senior RCT's (</= 5 years as a qualified and documented RCT, either U.S. Department of Energy core, North East Utility Exam, National Registry of Radiation Protection Technologists [NRRPT], etc.). On a case by case basis, Jr RCT's will be evaluated by CH2M.

    a. Is the intent of sentence two to require 5 or more years' experience to qualify as a Senior RCT? Please explain.
    b. Will work performed by Jr RCT's be countersigned by a Senior RCT? Will a promotion from Jr. RCT to Senior RCT on the project call for the same experience and training requirements to be met as technicians originally hired as Senior RCTs?