N00247.000475
NTC SAN DIEGO
SSIC #5090.3

01 December 1997

RESPONSE TO REGULATORY COMMENTS ON DRAFT WORK PLAN ADDENDUM FOR EXTENDED SITE ASSESSMENT AT POI 29, NAVAL TRAINING CENTER, SAN DIEGO CTO-0122

Comments from Martin Hausladen

Received by facsimile on 12 November 1997
Martin Hausladen
United States Environmental Protection Agency

GENERAL COMMENTS

Comment 1: Section 1, page 1-1, paragraph 2: It is not correct to state that "...and a Quality Assurance Project Plan (QAPP) (Attachment B) that have been tailored to meet the requirements of this project" because Attachment B is a generic, "boiler-plate" QAPP with no site specific information. The QAPP needs to be rewritten with an appropriate level of detail. Specific examples of missing information include (but are not limited to):

- While definitions of precision, accuracy, representativeness, completeness, and comparability (PARCC) are presented, no numerical criteria are established in the plan.
- The plan is lacking any discussion of analytical methods and quantitation limits required to achieve DQOs.
- Field measurements and instrument calibration are described but there is no indication of what field instruments will be used or what measurements will be performed.

Response 1: The Navy has developed a model QAPP for the CLEAN program. This model was used as the basis for Attachment B of the draft Work Plan Addendum; however, Attachment B was modified to meet the requirements and limitations of this scope of work. Most of the site-specific information listed in Comment 1 is in Attachment A, Field Sampling Plan (FSP), of the draft Work Plan Addendum. The FSP will be modified in the following manor to update the existing information and to add additional site-specific information.

The precision and accuracy of the XRF described in Section 4.2, page A4-1, of the FSP will be modified to match the PARCC specifications published in the U.S. EPA Environmental Technology Verification Program, Verification Statement for the Niton XL Spectrum Analyzer.

- Precision: Relative Standard Deviation < 13 percent.
- Accuracy: 81.2 percent with an acceptable range of 80 to 120 percent.
- Representativeness: The sampling grid located directly over the area of known lead contamination, along with the step-out/step-in procedure will provide samples which adequately represent the site.
- Completeness: 99.8 percent of 1,260 samples tested.
- Comparability: Correlation coefficients of $\geq$ 0.86.

Section 4.1, page A4-1 of the FSP describes the method of soil analysis as U.S. EPA Draft Method 6200. This section will modified to add the method detection limit for lead as ranging from 45 to 80 milligrams per kilogram (mg/kg) (with a one minute reading), depending on the soil type.

Field measurements and instrument calibration are described in Section 3.3, pages A3-1 and A3-2, of the FSP.

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Comment 2: The Work Plan Addendum (Section 3.6 and Attachment A Sections 2.1.1 and 3.2.1) indicates that a maximum of three samples at a maximum depth of 3 feet will be collected at each location. A provision is made for step-out boring locations for determining the lateral extent of contamination. However, no provision is made for collecting additional samples at greater depth if the 3-foot sample exceeds the project specific threshold limit. Although it is unlikely that samples from depths greater than 3 feet will be needed, please include a provision for this situation. Note that it is usually possible to easily advance a hand auger beyond a depth of 3 feet.	**Response 2:** The study boundaries described in Section 3.4 of the draft Work Plan Addendum will be modified to reflect a change in the vertical extent of the investigation. This will include an additional sample collected 18 inches below the deepest detection of lead that exceeds the project-specific threshold level of 100 mg/kg.
Comment 3: There is a discrepancy in the number of QA samples. Section 4.7.2 and Attachment A Section 2.1 indicate that one duplicate sample will be collected for every 20 samples. Attachment B Sections 6.1.1 and 6.3 indicate that one duplicate sample will be collected for every 10 samples. Please resolve this discrepancy. The collection of one duplicate sample per 10 samples is preferable.	**Response 3:** The frequency of duplicate sample collection described in Section 4.7.2 and Attachment A, Section 2.1.1, page A2-1, of the draft Work Plan Addendum will be changed to properly describe the actual frequency of field duplicate sample collection, which is 1 in 10.
Comment 4: A detailed description of the method for collecting the duplicate sample is not presented in the Work Plan Addendum. Please indicate in Attachment A Section 4.1 and Attachment B Section 6.1.1 that for duplicate/primary sample pairs approximately 6 grams of soil will be processed and that the sample will be split after the homogenization and sieving step.	**Response 4:** A discussion of the method for duplicate sample collection and preparation will be added to both Attachment A, Section 4.1, page A4-1, and Attachment B, Section 6.1.1, page B6-1, of the draft Work Plan Addendum. The additions to these sections will define the procedure for collection of field duplicate samples for XRF analysis in which approximately 20 grams of soil will be screened and thoroughly homogenized before the sample is split into two XRF sample cups for analysis.
Comment 5: Section 4.4, page 4-3, first sentence: There seems to be a typographical error in the first sentence. It would be more accurate to state that VOC screening will be conducted while sampling, not during each weekday. Please revise the sentence.	**Response 5:** The first sentence of Section 4.4 of the draft Work Plan Addendum will be revised to read: "For safety and health reasons, volatile organic vapor screening will be performed during soil sampling, both in the breathing zone of the workers and at the borehole."
Comment 6: Section 4.8, page 4-5: GPS systems vary widely in accuracy. Please include the maximum expected error for the GPS system that will be used for this investigation.	**Response 6:** The global positioning system used to survey sample locations, described in Section 4.8 of the draft Work Plan Addendum, will be modified to include a reference to the surveying accuracy of the instrument, which is ±1.0 meter.

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RESPONSE TO NAVY COMMENTS ON PRELIMINARY DRAFT WORK PLAN ADDENDUM FOR EXTENDED SITE ASSESSMENT AT POI 29, NAVAL TRAINING CENTER, SAN DIEGO CTO-0122

Comments from Aaron Yue

Written on 07 November 1997
Received by facsimile on 12 November 1997

Aaron Yue
Remedial Project Manager
Cal-EPA Department of Toxic Substances Control

GENERAL COMMENTS

Comment 1: page 3-1, Section 3.4, Study Boundaries: According to this work plan, the maximum vertical investigation is 3 feet below ground surface. This may not be deep enough. A contingency for greater depth should be proposed in the event that contamination is found at the 3 feet depth sample.	**Response 1:** The study boundaries described in Section 3.4 of the draft Work Plan Addendum will be modified to reflect a change in the vertical extent of the investigation. This will include an additional sample collected 18 inches below the deepest detection of lead that exceeds the project-specific threshold level of 100 mg/kg.
Comment 2: page 3-3, Section 3.6, Sampling Design: Although a plan to conduct "step-out" sampling has been proposed, the sampling design does not discuss the possible requirement to "step-in." It is possible that the boundary of the contamination is between two sampling locations, especially when the grids are 50 feet wide. It is recommended that this section provide a strategy for "stepping-in" to determine the boundary of contamination.	**Response 2:** The sampling design described in Section 3.6 of the draft Work Plan Addendum will be modified to include the "step-in" procedure that will be used to further delineate the extent of potential lead contamination. When the "step-out" procedure (described in Section 3.6) is conducted and the full extent of the "step-out" criteria are met, the field crew will "step-in" to a location 25 feet from the original point of project threshold level exceedance and collect an additional soil sample. This procedure will delineate the potential lead contamination to within 25 feet.
Comment 3: page 3-4, Sampling Location Map: Will a sample be taken at the grid junction between SB-35 and the P29-T2? It is also unclear from studying the map whether or not any of the locations within the former bullet trap sand pit will be sampled. It is recommended that a sample be taken between SB-35 and P29-T2 to establish the lateral boundary of contamination.	**Response 3:** Samples from the area between SB-35 and P29-T2, and in the former bullet trap sand pit, will not be collected during this investigation to delineate the extent of potential lead contamination. These areas were sampled during previous investigations; thus, the extent of lead contamination has been fairly well delineated. Further delineation of these areas will be made by the remedial contractors during the removal action process.

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Comment 7: Please clarify whether lithologic information about each boring will be recorded. Lithologic changes in each boring should be recorded so that the extent of the younger, dark-brown silty sand, the older light-brown well-graded to silty sand and the estuarine deposits can be mapped. It is likely that important information would be missed if only the samples collected for analysis are logged.	**Response 7:** Section 4.3.1, page 4-2, and Section 3.2.1, page A3-14, of the draft Work Plan Addendum will be modified to include the following sentence regarding borehole logging: "As each borehole is being advanced, a trained geologist will log the boring under the direction of a California registered geologist."

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Comment 4: page 4-2, Section 4.3.2, X-Ray Fluorescence Analyzer: Since the use of the X-Ray Fluorescence Analyzer (XRF) has been found to be unsuitable for samples having a greater than 20% moisture, the moisture content of the sampled soil should be measured and recorded with every sample. Moreover, the sampling activities should be discontinued if the moisture in the soil is found to exceed 20%.	**Response 4:** Twenty percent moisture in a sandy soil or a soil with light organic content, such as that which exists in the area of POI 29, is at or near saturation. The only way that a sample composed of course sand or soil with light organic content can hold moisture at or near its saturation point is if it is contained in a leak-proof container. Therefore, even if soil samples that are being collected for XRF analysis come from the saturated zone, the soil moisture content will be well below the 20 percent limit by the time they are screened and prepared for XRF analysis. The soil sampling team will use precautions (e.g., not sampling in the rain or soon after a significant rain event, not sampling if soil appears to be extremely moist from irrigation, and using professional judgment) to assure that any samples collected from below the groundwater saturation zone (based on contingency samples deeper than 3 to 5 feet) are adequately drained as a result of the sample preparation process.
The XRF is also subject to interferences from other elements in the natural soil. DTSC proposes that the Navy conducts confirmatory laboratory analyses for 10% of the field samples to evaluate the accuracy of the XRF analysis as part of the QA/QC procedure.	Method 6200 is an officially promulgated method for the determination of lead using X-ray fluorescence. In terms of the precision and accuracy criteria and general method performance, it is comparable to Method 7421 (determination of lead by GFAA). According to tests by the U.S. EPA Environmental Technology Verification Program, the XRF analyzer of lead in soil has a precision of < 13 percent relative standard deviation and an accuracy of 81.2 percent (Attachment A). Under XRF tests conducted by the U.S. EPA, two specific interferences were noted. These interferences consist of arsenic and lead interference in cases where lead-to-arsenic ratios greater than 10 to 1 resulted in false-positive readings for arsenic (the only condition under which arsenic can interfere with lead readings is if arsenic concentrations are in the 20,000-mg/kg range). The second interference involved copper and zinc; the accuracy for zinc was reduced in the presence of high concentrations of copper. However, the DQOs for this project are only concerned with the lateral and vertical extent of lead; therefore, these additional elemental interferences are not of concern. It is recognized that X-ray fluorescence has some limitations; however, all methods do, including those methods employed by a fixed-base laboratory. NIST traceable standards will be used as part of the standard QC checks employed for this

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Comment 4 (continued)	**Response 4** (continued) method. The U.S. EPA has stated that the use of X-ray fluorescence may be used for "stand alone decision making" based on the DQOs of the individual project. The DQOs for this project are ideally suited to this type of sampling and analysis because the objective of this investigation is to delineate the extent of lead contamination that has been confirmed by previous sampling efforts.
Comment 5, page 4-2, Section 4.3.2, X-Ray Fluorescence Analyzer, third paragraph: Although the XRF will yield the best results with a uniform sample particle size, it is equally important not to skew the composition of the soil sample by removing pertinent debris (i.e., tiny lead fragments from spent bullets) that may be intermixed with the soil, especially when only three grams of soil sample will be used. The stones and debris of the soil samples that have been separated after screening should be crushed with the mortar and pestle and be reintroduced into the sample for analysis.	**Response 5:** The sample preparation procedure, described in Section 4.3.2 of the draft Work Plan Addendum, will be revised to more clearly describe the sampling procedures by including the following. Approximately 10 grams of soil will be collected and screened through a #10 (2-mm) sieve to remove stones and organic debris that could affect false-negative results in the analysis of soil for lead. Care will be taken to not remove anything that could potentially be a metal bullet fragment, and all removed material will be noted and described in the sampling log. The remaining sample (without the stones and organic debris) will be homogenized with a mortar a pestle and screened through a #60 (250-micron) fine mesh sieve to establish particle size distribution. The resulting homogenized sample will then be used to fill the XRF sample cup (approximately 3 grams).
Comment 6: page 5-2, Section 5.3.1, Precision and Accuracy: Since the precision and accuracy of XRF analyses are dependent on the sampling technique (see comment 5 above), and are subject to instrument limitations, i.e., interferences and moisture, DTSC recommends a 10% confirmatory laboratory analysis as a mean to verify the XRF data.	**Response 6:** See response to Comment 5 regarding the sample collection procedure. The sample preparation technique described in Response 5 (above) is as conservative as any preparation technique employed by a certified fixed-base analytical laboratory. See response to Comment 4 regarding the precision and accuracy of the XRF.
Comment 7: page 5-2, Section 5.3.3, Completeness: Section 5.2.2 specified that data validation is not proposed for the XRF analytical method; therefore, this section should be clarified accordingly.	**Response 7:** The data completeness discussed in Section 5.3.3 of the draft Work Plan Addendum does not apply to this scope of work; therefore, this section will be removed from the Work Plan, and the related Section 7.2.3.3 of the QAPP will also be removed.

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Comment 8: page A2-2, Section 2.2, Sampling Locations and Rationale: The proposed soil sampling protocol should not assume that lead contamination is limited to the "dark brown" silty sand layer simply because the highest concentrations of lead were found within this layer from previous investigations. Please note, however, that sample[s] P29-09, SB35 and SB36 are samples taken from the within the "older" fill layer. Therefore, the sampling protocol must consider the possibility of contamination within the older layer as well. It is recommended that the sampling protocol for the vertical extent should include at least one sample from the "older" fill layer regardless of depth.	**Response 8:** The rationale used to determine sample locations and depths does not assume that lead contamination only exists in the "dark brown" silty sand layer. The sampling approach consists of collecting one sample just below the surface, one sample at 1.25 feet below ground surface (bgs), and potentially more samples at 3 feet bgs and deeper, depending on the lead concentrations in the shallower samples. Data from previous investigations suggest that the highest lead concentrations are found in the dark-brown silty sand layer that generally extends to approximately 1.5 feet bgs. If the sample collected from 1.25 feet bgs is in the dark-brown silty sands, it is more likely to contain lead concentrations that exceed the project-specific threshold level of 100 mg/kg. The sampling depths that were chosen, therefore, are inherently conservative based on data from previous studies at the site.
Comment 9: page A5-1, Section 5.5.1, Field Logbook: The field sampler should also include the ambient air temperature, percent humidity, and soil moisture information in the field logbook due to the instrument's limitation.	**Response 9:** The field logbook requirements described in Section 5.1.1 of Appendix A of the draft Work Plan Addendum will be modified to include information on ambient air temperature and relative percent humidity for each day that XRF samples are collected. Collection of real-time soil moisture data is not practical for two main reasons. First, there are limitations on the availability of sufficiently accurate instrumentation needed for this analysis due to strong radioactive sources contained in the instruments; and second, the costs associated with procurement of subcontractors who are licensed and trained to transport and conduct this analysis are high. As described in response to Comment 4, it is not necessary to conduct field soil moisture testing for XRF analysis.