Responses to Comments - Parcel G
Draft Radiological Data Evaluation Findings Report for Parcels B and G Soil, September 2017
Former Hunters Point Naval Shipyard, San Francisco, CA

Reviewer	Date	Comment No.	Section/Figure	Comment	Response
EPA	10/20/2017	1	General, 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.	This report is intended to be technical; however, Sections 1 through 3 were written to be less technical as a bridge for the community fact sheets and meeting materials that the Navy will prepare to address this comment.
EPA	10/20/2017	2	General, 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	The assumptions and uncertainties section is included in the Executive Summary and the text was reworded for clarification. Additionally, due to several comments regarding the "No Further Action" recommendation, it was changed to "No Further Evaluation".
EPA	10/20/2017	3	General, 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, 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).	The purpose of this evaluation was to identify potential falsification and manipulation. Therefore, the evaluation did not identify whether ROD requirements were met, data quality issues, or work plan discrepancies. Physical inspection of archived samples and reanalysis of archived samples will be removed from the report.

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EPA	10/20/2017	4	General, Executive Summary, page vi, last bullet, and Section 1.3 (Assumptions and Uncertainties), page 1-2, The last bullet	States 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. 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.	The focus of this project is to identify potential falsification and manipulation. Data quality procedures were included in work plans and addressed in previous reports that were approved by the regulatory agencies.
EPA	10/20/2017	5	General, 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?	The next steps will be outlined in the work plan and community fact sheets and meeting materials should address these comments as needed.
EPA	10/20/2017	6	General, 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: Gamma Spectroscopy • 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) 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.	The statement in Section 2.3 was revised for clarification. Based on multiple comments, the statement in Section 4 was revised to "After carefully examining the analytical data and conceptual site model for soil contamination, it is suspected that the upper range of naturally-occurring Ra-226 may exceed the release criterion. Therefore, the subsequent work plan will describe a method to determine whether Ra-226 is in equilibrium with its parent, U-238. If Ra-226 and U-238 are in equilibrium, it may be assumed that the Ra-226 is not the result of contamination." The next steps, including the analytical parameters and background approach, will be outlined in the SAP and work plan.

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EPA	10/20/2017	7	General, 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.	A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification.
EPA	10/20/2017	8	General, 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 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.	Currently, not all chain of custody forms are available. As part of the evaluation, "Scan/Static Surveyor Name" and/or "Sampler/Surveyor Name" available in TtEC's reports were included in the forms/report as flags if a suspect worker was identified; however, a flag "does not mean definitely falsification occurred".
EPA	10/20/2017	9	General, 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.	Agree, should data become verified as falsified, the data will need to be identified in some way. The Navy will discuss the appropriate method for handling falsified data with quality control and database groups.
EPA	10/20/2017	10	General, 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.	FSS-BIAS was used in FRED because the rationale for bias samples was not always provided in the reports; therefore, the biased samples were grouped for evaluation. The sentence is accurate as written.
EPA	10/20/2017	11	General, 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.	This specific statement was pulled from TtEC's SAP and was not evaluated as it was not used to identify potential data falsification and manipulation. In general, if Cs-137 was detected at concentrations exceeding the release criterion in a soil sample collected from a trench or fill unit, additional analyses were not included in the laboratory data packages provided in the SUPRs.
EPA	10/20/2017	12	General, 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.	Scan data results will be re-reviewed for confirmation and changes made to the recommendations as appropriate. A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification.

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EPA	10/20/2017	13	General, 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: <u>Flag in Plots</u> • Box plots o Significantly different populations; look at variability of range for each radionuclides provided o 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) <u>Flag in forms</u> • 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 <u>Other – Open-ended: anything else that looks noteworthy</u>	Comment noted. A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification.
EPA	10/20/2017	14	General, 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 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.	The plots provided will be included in Appendix D. On the data evaluation forms, the scales for the box plots and Q-Q plots for each nuclide and each unit will be revised for consistency.
EPA	10/20/2017	15	General, 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.	Based on multiple comments, the statement was revised to "After carefully examining the analytical data and conceptual site model for soil contamination, it is suspected that the upper range of naturally-occurring Ra-226 may exceed the release criterion. Therefore, the subsequent work plan will describe a method to determine whether Ra-226 is in equilibrium with its parent, U-238. If Ra-226 and U-238 are in equilibrium, it may be assumed that the Ra-226 is not the result of contamination."
EPA	10/20/2017	16	General, Section 4.1 Parcel B	EPA will provide comments on the Parcel B sections of this report at a later date.	Comment noted.

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EPA	10/20/2017	17	General, 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. • 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.	Comment noted, see response to DTSC comment 1 below (row 56, highlighted blue).
EPA	10/20/2017	18	General, 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. 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.	Evidence of potential falsification or manipulation at a trench unit is not considered representative of a source and has no link to potential falsification or manipulation at a fill unit. Therefore, the recommendation for confirmation sampling at a trench unit was not considered directly related to the recommendation for excavated soil from that trench unit. The fill units were evaluated independently for evidence of potential falsification or manipulation. Comment noted, see response to DTSC comment 3 in Parcel B tab (highlighted blue). The path forward for confirmation sampling will be included in the work plan.

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EPA	10/20/2017	19	General, 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.	See response to CDPH Specific Comment 5: The logic tests were intended to identify inconsistencies in sample processing by the onsite laboratory. Samples not counted within the 2 week timeframe by the offsite laboratory were not considered in the logic tests because it is expected that the offsite laboratory allowed for 21-day in-growth prior to analysis. A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification. This supplement will include a better explanation of the logic tests. Comment noted, see response to DTSC comment 1 below (row 56, highlighted blue).
EPA	10/20/2017	20	General, 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.	Comment noted, see response to DTSC comment 1 below (row 56, highlighted blue).
EPA	10/20/2017	1	Specific, 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 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.	The time period and the total number of soil data points reviewed were added to first paragraph of the Executive Summary.
EPA	10/20/2017	2	Specific, 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.	References to the figures presenting the areas evaluated and recommendations for each parcel were added to the Executive Summary. Figures are sized as 11x17.
EPA	10/20/2017	3	Specific, 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.	The assumptions and uncertainties section is included in the Executive Summary and seems out of order to include in the beginning.
EPA	10/20/2017	4	Specific, 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) …	Revision was made as requested.
EPA	10/20/2017	5	Specific, Executive Summary	Delete the Parcel B and Parcel G Graphs – they do not support the summary nor give any relevant clarity to the reader.	Revision was made as requested.
EPA	10/20/2017	6	Specific, Executive Summary	Add to the titles on page iii and iv, Parcel B Recommendations and Parcel G Recommendations.	Revision was made as requested.
EPA	10/20/2017	7	Specific, 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.	"No Further Action" was changed to "No Further Evaluation" and the definition was revised to specify that this recommendation was made if no evidence of falsification was found in the FSS sample data.

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EPA	10/20/2017	8	Specific, 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.	See response to EPA General Comment 11: This specific statement was pulled from TtEC's SAP and was not evaluated as it was not used to identify potential data falsification and manipulation. In general, if Cs-137 was detected at concentrations exceeding the release criterion in a soil sample collected from a trench or fill unit, additional analyses were not included in the laboratory data packages provided in the SUPRs.
EPA	10/20/2017	9	Specific, 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. "	Revision was made as requested.
EPA	10/20/2017	10	Specific, 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.	An explanation of the box plots was added to the text; however, analytical uncertainty was not considered in the plots. A data dictionary was provided with FRED and consistent terms were used in the report.
EPA	10/20/2017	11	Specific, 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 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.	Revision was made as requested.
EPA	10/20/2017	1	Minor, Executive Summary: On page i, paragraph three, sentence three	Change "…were purported to..." to "…were reported to…"	Revision was made as requested.
EPA	10/20/2017	2	Minor, 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,…"	Revision was made as requested.
EPA	10/20/2017	3	Minor, 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.	Revision was made as requested.
EPA	10/20/2017	4	Minor, 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.	A higher speed would reduce the probability of radiation detection; therefore, the text was restated as "During the screening of overburden soil, actual towed array speeds were greater than allowed speeds. The higher speed reduced the probability of radiation detection and reduced the likelihood of meeting required detection limits."

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Reviewer	Date	Comment No.	Section/Figure	Comment	Response
EPA	10/20/2017	5	Minor, 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.	See response to EPA General Comment 2: The assumptions and uncertainties section is included in the Executive Summary and the text was reworded for clarification. Additionally, due to several comments regarding the "No Further Action" recommendation, it was changed to "No Further Evaluation". Also, see response to EPA General Comment 3: Physical inspection of archived samples and reanalysis of archived samples will be removed from the report.
EPA	10/20/2017	6	Minor, 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.	The objective was restated as "The objective of this evaluation is to review and assess the historical radiological data collected by TtEC at HPNS for potential falsification or manipulation and recommend follow-up data collection needed to evaluate the current radiological conditions and whether release criteria have been met regarding the property identified in this report. Based on the findings from the evaluation, recommendations are made herein for next steps."
EPA	10/20/2017	7	Minor, 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.	Initially, the gamma radiation investigation level was used as the trigger for classification as LLRW and later, the release criteria were used. Therefore, the sentence was reworded to "If peripheral soil was identified above the gamma radiation investigation level and/or the release criteria....."
EPA	10/20/2017	8	Minor, 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.	The year was added to the reference.
EPA	10/20/2017	9	Minor, 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 data manipulation and falsification, which have been substantiated by this investigation report.	This section is intended to present the findings and corrective actions from the Anomalous Soil Samples report, not the findings of the data evaluation.
EPA	10/20/2017	10	Minor, 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:	Triple A was defined in the text and the revision in paragraph 2 was made as requested.

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Reviewer	Date	Comment No.	Section/Figure	Comment	Response
CDPH	10/24/2017	1	General	The Navy has concluded that the "upper range of naturally occurring Ra-226 exceeds the release criteria" as stated on pages 4-2 and 4-34. Please provide scientific justification for this conclusion. Also, explain why Navy has a different conclusion now, during the re-evaluation of the work conducted previously in Parcels B and G.	Based on multiple comments, the statement in Section 4 was revised to "After carefully examining the analytical data and conceptual site model for soil contamination, it is suspected that the upper range of naturally-occurring Ra-226 may exceed the release criterion. Therefore, the subsequent work plan will describe a method to determine whether Ra-226 is in equilibrium with its parent, U-238. If Ra-226 and U-238 are in equilibrium, it may be assumed that the Ra-226 is not the result of contamination." However, see Section 2.1 and associated references for scientific justification "For soil in the United States, the expected Ra-226 activity is 1 pCi/g and can range from 0.2 to 4 pCi/g (DoD, 2009). Therefore, the HPNS background value for Ra-226 is conservative."
CDPH	10/24/2017	2	General	How does the Navy plan to evaluate the trench units filled with fill units that have evidence of potential data manipulation or falsification?	Further evaluation of trench units and associated fill units will be included in the work plan.
CDPH	2/20/2018	2	Comment on response to comment above	In response to CDPH comments (General Comments 2, Specific Comments 4 and 5), the Navy plans to provide additional information in a supplemental work plan. In summary the Navy plans to provide information on the decision rules for data evaluation including Naturally Occurring Radiological Material (NORM), explanation of logic test evaluation, decision tree data evaluation for trench units and associated fill units. Please note that CDPH would will need to review the additional information provided in the supplemental work plan prior to approving this document.	Comment noted. All work plan documents will be submitted to CDPH for review.
CDPH	10/24/2017	1	Specific, Section Executive Summary, Page 2, Bullet 2, "Reanalysis of Archived Samples"	Explain how the Navy will determine whether the soil samples were appropriately collected, and that there is no indication of falsification, through reanalysis of the archived soil samples.	There were not allegations regarding the initial systematic sample results and the purpose for reanalysis is outlined in Section 4 of the report. Reanalysis of archived samples will be removed from the report.
CDPH	10/24/2017	2	Specific, Section 1.3, Assumptions and Uncertainties, Page 1-2, Bullet 3	States, "Data quality related to Tetra Tech laboratory analytical methods and procedures were not evaluated". Please explain why the Navy is not evaluating the laboratory analytical methods and quality procedures.	The focus of this project is to identify potential falsification and manipulation. Data quality procedures were included in work plans and addressed in previous reports that were approved by the regulatory agencies.
CDPH	10/24/2017	3	Specific, Section 2.1, Storm Drain and Sanitary Sewer Line Investigation, page 2-2, Paragraph 3, last sentence	States, "At this stage, nearly all radioactive contamination is expected to have been removed. Surveying and sampling the soil above and below the piping was a conservative measure implemented by the Navy". Please explain why the Navy considers this approach "conservative".	Based on multiple comments, the statement was removed.
CDPH	10/24/2017	4	Specific, Section 3, "Data Evaluation Activities", Page 3-1, Primary Radionuclides to Evaluate, Bullet 2	Please explain Navy's approach if increased concentrations of Bis-214 is discovered. How will the Navy distinguish between naturally occurring radiological material and radiological contamination?	A proposed NORM evaluation process will be included in the work plan.
CDPH	2/20/2018	4	Comment on response to comment above	In response to CDPH comments (General Comments 2, Specific Comments 4 and 5), the Navy plans to provide additional information in a supplemental work plan. In summary the Navy plans to provide information on the decision rules for data evaluation including Naturally Occurring Radiological Material (NORM), explanation of logic test evaluation, decision tree data evaluation for trench units and associated fill units. Please note that CDPH would will need to review the additional information provided in the supplemental work plan prior to approving this document.	Comment noted. All work plan documents will be submitted to CDPH for review.

Responses to Comments - Parcel G
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Reviewer	Date	Comment No.	Section/Figure	Comment	Response
CDPH	10/24/2017	5	Specific, Section 3, Data Evaluations Activities, Page 3-2, Logic Tests, Bullet 2	States, "It is expected that final systematic soil samples would have been collected as a group on the same day, would have been the final set of samples collected, would have been analyzed as a group within 2 working day, would have been the collected before they were counted by the onsite laboratory, and would have been counted by the onsite laboratory within 2 weeks of sample collection to meet production schedules." EMB noted several Data Evaluation Documentation and Findings forms for Building Sites 317/364/365 that indicates samples were not counted within the two-week timeframe by the offsite lab. EMB is recommending resampling of these survey units. See attached.	The logic tests were intended to identify inconsistencies in sample processing by the onsite laboratory. Samples not counted within the 2 week timeframe by the offsite laboratory were not considered in the logic tests because it is expected that the offsite laboratory allowed for 21-day in-growth prior to analysis. A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification. This supplement will include a better explanation of the logic tests.
CDPH	2/20/2018	5	Comment on response to comment above	In response to CDPH comments (General Comments 2, Specific Comments 4 and 5), the Navy plans to provide additional information in a supplemental work plan. In summary the Navy plans to provide information on the decision rules for data evaluation including Naturally Occurring Radiological Material (NORM), explanation of logic test evaluation, decision tree data evaluation for trench units and associated fill units. Please note that CDPH would will need to review the additional information provided in the supplemental work plan prior to approving this document.	Comment noted. A Draft Final version of the report will be provided for review and will include the supplement.
CDPH	10/24/2017	6	Specific, Section 4.0 , Findings and Recommendations, Page 4-1, last paragraph	EMB does not agree with the statement, "Contamination from leakage or drain line repair should be relatively rare, yet the release criteria for Ra-226 was exceeded many times in soil samples collected from the excavated soil and trench sidewalls. After carefully examining the analytical data and the conceptual site 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 being indicative of contamination." This statement does not correlate with the conceptual site model described in Section 2.1 "Storm Drain and Sanitary Sewer Line Investigation". Please clarify.	Based on multiple comments, the statement was revised to "After carefully examining the analytical data and conceptual site model for soil contamination, it is suspected that the upper range of naturally-occurring Ra-226 may exceed the release criterion. Therefore, the subsequent work plan will describe a method to determine whether Ra-226 is in equilibrium with its parent, U-238. If Ra-226 and U-238 are in equilibrium, it may be assumed that the Ra-226 is not the result of contamination."
CDPH	10/24/2017	7	Specific, Parcel G Trench Units 89, 111, 118 and 151	For Trench 151, there is a gap of two years between commencement of excavation (11/28/2007) and concurrence on backfilling (12/14/2009). Please explain.	Per the RACR (TtEC, 2011), originally, portions of TU114, TU119, and TU151 were each part of TU84. Over the course of numerous sampling and remediation events, it became apparent that areas on the east, south, and west ends of TU84 needed to be realigned and segregated into three separate trench survey units to facilitate the remediation and FSS activities. This will be noted in the forms.
DTSC	10/20/2017	1	General	DTSC does not agree with the recommendations indicated in the Executive Summary and Section 4.3 regarding the number of trench units, fill units, and current and former building sites in Parcel G that require no further action (NFA). Please refer to the EPA comments on this Report in regard to the Parcel G trench and building units, which DTSC concurs with (submitted October 20, 2017 via email).	See response to EPA General Comment 17: The purpose of this evaluation was to identify potential falsification and manipulation. Therefore, the evaluation did not identify whether ROD requirements were met, data quality issues, or work plan discrepancies. Because EPA's data review did identify these in their evaluation, the findings and recommendations differ. Therefore, it is recommended that Section 4.3 of the report include a discussion of the evaluation EPA conducted with differing results based on professional judgement, and to include the comments and evaluation in an appendix to the report. The Navy will ensure that RAOs are achieved prior to completing a FOST and transferring property.

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Reviewer	Date	Comment No.	Section/Figure	Comment	Response
DTSC	1/23/2018	1	Comment on response to comment above	DTSC does not agree with the Navy's response. Agency recommendations were based on findings provided by the Navy and not all were based on data quality issues, and those based on professional judgment were justified and reasonable. We find it unacceptable that the Navy will not consider revisions to their recommendations. DTSC will not concur on the final findings report if revisions are not made.	As requested, the last paragraph of Section 4.3 will be revised as requested as follows: ORAU, the City of San Francisco, USEPA, DTSC, and CDPH reviewed and provided comments on this report. ORAU concluded the following: "ORAU agrees in most of the cases with the recommendations. However, several survey units were recommended for no further action that ORAU believes should be candidates for further investigation." Specific survey units were not provided. In addition, the USEPA, DTSC, and CDPH conducted a detailed review of the data evaluation forms and included additional potential categories of concerns, such as data quality issues. Their findings call into question the reliability of soil data in additional survey units in Parcels B and G. Because the Navy cannot provide assurance that the evaluation identified every instance of data manipulation or falsification, the Navy and regulatory agencies will work collaboratively to initiate a sample collection program to confirm protectiveness of human health and the environment. This paragraph will also be added to the Executive Summary.
DTSC	3/20/2018	1	Comment on response to comment above	The response indicates: Therefore, it is recommended that Section 4.3 of the report include a discussion of the evaluation EPA conducted with differing results based on professional judgement, and to include the comments and evaluation in an appendix to the report. When will we see the revision so that we can determine if it is acceptable?	A Draft Final version of the report will be provided for review as soon as possible.

Reviewer	Date	Comment No.	Section/Figure	Comment	Response
DTSC	10/20/2017	2	General	DTSC has reviewed the findings of CDPH EMB and the EPA's analysis of the building units. DTSC concurs with these recommendations as indicated in the EPA comments on this Report (submitted October 20, 2017 via email).	See response to CDPH Specific Comment 5: The logic tests were intended to identify inconsistencies in sample processing by the onsite laboratory. Samples not counted within the 2 week timeframe by the offsite laboratory were not considered in the logic tests because it is expected that the offsite laboratory allowed for 21-day in-growth prior to analysis. A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification. This supplement will include a better explanation of the logic tests. Also, see response to EPA General Comment 17: The purpose of this evaluation was to identify potential falsification and manipulation. Therefore, the evaluation did not identify whether ROD requirements were met, data quality issues, or work plan discrepancies. Because EPA's data review did identify these in their evaluation, the findings and recommendations differ. Therefore, it is recommended that Section 4.3 of the report include a discussion of the evaluation EPA conducted with differing results based on professional judgement, and to include the comments and evaluation in an appendix to the report. The Navy will ensure that RAOs are achieved prior to completing a FOST and transferring property.
DTSC	1/23/2018	2	Comment on response to comment above	The response given does not address the comment. It seems as if the response was meant for another comment. Please respond to General Comment 2.	DTSC is referring to CDPH's and EPA's evaluation findings. The response above includes reference to the CDPH and EPA responses to comments on their findings.
DTSC	3/20/2018	2	Comment on response to comment above	The response indicates: A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification. This supplement will include a better explanation of the logic tests. When will we see the revision so that we can determine if it is acceptable?	A Draft Final version of the report will be provided for review as soon as possible and will include the supplement.
DTSC	10/20/2017	3	General	DTSC has reviewed the findings of the EPA's analysis of the trench units. It appears that all of the destination trench units where the excavated soil was used, are now recommended for resampling by either the Navy or EPA. DTSC concurs with these recommendations. Therefore, we request 100% of the fill units to be resampled.	See response to EPA General Comment 17: The purpose of this evaluation was to identify potential falsification and manipulation. Therefore, the evaluation did not identify whether ROD requirements were met, data quality issues, or work plan discrepancies. Because EPA's data review did identify these in their evaluation, the findings and recommendations differ. Therefore, it is recommended that Section 4.3 of the report include a discussion of the evaluation EPA conducted with differing results based on professional judgement, and to include the comments and evaluation in an appendix to the report. The Navy will ensure that RAOs are achieved prior to completing a FOST and transferring property.

Reviewer	Date	Comment No.	Section/Figure	Comment	Response
DTSC	1/23/2018	3	Comment on response to comment above	See follow-up comment to DTSC General Comment 1 (first bullet).	As requested, the last paragraph of Section 4.3 will be revised as requested as follows: ORAU, the City of San Francisco, USEPA, DTSC, and CDPH reviewed and provided comments on this report. ORAU concluded the following: "ORAU agrees in most of the cases with the recommendations. However, several survey units were recommended for no further action that ORAU believes should be candidates for further investigation." Specific survey units were not provided. In addition, the USEPA, DTSC, and CDPH conducted a detailed review of the data evaluation forms and included additional potential categories of concerns, such as data quality issues. Their findings call into question the reliability of soil data in additional survey units in Parcels B and G. Because the Navy cannot provide assurance that the evaluation identified every instance of data manipulation or falsification, the Navy and regulatory agencies will work collaboratively to initiate a sample collection program to confirm protectiveness of human health and the environment. This paragraph will also be added to the Executive Summary.
DTSC	3/20/2018	3	Comment on response to comment above	The response indicates: Therefore, it is recommended that Section 4.3 of the report include a discussion of the evaluation EPA conducted with differing results based on professional judgement, and to include the comments and evaluation in an appendix to the report. When will we see the revision so that we can determine if it is acceptable?	A Draft Final version of the report will be provided for review as soon as possible.
DTSC	10/20/2017	4	General	DTSC understands that more than one fill unit was required to fill a trench unit, and mixing most likely occurred. It is impossible to identify where in the trench unit the soil was placed. Therefore, sampling throughout the trench unit will be required.	Further evaluation of trench units and associated fill units will be included in the work plan.
DTSC	10/20/2017	5	General	It should be stated in the text of this report the possible next steps. For example: a. The reanalysis of archived soil samples may result in the need to collect confirmation samples. b. The collection of confirmation soil samples may lead to the need for collection of addition sample data and/or remediation.	Next steps will be included in the work plan.
DTSC	10/20/2017	6	General	The Report does not indicate how each of the allegations presented are addressed by the evaluations presented. It should be clearly demonstrated how each allegation of falsification is being addressed and how possible falsification can be identified with the various evaluations processes that were performed. The Report should also indicate if no evaluation tool has been identified to address an allegation.	A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification. The report and supplement indicate what data was available and evaluated.
DTSC	1/23/2018	6	Comment on response to comment above	DTSC would like the opportunity to review the supplement to the data evaluation section prior to submittal of the final report.	A Draft Final version of the report will be provided for review and will include the supplement.
DTSC	3/20/2018	6	Comment on response to comment above	The response indicates: A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification. This supplement will include a better explanation of the logic tests. When will we see the revision so that we can determine if it is acceptable?	A Draft Final version of the report will be provided for review and will include the supplement.
DTSC	10/20/2017	7	General	The range of naturally occurring Ra-226 has not been demonstrated. It is inappropriate to indicate that radionuclide concentrations are within a naturally occurring range that has not yet been established. In order to determine the range of naturally occurring Ra-226 at the Hunters Point site, the Navy will need to submit a draft work plan with the process for making such a determination to the regulatory agencies for review and acceptance. See also Specific Comment 16.	Based on multiple comments, the statement in Section 4.1 was revised to "After carefully examining the analytical data and conceptual site model for soil contamination, it is suspected that the upper range of naturally-occurring Ra-226 may exceed the release criteria. Therefore, the subsequent work plan will describe a method to determine whether Ra-226 is in equilibrium with its parent, U-238. If Ra-226 and U-238 are in equilibrium, it may be assumed that the Ra-226 is not due to contamination." The statement at the end of Section 4.3 was removed.

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Reviewer	Date	Comment No.	Section/Figure	Comment	Response
DTSC	10/20/2017	8	General	Please revise and/or replace the Box Plots and Quantile Plots provided in the report with ones that are more readable, e.g. same scale and within the same plot for better interpretation. See the attached examples provided by Langan environmental consulting.	The scales for the box plots and Q-Q plots for each nuclide and each unit will be revised for consistency.
DTSC	1/23/2018	8	Comment on response to comment above	The response is not clear. Will the requested box and Q-Q plots be provided with the submittal of the final summary findings report or another document.	A Draft Final version of the report will be provided for review as soon as possible.
DTSC	1/23/2018	8	Comment on response to comment above	What final documents will they provided in? This final report or other?	A Draft Final version of the report will be provided for review as soon as possible.
DTSC	10/20/2017	1	Specific, Executive Summary, bullet #7	The statement from the previous bullet should be added to this one as well, "thereby reducing the probability of radiation detection".	Revision was made as requested.
DTSC	10/20/2017	2	Specific, Executive Summary, 2nd set of bullets, bullet #2	Please justify within the text of the Report why the archived soil samples (initial systematic samples) may be considered valid given Tetra Tech EC, Inc.'s (TtEC) attempt to falsify other samples.	There were not allegations regarding the initial systematic sample results. Reanalysis of archived samples will be removed from the report.
DTSC	10/20/2017	3	Specific, Executive Summary, 2nd set of bullets	What is the decision criteria for the various recommendations; reanalysis of archived samples, collect new confirmation samples, inspection of archived samples? The first, reanalysis of archived samples, will only be acceptable if there is confidence in the validity of the sample. The later will be subjective and provide no quantitative results that can be used as a decision maker and, therefore, should be deleted.	A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification. Physical inspection of archived samples and reanalysis of archived samples will be removed from the report.
DTSC	3/20/2018	3	Comment on response to comment above	The response indicates: A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification. This supplement will include a better explanation of the logic tests. When will we see the revision so that we can determine if it is acceptable?	A Draft Final version of the report will be provided for review and will include the supplement.
DTSC	10/20/2017	4	Specific, Executive Summary, 2nd set of bullets, Confirmation Sampling	Indicates collection of additional data may include surveys and scans. Please define and/or explain the difference between the two. These terms are used throughout the report in various forms. Please also define/describe the term static. Section 2.1 refers to radiological surveys as gamma surface scans, gamma radiation scan surveys, and refers to both static and scan measurements.	Radiological survey is defined in Section 2.1 and the text was revised to clarify the terms gamma surface scan and gamma static measurements for consistency throughout.
DTSC	10/20/2017	5	Specific, Executive Summary, Footnote #3 and Section 4, Footnote #1	This is an important footnote. Suggest it is included in the main text of the Report rather than as a footnote.	The footnote was incorporated into the main text of Section 2.1.
DTSC	10/20/2017	6	Specific, Executive Summary, Assumptions and Uncertainties, Bullet #3	Please revise as follows: Data quality related to TtEC's laboratory analytical methods and procedures has been assessed and approved by the Navy and regulatory agencies in previous reports submitted by TtEC.	Revision was made as requested.
DTSC	10/20/2017	7	Specific, Section 1.3, last bullet	See Specific Comment #6.	Revision was made as requested.
DTSC	10/20/2017	8	Specific, Section 2.1	Were static scan surveys performed on piping only? Please clarify.	No, these measurements were also made in soil and this was clarified in the text.
DTSC	10/20/2017	9	Specific, Section 2.3	Indicates Ra-226 release criteria is 1 pCi/g above background activity. This should be included in Table 2-1 table as a footnote.	Revision was made as requested.
DTSC	10/20/2017	10	Specific, Section 2.5	An additional allegation that should be considered and listed: When soil was to be used as backfill, rather than disposed of off-site, screening procedures may have been more lax. This is per the EPA list of allegations.	The list of allegations specifies the practices that may have been considered more lax (e.g., scan speed, distance of detector from soil surface, and failure to sample at high gamma radiation readings).
DTSC	10/20/2017	11	Specific, Section 3, 1st paragraph	Clarification is needed between #1 and #2; they appear very similar.	The text was revised for clarification.
DTSC	10/20/2017	12	Specific, Section 3, 1st paragraph, #3	This should be included in the executive summary as well.	Revision was made as requested.

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Reviewer	Date	Comment No.	Section/Figure	Comment	Response
DTSC	10/20/2017	13	Specific, Section 3	An additional bullet should be added to describe how suspect data were evaluated. Suggestion: Additional Evaluation. This category would cover such things as review of SUPRs for gamma scan range for criteria exceedances, which was identified numerous times. And also, gamma scan performed after the final systematic samples were collected.	The additional evaluation is discussed after the bullets in Section 3 and clarifying text was added to the beginning of Section 4. In addition, a supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification.
DTSC	10/20/2017	14	Specific, Section 3, 1st bullet	It is not clear that laboratory results were used to fill in data gaps found in TtEC's database. If this is correct, please revise this section so that it is clear to the reader that laboratory results were used in place of missing or incorrect data found in TtEC's database.	The text was revised for clarification.
DTSC	10/20/2017	15	Specific, Section 3, 4th bullet, Logic Tests	The approach includes assumptions regarding final systematic soil samples. Assumptions should also be included about initial systematic samples to explain why/if there is confidence in the data.	Decisions were based on FSS data; therefore, they were the focus of the evaluation. Data was compared to the initial data if available and there were not allegations regarding the initial systematic sample results.
DTSC	10/20/2017	16	Specific, Section 4, last paragraph	Indicates "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." DTSC agrees with the later part of this statement, however, the Navy has not presented an evaluation of the range of naturally occurring Ra-226. Therefore, this statement must be deleted. See General Comment #1 above.	Based on multiple comments, the statement was removed.
DTSC	10/20/2017	17	Specific, Section 4.1.1.1	Indicates that one sample will be reweighed and reanalyzed. In the interest of time, please include the next step as well. a. What will the reweigh and reanalyze tell you, and how will that information be used? b. Will the next step be to reanalyze all initial systematic samples or collect new confirmation samples?	Next steps will be included in the work plan.
DTSC	10/20/2017	18	Specific, Section 4.1.2.1	It appears that OB 72 should be OB 196.	This was corrected.
DTSC	10/20/2017	19	Specific, Section 4.1.2.2, OB 72	Recommends confirmation sampling. Please clarify in the text that sampling of a fill unit (both ES and 08) will be conducted in the TU where it was used to fill.	Next steps will be included in the work plan.
DTSC	10/20/2017	20	Specific, Section 4.1.3.1, SU G, last sentence	Indicates sample results from Building 103 SUs A through F are suspect. This should indicate A through G.	This statement was revised for clarification and consistency for each of the survey units.
DTSC	10/20/2017	21	Specific, Section 4.2.1.1, TU 77	Please clarify the term "survey activity" in the text. This term is repeated often but it is unclear what that entails.	The text was revised for clarification throughout.
DTSC	10/20/2017	22	Specific, Section 4.2.1.1, TU 77, 81, 90, 95, 105, 109, 110, 112, 113, 114, 120, 122, 123, 129, 153	Add new bullet. See Specific Comment #13.	Clarifying text was added to the beginning of Section 4. In addition, a supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification.
DTSC	10/20/2017	23	Specific, Section 4.2.1.1 TU 94	Add new bullet. See comment #13 above.	Clarifying text was added to the beginning of Section 4. In addition, a supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification.
DTSC	10/20/2017	24	Specific, Section 4.2.2.1, ES 12, 1st sentence	States, "Soil used to create ES 6 originated ..... " It appears this should state ES 12.	This was corrected.
DTSC	10/20/2017	25	Specific, Section 4.3, last paragraph	See General Comment #1. Delete last sentence.	Based on multiple comments, the statement was removed.
DTSC	1/23/2018	1	Section 2.5, bullet 6	A sentence was added that appears to be an incorrect statement. Please replace the word lower with higher.	The change was made as requested.

Responses to Comments - Parcel G
Draft Radiological Data Evaluation Findings Report for Parcels B and G Soil, September 2017
Former Hunters Point Naval Shipyard, San Francisco, CA

Reviewer	Date	Comment No.	Section/Figure	Comment	Response
SFDPH	10/16/2017	1	General	We recognize that a tremendous effort has been put into the data analysis efforts of these Parcel B and G reports and that it is difficult to write a document that will satisfy everyone's needs. In particular, the follow-up final version of this Parcel B and G document may not satisfy the needs of interested parties who wish to have an overall summary of what is and isn't included in this overall basewide data evaluation project. We offer these comments towards the goal of improving the overall summary and look forward to discussions of how and where such a summary could be written and distributed. If such a summary becomes a separate document (e.g., Fact Sheet) and consequently the summary information isn't needed in this Parcel B and G report (i.e., the introduction of this report could be shortened), that might reduce the time needed to finalize this report. We request that some version of the summary information be written and available for a wider distribution in a timely manner. In addition to the information provided in this Findings Report, the summary document/section should provide: A - A description regarding exclusion of Parcel D-1, Parcel E-2 and IR 7/18 from the basewide data evaluation project (as shown on Figures 1-1 & 1-2). We understand the reason for not including these areas was because TtEC didn't have contracts to work in these areas. Please also include an explanation of how Navy contracting oversight or other mechanism(s) provide assurance that non-TtEC contractors had control of their work areas (e.g., by fencing, screen in and out procedures, etc.). B - A description regarding exclusion of certain radiologically impacted buildings from the basewide data evaluation project and/or soil-specific evaluations for specific parcels. How are certain radiologically impacted buildings differentiated from the larger set of radiologically impacted buildings at HPNS (e.g., the difference of building material vs. soil)? C - A description of the Navy's process for identifying allegations of falsification or data manipulation. Please include information to address a concern that was raised at the Mayor's Hunters Point Shipyard Citizens Advisory Committee (CAC) meeting on 11 September 2017 regarding how allegations were identified and if all involved TtEC employees were interviewed.	A and B - The community fact sheets and meeting materials should address these comments as needed. C - A supplement to the data evaluation section is being prepared that will include the decision rules used for the evaluations for clarification.
SFDPH	10/16/2017	2	General	In order to not delay the work for Parcels B and G, this summary document might also refer to future work efforts and topics. One such work effort is related to the concept that naturally occurring Ra-226 may exceed the release criterion without being indicative of contamination. See specific comment 19 below with further details.	Based on multiple comments, the statement was removed.
SFDPH	10/16/2017	3	General	If you decide to focus this report narrowly on Parcels B and G (see comment #1 above), please consider revising the objective and scope sections to clarify report-specific objective and scope (i.e., related to Parcels B and G soil samples and identification of trench, fill, and building survey units for resampling or reanalysis of archived samples). Please also consider changing figures in Section 3 to focus on Parcels B and G.	Based on the reporting schedule, similarity in the background and history, and data evaluation methodology used, Sections 1 through 3 are intended to be general.
SFDPH	10/16/2017	1	Specific, Figure 1-1, HPNS and Parcel Locations	Given that not all HPNS parcels are shown on Figure 1, please consider renaming Figure 1-1 as "HPNS Parcels Included in Basewide Radiological Data Evaluation," or similar.	Revision was made as requested.
SFDPH	10/16/2017	2	Specific, Figure 1-2, Scope of Data Evaluation	A blue trench unit is shown to extend on to Lot 3 at IR 7/18 on Figure 1-2. Please confirm whether this trench was reviewed (and is recommended for NFA) in conjunction with the remainder of Parcel B, excluding IR 7/18. If true, we agree with this approach because that section of Lot 3 allows residential use.	If Trench Unit 59 is being referred to (see Figure 4-2), it is being recommended for no further evaluation.
SFDPH	10/16/2017	3	Specific, Figure 1-2, Scope of Data Evaluation	When introducing Figure 1-2, the text states "Figure 1-2 presents the areas evaluated by TtEC and defines the scope of the data evaluation." We recommend 'evaluated by TtEC' be changed to 'where work was completed by TtEC'. Can you also clarify if the review is limited to specific dates of TtEC work?	The statement introducing Figure 1-2 was revised and clarified per comment and the dates were added to the text.
SFDPH	10/16/2017	4	Specific, Figure 1-2, Scope of Data Evaluation	Please clarify in text and on Figure 1-2 whether Figure 1-2 shows all current and former buildings being evaluated or only those buildings where soil samples were collected.	The text and figure title was revised for clarification.
SFDPH	10/16/2017	5	Specific, Section 1, Introduction, page 1-1, first paragraph, last three sentences	We suggest the following revisions: Separate reports will be provided for interior building surfaces ~~and for soil collected from other parcels at HPNS~~. This report is limited to the soil data at Parcels B and G. The other parcels (C, D-2, E, UC-1, UC-2 and UC-3) and HPNS buildings interiors will be addressed in future reports.	Revision was made as requested.
SFDPH	10/16/2017	6	Specific, Section 1.2, Scope of Data Evaluation, page 1-2, first sentence	Please revise as follows: building sites include approximately 50,000 soil samples and each sample is analyzed for multiple constituents resulting in ~~(equivalent to~~ more than 900,000 analytical results~~)~~. The samples were collected from more than 300 trench units, more than 500 fill units, more than 25 current and former building sites, and 11 survey units at the North Pier.	Revision was made as requested.
SFDPH	43024	7	Specific, Section 1.3, Assumptions and Uncertainties, page 1-2	While we understand that the Navy has discussed reliance on the previous data quality assessment related to TtEC's laboratory analytical methods and procedures with the regulatory agencies, please provide an explanation of acceptability for the purpose of records-keeping. Specifically, how do the previous laboratory analytical methods and procedures for data quality assessment differ from the current scope of the assessment related to potential data manipulation and falsification? Is it known that quality control measures were appropriately followed by TtEC?	The focus of this project is to identify potential falsification and manipulation and data quality was not evaluated. Data quality procedures were included in work plans and addressed in previous reports that were approved by the regulatory agencies.
SFDPH	10/16/2017	8	Specific, Section 2.0, Radiological History, page 2-2	Please provide a brief explanation of investigation levels. In Section 4, it is unclear why investigation levels that trigger biased sampling vary between survey units at 7,048 and 9,894 counts per minute.	A description of investigation levels as defined in the work plan (TtEC, 2010) was added to Section 2.1.

Responses to Comments - Parcel G
Draft Radiological Data Evaluation Findings Report for Parcels B and G Soil, September 2017
Former Hunters Point Naval Shipyard, San Francisco, CA

Reviewer	Date	Comment No.	Section/Figure	Comment	Response
SFDPH	3/6/2018	8	Comment on response to comment above	The Navy's Response to our Comment 8 included the addition of a footnote to section 2.1. While the footnote is helpful, it is qualitative in nature and does not explain why different gamma scan investigation levels (ILs; e.g., 7,048 cpm and 9,894 cpm) are seen in Section 4. Please include some discussion of why different ILs were applied, e.g. different reference areas were used (to reflect different material types, perhaps), different survey instruments were used, etc.	Comment noted. Footnote revised to read, As described in the Work Plan (TtEC, 2010c), "investigation levels are specific levels of radioactivity used to indicate when additional investigation may be necessary. Investigation levels also serve as a QC check. For example, in addition to indicating potential contamination, a measurement that exceeds the investigation level may indicate a failing instrument. For gamma surface scan surveys, the investigation level will normally be established at the reference area mean plus 3σ, where σ is the standard deviation of the gamma readings in the reference area." Investigation levels are instrument specific and because various instruments were used during survey activities, investigation levels varied based on the individual instrument's parameters (TtEC, 2011b, 2012).
SFDPH	10/16/2017	9	Specific, Section 2.3, Release Criteria	Please provide the reference(s) for determination of background at Parcels B and G. Please also specify the location of the "area free of potential contamination."	Text was added to address this comment.
SFDPH	10/16/2017	10	Specific, Section 2.5, Former Worker Allegations	The sixth bullet in Section 2.5 states that "During the screening of overburden soil, actual towed array speeds were greater than allowed speeds, thereby reducing the probability of radiation detection." Please clarify whether all backfill sourced from trench units should be considered suspect?	The process for evaluating trench and fill units is detailed in the report and recommendations were based on the results of the evaluation. Per the recommendations, not all backfill sourced from trench units was identified as suspect.
SFDPH	10/16/2017	11	Specific, Figure 2-1, Parcel B Current and Former Building Site Locations, and Figure 2-2, Parcel G Current and Former Building Site Locations	Please update legend for blue areas as "Survey Units where soil samples were collected [by TtEC]." It also looks like some survey unit labels may be missing from Building 130.	The figure revision will be made as requested. The survey units labeled are the survey units where TtEC collected soil samples at Building 130 and are correct.
SFDPH	10/16/2017	12	Specific, Section 3, Data Evaluation Activities, Historically Significant Sites, page 3-3, 3rd sub-bullet	Please consider rephrasing "How data were flagged as unusual or suspect." Please clarify that these areas are being flagged as higher potential risk if not properly remediated rather than actual suspicion of falsification. Please carry change forward into Section 4 as appropriate.	Removed "as unusual or suspect" and clarification was provided as to why these areas are flagged. A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification.
SFDPH	10/16/2017	13	Specific, Section 3, Data Evaluation Activities, Sites Based on Allegations, pages 3-3 and 3-4	Should the purpose be expanded as "To identify sites based on [direct] allegations [by suspect workers] of data manipulation or falsification [and sites where those workers conducted work without specific allegations]? It is unclear how the last sentence of the third bullet (top of page 3-4) relates to "Sites Based on Allegations." If interpreting correctly, should this sentence be revised as "Data [for sites with suspect workers but no direct allegations] will be further scrutinized…"?	The purpose description was meant to be broad so that additional allegations could be added as appropriate. Minor revisions to the text were made for clarification.
SFDPH	10/16/2017	14	Specific, Section 3, Data Evaluation Activities, Statistical Tests, Third bullet, page 3-2	Please elaborate regarding how the Navy made the determination that the distribution of sample data is or is not significantly different using K-S test results. Also, the Navy states "The results from [statistical tests other than K-S tests] were available for review during the evaluation as needed." Please elaborate regarding how statistical tests other than K-S tests were used to support the evaluation.	A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification.

Reviewer	Date	Comment No.	Section/Figure	Comment	Response
SFDPH	10/16/2017	15	Specific, Section 4, Findings and Recommendations, page 4-2	The Navy states "…leakage or drain line repair should be relatively rare, yet the release criteria for Ra-226 was exceeded many times in soil samples collected from the excavated soil and trench sidewalls. 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." While the Navy has discussed this possibility with the regulatory agencies, this concept will need more discussion and details to be considered during the future resampling efforts. In order to not hamper the finalization of this report, should these words just refer to ongoing reports or work efforts? What findings in the Navy's evaluation of analytical data and the conceptual model lead to the conclusion that the upper range of naturally occurring Ra-226 exceeds the release criteria currently set at 1pCi/g above the background activity? The Navy also states that "cleanup will be hampered without an understanding that naturally occurring Ra-226 may exceed the release criterion without being indicative of contamination." Please clarify whether this statement is referring to additional cleanup at the areas recommended for re-evaluation? Would it be possible for the Navy to refer to the steps being taken to understand the range of naturally occurring Ra-226 levels or reference future reports or work efforts?	Based on multiple comments, the statement was revised to "After carefully examining the analytical data and conceptual site model for soil contamination, it is suspected that the upper range of naturally-occurring Ra-226 may exceed the release criterion. Therefore, the subsequent work plan will describe a method to determine whether Ra-226 is in equilibrium with its parent, U-238. If Ra-226 and U-238 are in equilibrium, it may be assumed that the Ra-226 is not the result of contamination."
SFDPH	10/16/2017	16	Specific, Section 4.1.1.1, Recommended for Reanalysis of Archived Samples, Trench Unit 59, page 4-2, second bullet	The Navy recommends that the suspect sample collected at TU 59 be reanalyzed. The sample is considered suspect due to differences in sample mass recorded by the onsite and offsite labs. If the sample is re-weighed and still found to differ in mass from the sample analyzed at the onsite lab, then it is unclear what the Navy hopes to gain by reanalysis of an archived sample that may be a falsified replacement. Please clarify.	The recommendation is being revised to no further evaluation per the updated evaluation form.
SFDPH	10/16/2017	17	Specific, Section 4.1.2.1, Recommended for Reanalysis of Archived Samples, Overburden Unit 196	Please correct second bullet. It is not clear why it is citing OB 72.	This was corrected.
SFDPH	10/16/2017	18	Specific, Section 4.1.2.3, Recommended for Confirmation Sampling Based on Evidence of Biased Sample Collection at Locations to Potentially Avoid Highest Gamma Scan Measurements, page 4-6, and Section 4.2.2.2, Recommended for Confirmation Sampling, Recommended for Confirmation Sampling Based on Evidence of Biased Sample Collection at Locations to Potentially Avoid Highest Gamma Scan Measurements	For clarity, please consider modifying the last sentence as follows, "Therefore, confirmation sampling and analysis by an independent, certified laboratory are recommended to document current site conditions at ~~the following~~ fill units [where biased sampling did not identify activity above release criteria despite gamma scan measurements above the investigation level, as follows]…" Also, please explain why identification of no samples is an appropriate threshold as opposed to a number of samples a certain degree less than the number of gamma scan measurements above the investigation level? Could an expected ratio be assumed based on other work at HPS that is not under suspicion?	Revisions were made to the text for clarification. A supplement to the data evaluation section is being prepared, for inclusion in the final report, that will include the decision rules used for the evaluations for clarification.
SFDPH	10/16/2017	19	Specific, Section 4.3, Conclusions and Recommendations, page 4-34	The conclusion states "The sampling program should be based on the findings of this report and consider that naturally occurring Ra-226 may exceed the release criterion without being indicative of site-related contamination." As indicated in general comment 2 above, we recommend this report state that additional information will be presented in a different document to confirm that Ra-226 concentrations above the release criterion may not be indicative of site-related contamination.	Based on multiple comments, the statement was removed.