EPA Review of Draft *Radiological Data Evaluation Findings Report for Parcels B and G Soil, Former Hunters Point Naval Shipyard, San Francisco, California, September 2017.*

EPA Interim Draft Comments on Parcel G portions, Version 1, October 20, 2017

General Comments

1. Executive Summary: This Report will likely attract interest from a broad audience that will include laypeople. The Executive Summary needs to be understandable to this broad audience. It should begin with more context, including a broad overview of next steps. It should be written in "plain language" with references added to direct the reader to more information within the body of the report. This same language can be used as the basis for the Navy's fact sheet on the same subject. Please consider writing the bullets of allegations and defined recommendations portions using terms easily understood by a layperson.

2. Executive Summary: The Navy wrote in Section 1.3, p. 1-2, "Because it is impossible to determine whether every instance of potential data manipulation or falsification has been identified, the Navy recommends additional surveys and sampling beyond the areas with evidence of data manipulation. Additional soil sampling locations will be selected in coordination with the regulatory agencies." EPA agrees with this statement. This important statement needs to be up front in the Executive Summary as early as possible. Based on this information, the designation "No Further Action" for some survey units contradicts the above statement and could mislead a reader. Please choose a more accurate term to describe the survey units that fall into this category. This statement should be repeated in the report wherever relevant (e.g. in locations where "no further action" is currently written) to avoid potential misunderstandings.

3. Executive Summary, Page iii and iv and Section 4.0, p. 4-1: The draft states "The purpose for the reanalysis is to a) compare the initial systematic sample results to the release criteria to see if the results may reveal that the release criteria were met and remediation was not required even though final systematic sample results were potentially manipulated and falsified, or b) provide offsite laboratory results to document current site conditions." Revisiting archived samples can indeed be another way to find evidence of falsification. However, if a trench unit shows signs of potential falsification of work, then reanalysis or physical inspection of archived samples cannot by itself provide sufficient documentation that Record of Decision (ROD) requirements have been met. Specifically, the re-analysis of archived samples should not be considered reliable for providing defensible data for decision making for the following reasons:

    - Overall, review of Parcel G data evaluation results have shown such widespread failures to follow proper practices in so many aspects of the characterization process that the archived samples cannot be considered reliable indicators of actual conditions at the first round of sampling. More specifically, Parcel G,

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Building 364, Survey Unit 27 showed indication of potential falsification in the first and only round of sampling.

- Former workers have alleged that in the building where samples were stored, samples were spilled on the floor, and in addition, workers did not properly secure radiological controlled areas. Therefore, cross-contamination or sample tampering could have occurred.

- Global Positioning System (GPS) coordinates were not collected during the majority of sample collection events. Therefore, the locations where samples were collected cannot be confirmed. In addition, former workers have alleged that samples were collected purposely from areas where gamma scans showed the lowest readings, rather than the highest readings. In Parcel G, the following observations are indicators of this potential concern: 1) in box plots and Q-Q plots biased samples have shown low variability and have mean values below other data sets and 2) statements in forms that gamma scans and gamma statics are inconsistent with each other and/or with the Final Status Survey samples. A recent Nuclear Regulatory Commission (NRC) enforcement action confirmed that samples were sometimes purposefully not collected from the appropriate locations in violation of the Work Plan requirements. This would be difficult to verify even if the samples are physically examined for consistency with other samples collected from the same survey unit.

- The Navy's Data Evaluation Forms indicate that some of the Survey Unit Project Reports (SUPRs) are missing the chain-of-custody forms (COCs) for samples collected at various survey units. Further, worker allegations state that some COCs were falsified. Based on a review of these forms, allegations regarding COC tampering/falsification have been confirmed by the Navy. COCs provide documentary evidence to authenticate who, where, and when samples were collected, transported, and analyzed. Signed and dated COC documentation is also required to verify that custody of the samples was maintained by the appropriate personnel from the time of collection through analysis and storage, in order to prove that the samples were not tampered with or altered. Any archived samples which do not have the appropriate COC documentation, or which may have an accompanying COC but which have not been maintained in a locked room under controlled custody as evidenced by signed COC documentation, cannot be used to provide defensible data regarding site conditions.

Please revise the Report to remove all references to re-analysis of archived samples as a means to verify compliance with release criteria in accordance with the Hunter's Point Naval Shipyard (HPNS) Record of Decision (ROD).

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4. Executive Summary, page vi, last bullet, and Section 1.3 (Assumptions and Uncertainties), page 1-2, The last bullet, state that data quality was not evaluated by the Navy. The text further states that data quality has been assessed and approved by the Navy and regulatory agencies in previous reports, indicating that data quality should not be re-considered in the review of data and environmental decision making. The data quality related to Tetra Tech EC, Inc., work, including its laboratories, should be considered regardless of the prior approval by the Navy or any of the regulatory agencies. A re-review of the data based on former worker allegations has also brought to light data quality concerns not previously identified.

   For example,

   - The contract off-site laboratory had data quality issues such as the identification of sets of data with an unusual number of non-detect or negative values, and there were revelations about the use of inaccurate nuclide libraries for identifying and quantifying gamma emitting radionuclides. In some cases, the Ac-228 sample data was unusually low, or reported as '0' in Trench Units (TUs) 076, 077, 078, and 080 for all survey types. TUs 076, 077, 078, and 080 are all adjacent to Bldg. 411. TU077 is adjacent to TU076. Negative, zero and <1 Actinium values are off-site lab data, not on-site lab data, for the NFA TUs in Parcel G.

   - Additionally, for some survey units, significant discrepancies exist between on-site and off-site laboratories, with the concurrent identification of insufficient analysis procedures for identifying Radium-226 (Ra-226) contamination at the on-site laboratory. For example, it has been determined that the on-site laboratory analyzed for Ra-226 using the Ra-226 gamma energy line at 186 Kilo-electron volts (KeV) in the gamma spectroscopy analysis, but with insufficient counting time to achieve the required detection limits.

   - In addition, multiple former workers have reported fraud associated with quality control and work plan requirements, such as the failure of some workers to follow work plans by scanning soil too quickly or with the detector too far from the surface to achieve the detection limit requirements for the analysis.

   This newly identified information reveals a general lack of data quality and reliability, indicating the associated data are neither reliable nor defensible. Please revise the Report to remove reference to data quality issues not being considered in the evaluation of the usability and defensibility of the data and discuss issues associated with the allegations and how they may impact data quality. A more detailed discussion about data quality and the resampling effort is needed to provide assurance that any area not being resampled has defensible data, i.e., the work plan was followed and documentation exist with required signatures for surveys, COCs, reviews, and what those requirements were and how the Navy verified that the requirements in the work plan and release criteria have been met.

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In the bigger picture, beyond the scope of this specific Report, prior to resampling efforts, a thorough review of work plans, process review, documentation, and data quality should be of primary concern to ensure that high quality defensible data is obtained. Ongoing onsite oversight by the Navy and regulatory agencies should be conducted frequently.

5. Executive Summary: Please add language to the end of the Executive Summary and in the Report's conclusion that answer the following questions: 1.) What happens next with each parcel? 2.) How does the public get involved? 3.) What actions need to take place for each of these parcels? and 4.) What needs to happen to initiate the restart of the transfer process for each of these parcels?

6. Section 2.3 (Release Criteria) states that the background activity used for Ra-226 in Parcels B and G is 0.485 Picocuries per gram (pCi/g), and that for soil in the United States, the expected Ra-226 activity is 1 pCi/g and can range up to 4 pCi/g; therefore, the HPNS background value for HPNS is conservative. The statement that use of the 0.485 pCi/g concentration as the average background concentration for Ra-226 at HPNS is conservative is not supported by current site-specific background data. In addition, Section 4 (Findings and Recommendations) states at the top of page 4-2 "After carefully examining the analytical data and the conceptual model for soil contamination, it is concluded that the upper range of naturally occurring Ra-226 exceeds the release criteria. Therefore, cleanup will be hampered without an understanding that naturally occurring Ra-226 may exceed the release criterion without being indicative of contamination." However, the Report has not provided data that supports this statement or provides sufficient information to identify definitively the background concentration range of Ra-226 at the HPNS. It is therefore recommended that the Navy consider generating a new set of representative background data from areas not impacted by HPNS operations for each Parcel or geographical area, incorporating the Quality Assurance requirements for this sampling in a new Sampling and Analysis Plan. Generation of such background data will provide defensible information for supporting decision making for newly generated data at the HPNS. As such, the following analytical parameters are requested to ensure the background data are comprehensive and meet the data quality objectives for determining which radionuclides of concern resulting from operations at the HPNS are present at levels that exceed the ROD release criteria:

<u>Gamma Spectroscopy</u>

- All naturally occurring decay chain radionuclides for the Uranium-238, Thorium-232 (Th-232), Uranium-235, including Pa-231, Th-227, Ra-223 should be quantified by gamma spectroscopy analysis to verify which areas are in secular equilibrium. Determining which radionuclides are in secular equilibrium will provide more information regarding natural background variations.
- Europium-152 (Eu-152) and Eu-154
- Potassium-40 (K-40)
- Non-anthropogenic radionuclides, including Americium-241 (Am-241), Cobalt-60 (Co-60)

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Strontium

- Total Strontium and/or Strontium-90 (Sr-90)

Alpha Spectroscopy

- Isotopic Plutonium, Uranium, Thorium, and Am-241

Please revise the Report to discuss whether historical or newly generated background data will be used for future assessments regarding compliance with the HPNS ROD.

7. Section 2.5 Former Worker Allegations: Please revise this section as needed to ensure that where the findings in the forms appear to confirm any specific allegations, those specific allegations are included to the list in this section. In addition, please note which allegations have been confirmed from data evaluation, e.g. in parentheses after the particular bullet or in some other section.

8. Section 2.5 Former Worker Allegations: The Navy has already screened the chain of custody forms for names of people associated with allegations of falsification. EPA reviewed "Scan/Static Surveyor Name" and/or "Sampler/Surveyor Name" portions of the forms. Out of the 43 forms in Parcel G that the Navy recommended for "NFA," 23 of them listed names associated with allegations of falsification. EPA recommends that the Navy also search for names associated with falsification for these two categories listed above in its future reviews.

   As background, a person could have been on this list of "suspect names" for various reasons. For example:

   - A former worker stated that s/he did falsify radiological work, often due to an or a perceived order from a supervisor
   - A former worker stated that s/he observed this person falsifying radiological work
   - A former worker stated that this person was on a crew that was associated with falsifying radiological work

   As a caveat, if a name were on this list and did indeed falsify in one situation, that does not mean that s/he falsified in any given particular survey unit. In addition, a person's name being on this list does not mean definitely falsification occurred.

   That being said, under normal circumstances, missing names or names associated with potential falsification may not by itself raise significant concerns that the record does not support that ROD requirements have been met. However, in this site, worker allegations have sometimes been confirmed to be true. For example, the NRC concluded enforcement action documented that tampering with Chain of Custody documentation was in some instances associated with attempts to under-represent the true extent of

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contamination. Therefore, certain names appearing as associated with a given parcel is considered one line of evidence to be weighed together with other lines of evidence as part of developing a conclusion about the need for resampling.

9. Section 3 Data Evaluation Activities, Page 3-1 states "(3) recommend additional data collection to confirm existing data, or replace potentially manipulated or falsified data." Old data should not be deleted even if it was proven to be falsified. It should be flagged as "rejected" data.

10. Section 3 Data Evaluation Activities, Page 3-1 End of first bullet: "Biased samples that were collected to determine the limits of soil exceeding the release criteria or to confirm the successful removal of soil exceeding the release criteria, were designated as "FSS-BIAS" and "RAS" in FRED, and are also referred to as "Confirmatory" and "Bias" in this evaluation." The FSS-Biased samples should not have been included in with the other RAS biased samples for plot evaluations during the FSS survey, but they were. This sentence needs to be reworded for accuracy.

11. Section 3 Data Evaluation Activities, Page 3-2: The draft states "Other naturally occurring radionuclides (including Th-232 progeny Bi-212 and lead (Pb)-212, and Ra-226 and progeny Pb-214) were evaluated when additional information was needed. ROCs not identified as primary radionuclides for this evaluation include Sr-90 and Cs-137, which are present in soil from fallout as a result of nuclear testing. Sr-90 was only analyzed in 10 percent of the soil samples, limiting its usefulness in the evaluation. Cs-137 is only discussed in the evaluation if exceedances of the release criterion in soil were reported." If Cs-137 was above the release criteria then additional analyses should have been performed as stated in Section 2.1 ("If Cs-137 results from the onsite laboratory were at or above the release criteria, isotopic plutonium, isotopic uranium, and Sr-90 were also analyzed by the offsite laboratory."). Please check this in the FRED database and develop a summary table to clarify if these additional analyses were performed.

12. Section 3 Data Evaluation Activities: After reviewing the data, there is evidence that some biased samples were not taken, even where gamma scan count rates exceeded investigation levels. Yet some survey units in which this occurred were not flagged for resampling. Please use consistent review decision rules, i.e. incorporating across the board the latest versions of internal criteria for conclusions regarding recommendations for resampling.

13. Section 3 Data Evaluation Activities: Attachment 1 of these comments shows overall guidelines that EPA has used in its reviews of forms and data for trench units and building site survey units. If any of these factors are not already being used by the Navy, please incorporate them into future reviews.

14. Section 3 Data Evaluation Activities: Please see the EPA's comments on the box plots and Q-Q plots submitted June 9, 2017, in which EPA gave the Navy recommendations from statisticians for displaying data in a manner that facilitates efficient reviews. The City created plots for Parcels B and G in this format and provided them to the Navy and

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agency reviewers. These have indeed proven to be effective time savers in EPA Parcel G reviews. Please add these to the final report. Please provide plots in a similar format for other Parcels before sending to the regulatory agencies for review.

15. Section 4 Findings and Recommendations, Section 4.0, p. 4-2: The draft states, "After carefully examining the analytical data and the conceptual model for soil contamination, it is concluded that the upper range of naturally occurring Ra-226 exceeds the release criteria. Therefore, cleanup will be hampered without an understanding that naturally occurring Ra-226 may exceed the release criterion without being indicative of contamination." When Navy did three rounds of attempts to separate storm drain and sewer lines, the fill consisted of many types of piping that were not original. Contamination could have spilled. All soil would have gotten mixed up. The Navy would need to perform alpha spectroscopy to show that Th-230 was in equilibrium with Ra-226 to conclude that Ra-226 is naturally occurring. Either delete this statement or give evidence in the form of laboratory results that Ra-226 present is naturally occurring. If the Navy wishes to establish new reference background levels, new sample collection would need to be located in areas that are established as unimpacted.

16. Section 4.1 Parcel B: EPA will provide comments on the Parcel B sections of this report at a later date.

17. Section 4.2 Parcel G, 4.2.1 Trench Units: The individual forms in Appendix C of this report give more specific documentation of signs of such "soil data manipulation and falsification" and give locations where the Navy recommends further action to address these problems. EPA has identified more locations with signs of falsification. The forms and data also document signs of failure to follow the workplan in multiple locations. In some locations, even when signs of falsification are not found, the record may not be complete enough to allow a determination that ROD conditions have been met. For example, the workplan requires that in addition to systematic soil samples using a grid, 100% scans are also necessary to identify potential hot spots missed between systematic samples. If scan results are missing or if they do not appear to represent a wide range of readings that would be typical, then a determination cannot be made about whether or not potential hotspots were identified and remediated. In these situations and others, further action is necessary before the EPA can concur on a FOST.

Some of the guiding principles of EPA's review included the following:

- Further action recommended action should be based on a technical decision, using best professional judgement, as to whether the record is sufficient to support a conclusion that the ROD requirements have been met to "ensure that no residual radioactivity is present at levels above the remedial goals." Otherwise EPA cannot concur on a FOST.

- If multiple explanations are possible for an observation in the record, then for purposes of recommendations for further action, reviewers should assume the worst case reasonable explanation.

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- Any falsification anywhere in the process in a given survey unit calls into question any findings within that survey unit, and resampling is recommended. If the same team has done the work within a given survey unit, then they could have engaged in falsification during multiple aspects of work in that survey unit, even if statistical analysis did not identify additional evidence of falsification.

Results of EPA's review appear in the attached spreadsheet. The second column with an "overall score" indicates the following determinations:

- 2 = Sufficient evidence has already been found in the form, the FRED database, and/or other sources to conclude the resampling is necessary in this trench unit before EPA can conclude that the record supports that the ROD requirements have been met.

- 0 = No indications have been found thus far for particular concerns in this trench unit. However, as the Navy wrote in Section 1.3 of this draft report, "Because it is impossible to determine whether every instance of potential data manipulation or falsification has been identified, the Navy recommends additional surveys and sampling beyond the areas with evidence of data manipulation. Additional soil sampling locations will be selected in coordination with the regulatory agencies." (Section 1.3, p. 1-2)

In addition, EPA's statistician has created index plots for all Parcel G Trench Units the Navy recommended for "No Further Action" and more specialized plots for some individual Parcel G Trench Units (73, 75, 82, 91, and 121). These analyses are attached separately. The Trench Unit spreadsheet's final column show those trench units that have one of these specific analyses.

18. Section 4.2.2 Fill Units: EPA agrees with the Navy's approach to prioritize fill units for resampling in correspondence with the priority of the source trench units for resampling. That is, if the source trench is suspect, then the destination trench is also suspect. If any single source trench unit is suspect, then because of mixing of material from multiple sources during backfill, all the fill material for a given fill unit is suspect. For fill, EPA is also assuming that if either trench unit or fill unit are suspect then the entire unit needs rework for both trench and fill. Here are several reasons for this assumption. First, if crews are mobilized to sample in a trench unit anyway, this approach provides information about more locations with less additional work. Second, in some locations, the boundary between the fill and the previously unexcavated original fill may not be easy to tell. Documentation of depths and locations of excavation may not be reliable. Finally, cross-contamination could occur between fill and the previously unexcavated original fill.

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In Parcel G, based on the above criteria, the State Department of Toxic Substances Control (DTSC) analysis has concluded that all fill units require resampling. EPA has independently reviewed the findings of the DTSC and concurs with its recommendations.

In other parcels, however, even if fill units have not received soil from suspect source trench units, they may still require resampling if they show additional signs of falsification related to Radiation Screening Yard evaluation or other signs that the data do not provide a sufficient record to confirm ROD conditions are met. As a practical matter for Parcel G, this situation is not relevant because 100% of fill units are already recommended for rescanning and/or resampling through the entirety of the trench unit anyway.

19. Section 4.2.3 Current and Former Building Sites: EPA has also independently reviewed the findings of the California Department of Public Health (CDPH) of building site survey units of concern. EPA concurs with its recommendations for locations that require additional sampling. Please see attached spreadsheet for detailed analysis.

20. Section 4.3 Conclusions and Recommendations: Together, the EPA and the Navy found enough concerns to recommend resampling in 94% of trench units in Parcel G. The data analyzed demonstrate a widespread pattern of practices that appeared to show potential deliberate falsification, potential failure to perform the work required to ensure ROD requirements were met, or both. The data revealed not only potential purposeful falsification and fraud in terms of sample and/or data manipulation, they also reveal the potential failure to conduct adequate scans, a lack of proper chain of custody for ensuring samples were not tampered with, extensive data quality issues (including off-site laboratory data) and general mis-management of the entire characterization and cleanup project.

    These observations in the record call into question the performance of Tetra Tech EC, Inc., across all of Parcel G. Many of the same personnel in Tetra Tech EC, Inc., worked in a similar time period at nearby locations in Parcel G. The pervasiveness and magnitude of the documented wrongdoing makes it difficult to conclude that similar falsification did not also occur at the four out of 63 trench units where evidence of wrongdoing was not as apparent. Therefore, none of the data generated while Tetra Tech EC, Inc., was involved with the cleanup activities at Parcel G, can be deemed to be definitive or defensible. Therefore, the extent of the problems found in Tetra Tech EC, Inc., work and the history of contamination confirmed in Parcel G (see examples listed in the cover letter) make comprehensive rework for characterization, and potential additional cleanup, necessary to demonstrate in the record that ROD requirements have been met.

SPECIFIC COMMENTS

1. Executive Summary: At the beginning, please add the time-period and number of the soil data points being reviewed by this investigation for each parcel. The Navy could move the first

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sentence under Parcel B on page iii and the first sentence of Parcel G on page iv to this area. The community wants to know up front the number of data points reviewed.

2. Executive Summary: Please reference the site maps in the summary that are within the report body. Maps give the reader clarity when discussing areas of concern. In addition, the maps need to be enlarged to be viewed by the myopic eye.

3. Executive Summary: Please move the "Assumptions and Uncertainties" explanation from the end of the summary to the beginning so the reader has this foremost in their mind. It gives them clarity as to why the Navy made certain decisions about the investigation.

4. Executive Summary: In the last paragraph on page i, please add, … "TtTec conducted rework at each of the survey units identified (in parcel C and E) …

5. Executive Summary: Delete the Parcel B and Parcel G Graphs – they do not support the summary nor give any relevant clarity to the reader.

6. Executive Summary: Add to the titles on page iii and iv, Parcel B Recommendations and Parcel G Recommendations.

7. Executive Summary, Parcel G, first bullet, Page iv: The first bulleted item on page iv states that there was evidence of potential data manipulation or falsification in twenty trench units, whereas the remaining forty-three of sixty-three units did not have such evidence. However, there are numerous Data Evaluation Forms provided by the Navy that identified some form of falsification (e.g., TU 97), but then proposed no action. If all of the Data Evaluation Forms that mention alleged falsification associated with activities for each trench unit are counted, there would be more than twenty in total. Please revise this bulleted item to include a tally of all of the Trench Units where data manipulation or falsification was noted in the Data Evaluation Forms.

8. Section 2.1, p. 2-2, paragraph 5 states "If Cs-137 results from the onsite laboratory were at or above the release criteria, isotopic plutonium, isotopic uranium, and Sr-90 were also analyzed by the offsite laboratory." Was this checked as a part of the investigation? If it was not followed this would be another instance of not following the work plan.

9. Section 2.1, Page 2-2, paragraph 3: Suggest deletion of the last sentence since it is subjective. "At this stage, nearly all radioactive contamination is expected to have been removed. Surveying and sampling of the soil above and below the piping was a conservative measure implemented by the Navy. "

10. Section 3.0, Graphical Data Review, Page 3-3: The symbols used on the box plots should be explained in the text. Additionally, it is unclear how uncertainty associated with the collection of radiological data was addressed on the box plots (i.e., whether it was considered). The text should also explain how "bias" and "characterization" samples coordinate with the labels used in the current FRED database built by the Navy. Please revise the Report to address these concerns.

11. Section 4.3, Page 4-34: The text states," The sampling program should be based on the findings of this report and consider that naturally occurring Ra-226 may exceed the release

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criterion without being indicative of site-related contamination." This statement should be deleted since the purpose of performing the analyses was to ensure that the ROC concentrations remaining onsite are below the agreed upon release criteria.

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MINOR COMMENTS (e.g., suggestions for clarity in wording)

1. Executive Summary: On page i, paragraph three, sentence three, change "…were purported to..." to "…were reported to…"

2. Executive Summary: One page i, paragraph three, sentence five, there is an end quotation, but no beginning quotation mark from the TtTec's report. If sentence five is not a direct quote from TtTec's report, please change "…persons listed as the sample collectors,…" to "…employees listed as sample collectors,…"

3. Executive Summary, Page i first bullet of allegations: Here is suggested rewording for clarity: When soil concentrations were expected to be above release criteria, soil samples were collected from a different area known to have lower radioactivity. These samples were incorrectly reported as having come from the original location.

4. Executive Summary, Page ii 3rd bullet. Here is suggested rewording: During the screening of overburden soil, actual towed array scan speeds were greater than allowed speeds. The lower speed reduced the probability of radiation detection and reduced the likelihood of meeting required detection limits.

5. Executive Summary, Page ii last paragraph last sentence. Based on General Comment 2, it is inconsistent to use the term "No Further Action." Here is suggested rewording: "Based solely on a review of the data previously collected by Tetra Tech EC, Inc., and the findings of the data evaluation, recommendations are provided for resampling in some survey units where data revealed concerns." Please delete mention of archived samples for the reasons listed in General Comment 3.

6. Section 1.1 Objective: Suggested rewording: The objective of this evaluation is to review and assess the historical radiological data collected by TtEC at HPNS and recommend follow-up data collection needed to ~~validate~~ evaluate the current radiological conditions and whether release criteria have been met regarding the property identified in this report.

7. Section 2.1, p. 2-2, last paragraph suggested rewording: "If peripheral soil was identified above the release criteria, it was processed as low-level radioactive waste (LLRW), it was disposed of, and the trench segment where the peripheral soil originated was sampled in 3-foot intervals to determine the extent of potential contamination.

8. Table 2-1 says "TtEC. 2011. *Survey Unit Project Reports Abstract, Sanitary Sewer and Storm Drain Removal Project, Hunters Point Shipyard, San Francisco, California, Revision 3.* July 7. YYYY." The year should be included.

9. Section 2.4 Anomalous Soil Samples Report, Page 2-4, second to last sentence: Here is suggested rewording: " indicating that the corrective actions had addressed the problem." Ultimately, TtEC conducted rework at each of the survey units identified. However, in the following years, former workers at HPNS alleged additional and more widespread

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data manipulation and falsification, which have been substantiated by this investigation report.

10. **Section 2. Radiological History**

- Bullet 1: define "Triple A"
- Paragraph 2: Suggest additional langue: Release criteria were discussed and agreed upon by the Navy and regulatory agencies. Areas where low-level radioactive contaminants were addressed, through radiological removal actions by TtEC, include the following:

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ATTACHMENT 1

EPA Review Guidelines for Parcel G Forms, Plots, and Data

Flag in Plots

- Box plots
  - Significantly different populations; look at variability of range for each radionuclides provided
  - Biased lower than the others, would expect biased to be similar to or higher than systematic.
- Q-Q plots - Slope break, sometimes flatter, sometimes steeper, which would be sign of different populations; slopes should be similar for various scan types of each radionuclide (not necessarily for K-40)

Flag in forms

- Multiple rounds of excavations
- Gamma scan or static not provided or range less than 2,000-3,000 counts per min; Scan and statics not consistent (one example showed a range of 2,900 to 9,400 which is normal)
- Off site and on-site lab results significant difference, e.g. > 2X
- Time Series – Time series show anomalies or missing time series, e.g. S024, Cs-137 was remediated but graphs not provided

Other – Open-ended: anything else that looks noteworthy

Enter into Review Spreadsheet:

- Sign of falsification? 1=yes, 0=no, plus add summary of why
- Failure to follow workplan? 1=yes, 0=no, plus add summary of why
- Level of concern/need for resampling
  - 2=high level of concern, e.g. yes signs of potential deliberate falsification found, > 2-3 red flags from above
  - 1= need further review, e.g. no sign of potential deliberate falsification, some uncertainty due to missing or unclear information, 1 red flag found
  - 0=low, e.g. nothing noteworthy observed
- Comments – Other – anything not already covered elsewhere
- Followup research questions? Do we need more info from Navy to make determinations

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